Course: 5020010 Science - Grade K

GENERAL INFORMATION

Course Number:	5020010
Course Title:	Science - Grade K
Abbreviated Title:	SCIENCE GRADE K
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades PreK to 5 Education Courses » Subject: Science » SubSubject: General Sciences »
Number of Credits:	NA
Course Length:	Year
Course Type:	Core
Course Level:	NA
Course Status:	SBE Approval Pending

RELATED STANDARDS/BENCHMARKS

HE.K.C.1.5	Recognize there are body parts inside and outside of the body.
LACC.K.RI.1	**Key Ideas and Details**
LACC.K.RI.1.1	With prompting and support, ask and answer questions about key details in a text.
LACC.K.RI.2	**Craft and Structure**
LACC.K.RI.2.4	With prompting and support, ask and answer questions about unknown words in a text.
LACC.K.RI.4	**Range of Reading and Complexity of Text**
LACC.K.RI.4.10	Actively engage in group reading activities with purpose and understanding.
LACC.K.W.3	**Research to Build and Present Knowledge**
LACC.K.W.3.8	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
LACC.K.SL.1	**Comprehension and Collaboration**
LACC.K.SL.1.1	Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups.

MACC.K.MD	**Measurement and Data**
MACC.K.MD.1	**Describe and compare measurable attributes.**
MACC.K.MD.1.2	Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.
MACC.K.MD.2	Classify objects and count the number of objects in each category.
MACC.K.MD.2.3	Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. Note: Limit category counts to be less than or equal to 10.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.K.E.5.1	Explore the Law of Gravity by investigating how objects are pulled toward the ground unless something holds them up.
SC.K.E.5.2	Recognize the repeating pattern of day and night.
SC.K.E.5.3	Recognize that the Sun can only be seen in the daytime.
SC.K.E.5.4	Observe that sometimes the Moon can be seen at night and sometimes during the day.
SC.K.E.5.5	Observe that things can be big and things can be small as seen from Earth.
SC.K.E.5.6	Observe that some objects are far away and some are nearby as seen from Earth.
SC.K.L.14.1	Recognize the five senses and related body parts.
SC.K.L.14.2	Recognize that some books and other media portray animals and plants with characteristics and behaviors they do not have in real life.
SC.K.L.14.3	Observe plants and animals, describe how they are alike and how they are different in the way they look and in the things they do.
SC.K.N.1.1	Collaborate with a partner to collect information.
SC.K.N.1.2	Make observations of the natural world and know that they are descriptors collected using the five senses.
SC.K.N.1.3	Keep records as appropriate -- such as pictorial records -- of investigations conducted.
SC.K.N.1.4	Observe and create a visual representation of an object which includes its major features.
SC.K.N.1.5	Recognize that learning can come from careful observation.

SC.K.P.8.1	Sort objects by observable properties, such as size, shape, color, temperature (hot or cold), weight (heavy or light) and texture.
SC.K.P.9.1	Recognize that the shape of materials such as paper and clay can be changed by cutting, tearing, crumpling, smashing, or rolling.
SC.K.P.10.1	Observe that things that make sound vibrate.
SC.K.P.12.1	Investigate that things move in different ways, such as fast, slow, etc.
SC.K.P.13.1	Observe that a push or a pull can change the way an object is moving.

Course: 5020060 Science - Grade Five

GENERAL INFORMATION

Course Number:	5020060
Course Title:	Science - Grade Five
Abbreviated Title:	SCIENCE GRADE FIVE
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades PreK to 5 Education Courses » Subject: Science » SubSubject: General Sciences »
Number of Credits:	NA
Course Length:	Year
Course Type:	Core
Course Level:	NA
Course Status:	SBE Approval Pending
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.5.C.1.6	Explain how human body parts and organs work together in healthy body systems, including the endocrine and reproductive systems.
LACC.5.RI.1	**Key Ideas and Details**
LACC.5.RI.1.3	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
LACC.5.RI.2	**Craft and Structure**
LACC.5.RI.2.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.

LACC.5.RI.4	**Range of Reading and Complexity of Text**
LACC.5.RI.4.10	By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently.
LACC.5.W.3	**Research to Build and Present Knowledge**
LACC.5.W.3.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
LACC.5.W.3.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
LACC.5.SL.1	**Comprehension and Collaboration**
LACC.5.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
MACC.5.MD	**Measurement and Data**
MACC.5.MD.2	**Represent and interpret data.**
MACC.5.MD.2.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*
MACC.5.G	**Geometry**
MACC.5.G.1	**Graph points on the coordinate plane to solve real-world and mathematical problems.**
MACC.5.G.1.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.5.E.5.1	Recognize that a galaxy consists of gas, dust, and many stars, including any objects orbiting the stars. Identify our home galaxy as the Milky Way.
SC.5.E.5.2	Recognize the major common characteristics of all planets and compare/contrast the properties of inner and outer planets.
SC.5.E.5.3	Distinguish among the following objects of the Solar System -- Sun, planets, moons, asteroids, comets -- and identify Earth's position in it.

SC.5.E.7.1	Create a model to explain the parts of the water cycle. Water can be a gas, a liquid, or a solid and can go back and forth from one state to another.
SC.5.E.7.2	Recognize that the ocean is an integral part of the water cycle and is connected to all of Earth's water reservoirs via evaporation and precipitation processes.
SC.5.E.7.3	Recognize how air temperature, barometric pressure, humidity, wind speed and direction, and precipitation determine the weather in a particular place and time.
SC.5.E.7.4	Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.
SC.5.E.7.5	Recognize that some of the weather-related differences, such as temperature and humidity, are found among different environments, such as swamps, deserts, and mountains.
SC.5.E.7.6	Describe characteristics (temperature and precipitation) of different climate zones as they relate to latitude, elevation, and proximity to bodies of water.
SC.5.E.7.7	Design a family preparedness plan for natural disasters and identify the reasons for having such a plan.
SC.5.L.14.1	Identify the organs in the human body and describe their functions, including the skin, brain, heart, lungs, stomach, liver, intestines, pancreas, muscles and skeleton, reproductive organs, kidneys, bladder, and sensory organs.
SC.5.L.14.2	Compare and contrast the function of organs and other physical structures of plants and animals, including humans, for example: some animals have skeletons for support -- some with internal skeletons others with exoskeletons -- while some plants have stems for support.
SC.5.L.15.1	Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.
SC.5.L.17.1	Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics.
SC.5.N.1.1	Define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations, experiments requiring the identification of variables, collecting and organizing data, interpreting data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

SC.5.N.1.2	Explain the difference between an experiment and other types of scientific investigation.
SC.5.N.1.3	Recognize and explain the need for repeated experimental trials.
SC.5.N.1.4	Identify a control group and explain its importance in an experiment.
SC.5.N.1.5	Recognize and explain that authentic scientific investigation frequently does not parallel the steps of "the scientific method."
SC.5.N.1.6	Recognize and explain the difference between personal opinion/interpretation and verified observation.
SC.5.N.2.1	Recognize and explain that science is grounded in empirical observations that are testable; explanation must always be linked with evidence.
SC.5.N.2.2	Recognize and explain that when scientific investigations are carried out, the evidence produced by those investigations should be replicable by others.
SC.5.P.8.1	Compare and contrast the basic properties of solids, liquids, and gases, such as mass, volume, color, texture, and temperature.
SC.5.P.8.2	Investigate and identify materials that will dissolve in water and those that will not and identify the conditions that will speed up or slow down the dissolving process.
SC.5.P.8.3	Demonstrate and explain that mixtures of solids can be separated based on observable properties of their parts such as particle size, shape, color, and magnetic attraction.
SC.5.P.8.4	Explore the scientific theory of atoms (also called atomic theory) by recognizing that all matter is composed of parts that are too small to be seen without magnification.
SC.5.P.9.1	Investigate and describe that many physical and chemical changes are affected by temperature.
SC.5.P.10.1	Investigate and describe some basic forms of energy, including light, heat, sound, electrical, chemical, and mechanical.
SC.5.P.10.2	Investigate and explain that energy has the ability to cause motion or create change.
SC.5.P.10.3	Investigate and explain that an electrically-charged object can attract an uncharged object and can either attract or repel another charged object without any contact between the objects.
SC.5.P.10.4	Investigate and explain that electrical energy can be transformed into heat, light, and sound energy, as well as the energy of motion.

SC.5.P.11.1	Investigate and illustrate the fact that the flow of electricity requires a closed circuit (a complete loop).
SC.5.P.11.2	Identify and classify materials that conduct electricity and materials that do not.
SC.5.P.13.1	Identify familiar forces that cause objects to move, such as pushes or pulls, including gravity acting on falling objects.
SC.5.P.13.2	Investigate and describe that the greater the force applied to it, the greater the change in motion of a given object.
SC.5.P.13.3	Investigate and describe that the more mass an object has, the less effect a given force will have on the object's motion.
SC.5.P.13.4	Investigate and explain that when a force is applied to an object but it does not move, it is because another opposing force is being applied by something in the environment so that the forces are balanced.

Course: 5020050 Science - Grade Four

GENERAL INFORMATION

Course Number:	5020050
Course Title:	Science - Grade Four
Abbreviated Title:	SCIENCE GRADE FOUR
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades PreK to 5 Education Courses » Subject: Science » SubSubject: General Sciences »
Number of Credits:	NA
Course Length:	Year
Course Type:	Core
Course Level:	NA
Course Status:	SBE Approval Pending
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).
Special Notes:	Additional content addressed on the Grade 4 NAEP Science assessment includes: • Earth materials have properties that make them useful in solving human problems and enhancing the quality of life. (SC.6.E.6.2) • The Sun warms the land, air, and water and helps plants grow. (SC.3.E.6.1;SC.3.L.17.2) • Weather changes from day to day and during the seasons. (SC.2.E.7.1) • Scientists use tools for observing, recording, and predicting weather changes. (SC.5.E.7.3; SC.5.E.7.4) • Plants and animals have life cycles. (SC.2.L.16.1) • Environment changes impact organism survival and reproduction. (SC.5.L.15.1) • Organisms need food, water, air, and shelter. (SC.1.L.17.1) • Some objects are composed of a single substance; others are composed of more than one substance. (SC.5.P.8.3)

- Heat (thermal energy) results when substances burn, materials rub against each other, and electricity flows though wires. (SC.3.P.11.2)
- Metals are conductors of heat and electricity. (SC.3.P.11.2)
- Increasing the temperature of any substance requires the addition of energy.
- Electricity flowing through an electrical circuit produces magnetic effects in the wires. Energy is transferred to the surroundings as light, sound, and heat (thermal energy). (SC.5.P.11.1; SC.5.P.11.2)

The NAEP frameworks for Science may be accessed at http://www.nagb.org/publications/frameworks/science-09.pdf

RELATED STANDARDS/BENCHMARKS

HE.4.C.1.6	Identify the human body parts and organs that work together to form healthy body systems.
LACC.4.RI.1	**Key Ideas and Details**
LACC.4.RI.1.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
LACC.4.RI.2	**Craft and Structure**
LACC.4.RI.2.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 4 topic or subject area.
LACC.4.RI.4	**Range of Reading and Complexity of Text**
LACC.4.RI.4.10	By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as necessary at the high end of the range.
LACC.4.W.3	**Research to Build and Present Knowledge**
LACC.4.W.3.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
LACC.4.W.3.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
LACC.4.SL.1.1	**Comprehension and Collaboration**
LACC.4.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led)with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
MACC.4.MD	**Measurement and Data**
MACC.4.MD.1	**Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**
MACC.4.MD.1.1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single

system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example: Know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ….*

MACC.4.MD.2	**Represent and interpret data.**
MACC.4.MD.2.4	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.4.E.5.1	Observe that the patterns of stars in the sky stay the same although they appear to shift across the sky nightly, and different stars can be seen in different seasons.
SC.4.E.5.2	Describe the changes in the observable shape of the moon over the course of about a month.
SC.4.E.5.3	Recognize that Earth revolves around the Sun in a year and rotates on its axis in a 24-hour day.
SC.4.E.5.4	Relate that the rotation of Earth (day and night) and apparent movements of the Sun, Moon, and stars are connected.
SC.4.E.5.5	Investigate and report the effects of space research and exploration on the economy and culture of Florida.
SC.4.E.6.1	Identify the three categories of rocks: igneous, (formed from molten rock); sedimentary (pieces of other rocks and fossilized organisms); and metamorphic (formed from heat and pressure).
SC.4.E.6.2	Identify the physical properties of common earth-forming minerals, including hardness, color, luster, cleavage, and streak color, and recognize the role of minerals in the formation of rocks.
SC.4.E.6.3	Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable.
SC.4.E.6.4	Describe the basic differences between physical weathering (breaking down of rock by wind, water, ice, temperature change, and plants) and erosion (movement of rock by gravity, wind, water, and ice).
SC.4.E.6.5	Investigate how technology and tools help to extend the ability of humans to observe very small things and very large things
. SC.4.E.6.6	Identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).

SC.4.L.16.1	Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination.
SC.4.L.16.2	Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment.
SC.4.L.16.3	Recognize that animal behaviors may be shaped by heredity and learning.
SC.4.L.16.4	Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete and complete metamorphosis, and flowering and nonflowering seed-bearing plants.
SC.4.L.17.1	Compare the seasonal changes in Florida plants and animals to those in other regions of the country.
SC.4.L.17.2	Explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them.
SC.4.L.17.3	Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.
SC.4.L.17.4	Recognize ways plants and animals, including humans, can impact the environment.
SC.4.N.1.1	Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.
SC.4.N.1.2	Compare the observations made by different groups using multiple tools and seek reasons to explain the differences across groups.
SC.4.N.1.3	Explain that science does not always follow a rigidly defined method ("the scientific method") but that science does involve the use of observations and empirical evidence.
SC.4.N.1.4	Attempt reasonable answers to scientific questions and cite evidence in support.
SC.4.N.1.5	Compare the methods and results of investigations done by other classmates.
SC.4.N.1.6	Keep records that describe observations made, carefully distinguishing actual observations from ideas and inferences about the observations.

SC.4.N.1.7	Recognize and explain that scientists base their explanations on evidence.
SC.4.N.1.8	Recognize that science involves creativity in designing experiments.
SC.4.N.2.1	Explain that science focuses solely on the natural world.
SC.4.N.3.1	Explain that models can be three dimensional, two dimensional, an explanation in your mind, or a computer model.
SC.4.P.8.1	Measure and compare objects and materials based on their physical properties including: mass, shape, volume, color, hardness, texture, odor, taste, attraction to magnets.
SC.4.P.8.2	Identify properties and common uses of water in each of its states.
SC.4.P.8.3	Explore the Law of Conservation of Mass by demonstrating that the mass of a whole object is always the same as the sum of the masses of its parts.
SC.4.P.8.4	Investigate and describe that magnets can attract magnetic materials and attract and repel other magnets.
SC.4.P.9.1	Identify some familiar changes in materials that result in other materials with different characteristics, such as decaying animal or plant matter, burning, rusting, and cooking.
SC.4.P.10.1	Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.
SC.4.P.10.2	Investigate and describe that energy has the ability to cause motion or create change.
SC.4.P.10.3	Investigate and explain that sound is produced by vibrating objects and that pitch depends on how fast or slow the object vibrates.
SC.4.P.10.4	Describe how moving water and air are sources of energy and can be used to move things.
SC.4.P.11.1	Recognize that heat flows from a hot object to a cold object and that heat flow may cause materials to change temperature.
SC.4.P.11.2	Identify common materials that conduct heat well or poorly.
SC.4.P.12.1	Recognize that an object in motion always changes its position and may change its direction.
SC.4.P.12.2	Investigate and describe that the speed of an object is determined by the distance it travels in a unit of time and that objects can move at different speeds.

Course: 5020040 Science - Grade Three

GENERAL INFORMATION

Course Number:	5020040
Course Title:	Science - Grade Three
Abbreviated Title:	SCIENCE GRADE THREE
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades PreK to 5 Education Courses » Subject: Science » SubSubject: General Sciences »
Number of Credits:	NA
Course Length:	Year
Course Type:	Core
Course Level:	NA
Course Status:	SBE Approval Pending
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.3.C.1.4	Describe common childhood health conditions.
HE.3.C.1.5	Recognize that body parts and organs work together to form human body systems.
LACC.3.RI.1	**Key Ideas and Details**
LACC.3.RI.1.3	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
LACC.3.RI.2	**Craft and Structure**
LACC.3.RI.2.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area

LACC.3.RI.4	**Range of Reading and Complexity of Text**
LACC.3.RI.4.10	By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 2–3 text complexity band independently and proficiently.
LACC.3.W.3	**Research to Build and Present Knowledge**
LACC.3.W.3.8	Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.
LACC.3.SL.1	**Comprehension and Collaboration**
LACC.3.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly
MACC.3.MD	**Measurement and Data**
MACC.3.MD.1	**Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.**
MACC.3.MD.1.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Excludes compound units such as cm^3 and finding the geometric volume of a container.) Note: Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Excludes multiplicative comparison problems (problems involving notions of "times as much.")
MACC.3.MD.2	**Represent and interpret data.**
MACC.3.MD.2.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.3.E.5.1	Explain that stars can be different; some are smaller, some are larger, and some appear brighter than others; all except the Sun are so far away that they look like points of light.
SC.3.E.5.2	Identify the Sun as a star that emits energy; some of it in the form of light.
SC.3.E.5.3	Recognize that the Sun appears large and bright because it is the closest star to Earth.
SC.3.E.5.4	Explore the Law of Gravity by demonstrating that gravity is a force that can be overcome.
SC.3.E.5.5	Investigate that the number of stars that can be seen through telescopes is dramatically greater than those seen by the unaided eye.

SC.3.E.6.1	Demonstrate that radiant energy from the Sun can heat objects and when the Sun is not present, heat may be lost.
SC.3.L.14.1	Describe structures in plants and their roles in food production, support, water and nutrient transport, and reproduction.
SC.3.L.14.2	Investigate and describe how plants respond to stimuli (heat, light, gravity), such as the way plant stems grow toward light and their roots grow downward in response to gravity.
SC.3.L.15.1	Classify animals into major groups (mammals, birds, reptiles, amphibians, fish, arthropods, vertebrates and invertebrates, those having live births and those which lay eggs) according to their physical characteristics and behaviors.
SC.3.L.15.2	Classify flowering and nonflowering plants into major groups such as those that produce seeds, or those like ferns and mosses that produce spores, according to their physical characteristics.
SC.3.L.17.1	Describe how animals and plants respond to changing seasons.
SC.3.L.17.2	Recognize that plants use energy from the Sun, air, and water to make their own food.
SC.3.N.1.1	Raise questions about the natural world, investigate them individually and in teams through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.
SC.3.N.1.2	Compare the observations made by different groups using the same tools and seek reasons to explain the differences across groups.
SC.3.N.1.3	Keep records as appropriate, such as pictorial, written, or simple charts and graphs, of investigations conducted.
SC.3.N.1.4	Recognize the importance of communication among scientists.
SC.3.N.1.5	Recognize that scientists question, discuss, and check each others' evidence and explanations.
SC.3.N.1.6	Infer based on observation.
SC.3.N.1.7	Explain that empirical evidence is information, such as observations or measurements, that is used to help validate explanations of natural phenomena.
SC.3.N.3.1	Recognize that words in science can have different or more specific meanings than their use in everyday language; for example, energy, cell, heat/cold, and evidence.
SC.3.N.3.2	Recognize that scientists use models to help understand and explain how things work.

SC.3.N.3.3	Recognize that all models are approximations of natural phenomena; as such, they do not perfectly account for all observations.
SC.3.P.8.1	Measure and compare temperatures of various samples of solids and liquids.
SC.3.P.8.2	Measure and compare the mass and volume of solids and liquids.
SC.3.P.8.3	Compare materials and objects according to properties such as size, shape, color, texture, and hardness.
SC.3.P.9.1	Describe the changes water undergoes when it changes state through heating and cooling by using familiar scientific terms such as melting, freezing, boiling, evaporation, and condensation.
SC.3.P.10.1	Identify some basic forms of energy such as light, heat, sound, electrical, and mechanical.
SC.3.P.10.2	Recognize that energy has the ability to cause motion or create change.
SC.3.P.10.3	Demonstrate that light travels in a straight line until it strikes an object or travels from one medium to another.
SC.3.P.10.4	Demonstrate that light can be reflected, refracted, and absorbed.
SC.3.P.11.1	Investigate, observe, and explain that things that give off light often also give off heat.
SC.3.P.11.2	Investigate, observe, and explain that heat is produced when one object rubs against another, such as rubbing one's hands together.

Course: 5020030 Science - Grade Two

GENERAL INFORMATION

Course Number:	5020030
Course Title:	Science - Grade Two
Abbreviated Title:	SCIENCE GRADE TWO
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades PreK to 5 Education Courses » Subject: Science » SubSubject: General Sciences »
Number of Credits:	NA
Course Length:	Year
Course Type:	Core
Course Level:	NA
Course Status:	SBE Approval Pending

RELATED STANDARDS/BENCHMARKS

HE.2.B.3.2	Name healthy options to health-related issues and problems.
HE.2.C.1.6	Recognize the locations and functions of major human organs.
LACC.2.RI.1	**Key Ideas and Details**
LACC.2.RI.1.3	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
LACC.2.RI.2	**Craft and Structure**
LACC.2.RI.2.4	Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
LACC.2.RI.4	**Range of Reading and Complexity of Text**
LACC.2.RI.4.10	By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range.
LACC.2.W.3	**Research to Build and Present Knowledge**
LACC.2.W.3.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).
LACC.2.W.3.8	Recall information from experiences or gather information from provided sources to answer a question.

LACC.2.SL.1	**Comprehension and Collaboration**
LACC.2.SL.1.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
MACC.2.MD	**Measurement and Data**
MACC.2.MD.4	**Represent and interpret data**
MACC.2.MD.4.9	Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
MACC.2.MD.4.10	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.2.E.6.1	Recognize that Earth is made up of rocks. Rocks come in many sizes and shapes.
SC.2.E.6.2	Describe how small pieces of rock and dead plant and animal parts can be the basis of soil and explain the process by which soil is formed.
SC.2.E.6.3	Classify soil types based on color, texture (size of particles), the ability to retain water, and the ability to support the growth of plants.
SC.2.E.7.1	Compare and describe changing patterns in nature that repeat themselves, such as weather conditions including temperature and precipitation, day to day and season to season.
SC.2.E.7.2	Investigate by observing and measuring, that the Sun's energy directly and indirectly warms the water, land, and air.
SC.2.E.7.3	Investigate, observe and describe how water left in an open container disappears (evaporates), but water in a closed container does not disappear (evaporate).
SC.2.E.7.4	Investigate that air is all around us and that moving air is wind.
SC.2.E.7.5	State the importance of preparing for severe weather, lightning, and other weather related events.
SC.2.L.14.1	Distinguish human body parts (brain, heart, lungs, stomach, muscles, and skeleton) and their basic functions.
SC.2.L.16.1	Observe and describe major stages in the life cycles of plants and animals, including beans and butterflies.
SC.2.L.17.1	Compare and contrast the basic needs that all living things, including humans, have for survival

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SC.2.L.17.2	Recognize and explain that living things are found all over Earth, but each is only able to live in habitats that meet its basic needs.
SC.2.N.1.1	Raise questions about the natural world, investigate them in teams through free exploration and systematic observations, and generate appropriate explanations based on those explorations.
SC.2.N.1.2	Compare the observations made by different groups using the same tools.
SC.2.N.1.3	Ask "how do you know?" in appropriate situations and attempt reasonable answers when asked the same question by others.
SC.2.N.1.4	Explain how particular scientific investigations should yield similar conclusions when repeated.
SC.2.N.1.5	Distinguish between empirical observation (what you see, hear, feel, smell, or taste) and ideas or inferences (what you think).
SC.2.N.1.6	Explain how scientists alone or in groups are always investigating new ways to solve problems.
SC.2.P.8.1	Observe and measure objects in terms of their properties, including size, shape, color, temperature, weight, texture, sinking or floating in water, and attraction and repulsion of magnets.
SC.2.P.8.2	Identify objects and materials as solid, liquid, or gas.
SC.2.P.8.3	Recognize that solids have a definite shape and that liquids and gases take the shape of their container.
SC.2.P.8.4	Observe and describe water in its solid, liquid, and gaseous states.
SC.2.P.8.5	Measure and compare temperatures taken every day at the same time.
SC.2.P.8.6	Measure and compare the volume of liquids using containers of various shapes and sizes.
SC.2.P.9.1	Investigate that materials can be altered to change some of their properties, but not all materials respond the same way to any one alteration.
SC.2.P.10.1	Discuss that people use electricity or other forms of energy to cook their food, cool or warm their homes, and power their cars.
SC.2.P.13.1	Investigate the effect of applying various pushes and pulls on different objects.
SC.2.P.13.2	Demonstrate that magnets can be used to make some things move without touching them.

SC.2.P.13.3	Recognize that objects are pulled toward the ground unless something holds them up.
SC.2.P.13.4	Demonstrate that the greater the force (push or pull) applied to an object, the greater the change in motion of the object.

Course: 5020020 Science - Grade One

GENERAL INFORMATION

Course Number:	5020020
Course Title:	Science - Grade One
Abbreviated Title:	SCIENCE GRADE ONE
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades PreK to 5 Education Courses » Subject: Science » SubSubject: General Sciences »
Number of Credits:	NA
Course Length:	Year
Course Type:	Core
Course Level:	NA
Course Status:	SBE Approval Pending

RELATED STANDARDS/BENCHMARKS

HE.1.C.1.6	Emphasize the correct names of human body parts.
LACC.1.RI.1	**Key Ideas and Details**
LACC.1.RI.1.1	Ask and answer questions about key details in a text.
LACC.1.RI.2	**Craft and Structure**
LACC.1.RI.2.4	Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
LACC.1.RI.4	**Range of Reading and Complexity of Text**
LACC.1.RI.4.10	With prompting and support, read informational texts appropriately complex for grade 1.
LACC.1.W.3	**Research to Build and Present Knowledge**
LACC.1.W.3.8	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
LACC.1.SL.1	**Comprehension and Collaboration**
LACC.1.SL.1.1	Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
MACC.1.MD	**Measurement and Data**
MACC.1.MD.1	**Measure lengths indirectly and by iterating length units**.

MACC.1.MD.1.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*
MACC.1.MD.3	**Represent and interpret data.**
MACC.1.MD.3.4	Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.1.E.5.1	Observe and discuss that there are more stars in the sky than anyone can easily count and that they are not scattered evenly in the sky.
SC.1.E.5.2	Explore the Law of Gravity by demonstrating that Earth's gravity pulls any object on or near Earth toward it even though nothing is touching the object.
SC.1.E.5.3	Investigate how magnifiers make things appear bigger and help people see things they could not see without them.
SC.1.E.5.4	Identify the beneficial and harmful properties of the Sun.
SC.1.E.6.1	Recognize that water, rocks, soil, and living organisms are found on Earth's surface.
SC.1.E.6.2	Describe the need for water and how to be safe around water.
SC.1.E.6.3	Recognize that some things in the world around us happen fast and some happen slowly.
SC.1.L.14.1	Make observations of living things and their environment using the five senses.
SC.1.L.14.2	Identify the major parts of plants, including stem, roots, leaves, and flowers.
SC.1.L.14.3	Differentiate between living and nonliving things.
SC.1.L.16.1	Make observations that plants and animals closely resemble their parents, but variations exist among individuals within a population.
SC.1.L.17.1	Through observation, recognize that all plants and animals, including humans, need the basic necessities of air, water, food, and space.

SC.1.N.1.1	Raise questions about the natural world, investigate them in teams through free exploration, and generate appropriate explanations based on those explorations.
SC.1.N.1.2	Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.
SC.1.N.1.3	Keep records as appropriate - such as pictorial and written records - of investigations conducted.
SC.1.N.1.4	Ask "how do you know?" in appropriate situations.
SC.1.P.8.1	Sort objects by observable properties, such as size, shape, color, temperature (hot or cold), weight (heavy or light), texture, and whether objects sink or float.
SC.1.P.12.1	Demonstrate and describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.
SC.1.P.13.1	Demonstrate that the way to change the motion of an object is by applying a push or a pull.

Course: 2003020 M/J Physical Science, Advanced

GENERAL INFORMATION

Course Number:	2003020
Course Title:	M/J Physical Science, Advanced
Abbreviated Title:	M/J PHY SCI ADV
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Length:	Year
Course Level:	3
Course Status:	SBE Approval Pending

General Notes: Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).

Special Notes: Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.7.C.1.4	Describe how heredity can affect personal health.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.1	**Develop understanding of statistical variability.**
MACC.6.SP.1.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
MACC.6.SP.2	**Summarize and describe distributions.**
MACC.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
MACC.6.SP.2.5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.
MACC.8.F	**Functions**
MACC.8.F.2	**Use functions to model relationships between quantities.**

MACC.8.F.2.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.6.N.1.1	Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.6.N.1.2	Explain why scientific investigations should be replicable.
SC.6.N.1.3	Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.
SC.6.N.1.4	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
SC.6.N.2.1	Distinguish science from other activities involving thought.
SC.6.N.2.2	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
SC.6.N.3.1	Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
SC.6.N.3.2	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
SC.6.N.3.3	Give several examples of scientific laws.
SC.6.N.3.4	Identify the role of models in the context of the sixth grade science benchmarks.

SC.6.P.11.1	Explore the Law of Conservation of Energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.
SC.6.P.12.1	Measure and graph distance versus time for an object moving at a constant speed. Interpret this relationship.
SC.6.P.13.1	Investigate and describe types of forces including contact forces and forces acting at a distance, such as electrical, magnetic, and gravitational.
SC.6.P.13.2	Explore the Law of Gravity by recognizing that every object exerts gravitational force on every other object and that the force depends on how much mass the objects have and how far apart they are.
SC.6.P.13.3	Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both.
SC.7.N.1.1	Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).
SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
SC.7.N.1.4	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.
SC.7.N.1.5	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
SC.7.N.1.7	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.
SC.7.N.2.1	Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
SC.7.N.3.1	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.

SC.7.P.10.1	Illustrate that the sun's energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.
SC.7.P.10.2	Observe and explain that light can be reflected, refracted, and/or absorbed.
SC.7.P.10.3	Recognize that light waves, sound waves, and other waves move at different speeds in different materials.
SC.7.P.11.1	Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.
SC.7.P.11.2	Investigate and describe the transformation of energy from one form to another.
SC.7.P.11.3	Cite evidence to explain that energy cannot be created nor destroyed, only changed from one form to another.
SC.7.P.11.4	Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature.
SC.8.N.1.1	Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.8.N.1.2	Design and conduct a study using repeated trials and replication.
SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in different fields of science.
SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.
SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.
SC.8.N.2.2	Discuss what characterizes science and its methods.

SC.8.N.3.1	Select models useful in relating the results of their own investigations.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.
SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.
SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.
SC.8.P.8.1	Explore the scientific theory of atoms (also known as atomic theory) by using models to explain the motion of particles in solids, liquids, and gases.
SC.8.P.8.2	Differentiate between weight and mass recognizing that weight is the amount of gravitational pull on an object and is distinct from, though proportional to, mass.
SC.8.P.8.3	Explore and describe the densities of various materials through measurement of their masses and volumes.
SC.8.P.8.4	Classify and compare substances on the basis of characteristic physical properties that can be demonstrated or measured; for example, density, thermal or electrical conductivity, solubility, magnetic properties, melting and boiling points, and know that these properties are independent of the amount of the sample.
SC.8.P.8.5	Recognize that there are a finite number of elements and that their atoms combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.
SC.8.P.8.6	Recognize that elements are grouped in the periodic table according to similarities of their properties.
SC.8.P.8.7	Explore the scientific theory of atoms (also known as atomic theory) by recognizing that atoms are the smallest unit of an element and are composed of sub-atomic particles (electrons surrounding a nucleus containing protons and neutrons).
SC.8.P.8.8	Identify basic examples of and compare and classify the properties of compounds, including acids, bases, and salts.
SC.8.P.8.9	Distinguish among mixtures (including solutions) and pure substances.
SC.8.P.9.1	Explore the Law of Conservation of Mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes.
SC.8.P.9.2	Differentiate between physical changes and chemical changes.
SC.8.P.9.3	Investigate and describe how temperature influences chemical changes.

SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.

Course: 2003010 M/J Physical Science

GENERAL INFORMATION

Course Number:	2003010
Course Title:	M/J Physical Science
Abbreviated Title:	M/J PHY SCI
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Length:	Year
Course Level:	2
Course Status:	SBE Approval Pending

General Notes: Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).

Special Notes: Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.7.C.1.4	Describe how heredity can affect personal health.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.1	**Develop understanding of statistical variability.**
MACC.6.SP.1.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
MACC.6.SP.2	**Summarize and describe distributions.**
MACC.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
MACC.6.SP.2.5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.
MACC.8.F	**Functions**
MACC.8.F.2	**Use functions to model relationships between quantities.**

MACC.8.F.2.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.6.N.1.1	Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.6.N.1.2	Explain why scientific investigations should be replicable.
SC.6.N.1.3	Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.
SC.6.N.1.4	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
SC.6.N.2.1	Distinguish science from other activities involving thought.
SC.6.N.2.2	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
SC.6.N.3.1	Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
SC.6.N.3.2	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
SC.6.N.3.3	Give several examples of scientific laws.
SC.6.N.3.4	Identify the role of models in the context of the sixth grade science benchmarks.

SC.6.P.11.1	Explore the Law of Conservation of Energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.
SC.6.P.12.1	Measure and graph distance versus time for an object moving at a constant speed. Interpret this relationship.
SC.6.P.13.1	Investigate and describe types of forces including contact forces and forces acting at a distance, such as electrical, magnetic, and gravitational.
SC.6.P.13.2	Explore the Law of Gravity by recognizing that every object exerts gravitational force on every other object and that the force depends on how much mass the objects have and how far apart they are.
SC.6.P.13.3	Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both.
SC.7.N.1.1	Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).
SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
SC.7.N.1.4	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.
SC.7.N.1.5	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
SC.7.N.1.7	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.
SC.7.N.2.1	Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
SC.7.N.3.1	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.

SC.7.P.10.1	Illustrate that the sun's energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.
SC.7.P.10.2	Observe and explain that light can be reflected, refracted, and/or absorbed.
SC.7.P.10.3	Recognize that light waves, sound waves, and other waves move at different speeds in different materials.
SC.7.P.11.1	Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.
SC.7.P.11.2	Investigate and describe the transformation of energy from one form to another.
SC.7.P.11.3	Cite evidence to explain that energy cannot be created nor destroyed, only changed from one form to another.
SC.7.P.11.4	Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature.
SC.8.N.1.1	Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.8.N.1.2	Design and conduct a study using repeated trials and replication.
SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in different fields of science.
SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.
SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.
SC.8.N.2.2	Discuss what characterizes science and its methods.

SC.8.N.3.1	Select models useful in relating the results of their own investigations.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.
SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.
SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.
SC.8.P.8.1	Explore the scientific theory of atoms (also known as atomic theory) by using models to explain the motion of particles in solids, liquids, and gases.
SC.8.P.8.2	Differentiate between weight and mass recognizing that weight is the amount of gravitational pull on an object and is distinct from, though proportional to, mass.
SC.8.P.8.3	Explore and describe the densities of various materials through measurement of their masses and volumes.
SC.8.P.8.4	Classify and compare substances on the basis of characteristic physical properties that can be demonstrated or measured; for example, density, thermal or electrical conductivity, solubility, magnetic properties, melting and boiling points, and know that these properties are independent of the amount of the sample.
SC.8.P.8.5	Recognize that there are a finite number of elements and that their atoms combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.
SC.8.P.8.6	Recognize that elements are grouped in the periodic table according to similarities of their properties.
SC.8.P.8.7	Explore the scientific theory of atoms (also known as atomic theory) by recognizing that atoms are the smallest unit of an element and are composed of sub-atomic particles (electrons surrounding a nucleus containing protons and neutrons).
SC.8.P.8.8	Identify basic examples of and compare and classify the properties of compounds, including acids, bases, and salts.
SC.8.P.8.9	Distinguish among mixtures (including solutions) and pure substances.
SC.8.P.9.1	Explore the Law of Conservation of Mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes.
SC.8.P.9.2	Differentiate between physical changes and chemical changes.
SC.8.P.9.3	Investigate and describe how temperature influences chemical changes.

Course: 2002110 M/J Comprehensive Science 3, Advanced

GENERAL INFORMATION

Course Number:	2002110
Course Title:	M/J Comprehensive Science 3, Advanced
Abbreviated Title:	M/J COMPRE SCI 3 ADV
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: General Sciences »
Course Length:	Year
Course Level:	3
Course Status:	SBE Approval Pending

General Notes: Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).

Special Notes: Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

Additional content that may be included in the Grade 8 NAEP Science assessment includes:

- Rocks and rock formations bear evidence of the minerals, materials, temperature/pressure conditions, and forces that created them. (SC.4.E.6.1 and SC.4.E.6.2)
- Earth as a whole has a magnetic field that is detectable at the surface with a compass, with north and south poles and lines of force. (SC.912.P.10.16)
- The Sun is the major source of energy for phenomena on Earth's surface. (SC.3.L.17.2; SC.3.E.5.2; SC.3.E.6.1; SC.4.P.10.4; SC.4.L.17.2)
- Water, which covers the majority of Earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the water cycle. (SC.5.E.7.1; SC.5.E.7.2; SC.5.E.7.6)
- A tiny fraction of the light energy from the Sun is Earth's primary source of energy, heating Earth surfaces and providing the energy that results in wind, ocean currents, and storms. (SC.2.E.7.2; SC.3.E.6.1)
- Following fertilization, cell division produces a small cluster of cells that then differentiate by appearance and function to form the basic tissues of an embryo. (SC.912.L.16.13)
- Characteristics of organisms are influenced by heredity and environment. (SC.4.L.16.2 and SC.4.L.16.3)
- Nuclear reactions take place in the Sun. (SC.912.P.10.10; SC.912.P.10.11)

The NAEP frameworks for Science may be accessed at
http://www.nagb.org/publications/frameworks/science-09.pdf

RELATED STANDARDS/BENCHMARKS

LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**

LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.8.F	**Functions**
MACC.8.F.2	**Use functions to model relationships between quantities.**
MACC.8.F.2.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.8.E.5.1	Recognize that there are enormous distances between objects in space and apply our knowledge of light and space travel to understand this distance.
SC.8.E.5.2	Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars.
SC.8.E.5.3	Distinguish the hierarchical relationships between planets and other astronomical bodies relative to solar system, galaxy, and universe, including distance, size, and composition.
SC.8.E.5.4	Explore the Law of Universal Gravitation by explaining the role that gravity plays in the formation of planets, stars, and solar systems and in determining their motions.
SC.8.E.5.5	Describe and classify specific physical properties of stars: apparent magnitude (brightness), temperature (color), size, and luminosity (absolute brightness).
SC.8.E.5.6	Create models of solar properties including: rotation, structure of the Sun, convection, sunspots, solar flares, and prominences.
SC.8.E.5.7	Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions.
SC.8.E.5.8	Compare various historical models of the Solar System, including geocentric and heliocentric.
SC.8.E.5.9	Explain the impact of objects in space on each other including: 1. the Sun on the Earth including seasons and gravitational attraction 2. the Moon on the Earth, including phases, tides, and eclipses, and the relative position of each body.

SC.8.E.5.10	Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, and communication of information.
SC.8.E.5.11	Identify and compare characteristics of the electromagnetic spectrum such as wavelength, frequency, use, and hazards and recognize its application to an understanding of planetary images and satellite photographs.
SC.8.E.5.12	Summarize the effects of space exploration on the economy and culture of Florida.
SC.8.L.18.1	Describe and investigate the process of photosynthesis, such as the roles of light, carbon dioxide, water and chlorophyll; production of food; release of oxygen.
SC.8.L.18.2	Describe and investigate how cellular respiration breaks down food to provide energy and releases carbon dioxide.
SC.8.L.18.3	Construct a scientific model of the carbon cycle to show how matter and energy are continuously transferred within and between organisms and their physical environment.
SC.8.L.18.4	Cite evidence that living systems follow the Laws of Conservation of Mass and Energy.
SC.8.N.1.1	Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.8.N.1.2	Design and conduct a study using repeated trials and replication.
SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in different fields of science.
SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.

SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.
SC.8.N.2.2	Discuss what characterizes science and its methods.
SC.8.N.3.1	Select models useful in relating the results of their own investigations.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.
SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.
SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.
SC.8.P.8.1	Explore the scientific theory of atoms (also known as atomic theory) by using models to explain the motion of particles in solids, liquids, and gases.
SC.8.P.8.2	Differentiate between weight and mass recognizing that weight is the amount of gravitational pull on an object and is distinct from, though proportional to, mass.
SC.8.P.8.3	Explore and describe the densities of various materials through measurement of their masses and volumes.
SC.8.P.8.4	Classify and compare substances on the basis of characteristic physical properties that can be demonstrated or measured; for example, density, thermal or electrical conductivity, solubility, magnetic properties, melting and boiling points, and know that these properties are independent of the amount of the sample.
SC.8.P.8.5	Recognize that there are a finite number of elements and that their atoms combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.
SC.8.P.8.6	Recognize that elements are grouped in the periodic table according to similarities of their properties.
SC.8.P.8.7	Explore the scientific theory of atoms (also known as atomic theory) by recognizing that atoms are the smallest unit of an element and are composed of sub-atomic particles (electrons surrounding a nucleus containing protons and neutrons).
SC.8.P.8.8	Identify basic examples of and compare and classify the properties of compounds, including acids, bases, and salts.
SC.8.P.8.9	Distinguish among mixtures (including solutions) and pure substances.

SC.8.P.9.1	Explore the Law of Conservation of Mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes.
SC.8.P.9.2	Differentiate between physical changes and chemical changes.
SC.8.P.9.3	Investigate and describe how temperature influences chemical changes.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.

Course: 2002100 M/J Comprehensive Science 3

GENERAL INFORMATION

Course Number:	2002100
Course Title:	M/J Comprehensive Science 3
Abbreviated Title:	M/J COMPRE SCI 3
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: General Sciences »
Course Length:	Year
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

Additional content that may be included in the Grade 8 NAEP Science assessment includes:

- Rocks and rock formations bear evidence of the minerals, materials, temperature/pressure conditions, and forces that created them. (SC.4.E.6.1 and SC.4.E.6.2)
- Earth as a whole has a magnetic field that is detectable at the surface with a compass, with north and south poles and lines of force. (SC.912.P.10.16)
- The Sun is the major source of energy for phenomena on Earth's surface. (SC.3.L.17.2; SC.3.E.5.2; SC.3.E.6.1; SC.4.P.10.4; SC.4.L.17.2)
- Water, which covers the majority of Earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the water cycle. (SC.5.E.7.1; SC.5.E.7.2; SC.5.E.7.6)
- A tiny fraction of the light energy from the Sun is Earth's primary source of energy, heating Earth surfaces and providing the energy that results in wind, ocean currents, and storms. (SC.2.E.7.2; SC.3.E.6.1)
- Following fertilization, cell division produces a small cluster of cells that then differentiate by appearance and function to form the basic tissues of an embryo. (SC.912.L.16.13)
- Characteristics of organisms are influenced by heredity and environment. (SC.4.L.16.2 and SC.4.L.16.3)
- Nuclear reactions take place in the Sun. (SC.912.P.10.10; SC.912.P.10.11)

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RELATED STANDARDS/BENCHMARKS

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LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**

LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.8.F	**Functions**
MACC.8.F.2	**Use functions to model relationships between quantities.**
MACC.8.F.2.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.8.E.5.1	Recognize that there are enormous distances between objects in space and apply our knowledge of light and space travel to understand this distance.
SC.8.E.5.2	Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars.
SC.8.E.5.3	Distinguish the hierarchical relationships between planets and other astronomical bodies relative to solar system, galaxy, and universe, including distance, size, and composition.
SC.8.E.5.4	Explore the Law of Universal Gravitation by explaining the role that gravity plays in the formation of planets, stars, and solar systems and in determining their motions.
SC.8.E.5.5	Describe and classify specific physical properties of stars: apparent magnitude (brightness), temperature (color), size, and luminosity (absolute brightness).
SC.8.E.5.6	Create models of solar properties including: rotation, structure of the Sun, convection, sunspots, solar flares, and prominences.
SC.8.E.5.7	Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions.
SC.8.E.5.8	Compare various historical models of the Solar System, including geocentric and heliocentric.
SC.8.E.5.9	Explain the impact of objects in space on each other including: 1. the Sun on the Earth including seasons and gravitational attraction 2. the Moon on the Earth, including phases, tides, and eclipses, and the relative position of each body.

SC.8.E.5.10	Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, and communication of information.
SC.8.E.5.11	Identify and compare characteristics of the electromagnetic spectrum such as wavelength, frequency, use, and hazards and recognize its application to an understanding of planetary images and satellite photographs.
SC.8.E.5.12	Summarize the effects of space exploration on the economy and culture of Florida.
SC.8.L.18.1	Describe and investigate the process of photosynthesis, such as the roles of light, carbon dioxide, water and chlorophyll; production of food; release of oxygen.
SC.8.L.18.2	Describe and investigate how cellular respiration breaks down food to provide energy and releases carbon dioxide.
SC.8.L.18.3	Construct a scientific model of the carbon cycle to show how matter and energy are continuously transferred within and between organisms and their physical environment.
SC.8.L.18.4	Cite evidence that living systems follow the Laws of Conservation of Mass and Energy.
SC.8.N.1.1	Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.8.N.1.2	Design and conduct a study using repeated trials and replication.
SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in different fields of science.
SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.

SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.
SC.8.N.2.2	Discuss what characterizes science and its methods.
SC.8.N.3.1	Select models useful in relating the results of their own investigations.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.
SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.
SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.
SC.8.P.8.1	Explore the scientific theory of atoms (also known as atomic theory) by using models to explain the motion of particles in solids, liquids, and gases.
SC.8.P.8.2	Differentiate between weight and mass recognizing that weight is the amount of gravitational pull on an object and is distinct from, though proportional to, mass.
SC.8.P.8.3	Explore and describe the densities of various materials through measurement of their masses and volumes.
SC.8.P.8.4	Classify and compare substances on the basis of characteristic physical properties that can be demonstrated or measured; for example, density, thermal or electrical conductivity, solubility, magnetic properties, melting and boiling points, and know that these properties are independent of the amount of the sample.
SC.8.P.8.5	Recognize that there are a finite number of elements and that their atoms combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.
SC.8.P.8.6	Recognize that elements are grouped in the periodic table according to similarities of their properties.
SC.8.P.8.7	Explore the scientific theory of atoms (also known as atomic theory) by recognizing that atoms are the smallest unit of an element and are composed of sub-atomic particles (electrons surrounding a nucleus containing protons and neutrons).
SC.8.P.8.8	Identify basic examples of and compare and classify the properties of compounds, including acids, bases, and salts.
SC.8.P.8.9	Distinguish among mixtures (including solutions) and pure substances.

SC.8.P.9.1	Explore the Law of Conservation of Mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes.
SC.8.P.9.2	Differentiate between physical changes and chemical changes.
SC.8.P.9.3	Investigate and describe how temperature influences chemical changes.

Course: 2002090 International Baccalaureate Mid Yrs Prog M/J Comprehensive Science 2

GENERAL INFORMATION

Course Number:	2002090
Course Title:	International Baccalaureate Mid Yrs Prog M/J Comprehensive Science 2
Abbreviated Title:	IB MYP M/J COMP SCI 2
Course Path:	Section: Grades PreK to 12 Education Courses» Grade Group: Middle School Grades 6-8 Courses » Subject: Science » SubSubject: General Sciences »
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
IB International Baccalaureate:	Yes
Course Status:	SBE Approval Pending
General Notes:	The course description for the International Baccalaureate Middle Years Programme course is provided through http://www.ibo.org/myp/curriculum/group4/.

Course: 2002085 M/J Comprehensive Science 2 Accelerated Advanced

GENERAL INFORMATION

Course Number:	2002085
Course Title:	M/J Comprehensive Science 2 Accelerated Advanced
Abbreviated Title:	M/J COMP SCI 2 ACC ADV
Course Path:	Section: Basic and Adult Education » Grade Group: Middle School Grades 6-8 » Subject: Science » SubSubject: General Sciences »
Course Length:	Year
Course Level:	3
Course Status:	Pending State Board Approval
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.7.C.1.4	Describe how heredity can affect personal health.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.1	**Develop understanding of statistical variability.**
MACC.6.SP.1.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
MACC.6.SP.2	**Summarize and describe distributions.**
MACC.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
MACC.6.SP.2.5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.7.E.6.1	Describe the layers of the solid Earth, including the lithosphere, the hot convecting mantle, and the dense metallic liquid and solid cores.
SC.7.E.6.2	Identify the patterns within the rock cycle and relate them to surface events (weathering and erosion) and sub-surface events (plate tectonics and mountain building).
SC.7.E.6.3	Identify current methods for measuring the age of Earth and its parts, including the law of superposition and radioactive dating.
SC.7.E.6.4	Explain and give examples of how physical evidence supports scientific theories that Earth has evolved over geologic time due to natural processes.
SC.7.E.6.5	Explore the scientific theory of plate tectonics by describing how the movement of Earth's crustal plates causes both slow and rapid changes in Earth's surface, including volcanic eruptions, earthquakes, and mountain building.
SC.7.E.6.6	Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.
SC.7.E.6.7	Recognize that heat flow and movement of material within Earth causes earthquakes and volcanic eruptions, and creates mountains and ocean basins.
SC.7.L.15.1	Recognize that fossil evidence is consistent with the scientific theory of evolution that living things evolved from earlier species.
SC.7.L.15.2	Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms.
SC.7.L.15.3	Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species.
SC.7.L.16.1	Understand and explain that every organism requires a set of instructions that specifies its traits that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another.
SC.7.L.16.2	Determine the probabilities for genotype and phenotype combinations using Punnett Squares and pedigrees.
SC.7.L.16.3	Compare and contrast the general processes of sexual reproduction requiring meiosis and asexual reproduction requiring mitosis.

SC.7.L.16.4	Recognize and explore the impact of biotechnology (cloning, genetic engineering, artificial selection) on the individual, society and the environment.
SC.7.L.17.1	Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
SC.7.L.17.2	Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
SC.7.L.17.3	Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.
SC.7.N.1.1	Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).
SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
SC.7.N.1.4	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.
SC.7.N.1.5	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
SC.7.N.1.7	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.
SC.7.N.2.1	Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
SC.7.N.3.1	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.

SC.7.P.10.1	Illustrate that the sun's energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.
SC.7.P.10.2	Observe and explain that light can be reflected, refracted, and/or absorbed.
SC.7.P.10.3	Recognize that light waves, sound waves, and other waves move at different speeds in different materials.
SC.7.P.11.1	Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.
SC.7.P.11.2	Investigate and describe the transformation of energy from one form to another.
SC.7.P.11.3	Cite evidence to explain that energy cannot be created nor destroyed, only changed from one form to another.
SC.7.P.11.4	Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature.
SC.8.E.5.1	Recognize that there are enormous distances between objects in space and apply our knowledge of light and space travel to understand this distance.
SC.8.E.5.2	Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars.
SC.8.E.5.3	Distinguish the hierarchical relationships between planets and other astronomical bodies relative to solar system, galaxy, and universe, including distance, size, and composition.
SC.8.E.5.4	Explore the Law of Universal Gravitation by explaining the role that gravity plays in the formation of planets, stars, and solar systems and in determining their motions.
SC.8.E.5.5	Describe and classify specific physical properties of stars: apparent magnitude (brightness), temperature (color), size, and luminosity (absolute brightness).
SC.8.E.5.6	Create models of solar properties including: rotation, structure of the Sun, convection, sunspots, solar flares, and prominences.
SC.8.E.5.7	Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions.
SC.8.E.5.8	Compare various historical models of the Solar System, including geocentric and heliocentric.

SC.8.E.5.9	Explain the impact of objects in space on each other including: 1. the Sun on the Earth including seasons and gravitational attraction 2. the Moon on the Earth, including phases, tides, and eclipses, and the relative position of each body.
SC.8.E.5.10	Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, and communication of information.
SC.8.E.5.11	Identify and compare characteristics of the electromagnetic spectrum such as wavelength, frequency, use, and hazards and recognize its application to an understanding of planetary images and satellite photographs.
SC.8.E.5.12	Summarize the effects of space exploration on the economy and culture of Florida.
SC.8.L.18.1	Describe and investigate the process of photosynthesis, such as the roles of light, carbon dioxide, water and chlorophyll; production of food; release of oxygen.
SC.8.L.18.2	Describe and investigate how cellular respiration breaks down food to provide energy and releases carbon dioxide.
SC.8.L.18.3	Construct a scientific model of the carbon cycle to show how matter and energy are continuously transferred within and between organisms and their physical environment.
SC.8.L.18.4	Cite evidence that living systems follow the Laws of Conservation of Mass and Energy.
SC.8.N.1.1	Define a problem from the eighth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions
SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.
SC.8.N.2.2	Discuss what characterizes science and its methods.
SC.8.N.3.1	Select models useful in relating the results of their own investigations.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.
SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.

SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.
SC.8.P.9.1	Explore the Law of Conservation of Mass by demonstrating and concluding that mass is conserved when substances undergo physical and chemical changes.
SC.8.P.9.2	Differentiate between physical changes and chemical changes.
SC.8.P.9.3	Investigate and describe how temperature influences chemical changes.
SC.912.E.6.1	Describe and differentiate the layers of Earth and the interactions among them.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.6.3	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and

	electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.

Course: 2002080 M/J Comprehensive Science 2, Advanced

GENERAL INFORMATION

Course Number:	2002080
Course Title:	M/J Comprehensive Science 2, Advanced
Abbreviated Title:	M/J COMPRE SCI 2 ADV
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: General Sciences »
Course Length:	Year
Course Level:	3
Course Status:	SBE Approval Pending

General Notes: Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).

Special Notes: Instructional Practices
Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.7.C.1.4	Describe how heredity can affect personal health.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.1	**Develop understanding of statistical variability.**
MACC.6.SP.1.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
MACC.6.SP.2	**Summarize and describe distributions.**
MACC.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
MACC.6.SP.2.5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.7.E.6.1	Describe the layers of the solid Earth, including the lithosphere, the hot convecting mantle, and the dense metallic liquid and solid cores.
SC.7.E.6.2	Identify the patterns within the rock cycle and relate them to surface events (weathering and erosion) and sub-surface events (plate tectonics and mountain building).
SC.7.E.6.3	Identify current methods for measuring the age of Earth and its parts, including the law of superposition and radioactive dating.
SC.7.E.6.4	Explain and give examples of how physical evidence supports scientific theories that Earth has evolved over geologic time due to natural processes.
SC.7.E.6.5	Explore the scientific theory of plate tectonics by describing how the movement of Earth's crustal plates causes both slow and rapid changes in Earth's surface, including volcanic eruptions, earthquakes, and mountain building.
SC.7.E.6.6	Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.
SC.7.E.6.7	Recognize that heat flow and movement of material within Earth causes earthquakes and volcanic eruptions, and creates mountains and ocean basins.
SC.7.L.15.1	Recognize that fossil evidence is consistent with the scientific theory of evolution that living things evolved from earlier species.
SC.7.L.15.2	Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms.
SC.7.L.15.3	Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species.
SC.7.L.16.1	Understand and explain that every organism requires a set of instructions that specifies its traits that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another.
SC.7.L.16.2	Determine the probabilities for genotype and phenotype combinations using Punnett Squares and pedigrees.
SC.7.L.16.3	Compare and contrast the general processes of sexual reproduction requiring meiosis and asexual reproduction requiring mitosis.

SC.7.L.16.4	Recognize and explore the impact of biotechnology (cloning, genetic engineering, artificial selection) on the individual, society and the environment.
SC.7.L.17.1	Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
SC.7.L.17.2	Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
SC.7.L.17.3	Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.
SC.7.N.1.1	Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).
SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
SC.7.N.1.4	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.
SC.7.N.1.5	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
SC.7.N.1.7	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.
SC.7.N.2.1	Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
SC.7.N.3.1	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.

SC.7.P.10.1	Illustrate that the sun's energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.
SC.7.P.10.2	Observe and explain that light can be reflected, refracted, and/or absorbed.
SC.7.P.10.3	Recognize that light waves, sound waves, and other waves move at different speeds in different materials.
SC.7.P.11.1	Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.
SC.7.P.11.2	Investigate and describe the transformation of energy from one form to another.
SC.7.P.11.3	Cite evidence to explain that energy cannot be created nor destroyed, only changed from one form to another.
SC.7.P.11.4	Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature.
SC.912.E.6.1	Describe and differentiate the layers of Earth and the interactions among them.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.6.3	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.

SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.

Course: 2002070 M/J Comprehensive Science 2

GENERAL INFORMATION

Course Number:	2002070
Course Title:	M/J Comprehensive Science 2
Abbreviated Title:	M/J COMPRE SCI 2
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: General Sciences »
Course Length:	Year
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.7.C.1.4	Describe how heredity can affect personal health.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.1	**Develop understanding of statistical variability.**
MACC.6.SP.1.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
MACC.6.SP.2	**Summarize and describe distributions.**
MACC.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
MACC.6.SP.2.5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.7.E.6.1	Describe the layers of the solid Earth, including the lithosphere, the hot convecting mantle, and the dense metallic liquid and solid cores.
SC.7.E.6.2	Identify the patterns within the rock cycle and relate them to surface events (weathering and erosion) and sub-surface events (plate tectonics and mountain building).
SC.7.E.6.3	Identify current methods for measuring the age of Earth and its parts, including the law of superposition and radioactive dating.
SC.7.E.6.4	Explain and give examples of how physical evidence supports scientific theories that Earth has evolved over geologic time due to natural processes.
SC.7.E.6.5	Explore the scientific theory of plate tectonics by describing how the movement of Earth's crustal plates causes both slow and rapid changes in Earth's surface, including volcanic eruptions, earthquakes, and mountain building.
SC.7.E.6.6	Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.
SC.7.E.6.7	Recognize that heat flow and movement of material within Earth causes earthquakes and volcanic eruptions, and creates mountains and ocean basins.
SC.7.L.15.1	Recognize that fossil evidence is consistent with the scientific theory of evolution that living things evolved from earlier species.
SC.7.L.15.2	Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms.
SC.7.L.15.3	Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species.
SC.7.L.16.1	Understand and explain that every organism requires a set of instructions that specifies its traits that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another.
SC.7.L.16.2	Determine the probabilities for genotype and phenotype combinations using Punnett Squares and pedigrees.
SC.7.L.16.3	Compare and contrast the general processes of sexual reproduction requiring meiosis and asexual reproduction requiring mitosis.

SC.7.L.16.4	Recognize and explore the impact of biotechnology (cloning, genetic engineering, artificial selection) on the individual, society and the environment.
SC.7.L.17.1	Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
SC.7.L.17.2	Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
SC.7.L.17.3	Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.
SC.7.N.1.1	Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).
SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
SC.7.N.1.4	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.
SC.7.N.1.5	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
SC.7.N.1.7	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.
SC.7.N.2.1	Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
SC.7.N.3.1	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.

SC.7.P.10.1	Illustrate that the sun's energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.
SC.7.P.10.2	Observe and explain that light can be reflected, refracted, and/or absorbed.
SC.7.P.10.3	Recognize that light waves, sound waves, and other waves move at different speeds in different materials.
SC.7.P.11.1	Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.
SC.7.P.11.2	Investigate and describe the transformation of energy from one form to another.
SC.7.P.11.3	Cite evidence to explain that energy cannot be created nor destroyed, only changed from one form to another.
SC.7.P.11.4	Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature.

Course: 2002060 International Baccalaureate Mid Yrs Prog M/J Comprehensive Science 1

GENERAL INFORMATION

Course Number:	2002060
Course Title:	International Baccalaureate Mid Yrs Prog M/J Comprehensive Science 1
Abbreviated Title:	IB MYP M/J COMP SCI 1
Course Path:	Section: Grades PreK to 12 Education Courses» Grade Group: Middle School Grades 6-8 Courses » Subject: Science » SubSubject: General Sciences »
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
IB International Baccalaureate:	Yes
Course Status:	SBE Approval Pending
General Notes:	The course description for the International Baccalaureate Middle Years Programme course is provided through http://www.ibo.org/myp/curriculum/group4/.

Course: 2002055 M/J Comprehensive Science 1 Accelerated Advanced

GENERAL INFORMATION

Course Number:	2002055
Course Title:	M/J Comprehensive Science 1 Accelerated Advanced
Abbreviated Title:	M/J COMP SCI 1 ACC ADV
Course Path:	Section: Basic and Adult Education » Grade Group: Middle School Grades 6-8 » Subject: Science » SubSubject: General Sciences »
Course Length:	Year
Course Level:	3
Course Status:	SBE Approval Pending

General Notes:

Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).

Special Notes:

Instructional Practices
Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.6.C.1.3	Identify environmental factors that affect personal health.
HE.6.C.1.8	Explain how body systems are impacted by hereditary factors and infectious agents.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.EE	**Expressions and Equations**
MACC.6.EE.3	**Represent and analyze quantitative relationships between dependent and independent variables.**
MACC.6.EE.3.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.*
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.1	**Develop understanding of statistical variability.**
MACC.6.SP.1.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

MACC.6.SP.2	**Summarize and describe distributions.**
MACC.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
MACC.6.SP.2.5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.6.E.6.1	Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition.
SC.6.E.6.2	Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.
SC.6.E.7.1	Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system.
SC.6.E.7.2	Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.
SC.6.E.7.3	Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation.
SC.6.E.7.4	Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.
SC.6.E.7.5	Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land.
SC.6.E.7.6	Differentiate between weather and climate.
SC.6.E.7.7	Investigate how natural disasters have affected human life in Florida.
SC.6.E.7.8	Describe ways human beings protect themselves from hazardous weather and sun exposure.
SC.6.E.7.9	Describe how the composition and structure of the atmosphere protects life and insulates the planet.

SC.6.L.14.1	Describe and identify patterns in the hierarchical organization of organisms from atoms to molecules and cells to tissues to organs to organ systems to organisms.
SC.6.L.14.2	Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life.
SC.6.L.14.3	Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.
SC.6.L.14.4	Compare and contrast the structure and function of major organelles of plant and animal cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles.
SC.6.L.14.5	Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.
SC.6.L.14.6	Compare and contrast types of infectious agents that may infect the human body, including viruses, bacteria, fungi, and parasites.
SC.6.L.15.1	Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.
SC.6.N.1.1	Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.6.N.1.2	Explain why scientific investigations should be replicable.
SC.6.N.1.3	Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.
SC.6.N.1.4	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
SC.6.N.2.1	Distinguish science from other activities involving thought.

SC.6.N.2.2	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
SC.6.N.3.1	Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
SC.6.N.3.2	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
SC.6.N.3.3	Give several examples of scientific laws.
SC.6.N.3.4	Identify the role of models in the context of the sixth grade science benchmarks.
SC.6.P.11.1	Explore the Law of Conservation of Energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.
SC.6.P.12.1	Measure and graph distance versus time for an object moving at a constant speed. Interpret this relationship.
SC.6.P.13.1	Investigate and describe types of forces including contact forces and forces acting at a distance, such as electrical, magnetic, and gravitational.
SC.6.P.13.2	Explore the Law of Gravity by recognizing that every object exerts gravitational force on every other object and that the force depends on how much mass the objects have and how far apart they are.
SC.6.P.13.3	Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both.
SC.8.N.1.2	Design and conduct a study using repeated trials and replication.
SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in different fields of science.

SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.
SC.8.P.8.1	Explore the scientific theory of atoms (also known as atomic theory) by using models to explain the motion of particles in solids, liquids, and gases.
SC.8.P.8.2	Differentiate between weight and mass recognizing that weight is the amount of gravitational pull on an object and is distinct from, though proportional to, mass.
SC.8.P.8.3	Explore and describe the densities of various materials through measurement of their masses and volumes.
SC.8.P.8.4	Classify and compare substances on the basis of characteristic physical properties that can be demonstrated or measured; for example, density, thermal or electrical conductivity, solubility, magnetic properties, melting and boiling points, and know that these properties are independent of the amount of the sample.
SC.8.P.8.5	Recognize that there are a finite number of elements and that their atoms combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.
SC.8.P.8.6	Recognize that elements are grouped in the periodic table according to similarities of their properties.
SC.8.P.8.7	Explore the scientific theory of atoms (also known as atomic theory) by recognizing that atoms are the smallest unit of an element and are composed of sub-atomic particles (electrons surrounding a nucleus containing protons and neutrons).
SC.8.P.8.8	Identify basic examples of and compare and classify the properties of compounds, including acids, bases, and salts.
SC.8.P.8.9	Distinguish among mixtures (including solutions) and pure substances.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.

SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.

Course: 2002050 M/J Comprehensive Science 1, Advanced

GENERAL INFORMATION

Course Number:	2002050
Course Title:	M/J Comprehensive Science 1, Advanced
Abbreviated Title:	M/J COMPRE SCI 1 ADV
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: General Sciences »
Course Length:	Year
Course Level:	3
Course Status:	SBE Approval Pending

General Notes:

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Special Notes:

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1. Ensuring wide reading from complex text that varies in length.
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4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.6.C.1.3	Identify environmental factors that affect personal health.
HE.6.C.1.8	Explain how body systems are impacted by hereditary factors and infectious agents.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.EE	**Expressions and Equations**
MACC.6.EE.3	**Represent and analyze quantitative relationships between dependent and independent variables.**
MACC.6.EE.3.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.*
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.1	**Develop understanding of statistical variability.**
MACC.6.SP.1.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

MACC.6.SP.2	**Summarize and describe distributions.**
MACC.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
MACC.6.SP.2.5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.6.E.6.1	Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition.
SC.6.E.6.2	Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.
SC.6.E.7.1	Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system.
SC.6.E.7.2	Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.
SC.6.E.7.3	Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation.
SC.6.E.7.4	Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.
SC.6.E.7.5	Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land.
SC.6.E.7.6	Differentiate between weather and climate.
SC.6.E.7.7	Investigate how natural disasters have affected human life in Florida.
SC.6.E.7.8	Describe ways human beings protect themselves from hazardous weather and sun exposure.
SC.6.E.7.9	Describe how the composition and structure of the atmosphere protects life and insulates the planet.

SC.6.L.14.1	Describe and identify patterns in the hierarchical organization of organisms from atoms to molecules and cells to tissues to organs to organ systems to organisms.
SC.6.L.14.2	Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life.
SC.6.L.14.3	Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.
SC.6.L.14.4	Compare and contrast the structure and function of major organelles of plant and animal cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles.
SC.6.L.14.5	Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.
SC.6.L.14.6	Compare and contrast types of infectious agents that may infect the human body, including viruses, bacteria, fungi, and parasites.
SC.6.L.15.1	Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.
SC.6.N.1.1	Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.6.N.1.2	Explain why scientific investigations should be replicable.
SC.6.N.1.3	Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.
SC.6.N.1.4	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
SC.6.N.2.1	Distinguish science from other activities involving thought.

SC.6.N.2.2	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
SC.6.N.3.1	Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
SC.6.N.3.2	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
SC.6.N.3.3	Give several examples of scientific laws.
SC.6.N.3.4	Identify the role of models in the context of the sixth grade science benchmarks.
SC.6.P.11.1	Explore the Law of Conservation of Energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.
SC.6.P.12.1	Measure and graph distance versus time for an object moving at a constant speed. Interpret this relationship.
SC.6.P.13.1	Investigate and describe types of forces including contact forces and forces acting at a distance, such as electrical, magnetic, and gravitational.
SC.6.P.13.2	Explore the Law of Gravity by recognizing that every object exerts gravitational force on every other object and that the force depends on how much mass the objects have and how far apart they are.
SC.6.P.13.3	Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).

SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.

Course: 2002040 M/J Comprehensive Science 1

GENERAL INFORMATION

Course Number:	2002040
Course Title:	M/J Comprehensive Science 1
Abbreviated Title:	M/J COMPRE SCI 1
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: General Sciences »
Course Length:	Year
Course Level:	2
Course Status:	SBE Approval Pending

General Notes:

Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).

Special Notes:

Instructional Practices
Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:
1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.6.C.1.3	Identify environmental factors that affect personal health.
HE.6.C.1.8	Explain how body systems are impacted by hereditary factors and infectious agents.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.EE	**Expressions and Equations**
MACC.6.EE.3	**Represent and analyze quantitative relationships between dependent and independent variables.**
MACC.6.EE.3.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.*
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.1	**Develop understanding of statistical variability.**
MACC.6.SP.1.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

MACC.6.SP.2	**Summarize and describe distributions.**
MACC.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
MACC.6.SP.2.5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.6.E.6.1	Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition.
SC.6.E.6.2	Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.
SC.6.E.7.1	Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system.
SC.6.E.7.2	Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.
SC.6.E.7.3	Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation.
SC.6.E.7.4	Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.
SC.6.E.7.5	Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land.
SC.6.E.7.6	Differentiate between weather and climate.
SC.6.E.7.7	Investigate how natural disasters have affected human life in Florida.
SC.6.E.7.8	Describe ways human beings protect themselves from hazardous weather and sun exposure.
SC.6.E.7.9	Describe how the composition and structure of the atmosphere protects life and insulates the planet.

SC.6.L.14.1	Describe and identify patterns in the hierarchical organization of organisms from atoms to molecules and cells to tissues to organs to organ systems to organisms.
SC.6.L.14.2	Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life.
SC.6.L.14.3	Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.
SC.6.L.14.4	Compare and contrast the structure and function of major organelles of plant and animal cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles.
SC.6.L.14.5	Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.
SC.6.L.14.6	Compare and contrast types of infectious agents that may infect the human body, including viruses, bacteria, fungi, and parasites.
SC.6.L.15.1	Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.
SC.6.N.1.1	Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.6.N.1.2	Explain why scientific investigations should be replicable.
SC.6.N.1.3	Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.
SC.6.N.1.4	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
SC.6.N.2.1	Distinguish science from other activities involving thought.

SC.6.N.2.2	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
SC.6.N.3.1	Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
SC.6.N.3.2	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
SC.6.N.3.3	Give several examples of scientific laws.
SC.6.N.3.4	Identify the role of models in the context of the sixth grade science benchmarks.
SC.6.P.11.1	Explore the Law of Conservation of Energy by differentiating between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.
SC.6.P.12.1	Measure and graph distance versus time for an object moving at a constant speed. Interpret this relationship.
SC.6.P.13.1	Investigate and describe types of forces including contact forces and forces acting at a distance, such as electrical, magnetic, and gravitational.
SC.6.P.13.2	Explore the Law of Gravity by recognizing that every object exerts gravitational force on every other object and that the force depends on how much mass the objects have and how far apart they are.
SC.6.P.13.3	Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both.

Course: 2001020 M/J Earth/Space Science, Advanced

GENERAL INFORMATION

Course Number:	2001020
Course Title:	M/J Earth/Space Science, Advanced
Abbreviated Title:	M/J ERTH/SPA SCI ADV
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: Earth/Space Sciences »
Course Length:	Year
Course Level:	3
Course Status:	SBE Approval Pending

General Notes:

Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).

Special Notes:

Instructional Practices
Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.6.C.1.3	Identify environmental factors that affect personal health.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.2	**Summarize and Describe Distributions**
MACC.6.SP.2.4	Summarize and describe distributions. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
MACC.6.SP.2.5	Summarize and describe distributions. Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.6.E.6.1	Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition.
SC.6.E.6.2	Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.
SC.6.E.7.1	Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system.
SC.6.E.7.2	Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.
SC.6.E.7.3	Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation.
SC.6.E.7.4	Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.
SC.6.E.7.5	Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land.
SC.6.E.7.6	Differentiate between weather and climate.
SC.6.E.7.7	Investigate how natural disasters have affected human life in Florida.
SC.6.E.7.8	Describe ways human beings protect themselves from hazardous weather and sun exposure.
SC.6.E.7.9	Describe how the composition and structure of the atmosphere protects life and insulates the planet.
SC.6.N.1.1	Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.6.N.1.2	Explain why scientific investigations should be replicable.
SC.6.N.1.3	Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.

SC.6.N.1.4	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
SC.6.N.2.1	Distinguish science from other activities involving thought.
SC.6.N.2.2	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
SC.6.N.3.1	Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
SC.6.N.3.2	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
SC.6.N.3.3	Give several examples of scientific laws.
SC.6.N.3.4	Identify the role of models in the context of the sixth grade science benchmarks.
SC.7.E.6.1	Describe the layers of the solid Earth, including the lithosphere, the hot convecting mantle, and the dense metallic liquid and solid cores.
SC.7.E.6.2	Identify the patterns within the rock cycle and relate them to surface events (weathering and erosion) and sub-surface events (plate tectonics and mountain building).
SC.7.E.6.3	Identify current methods for measuring the age of Earth and its parts, including the law of superposition and radioactive dating.
SC.7.E.6.4	Explain and give examples of how physical evidence supports scientific theories that Earth has evolved over geologic time due to natural processes.
SC.7.E.6.5	Explore the scientific theory of plate tectonics by describing how the movement of Earth's crustal plates causes both slow and rapid changes in Earth's surface, including volcanic eruptions, earthquakes, and mountain building.

SC.7.E.6.6	Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.
SC.7.E.6.7	Recognize that heat flow and movement of material within Earth causes earthquakes and volcanic eruptions, and creates mountains and ocean basins.
SC.7.N.1.1	Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions
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SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).
SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
SC.7.N.1.4	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.
SC.7.N.1.5	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
SC.7.N.1.7	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.
SC.7.N.2.1	Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
SC.7.N.3.1	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.
SC.8.E.5.1	Recognize that there are enormous distances between objects in space and apply our knowledge of light and space travel to understand this distance.
SC.8.E.5.2	Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars.

SC.8.E.5.3	Distinguish the hierarchical relationships between planets and other astronomical bodies relative to solar system, galaxy, and universe, including distance, size, and composition.
SC.8.E.5.4	Explore the Law of Universal Gravitation by explaining the role that gravity plays in the formation of planets, stars, and solar systems and in determining their motions.
SC.8.E.5.5	Describe and classify specific physical properties of stars: apparent magnitude (brightness), temperature (color), size, and luminosity (absolute brightness).
SC.8.E.5.6	Create models of solar properties including: rotation, structure of the Sun, convection, sunspots, solar flares, and prominences.
SC.8.E.5.7	Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions.
SC.8.E.5.8	Compare various historical models of the Solar System, including geocentric and heliocentric.
SC.8.E.5.9	Explain the impact of objects in space on each other including: 1. the Sun on the Earth including seasons and gravitational attraction 2. the Moon on the Earth, including phases, tides, and eclipses, and the relative position of each body.
SC.8.E.5.10	Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, and communication of information.
SC.8.E.5.11	Identify and compare characteristics of the electromagnetic spectrum such as wavelength, frequency, use, and hazards and recognize its application to an understanding of planetary images and satellite photographs.
SC.8.E.5.12	Summarize the effects of space exploration on the economy and culture of Florida.
SC.8.N.1.1	Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.8.N.1.2	Design and conduct a study using repeated trials and replication.

SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in different fields of science.
SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.
SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.
SC.8.N.2.2	Discuss what characterizes science and its methods.
SC.8.N.3.1	Select models useful in relating the results of their own investigations.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.
SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.
SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.6.1	Describe and differentiate the layers of Earth and the interactions among them
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SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.6.3	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.

Course: 2001010 M/J Earth/Space Science

GENERAL INFORMATION

Course Number:	2001010
Course Title:	M/J Earth/Space Science
Abbreviated Title:	M/J ERTH/SPA SCI
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: Earth/Space Sciences »
Course Length:	Year
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.6.C.1.3	Identify environmental factors that affect personal health.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.2	**Summarize and Describe Distributions**
MACC.6.SP.2.4	Summarize and describe distributions. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
MACC.6.SP.2.5	Summarize and describe distributions. Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.6.E.6.1	Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition.
SC.6.E.6.2	Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.
SC.6.E.7.1	Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system.
SC.6.E.7.2	Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.
SC.6.E.7.3	Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation.
SC.6.E.7.4	Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.
SC.6.E.7.5	Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land.
SC.6.E.7.6	Differentiate between weather and climate.
SC.6.E.7.7	Investigate how natural disasters have affected human life in Florida.
SC.6.E.7.8	Describe ways human beings protect themselves from hazardous weather and sun exposure.
SC.6.E.7.9	Describe how the composition and structure of the atmosphere protects life and insulates the planet.
SC.6.N.1.1	Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.6.N.1.2	Explain why scientific investigations should be replicable.
SC.6.N.1.3	Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.

SC.6.N.1.4	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
SC.6.N.2.1	Distinguish science from other activities involving thought.
SC.6.N.2.2	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
SC.6.N.3.1	Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
SC.6.N.3.2	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
SC.6.N.3.3	Give several examples of scientific laws.
SC.6.N.3.4	Identify the role of models in the context of the sixth grade science benchmarks.
SC.7.E.6.1	Describe the layers of the solid Earth, including the lithosphere, the hot convecting mantle, and the dense metallic liquid and solid cores.
SC.7.E.6.2	Identify the patterns within the rock cycle and relate them to surface events (weathering and erosion) and sub-surface events (plate tectonics and mountain building).
SC.7.E.6.3	Identify current methods for measuring the age of Earth and its parts, including the law of superposition and radioactive dating.
SC.7.E.6.4	Explain and give examples of how physical evidence supports scientific theories that Earth has evolved over geologic time due to natural processes.
SC.7.E.6.5	Explore the scientific theory of plate tectonics by describing how the movement of Earth's crustal plates causes both slow and rapid changes in Earth's surface, including volcanic eruptions, earthquakes, and mountain building.

SC.7.E.6.6	Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.
SC.7.E.6.7	Recognize that heat flow and movement of material within Earth causes earthquakes and volcanic eruptions, and creates mountains and ocean basins.
SC.7.N.1.1	Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions
. SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).
SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
SC.7.N.1.4	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.
SC.7.N.1.5	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
SC.7.N.1.7	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.
SC.7.N.2.1	Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
SC.7.N.3.1	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.
SC.8.E.5.1	Recognize that there are enormous distances between objects in space and apply our knowledge of light and space travel to understand this distance.
SC.8.E.5.2	Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars.

SC.8.E.5.3	Distinguish the hierarchical relationships between planets and other astronomical bodies relative to solar system, galaxy, and universe, including distance, size, and composition.
SC.8.E.5.4	Explore the Law of Universal Gravitation by explaining the role that gravity plays in the formation of planets, stars, and solar systems and in determining their motions.
SC.8.E.5.5	Describe and classify specific physical properties of stars: apparent magnitude (brightness), temperature (color), size, and luminosity (absolute brightness).
SC.8.E.5.6	Create models of solar properties including: rotation, structure of the Sun, convection, sunspots, solar flares, and prominences.
SC.8.E.5.7	Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions.
SC.8.E.5.8	Compare various historical models of the Solar System, including geocentric and heliocentric.
SC.8.E.5.9	Explain the impact of objects in space on each other including: 1. the Sun on the Earth including seasons and gravitational attraction 2. the Moon on the Earth, including phases, tides, and eclipses, and the relative position of each body.
SC.8.E.5.10	Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, and communication of information.
SC.8.E.5.11	Identify and compare characteristics of the electromagnetic spectrum such as wavelength, frequency, use, and hazards and recognize its application to an understanding of planetary images and satellite photographs.
SC.8.E.5.12	Summarize the effects of space exploration on the economy and culture of Florida.
SC.8.N.1.1	Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.8.N.1.2	Design and conduct a study using repeated trials and replication.

SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in different fields of science.
SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.
SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.
SC.8.N.2.2	Discuss what characterizes science and its methods.
SC.8.N.3.1	Select models useful in relating the results of their own investigations.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.
SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.
SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.

Course: 2000020 M/J Life Science, Advanced

GENERAL INFORMATION

Course Number:	2000020
Course Title:	M/J Life Science, Advanced
Abbreviated Title:	M/J LIF SCI ADV
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Length:	Year
Course Level:	3
Course Status:	SBE Approval Pending

General Notes:

Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).

Special Notes:

Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.6.C.1.8	Explain how body systems are impacted by hereditary factors and infectious agents.
HE.7.C.1.4	Describe how heredity can affect personal health.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.2	**Summarize and Describe Distributions**
MACC.6.SP.2.4	Summarize and describe distributions. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
MACC.6.SP.2.5	Summarize and describe distributions. Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.6.L.14.1	Describe and identify patterns in the hierarchical organization of organisms from atoms to molecules and cells to tissues to organs to organ systems to organisms.
SC.6.L.14.2	Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life.
SC.6.L.14.3	Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.
SC.6.L.14.4	Compare and contrast the structure and function of major organelles of plant and animal cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles.
SC.6.L.14.5	Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.
SC.6.L.14.6	Compare and contrast types of infectious agents that may infect the human body, including viruses, bacteria, fungi, and parasites.
SC.6.L.15.1	Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.
SC.6.N.1.1	Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.6.N.1.2	Explain why scientific investigations should be replicable.
SC.6.N.1.3	Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.
SC.6.N.1.4	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
SC.6.N.2.1	Distinguish science from other activities involving thought.

SC.6.N.2.2	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals
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SC.6.N.3.1	Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
SC.6.N.3.2	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
SC.6.N.3.3	Give several examples of scientific laws.
SC.6.N.3.4	Identify the role of models in the context of the sixth grade science benchmarks
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SC.7.L.15.1	Recognize that fossil evidence is consistent with the scientific theory of evolution that living things evolved from earlier species.
SC.7.L.15.2	Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms.
SC.7.L.15.3	Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species
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SC.7.L.16.1	Understand and explain that every organism requires a set of instructions that specifies its traits, that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another.
SC.7.L.16.2	Determine the probabilities for genotype and phenotype combinations using Punnett Squares and pedigrees.
SC.7.L.16.3	Compare and contrast the general processes of sexual reproduction requiring meiosis and asexual reproduction requiring mitosis.
SC.7.L.16.4	Recognize and explore the impact of biotechnology (cloning, genetic engineering, artificial selection) on the individual, society and the environment.
SC.7.L.17.1	Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.

SC.7.L.17.2	Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
SC.7.L.17.3	Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.
SC.7.N.1.1	Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).
SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
SC.7.N.1.4	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.
SC.7.N.1.5	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
SC.7.N.1.7	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.
SC.7.N.2.1	Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
SC.7.N.3.1	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.
SC.8.L.18.1	Describe and investigate the process of photosynthesis, such as the roles of light, carbon dioxide, water and chlorophyll; production of food; release of oxygen.
SC.8.L.18.2	Describe and investigate how cellular respiration breaks down food to provide energy and releases carbon dioxide.

SC.8.L.18.3	Construct a scientific model of the carbon cycle to show how matter and energy are continuously transferred within and between organisms and their physical environment.
SC.8.L.18.4	Cite evidence that living systems follow the Laws of Conservation of Mass and Energy.
SC.8.N.1.1	Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.8.N.1.2	Design and conduct a study using repeated trials and replication.
SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in different fields of science.
SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.
SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.
SC.8.N.2.2	Discuss what characterizes science and its methods.
SC.8.N.3.1	Select models useful in relating the results of their own investigations.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.
SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.
SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).

SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.

Course: 2000010 M/J Life Science

GENERAL INFORMATION

Course Number:	2000010
Course Title:	M/J Life Science
Abbreviated Title:	M/J LIF SCI
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 6 to 8 Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Length:	Year
Course Level:	2
Course Status:	SBE Approval Pending

General Notes: Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).

Special Notes: Instructional Practices

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1. Ensuring wide reading from complex text that varies in length.
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4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

HE.6.C.1.8	Explain how body systems are impacted by hereditary factors and infectious agents.
HE.7.C.1.4	Describe how heredity can affect personal health.
LACC.68.RST.1	**Key Ideas and Details**
LACC.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
LACC.68.RST.2	**Craft and Structure**
LACC.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
LACC.68.RST.3	**Integration of Knowledge and Ideas**
LACC.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
LACC.68.RST.4	**Range of Reading and Level of Text Complexity**
LACC.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.
LACC.68.WHST.1	**Text Types and Purposes**
LACC.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.68.WHST.3	**Research to Build and Present Knowledge**
LACC.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
MACC.6.SP	**Statistics and Probability**
MACC.6.SP.2	**Summarize and Describe Distributions**
MACC.6.SP.2.4	Summarize and describe distributions. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
MACC.6.SP.2.5	Summarize and describe distributions. Summarize numerical data sets in relation to their context, such as by:
MACC.6.SP.2.5a	Reporting the number of observations.
MACC.6.SP.2.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MACC.6.SP.2.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.6.L.14.1	Describe and identify patterns in the hierarchical organization of organisms from atoms to molecules and cells to tissues to organs to organ systems to organisms.
SC.6.L.14.2	Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life.
SC.6.L.14.3	Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.
SC.6.L.14.4	Compare and contrast the structure and function of major organelles of plant and animal cells, including cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles.
SC.6.L.14.5	Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.
SC.6.L.14.6	Compare and contrast types of infectious agents that may infect the human body, including viruses, bacteria, fungi, and parasites.
SC.6.L.15.1	Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.
SC.6.N.1.1	Define a problem from the sixth grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.6.N.1.2	Explain why scientific investigations should be replicable.
SC.6.N.1.3	Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.
SC.6.N.1.4	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.

SC.6.N.2.1	Distinguish science from other activities involving thought.
SC.6.N.2.2	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
SC.6.N.2.3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
SC.6.N.3.1	Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.
SC.6.N.3.2	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.
SC.6.N.3.3	Give several examples of scientific laws.
SC.6.N.3.4	Identify the role of models in the context of the sixth grade science benchmarks.
SC.7.L.15.1	Recognize that fossil evidence is consistent with the scientific theory of evolution that living things evolved from earlier species.
SC.7.L.15.2	Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms.
SC.7.L.15.3	Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species.
SC.7.L.16.1	Understand and explain that every organism requires a set of instructions that specifies its traits, that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another.
SC.7.L.16.2	Determine the probabilities for genotype and phenotype combinations using Punnett Squares and pedigrees.
SC.7.L.16.3	Compare and contrast the general processes of sexual reproduction requiring meiosis and asexual reproduction requiring mitosis.
SC.7.L.16.4	Recognize and explore the impact of biotechnology (cloning, genetic engineering, artificial selection) on the individual, society and the environment.

SC.7.L.17.1	Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
SC.7.L.17.2	Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
SC.7.L.17.3	Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.
SC.7.N.1.1	Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).
SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
SC.7.N.1.4	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.
SC.7.N.1.5	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
SC.7.N.1.7	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.
SC.7.N.2.1	Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
SC.7.N.3.1	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.
SC.8.L.18.1	Describe and investigate the process of photosynthesis, such as the roles of light, carbon dioxide, water and chlorophyll; production of food; release of oxygen.

SC.8.L.18.2	Describe and investigate how cellular respiration breaks down food to provide energy and releases carbon dioxide.
SC.8.L.18.3	Construct a scientific model of the carbon cycle to show how matter and energy are continuously transferred within and between organisms and their physical environment.
SC.8.L.18.4	Cite evidence that living systems follow the Laws of Conservation of Mass and Energy.
SC.8.N.1.1	Define a problem from the eighth grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
SC.8.N.1.2	Design and conduct a study using repeated trials and replication.
SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in different fields of science.
SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.
SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.
SC.8.N.2.2	Discuss what characterizes science and its methods.
SC.8.N.3.1	Select models useful in relating the results of their own investigations.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.
SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.
SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.

Course: 2002425 Integrated Science 2 for Credit Recovery

GENERAL INFORMATION

Course Number:	2002425
Course Title:	Integrated Science 2 for Credit Recovery
Abbreviated Title:	INTEG SCI 2 CR
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	*Credit Recovery courses are credit bearing courses with specific content requirements defined by Next Generation Sunshine State Standards and/or Common Core State Standards. Students enrolled in a Credit Recovery course must have previously attempted the corresponding course (and/or End-of-Course assessment) since the course requirements for the Credit Recovery course are exactly the same as the previously attempted corresponding course. For example, Geometry (1206310) and Geometry for Credit Recovery (1206315) have identical content requirements. It is important to note that Credit Recovery courses are not bound by Section 1003.436(1)(a), Florida Statutes, requiring a minimum of 135 hours of bona fide instruction (120 hours in a*

school/district implementing block scheduling) in a designed course of study that contains student performance standards, since the students have previously attempted successful completion of the corresponding course. Additionally, Credit Recovery courses should ONLY be used for credit recovery, grade forgiveness, or remediation for students needing to prepare for an End-of-Course assessment retake.

Instructional Practices
Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:
1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3 Evaluate how environment and personal health are interrelated.

HE.912.C.1.4 Analyze how heredity and family history can impact personal health.

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:
1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.E.5.3	Describe and predict how the initial mass of a star determines its evolution.
SC.912.E.5.5	Explain the formation of planetary systems based on our knowledge of our Solar System and apply this knowledge to newly discovered planetary systems.
SC.912.E.5.6	Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.
SC.912.E.7.4	Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.
SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.L.14.5	Explain the evidence supporting the scientific theory of the origin of eukaryotic cells (endosymbiosis).
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.26	Identify the major parts of the brain on diagrams or models.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.52	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.

SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.

SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.P.8.6	Distinguish between bonding forces holding compounds together and other attractive forces, including hydrogen bonding and van der Waals forces.
SC.912.P.8.8	Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
SC.912.P.8.9	Apply the mole concept and the law of conservation of mass to calculate quantities of chemicals participating in reactions.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.8.12	Describe the properties of the carbon atom that make the diversity of carbon compounds possible.
SC.912.P.8.13	Identify selected functional groups and relate how they contribute to properties of carbon compounds.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.12.1:	Distinguish between scalar and vector quantities and assess which should be used to describe an event.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**

LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2002420 Integrated Science 2

GENERAL INFORMATION

Course Number:	2002420
Course Title:	Integrated Science 2
Abbreviated Title:	INTEG SCI 2
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3 Evaluate how environment and personal health are interrelated.

HE.912.C.1.4 Analyze how heredity and family history can impact personal health.

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.

SC.912.N.2.4 Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

SC.912.N.2.5 Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength

	of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.E.5.3	Describe and predict how the initial mass of a star determines its evolution.
SC.912.E.5.5	Explain the formation of planetary systems based on our knowledge of our Solar System and apply this knowledge to newly discovered planetary systems.
SC.912.E.5.6	Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.
SC.912.E.7.4	Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.
SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.L.14.5	Explain the evidence supporting the scientific theory of the origin of eukaryotic cells (endosymbiosis).
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.26	Identify the major parts of the brain on diagrams or models.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.52	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.

SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.P.8.6	Distinguish between bonding forces holding compounds together and other attractive forces, including hydrogen bonding and van der Waals forces.
SC.912.P.8.8	Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
SC.912.P.8.9	Apply the mole concept and the law of conservation of mass to calculate quantities of chemicals participating in reactions.

SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.8.12	Describe the properties of the carbon atom that make the diversity of carbon compounds possible.
SC.912.P.8.13	Identify selected functional groups and relate how they contribute to properties of carbon compounds.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.12.1:	Distinguish between scalar and vector quantities and assess which should be used to describe an event.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**

MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2002410 Integrated Science 1 Honors

GENERAL INFORMATION

Course Number:	2002410
Course Title:	Integrated Science 1 Honors
Abbreviated Title:	INTEG SCI 1 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	While the content focus of this course is consistent with the Integrated Science 1 course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.5 Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.

SC.912.N.2.1 Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).

SC.912.N.2.3 Identify examples of pseudoscience (such as astrology, phrenology) in society.

SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.E.5.1	Cite evidence used to develop and verify the scientific theory of the Big Bang (also known as the Big Bang Theory) of the origin of the universe.
SC.912.E.5.2	Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.6.1	Describe and differentiate the layers of Earth and the interactions among them.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.6.3	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.
SC.912.E.6.6	Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.

SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.
SC.912.L.14.1	Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.4	Compare and contrast structure and function of various types of microscopes.
SC.912.L.14.7	Relate the structure of each of the major plant organs and tissues to physiological processes.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.3	Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.

SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.2	Describe the important structural characteristics of monosaccharides, disaccharides, and polysaccharides and explain the functions of carbohydrates in living things.
SC.912.L.18.3	Describe the structures of fatty acids, triglycerides, phospholipids, and steroids. Explain the functions of lipids in living organisms. Identify some reactions that fatty acids undergo. Relate the structure and function of cell membranes.
SC.912.L.18.4	Describe the structures of proteins and amino acids. Explain the functions of proteins in living organisms. Identify some reactions that amino acids undergo. Relate the structure and function of enzymes.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and

	electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.8	Explain entropy's role in determining the efficiency of processes that convert energy to work.
SC.912.P.10.19	Explain that all objects emit and absorb electromagnetic radiation and distinguish between objects that are blackbody radiators and those that are not.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.8	Recognize that Newton’s Laws are a limiting case of Einstein’s Special Theory of Relativity at speeds that are much smaller than the speed of light.
SC.912.P.12.9	Recognize that time, length, and energy depends on the frame of reference.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**

LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.
MACC.912.N-VM	**Vector and Matrix Quantities**
MACC.912.N-VM.1	**Represent and model with vector quantities**
MACC.912.N-VM.1.3	Solve problems involving velocity and other quantities that can be represented by vectors.

Course: 2002405 Integrated Science 1 for Credit Recovery

GENERAL INFORMATION

Course Number:	2002405
Course Title:	Integrated Science 1 for Credit Recovery
Abbreviated Title:	INTEG SCI 1 CR
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	R
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	*Credit Recovery courses are credit bearing courses with specific content requirements defined by Next Generation Sunshine State Standards and/or Common Core State Standards. Students enrolled in a Credit Recovery course must have previously attempted the corresponding course (and/or End-of-Course assessment) since the course requirements for the Credit Recovery course are exactly the same as the previously attempted corresponding course. For example, Geometry (1206310) and Geometry for Credit Recovery (1206315) have identical content requirements. It is important to note that Credit Recovery courses are not bound by Section 1003.436(1)(a), Florida Statutes, requiring a minimum of 135 hours of bona fide instruction (120 hours in a school/district implementing block scheduling) in a designed course of*

study that contains student performance standards, since the students have previously attempted successful completion of the corresponding course. Additionally, Credit Recovery courses should ONLY be used for credit recovery, grade forgiveness, or remediation for students needing to prepare for an End-of-Course assessment retake.

Special Notes: Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.E.5.1	Cite evidence used to develop and verify the scientific theory of the Big Bang (also known as the Big Bang Theory) of the origin of the universe.
SC.912.E.5.2	Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.6.1	Describe and differentiate the layers of Earth and the interactions among them.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.6.3	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.
SC.912.L.14.1	Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.

SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.14.4	Compare and contrast structure and function of various types of microscopes.
SC.912.L.14.7	Relate the structure of each of the major plant organs and tissues to physiological processes.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.3	Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.

SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2002400 Integrated Science 1

GENERAL INFORMATION

Course Number:	2002400
Course Title:	Integrated Science 1
Abbreviated Title:	INTEG SCI 1
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.

SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.E.5.1	Cite evidence used to develop and verify the scientific theory of the Big Bang (also known as the Big Bang Theory) of the origin of the universe.
SC.912.E.5.2	Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.6.1	Describe and differentiate the layers of Earth and the interactions among them.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.6.3	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.
SC.912.L.14.1	Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.14.4	Compare and contrast structure and function of various types of microscopes.
SC.912.L.14.7	Relate the structure of each of the major plant organs and tissues to physiological processes.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.

SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.3	Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.

SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2002370 Experimental Science 4 Honors

GENERAL INFORMATION

Course Number:	2002370
Course Title:	Experimental Science 4 Honors
Abbreviated Title:	EXP SCI 4 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: General Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Elective
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	In addition to the course related benchmarks, this course requires additional science content that must include benchmarks from at least one other Body of Knowledge. The additional benchmarks must include rigor appropriate for Level 3 courses and should not duplicate additional content addressed in Experimental Science 1, 2 and 3. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations,
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.2.4 Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

SC.912.N.2.5 Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the

	potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**

MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2002360 Experimental Science 3 Honors

GENERAL INFORMATION

Course Number:	2002360
Course Title:	Experimental Science 3 Honors
Abbreviated Title:	EXP SCI 3 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: General Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Elective
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	In addition to the course related benchmarks, this course requires additional science content that must include benchmarks from at least one other Body of Knowledge. The additional benchmarks must include rigor appropriate for Level 3 courses and should not duplicate additional content addressed in Experimental Science 1 and 2. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.

4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations,
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.2.4 Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

SC.912.N.2.5 Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.

SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**

LACC.910.RST.3.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

LACC.1112.RST.3 Integration of Knowledge and Ideas
LACC.1112.RST.3.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

LACC.910.RST.4 Range of Reading and Level of Text Complexity
LACC.910.RST.4.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

LACC.1112.RST.4 Range of Reading and Level of Text Complexity
LACC.1112.RST.4.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

LACC.910.WHST.1 Text Types and Purposes
LACC.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.1 Text Types and Purposes
LACC.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.3 Research to Build and Present Knowledge
LACC.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3 Research to Build and Present Knowledge
LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF Interpreting Functions
MACC.912.F-IF.3 Analyze functions using different representations.
MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q Quantities
MACC.912.N-Q.1 Reason quantitatively and use units to solve problems.
MACC.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

MACC.912.S-IC Make Inferences and Justify Conclusions
MACC.912.S-IC.2 Make inferences and justify conclusions from sample surveys, experiments, and observational studies

MACC.912.S-IC.2.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2002350 Experimental Science 2 Honors

GENERAL INFORMATION

Course Number:	2002350
Course Title:	Experimental Science 2 Honors
Abbreviated Title:	EXP SCI 2 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: General Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Elective
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	In addition to the course related benchmarks, this course requires additional science content that must include benchmarks from at least one other Body of Knowledge. The additional benchmarks must include rigor appropriate for Level 3 courses and should not duplicate additional content addressed in Experimental Science 1. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations,
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.2.4 Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

SC.912.N.2.5 Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the

	potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**

MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2002340 Experimental Science 1 Honors

GENERAL INFORMATION

Course Number:	2002340
Course Title:	Experimental Science 1 Honors
Abbreviated Title:	EXP SCI 1 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: General Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Elective
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	In addition to the course related benchmarks, this course requires additional science content that must include benchmarks from at least one other Body of Knowledge. The additional benchmarks must include rigor appropriate for Level 3 courses. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.

4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations,
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.2.4 Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

SC.912.N.2.5 Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.

SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**

LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**

MACC.912.S-IC.2.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2002330 Space Technology and Engineering

GENERAL INFORMATION

Course Number:	2002330
Course Title:	Space Technology and Engineering
Abbreviated Title:	SPACE TECH ENG
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: General Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.11	Distinguish the various methods of measuring astronomical distances and apply each in appropriate situations.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.

SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.

SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.
SC.912.P.10.19	Explain that all objects emit and absorb electromagnetic radiation and distinguish between objects that are blackbody radiators and those that are not.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.8	Recognize that Newton's Laws are a limiting case of Einstein's Special Theory of Relativity at speeds that are much smaller than the speed of light.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

LACC.910.RST.2.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

LACC.1112.RST.2 **Craft and Structure**
LACC.1112.RST.2.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

LACC.910.RST.3 **Integration of Knowledge and Ideas**
LACC.910.RST.3.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

LACC.1112.RST.3 **Integration of Knowledge and Ideas**
LACC.1112.RST.3.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

LACC.910.RST.4 **Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

LACC.1112.RST.4 **Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

LACC.910.WHST.1 **Text Types and Purposes**
LACC.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.1 **Text Types and Purposes**
LACC.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.3 **Research to Build and Present Knowledge**
LACC.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3 **Research to Build and Present Knowledge**
LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF **Interpreting Functions**
MACC.912.F-IF.3 **Analyze functions using different representations.**
MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q **Quantities**
MACC.912.N-Q.1 **Reason quantitatively and use units to solve problems.**

MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2001350 Astronomy Solar/Galactic

GENERAL INFORMATION

Course Number:	2001350
Course Title:	Astronomy Solar/Galactic
Abbreviated Title:	ASTRONOMY
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Earth/Space Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.6	Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.
SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.5.9	Analyze the broad effects of space exploration on the economy and culture of Florida.
SC.912.E.5.11	Distinguish the various methods of measuring astronomical distances and apply each in appropriate situations.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.P.8.1	Differentiate among the four states of matter.

SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.19	Explain that all objects emit and absorb electromagnetic radiation and distinguish between objects that are blackbody radiators and those that are not.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.10.22	Construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.
SC.912.P.12.6	Qualitatively apply the concept of angular momentum.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**

LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2001340 Environmental Science

GENERAL INFORMATION

Course Number:	2001340
Course Title:	Environmental Science
Abbreviated Title:	ENV SCI
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
SC.912.E.6.6	Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.
SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.E.7.8	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.15.3	Describe how biological diversity is increased by the origin of new species and how it is decreased by the natural process of extinction.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.17.1	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.

SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.12	Discuss the political, social, and environmental consequences of sustainable use of land.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.14	Assess the need for adequate waste management strategies.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.18	Describe how human population size and resource use relate to environmental quality.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**

LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2001320 Earth/Space Science Honors

GENERAL INFORMATION

Course Number:	2001320
Course Title:	Earth/Space Science Honors
Abbreviated Title:	ERTH/SPA SCI HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Earth/Space Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Status:	SBE Approval Pending
Honors:	Yes
General Notes:	While the content focus of this course is consistent with the Earth/Space Science course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.1	Cite evidence used to develop and verify the scientific theory of the Big Bang (also known as the Big Bang Theory) of the origin of the universe.
SC.912.E.5.2	Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.
SC.912.E.5.3	Describe and predict how the initial mass of a star determines its evolution.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.5.5	Explain the formation of planetary systems based on our knowledge of our Solar System and apply this knowledge to newly discovered planetary systems.
SC.912.E.5.6	Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.
SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.5.9	Analyze the broad effects of space exploration on the economy and culture of Florida.
SC.912.E.5.10	Describe and apply the coordinate system used to locate objects in the sky.
SC.912.E.5.11	Distinguish the various methods of measuring astronomical distances and apply each in appropriate situations.
SC.912.E.6.1	Describe and differentiate the layers of Earth and the interactions among them.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.6.3	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.
SC.912.E.6.4	Analyze how specific geologic processes and features are expressed in Florida and elsewhere.

SC.912.E.6.5	Describe the geologic development of the present day oceans and identify commonly found features.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.E.7.2	Analyze the causes of the various kinds of surface and deep water motion within the oceans and their impacts on the transfer of energy between the poles and the equator.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.
SC.912.E.7.4	Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.
SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.E.7.8	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others,

10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.

SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.19	Explain that all objects emit and absorb electromagnetic radiation and distinguish between objects that are blackbody radiators and those that are not.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2001310 Earth/Space Science

GENERAL INFORMATION

Course Number:	2001310
Course Title:	Earth/Space Science
Abbreviated Title:	ERTH/SPA SCI
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Earth/Space Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.1	Cite evidence used to develop and verify the scientific theory of the Big Bang (also known as the Big Bang Theory) of the origin of the universe.
SC.912.E.5.2	Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.
SC.912.E.5.3	Describe and predict how the initial mass of a star determines its evolution.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.5.5	Explain the formation of planetary systems based on our knowledge of our Solar System and apply this knowledge to newly discovered planetary systems.
SC.912.E.5.6	Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.
SC.912.E.5.9	Analyze the broad effects of space exploration on the economy and culture of Florida.
SC.912.E.5.11	Distinguish the various methods of measuring astronomical distances and apply each in appropriate situations.
SC.912.E.6.1	Describe and differentiate the layers of Earth and the interactions among them.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.6.3	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.
SC.912.E.6.4	Analyze how specific geologic processes and features are expressed in Florida and elsewhere.
SC.912.E.6.5	Describe the geologic development of the present day oceans and identify commonly found features.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.
SC.912.E.7.4	Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.

SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.E.7.8	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the

	potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.19	Explain that all objects emit and absorb electromagnetic radiation and distinguish between objects that are blackbody radiators and those that are not.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**

LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2000800 Biology 1 - Florida’s Preinternational Baccalaureate

GENERAL INFORMATION

Course Number:	2000800
Course Title:	Biology 1 - Florida’s Preinternational Baccalaureate
Abbreviated Title:	BIO 1- FL PRE IB
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
IB International Baccalaureate:	Yes
Course Status:	SBE Approval Pending
General Notes:	This course is scheduled to be deleted from the 2013-2014 Course Code Directory. It will be replaced with the International Baccalaureate Middle Years Programme Biology Course (2000850). The course description for the International Baccalaureate Middle Years Programme course is provided through http://www.ibo.org/diploma/curriculum/group4/. What is meant by "the pre-IB"? Published 12/06/2010 07:21 PM | Updated 05/23/2011 06:21 PM Pre-IB courses have been created by individual schools or school districts since before the MYP started. These courses mapped backwards the Diploma Programme (DP) to prepare students as early as age 14. The IB was never involved in creating or approving these courses. The IB acknowledges that it is important for students to receive preparation for taking part in the DP, and that preparation is the MYP. The IB designed the MYP to address the whole child, which, as a result, has a very different philosophical approach that aims at educating all students aged 11–16. Pre-IB courses usually deal with content, with less emphasis upon the needs of the whole child or the affective domain than the MYP. A school can have a course that it calls “pre-IB” as long as it makes it clear that the course and any supporting material have been developed independently of the IB. For this reason, the school must name the course along the lines of, for example, the “Any School pre-IB course”.

Course: 2000520 Bioscience 3 Honors

GENERAL INFORMATION

Course Number:	2000520
Course Title:	Bioscience 3 Honors
Abbreviated Title:	BIOSCIENCE 3 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Status:	SBE Approval Pending
Honors:	Yes
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007). Bioscience III is an advanced laboratory based research course that will apply the conceptual knowledge and practical skills learned in Bioscience I and II. The goal of this course is to develop skills in the evaluation of research, to provide practice in scientific writing, to develop oral communication skills, and to expose students to current literature and research in the field of Bioscience. The first part of the course will focus on the analysis, evaluation, and discussion of recent Bioscience-related research publications. Students will be required to provide both oral and written evaluations of the publications that are discussed. Students will

form teams and work with faculty to design and implement an independent research project, prepare a technical paper, and present their results. Students will be given the option to participate in local and/or national science competitions. Students will have opportunities to contact mentors from surrounding Bioscience educational and research facilities for advice during the development and implementation of their research projects.

Independent laboratory activities should emphasize experimental design of an original research project and may include but should not be limited to:

- Determine and implement specific electrophoresis techniques
- Primer Design specified by the parameters of the research project
- Plasmid Design
- Extraction and purification of DNA and/or protein

Special Notes: Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

Pre-requisites: Bioscience II Corequisite: Equally rigorous science course

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,

10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.

SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.L.16.11	Discuss the technologies associated with forensic medicine and DNA identification, including restriction fragment length polymorphism (RFLP) analysis.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.
SS.912.C.2.4	Evaluate, take, and defend positions on issues that cause the government to balance the interests of individuals with the public good.
SS.912.C.2.5	Conduct a service project to further the public good.
SS.912.C.2.8	Analyze the impact of citizen participation as a means of achieving political and social change.
SS.912.C.2.10	Monitor current public issues in Florida.
SS.912.C.2.13	Analyze various forms of political communication and evaluate for bias, factual accuracy, omission, and emotional appeal.
HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.

RELATED STANDARDS/BENCHMARKS

LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

LACC.1112.RST.2 **Craft and Structure**

LACC.1112.RST.2.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

LACC.1112.RST.3 **Integration of Knowledge and Ideas**

LACC.1112.RST.3.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

LACC.1112.RST.3.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

LACC.1112.WHST.1 **Text Types and Purposes**

LACC.1112.WHST.1.1 Write arguments focused on discipline-specific content.

LACC.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.2 **Production and Distribution of Writing**

LACC.1112.WHST.2.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

LACC.1112.WHST.3 **Research to Build and Present Knowledge**

LACC.1112.WHST.3.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

LACC.1112.WHST.3.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.

LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.A-CED **Creating Equations**

MACC.912.A-CED.1 **Create equations that describe numbers or relationship.**

MACC.912.A-CED.1.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm’s law V = IR to highlight resistance R.*

MACC.912.A.SSE	**Seeing Structure in Expressions**
MACC.912.A.SSE.1	**Interpret the structure of expressions.**
MACC.912.A-SSE.1	Interpret expressions that represent a quantity in terms of context.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.2	Reason quantitatively and use units to solve problems. Define appropriate quantities for the purpose of descriptive modeling.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Making Inferences & Justifying Conclusion**
MACC.912.S-IC.1	**Understand and evaluate random processes underlying statistical experiments**
MACC.9-12.S.IC.1.1	Understand and evaluate random processes underlying statistical experiments. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.*
MACC.9-12.S.IC.1.5	Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.*
MACC.912.S-ID	**Interpreting Categorical & Quantitative Data**
MACC.912.S-ID.1	**Summarize, represent, and interpret data on a single count or measurement variable**
MACC.912.S-ID.1.6	Summarize, represent, and interpret data on two categorical and quantitative variables. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.*
MACC.912.S-ID.1.8	Compute (using technology) and interpret the correlation coefficient of a linear fit.

*Modeling Standards: Modeling is the process of choosing and using appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions. Quantities and their relationships in physical, economic, public policy, social, and everyday situations can be modeled using mathematical and statistical methods. When making mathematical models, technology is valuable for varying assumptions, exploring consequences, and comparing predictions with data. Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards.

Course: 2000510 Bioscience 2 Honors

GENERAL INFORMATION

Course Number:	2000510
Course Title:	Bioscience 2 Honors
Abbreviated Title:	BIOSCIENCE 2 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Status:	SBE Approval Pending
Honors:	Yes
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007). Bioscience II is a rigorous laboratory based course that provides an advanced foundation in the concepts, theories, and pioneering methods involved in micro and molecular based research including medical research, functional genomics, gene discovery, agriculture and forensics. Students will learn how to design plasmids and primers for polymerase chain reactions (PCR). Course focus will be on proteomics (the study of protein expression), protein separation and analysis, protein chromatography purification, protein quantification through spectroscopy,

cladistical analysis, immunology, stem cell research, gene sequencing, and bioinformatics using BLAST (Basic Local Alignment Search Tool.) Emphasis will be placed on training students in the means by which to design experiments in preparation for independent research. Students will learn the principles, methodologies, and applications of equipment such as thermocyclers, horizontal and vertical gel electrophoresis, micropipettes, spectrophotometers, centrifuges, and other advanced laboratory apparatus used in the bioscience industry.

Laboratory activities may include but not be limited to:

- The preparation of buffer solutions and polyacrylamide gels for vertical electrophoresis
- Quantitative analysis of protein molecular weights by developing a standard curve
- Western blotting and ELISA testing
- The preparation of serial dilutions for spectroscopy to determine unknown concentrations
- Bacterial transformation and ligation using bacterial blue/white screening
- Extraction of DNA for chromatography purification to be used for electrophoresis
- Polymerase chain reactions using self designed primers
- Gene Sequencing and Bioinformatics

Special Notes: Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

Prerequisite: Honors Chemistry and Bioscience I/or AP Biology Corequisite: Honors Physics

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,

6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.

SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.52	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.6	Discuss the mechanisms for regulation of gene expression in prokaryotes and eukaryotes at transcription and translation level.
SC.912.L.16.7	Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.12	Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning).

SC.912.L.18.4	Describe the structures of proteins and amino acids. Explain the functions of proteins in living organisms. Identify some reactions that amino acids undergo. Relate the structure and function of enzymes.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
SS.912.C.2.4	Evaluate, take, and defend positions on issues that cause the government to balance the interests of individuals with the public good.
SS.912.C.2.8	Analyze the impact of citizen participation as a means of achieving political and social change.
SS.912.C.2.13	Analyze various forms of political communication and evaluate for bias, factual accuracy, omission, and emotional appeal.

RELATED STANDARDS/BENCHMARKS

LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.2	**Production and Distribution of Writing**

LACC.1112.WHST.2.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

LACC.1112.WHST.3 Research to Build and Present Knowledge

LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.A-CED Creating Equations

MACC.912.A-CED.1 Create equations that describe numbers or relationship.

MACC.912.A-CED.1.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.*

MACC.912.A.SSE Seeing Structure in Expressions

MACC.912.A.SSE.1 Interpret the structure of expressions.

MACC.912.A-SSE.1 Interpret expressions that represent a quantity in terms of context.

MACC.912.F-IF Interpreting Functions

MACC.912.F-IF.3 Analyze functions using different representations.

MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.F-IF.4 Interpret functions that arise in applications in terms of the context.

MACC.912.F.IF.4.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features

MACC.912.F-LE Functions: Linear, Quadratic, & Exponential Models

MACC.912.F-LE.1 Construct and compare linear, quadratic, and exponential models and solve problems.

MACC.912.F-LE.1.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

MACC.912.N-Q Quantities

MACC.912.N-Q.1 Reason quantitatively and use units to solve problems.

MACC.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.2 Reason quantitatively and use units to solve problems. Define appropriate quantities for the purpose of descriptive modeling.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

MACC.912.S-ID Interpreting Categorical & Quantitative Data

MACC.912.S-ID.1	**Summarize, represent, and interpret data on a single count or measurement variable**
MACC.912.S-ID.1.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
MACC.912.S-ID.1.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
MACC.912.S-ID.1.6	Summarize, represent, and interpret data on two categorical and quantitative variables. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.*

*Modeling Standards: Modeling is the process of choosing and using appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions. Quantities and their relationships in physical, economic, public policy, social, and everyday situations can be modeled using mathematical and statistical methods. When making mathematical models, technology is valuable for varying assumptions, exploring consequences, and comparing predictions with data. Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards.

Course: 2000500 Bioscience I Honors

GENERAL INFORMATION

Course Number:	2000500
Course Title:	Bioscience 1 Honors
Abbreviated Title:	BIOSCIENCE 1 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Status:	SBE Approval Pending
Honors:	Yes
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007). Bioscience I is a laboratory based course that focuses on introducing students to the basic lab techniques, equipment, critical thinking, work ethics, and communication skills currently used in the medical, agricultural, marine and industrial bioscience fields. Students will gain an understanding of basic DNA and molecular biology, epigenetics, genetically modified foods, bacterial plasmids, and forensics. Students will learn the principles, methodologies, and applications of equipment such as thermocyclers, horizontal gel electrophoresis apparatus, micropipettes, spectrophotometers, centrifuges, etc. Students will gain proficiency in calculating, preparing, and pH control of common lab

reagents, solutions, buffers, and agarose gels. Students will learn the principles of qualitative and quantitative analysis using biomolecular indicators, spectrophotometry, and standard curves. Topics covered will include the genetics of cancer, epigenetics, emerging and re-emerging infectious diseases that affect plants and animals, ethics of bioscience, and careers in bioscience.

Laboratory activities should include but not be limited to:

- Sterilization, handling and safety requirements according to standard operating procedures,
- The preparation of buffer solutions and agarose gels for horizontal electrophoresis,
- The preparation of solutions for spectroscopy,
- Use a spectrophotometer to measure solution concentrations and graph standard curves,
- Bacterial transformation and ligation using the Green fluorescent protein gene,
- Extraction of DNA,
- Quantitative analysis of DNA molecular weights,
- Polymerase chain reactions using given primers,
- Simulate DNA fingerprinting techniques used in crime scene analysis using given gene sequences

Special Notes: Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

Prerequisite: Honors Biology Corequisite: Honors Chemistry

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),

7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.5 Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.

SC.912.N.2.1 Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).

SC.912.N.2.2 Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.

SC.912.N.2.3 Identify examples of pseudoscience (such as astrology, phrenology) in society.

SC.912.N.2.4 Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

SC.912.N.2.5 Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.

SC.912.N.3.1 Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.

SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.L.14.1	Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.6	Discuss the mechanisms for regulation of gene expression in prokaryotes and eukaryotes at transcription and translation level.
SC.912.L.16.7	Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology.

SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.12	Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning).
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.2	Describe the important structural characteristics of monosaccharides, disaccharides, and polysaccharides and explain the functions of carbohydrates in living things.
SC.912.L.18.3	Describe the structures of fatty acids, triglycerides, phospholipids, and steroids. Explain the functions of lipids in living organisms. Identify some reactions that fatty acids undergo. Relate the structure and function of cell membranes.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.8.12	Describe the properties of the carbon atom that make the diversity of carbon compounds possible.
SC.912.P.8.13	Identify selected functional groups and relate how they contribute to properties of carbon compounds.
HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
SS.912.C.2.4	Evaluate, take, and defend positions on issues that cause the government to balance the interests of individuals with the public good.
SS.912.C.2.8	Analyze the impact of citizen participation as a means of achieving political and social change.
SS.912.C.2.13	Analyze various forms of political communication and evaluate for bias, factual accuracy, omission, and emotional appeal.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.2	**Production and Distribution of Writing**
LACC.910.WHST.2.6	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
LACC.1112.WHST.2	**Production and Distribution of Writing**
LACC.1112.WHST.2.6	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.A-CED	**Creating Equations**
MACC.912.A-CED.1	**Create equations that describe numbers or relationship.**
MACC.912.A-CED.1.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.*
MACC.912.A.SSE	**Seeing Structure in Expressions**
MACC.912.A.SSE.1	**Interpret the structure of expressions.**
MACC.912.A-SSE.1	Interpret expressions that represent a quantity in terms of context.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.F-IF.4	**Interpret functions that arise in applications in terms of the context.**
MACC.912.F.IF.4.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features
MACC.912.F-LE	**Functions: Linear, Quadratic, & Exponential Models**
MACC.912.F-LE.1	**Construct and compare linear, quadratic, and exponential models and solve problems**.
MACC.912.F-LE.1.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**

MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.2	Reason quantitatively and use units to solve problems. Define appropriate quantities for the purpose of descriptive modeling.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-ID	**Interpreting Categorical & Quantitative Data**
MACC.912.S-ID.1	**Summarize, represent, and interpret data on a single count or measurement variable**
MACC.912.S-ID.1.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
MACC.912.S-ID.1.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
MACC.912.S-ID.1.6	Summarize, represent, and interpret data on two categorical and quantitative variables. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.*

*Modeling Standards: Modeling is the process of choosing and using appropriate mathematics and statistics to analyze empirical situations, to understand them better, and to improve decisions. Quantities and their relationships in physical, economic, public policy, social, and everyday situations can be modeled using mathematical and statistical methods. When making mathematical models, technology is valuable for varying assumptions, exploring consequences, and comparing predictions with data. Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards.

Course: 2000440 Genetics Honors

GENERAL INFORMATION

Course Number:	2000440
Course Title:	Genetics Honors
Abbreviated Title:	GENETICS HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Status:	SBE Approval Pending
General Notes:	The academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.L.15.9	Explain the role of reproductive isolation in the process of speciation.
SC.912.L.15.12	List the conditions for Hardy-Weinberg equilibrium in a population and why these conditions are not likely to appear in nature. Use the Hardy-Weinberg equation to predict genotypes in a population from observed phenotypes.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.6	Discuss the mechanisms for regulation of gene expression in prokaryotes and eukaryotes at transcription and translation level.
SC.912.L.16.7	Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.11	Discuss the technologies associated with forensic medicine and DNA identification, including restriction fragment length polymorphism (RFLP) analysis.

SC.912.L.16.12	Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning).
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.1	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).

SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

LACC.1112.RST.3 **Integration of Knowledge and Ideas**
LACC.1112.RST.3.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

LACC.910.RST.4 **Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

LACC.1112.RST.4 **Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

LACC.910.WHST.1 **Text Types and Purposes**
LACC.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.1 **Text Types and Purposes**
LACC.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.3 **Research to Build and Present Knowledge**
LACC.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3 **Research to Build and Present Knowledge**
LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF **Interpreting Functions**
MACC.912.F-IF.3 **Analyze functions using different representations.**
MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q **Quantities**
MACC.912.N-Q.1 **Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

MACC.912.S-IC **Make Inferences and Justify Conclusions**
MACC.912.S-IC.2 **Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6 Evaluate reports based on data.

Course: 2000430 Biology Technology

GENERAL INFORMATION

Course Number:	2000430
Course Title:	Biology Technology
Abbreviated Title:	BIOTECH
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
HE.912.C.1.8	Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.14.4	Compare and contrast structure and function of various types of microscopes.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.7	Relate the structure of each of the major plant organs and tissues to physiological processes.
SC.912.L.14.26	Identify the major parts of the brain on diagrams or models.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.52	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.L.15.10	Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.

SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.6	Discuss the mechanisms for regulation of gene expression in prokaryotes and eukaryotes at transcription and translation level.
SC.912.L.16.7	Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.11	Discuss the technologies associated with forensic medicine and DNA identification, including restriction fragment length polymorphism (RFLP) analysis.
SC.912.L.16.12	Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning).
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.

SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.6	Discuss the role of anaerobic respiration in living things and in human society.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence,

5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

LACC.910.WHST.1 **Text Types and Purposes**
LACC.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.1 **Text Types and Purposes**
LACC.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.3 **Research to Build and Present Knowledge**
LACC.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3 **Research to Build and Present Knowledge**
LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF **Interpreting Functions**
MACC.912.F-IF.3 **Analyze functions using different representations.**
MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q **Quantities**
MACC.912.N-Q.1 **Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2000410 Zoology

GENERAL INFORMATION

Course Number:	2000410
Course Title:	Zoology
Abbreviated Title:	ZOOLOGY
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.14.5	Explain the evidence supporting the scientific theory of the origin of eukaryotic cells (endosymbiosis).
SC.912.L.14.12	Describe the anatomy and histology of bone tissue.
SC.912.L.14.26	Identify the major parts of the brain on diagrams or models.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.44	Describe the physiology of the respiratory system including the mechanisms of ventilation, gas exchange, gas transport and the mechanisms that control the rate of ventilation.
SC.912.L.14.50	Describe the structure of vertebrate sensory organs. Relate structure to function in vertebrate sensory systems.
SC.912.L.14.51	Describe the function of the vertebrate integumentary system.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.3	Describe how biological diversity is increased by the origin of new species and how it is decreased by the natural process of extinction.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.7	Discuss distinguishing characteristics of vertebrate and representative invertebrate phyla, and chordate classes using typical examples.
SC.912.L.15.11	Discuss specific fossil hominids and what they show about human evolution.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.

SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.

LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**

LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2000390 Limnology

GENERAL INFORMATION

Course Number:	2000390
Course Title:	Limnology
Abbreviated Title:	LIMNOLOGY
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.17.1	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.3	Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.14	Assess the need for adequate waste management strategies.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation.

	Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**

MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q Quantities

MACC.912.N-Q.1 Reason quantitatively and use units to solve problems.

MACC.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2000380 Ecology

GENERAL INFORMATION

Course Number:	2000380
Course Title:	Ecology
Abbreviated Title:	ECOLOGY
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.15.12	List the conditions for Hardy-Weinberg equilibrium in a population and why these conditions are not likely to appear in nature. Use the Hardy-Weinberg equation to predict genotypes in a population from observed phenotypes.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.17.1	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.3	Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.

SC.912.L.17.17	Assess the effectiveness of innovative methods of protecting the environment.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**

LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**

MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2000370 Botany

GENERAL INFORMATION

Course Number:	2000370
Course Title:	Botany
Abbreviated Title:	BOTANY
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.14.5	Explain the evidence supporting the scientific theory of the origin of eukaryotic cells (endosymbiosis).
SC.912.L.14.7	Relate the structure of each of the major plant organs and tissues to physiological processes.
SC.912.L.14.8	Explain alternation of generations in plants.
SC.912.L.14.9	Relate the major structure of fungi to their functions.
SC.912.L.14.10	Discuss the relationship between the evolution of land plants and their anatomy.
SC.912.L.14.53	Discuss basic classification and characteristics of plants. Identify bryophytes, pteridophytes, gymnosperms, and angiosperms.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.3	Describe how biological diversity is increased by the origin of new species and how it is decreased by the natural process of extinction.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.

SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.5	Discuss the use of chemiosmotic gradients for ATP production in chloroplasts and mitochondria.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.

SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.P.8.12	Describe the properties of the carbon atom that make the diversity of carbon compounds possible.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2000360 Anatomy and Physiology Honors

GENERAL INFORMATION

Course Number:	2000360
Course Title:	Anatomy and Physiology Honors
Abbreviated Title:	ANAT PHYSIO HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Status:	SBE Approval Pending
Honors:	Yes
General Notes:	While the content focus of this course is consistent with the Anatomy and Physiology course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.14.11	Classify and state the defining characteristics of epithelial tissue, connective tissue, muscle tissue, and nervous tissue.
SC.912.L.14.12	Describe the anatomy and histology of bone tissue.
SC.912.L.14.13	Distinguish between bones of the axial skeleton and the appendicular skeleton.
SC.912.L.14.14	Identify the major bones of the axial and appendicular skeleton.
SC.912.L.14.15	Identify major markings (such as foramina, fossae, tubercles, etc.) on a skeleton. Explain why these markings are important.
SC.912.L.14.16	Describe the anatomy and histology, including ultrastructure, of muscle tissue.
SC.912.L.14.17	List the steps involved in the sliding filament of muscle contraction.
SC.912.L.14.18	Describe signal transmission across a myoneural junction.
SC.912.L.14.19	Explain the physiology of skeletal muscle.
SC.912.L.14.20	Identify the major muscles of the human on a model or diagram.
SC.912.L.14.21	Describe the anatomy, histology, and physiology of the central and peripheral nervous systems and name the major divisions of the nervous system.
SC.912.L.14.22	Describe the physiology of nerve conduction, including the generator potential, action potential, and the synapse.
SC.912.L.14.23	Identify the parts of a reflex arc.
SC.912.L.14.25	Identify the major parts of a cross section through the spinal cord.
SC.912.L.14.27	Identify the functions of the major parts of the brain, including the meninges, medulla, pons, midbrain, hypothalamus, thalamus, cerebellum and cerebrum.
SC.912.L.14.28	Identify the major functions of the spinal cord.
SC.912.L.14.29	Define the terms endocrine and exocrine.
SC.912.L.14.30	Compare endocrine and neural controls of physiology.
SC.912.L.14.31	Describe the physiology of hormones including the different types and the mechanisms of their action.

SC.912.L.14.34	Describe the composition and physiology of blood, including that of the plasma and the formed elements.
SC.912.L.14.35	Describe the steps in hemostasis, including the mechanism of coagulation. Include the basis for blood typing and transfusion reactions.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.37	Explain the components of an electrocardiogram.
SC.912.L.14.38	Describe normal heart sounds and what they mean.
SC.912.L.14.39	Describe hypertension and some of the factors that produce it.
SC.912.L.14.40	Describe the histology of the major arteries and veins of systemic, pulmonary, hepatic portal, and coronary circulation.
SC.912.L.14.41	Describe fetal circulation and changes that occur to the circulatory system at birth.
SC.912.L.14.42	Describe the anatomy and the physiology of the lymph system.
SC.912.L.14.43	Describe the histology of the respiratory system.
SC.912.L.14.44	Describe the physiology of the respiratory system including the mechanisms of ventilation, gas exchange, gas transport and the mechanisms that control the rate of ventilation.
SC.912.L.14.45	Describe the histology of the alimentary canal and its associated accessory organs.
SC.912.L.14.46	Describe the physiology of the digestive system, including mechanical digestion, chemical digestion, absorption and the neural and hormonal mechanisms of control.
SC.912.L.14.47	Describe the physiology of urine formation by the kidney.
SC.912.L.14.48	Describe the anatomy, histology, and physiology of the ureters, the urinary bladder and the urethra.
SC.912.L.14.49	Identify the major functions associated with the sympathetic and parasympathetic nervous systems.
SC.912.L.14.50	Describe the structure of vertebrate sensory organs. Relate structure to function in vertebrate sensory systems.
SC.912.L.14.51	Describe the function of the vertebrate integumentary system.
SC.912.L.14.52	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.

SC.912.L.18.2	Describe the important structural characteristics of monosaccharides, disaccharides, and polysaccharides and explain the functions of carbohydrates in living things.
SC.912.L.18.3	Describe the structures of fatty acids, triglycerides, phospholipids, and steroids. Explain the functions of lipids in living organisms. Identify some reactions that fatty acids undergo. Relate the structure and function of cell membranes.
SC.912.L.18.4	Describe the structures of proteins and amino acids. Explain the functions of proteins in living organisms. Identify some reactions that amino acids undergo. Relate the structure and function of enzymes.
SC.912.L.18.6	Discuss the role of anaerobic respiration in living things and in human society.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**

LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2000350 Anatomy and Physiology

GENERAL INFORMATION

Course Number:	2000350
Course Title:	Anatomy and Physiology
Abbreviated Title:	ANAT PHYSIO
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
SC.912.L.14.11	Classify and state the defining characteristics of epithelial tissue, connective tissue, muscle tissue, and nervous tissue.
SC.912.L.14.12	Describe the anatomy and histology of bone tissue.
SC.912.L.14.13	Distinguish between bones of the axial skeleton and the appendicular skeleton.
SC.912.L.14.14	Identify the major bones of the axial and appendicular skeleton.
SC.912.L.14.16	Describe the anatomy and histology, including ultrastructure, of muscle tissue.
SC.912.L.14.17	List the steps involved in the sliding filament of muscle contraction.
SC.912.L.14.18	Describe signal transmission across a myoneural junction.
SC.912.L.14.20	Identify the major muscles of the human on a model or diagram.
SC.912.L.14.21	Describe the anatomy, histology, and physiology of the central and peripheral nervous systems and name the major divisions of the nervous system.
SC.912.L.14.23	Identify the parts of a reflex arc.
SC.912.L.14.24	Identify the general parts of a synapse and describe the physiology of signal transmission across a synapse.
SC.912.L.14.25	Identify the major parts of a cross section through the spinal cord.
SC.912.L.14.26	Identify the major parts of the brain on diagrams or models.
SC.912.L.14.28	Identify the major functions of the spinal cord.
SC.912.L.14.29	Define the terms endocrine and exocrine.
SC.912.L.14.30	Compare endocrine and neural controls of physiology.
SC.912.L.14.32	Describe the anatomy and physiology of the endocrine system.
SC.912.L.14.33	Describe the basic anatomy and physiology of the reproductive system.
SC.912.L.14.34	Describe the composition and physiology of blood, including that of the plasma and the formed elements.
SC.912.L.14.35	Describe the steps in hemostasis, including the mechanism of coagulation. Include the basis for blood typing and transfusion reactions.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.38	Describe normal heart sounds and what they mean.
SC.912.L.14.39	Describe hypertension and some of the factors that produce it.
SC.912.L.14.41	Describe fetal circulation and changes that occur to the circulatory system at birth.

SC.912.L.14.42	Describe the anatomy and the physiology of the lymph system.
SC.912.L.14.44	Describe the physiology of the respiratory system including the mechanisms of ventilation, gas exchange, gas transport and the mechanisms that control the rate of ventilation.
SC.912.L.14.46	Describe the physiology of the digestive system, including mechanical digestion, chemical digestion, absorption and the neural and hormonal mechanisms of control.
SC.912.L.14.47	Describe the physiology of urine formation by the kidney.
SC.912.L.14.49	Identify the major functions associated with the sympathetic and parasympathetic nervous systems.
SC.912.L.14.50	Describe the structure of vertebrate sensory organs. Relate structure to function in vertebrate sensory systems.
SC.912.L.14.51	Describe the function of the vertebrate integumentary system.
SC.912.L.14.52	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**

LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2000330 Biology 2 Honors

GENERAL INFORMATION

Course Number:	2000330
Course Title:	Biology 2 Honors
Abbreviated Title:	BIO 2 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Status:	SBE Approval Pending
Honors:	Yes
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text.

5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.8	Explain alternation of generations in plants.
SC.912.L.14.9	Relate the major structure of fungi to their functions.
SC.912.L.14.50	Describe the structure of vertebrate sensory organs. Relate structure to function in vertebrate sensory systems.
SC.912.L.14.53	Discuss basic classification and characteristics of plants. Identify bryophytes, pteridophytes, gymnosperms, and angiosperms.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.7	Discuss distinguishing characteristics of vertebrate and representative invertebrate phyla, and chordate classes using typical examples.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.L.15.9	Explain the role of reproductive isolation in the process of speciation.
SC.912.L.15.11	Discuss specific fossil hominids and what they show about human evolution.
SC.912.L.16.6	Discuss the mechanisms for regulation of gene expression in prokaryotes and eukaryotes at transcription and translation level.
SC.912.L.16.7	Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology.
SC.912.L.16.11	Discuss the technologies associated with forensic medicine and DNA identification, including restriction fragment length polymorphism (RFLP) analysis.
SC.912.L.16.12	Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning).
SC.912.L.16.15	Compare and contrast binary fission and mitotic cell division.

SC.912.L.17.1	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
SC.912.L.17.3	Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.12	Discuss the political, social, and environmental consequences of sustainable use of land.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.14	Assess the need for adequate waste management strategies.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.17	Assess the effectiveness of innovative methods of protecting the environment.
SC.912.L.17.18	Describe how human population size and resource use relate to environmental quality.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.5	Discuss the use of chemiosmotic gradients for ATP production in chloroplasts and mitochondria.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.

SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.

SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.10	Describe oxidation-reduction reactions in living and non-living systems.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**

LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**

MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2000320 Biology 1 Honors

GENERAL INFORMATION

Course Number:	2000320
Course Title:	Biology 1 Honors
Abbreviated Title:	BIO 1 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Status:	SBE Approval Pending
Honors:	Yes
General Notes:	While the content focus of this course is consistent with the Biology I course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.

4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
HE.912.C.1.8	Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.L.14.1	Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.14.4	Compare and contrast structure and function of various types of microscopes.
SC.912.L.14.5	Explain the evidence supporting the scientific theory of the origin of eukaryotic cells (endosymbiosis).
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.7	Relate the structure of each of the major plant organs and tissues to physiological processes.
SC.912.L.14.26	Identify the major parts of the brain on diagrams or models.
SC.912.L.14.27	Identify the functions of the major parts of the brain, including the meninges, medulla, pons, midbrain, hypothalamus, thalamus, cerebellum and cerebrum.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.52	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.

SC.912.L.15.2	Discuss the use of molecular clocks to estimate how long ago various groups of organisms diverged evolutionarily from one another.
SC.912.L.15.3	Describe how biological diversity is increased by the origin of new species and how it is decreased by the natural process of extinction.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.L.15.10	Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.12	Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning).

SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.15	Compare and contrast binary fission and mitotic cell division.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability. *(Within the context of this benchmark, the Biology 1 EOC also assesses SC.912.L.17.13 Discuss the need for adequate monitoring of environmental parameters when making policy decisions).*
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.2	Describe the important structural characteristics of monosaccharides, disaccharides, and polysaccharides and explain the functions of carbohydrates in living things.

SC.912.L.18.3	Describe the structures of fatty acids, triglycerides, phospholipids, and steroids. Explain the functions of lipids in living organisms. Identify some reactions that fatty acids undergo. Relate the structure and function of cell membranes.
SC.912.L.18.4	Describe the structures of proteins and amino acids. Explain the functions of proteins in living organisms. Identify some reactions that amino acids undergo. Relate the structure and function of enzymes.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**

LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**

MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2000315 Biology 1 for Credit Recovery

GENERAL INFORMATION

Course Number:	2000315
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Course Title:	Biology 1 for Credit Recovery
Course Section:	Grades PreK to 12 Education Courses
Abbreviated Title:	BIO 1 CR
Number of Credits:	One credit (1)
Course Length:	R
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Biology 1 for Credit Recovery
Special Notes:	*Credit Recovery courses are credit bearing courses with specific content requirements defined by Next Generation Sunshine State Standards and/or Common Core State Standards. Students enrolled in a Credit Recovery course must have previously attempted the corresponding course (and/or End-of-Course assessment) since the course requirements for the Credit Recovery course are exactly the same as the previously attempted corresponding course. For example, Geometry (1206310) and Geometry for Credit Recovery (1206315) have identical content requirements. It is important to note that Credit Recovery courses are not bound by Section 1003.436(1)(a), Florida Statutes, requiring a minimum of 135 hours of bona fide instruction (120 hours in a school/district implementing block scheduling) in a designed course of study that contains student performance standards, since the students have previously attempted successful completion of the corresponding course. Additionally, Credit Recovery courses should ONLY be used for credit recovery, grade forgiveness, or remediation for students needing to prepare for an End-of-Course assessment retake.* Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text.

5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
HE.912.C.1.8	Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.L.14.1	Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.14.4	Compare and contrast structure and function of various types of microscopes.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.7	Relate the structure of each of the major plant organs and tissues to physiological processes.
SC.912.L.14.26	Identify the major parts of the brain on diagrams or models.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.52	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.

SC.912.L.15.10	Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.

SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),

7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2000310 Biology 1

GENERAL INFORMATION

Course Number:	2000310
Course Title:	Biology 1
Abbreviated Title:	BIO 1
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Biological Sciences »
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
HE.912.C.1.8	Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.L.14.1	Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.14.4	Compare and contrast structure and function of various types of microscopes.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.7	Relate the structure of each of the major plant organs and tissues to physiological processes.
SC.912.L.14.26	Identify the major parts of the brain on diagrams or models.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.52	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.L.15.10	Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.

SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.

SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences),

9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**

MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2000300 Intensive Science

GENERAL INFORMATION

Course Number:	2000300
Course Title:	Intensive Science
Abbreviated Title:	INTENS SCI
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Remedial Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	Multiple Credit (more than 1 credit)
Course Type:	Elective
Course Level:	1
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

LACC.910.RST.4 **Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

LACC.1112.RST.4 **Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

LACC.910.WHST.1 **Text Types and Purposes**
LACC.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.1 **Text Types and Purposes**
LACC.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.3 **Research to Build and Present Knowledge**
LACC.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3 **Research to Build and Present Knowledge**
LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF **Interpreting Functions**
MACC.912.F-IF.3 **Analyze functions using different representations.**
MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q **Quantities**
MACC.912.N-Q.1 **Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

NEXT GENERATION SUNSHINE STATE STANDARDS

All Courses:	*All courses taught under this course code should include the following science benchmarks:*
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.

Earth Science:	*Courses taught under this course code with an Earth and Space Science emphasis should include the following benchmarks:*
SC.912.E.5.1	Cite evidence used to develop and verify the scientific theory of the Big Bang (also known as the Big Bang Theory) of the origin of the universe.
SC.912.E.5.2	Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.
SC.912.E.5.3	Describe and predict how the initial mass of a star determines its evolution.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.5.5	Explain the formation of planetary systems based on our knowledge of our Solar System and apply this knowledge to newly discovered planetary systems.
SC.912.E.5.6	Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.
SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.5.9	Analyze the broad effects of space exploration on the economy and culture of Florida.
SC.912.E.6.1	Describe and differentiate the layers of Earth and the interactions among them.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.6.3	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.
SC.912.E.6.4	Analyze how specific geologic processes and features are expressed in Florida and elsewhere.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.E.7.2	Analyze the causes of the various kinds of surface and deep water motion within the oceans and their impacts on the transfer of energy between the poles and the equator.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.

SC.912.E.7.4	Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.
SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.E.7.8	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.

Life Science:	*Courses taught under this course code with a Life Science emphasis should include the following benchmarks:*
HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
HE.912.C.1.8	Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.L.14.1	Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.3	Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells.
SC.912.L.14.5	Explain the evidence supporting the scientific theory of the origin of eukaryotic cells (endosymbiosis).
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.

SC.912.L.14.7	Relate the structure of each of the major plant organs and tissues to physiological processes.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.
SC.912.L.15.10	Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.

SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.3	Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.

SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.

Environmental Science: *Courses taught under this course code with an Environmental Science emphasis should include the following benchmarks:*

HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
SC.912.E.6.6	Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.
SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.E.7.8	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.15.3	Describe how biological diversity is increased by the origin of new species and how it is decreased by the natural process of extinction.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.17.1	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.

SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.12	Discuss the political, social, and environmental consequences of sustainable use of land.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.14	Assess the need for adequate waste management strategies.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.18	Describe how human population size and resource use relate to environmental quality.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.

Physical Science:	*Courses taught under this course code with a Physical Science emphasis should include the following benchmarks:*
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.8.8	Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.

SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.10	Interpret the behavior of ideal gases in terms of kinetic molecular theory.

Course: 2020910 Astronomy Solar/Galactic Honors

GENERAL INFORMATION

Course Number:	2020910
Course Title:	Astronomy Solar/Galactic Honors
Abbreviated Title:	ASTR S/G HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Earth/Space Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
Honors:	Yes
General Notes:	While the content focus of this course is consistent with the Astronomy Solar/Galactic course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text- specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.5.9	Analyze the broad effects of space exploration on the economy and culture of Florida.
SC.912.E.5.10	Describe and apply the coordinate system used to locate objects in the sky.
SC.912.E.5.11	Distinguish the various methods of measuring astronomical distances and apply each in appropriate situations.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.
SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.

SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.

SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.19	Explain that all objects emit and absorb electromagnetic radiation and distinguish between objects that are blackbody radiators and those that are not.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.10.22	Construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.
SC.912.P.12.6	Qualitatively apply the concept of angular momentum.

SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.8	Recognize that Newton's Laws are a limiting case of Einstein's Special Theory of Relativity at speeds that are much smaller than the speed of light.
SC.912.P.12.9	Recognize that time, length, and energy depends on the frame of reference.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2020710 Nuclear Radiation Honors

GENERAL INFORMATION

Course Number:	2020710
Course Title:	Nuclear Radiation Honors (formerly 202071A)
Abbreviated Title:	NUC RADI HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
Honors:	Yes
General Notes:	While the content focus of this course is consistent with the Nuclear Radiation course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.1	Cite evidence used to develop and verify the scientific theory of the Big Bang (also known as the Big Bang Theory) of the origin of the universe.
SC.912.E.5.2	Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.
SC.912.E.5.3	Describe and predict how the initial mass of a star determines its evolution.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.6.6	Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.15.2	Discuss the use of molecular clocks to estimate how long ago various groups of organisms diverged evolutionarily from one another.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.14	Assess the need for adequate waste management strategies.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.17	Assess the effectiveness of innovative methods of protecting the environment.

SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.8	Explain entropy's role in determining the efficiency of processes that convert energy to work.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).

SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.9	Recognize that time, length, and energy depend on the frame of reference.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2003610 Principles of Technology 2

GENERAL INFORMATION

Course Number:	2003610
Course Title:	Principles of Technology 2
Abbreviated Title:	PRINC TECH 2
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.5.9	Analyze the broad effects of space exploration on the economy and culture of Florida.
SC.912.E.6.6	Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.

SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.1	Differentiate among the four states of matter.

SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.13	Relate the configuration of static charges to the electric field, electric force, electric potential, and electric potential energy.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.
SC.912.P.10.17	Explore the theory of electromagnetism by explaining electromagnetic waves in terms of oscillating electric and magnetic fields.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.10.22	Construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

LACC.910.WHST.1 **Text Types and Purposes**
LACC.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.1 **Text Types and Purposes**
LACC.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.3 **Research to Build and Present Knowledge**
LACC.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3 **Research to Build and Present Knowledge**
LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF **Interpreting Functions**
MACC.912.F-IF.3 **Analyze functions using different representations.**
MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q **Quantities**
MACC.912.N-Q.1 **Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2003600 Principles of Technology 1

GENERAL INFORMATION

Course Number:	2003600
Course Title:	Principles of Technology 1
Abbreviated Title:	PRINC TECH 1
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.

SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.

SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.13	Relate the configuration of static charges to the electric field, electric force, electric potential, and electric potential energy.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.12.1	Distinguish between scalar and vector quantities and assess which should be used to describe an event.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**

MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2003410 Physics 2 Honors

GENERAL INFORMATION

Course Number:	2003410
Course Title:	Physics 2 Honors
Abbreviated Title:	PHYS 2 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.5.9	Analyze the broad effects of space exploration on the economy and culture of Florida.
SC.912.E.5.10	Describe and apply the coordinate system used to locate objects in the sky.
SC.912.E.5.11	Distinguish the various methods of measuring astronomical distances and apply each in appropriate situations.
SC.912.E.6.6	Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.
SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.L.15.2	Discuss the use of molecular clocks to estimate how long ago various groups of organisms diverged evolutionarily from one another.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others,

	10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.

SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.8	Explain entropy's role in determining the efficiency of processes that convert energy to work.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.
SC.912.P.10.17	Explore the theory of electromagnetism by explaining electromagnetic waves in terms of oscillating electric and magnetic fields.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.19	Explain that all objects emit and absorb electromagnetic radiation and distinguish between objects that are blackbody radiators and those that are not.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.6	Qualitatively apply the concept of angular momentum.

SC.912.P.12.8	Recognize that Newton's Laws are a limiting case of Einstein's Special Theory of Relativity at speeds that are much smaller than the speed of light.
SC.912.P.12.9	Recognize that time, length, and energy depend on the frame of reference.
SC.912.P.12.10	Interpret the behavior of ideal gases in terms of kinetic molecular theory.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.A-CED	**Creating Equations**
MACC.912.A-CED.1	**Create equations that describe numbers or relationships**
MACC.912.A.CED.1.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.N-VM	**Vector and Matrix Quantities**

MACC.912.N-VM.1 Represent and model with vector quantities

MACC.912.N.VM.1.1 Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., **v**, |**v**|, ||**v**||, v).

MACC.912.N.VM.1.2 Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

MACC.912.N.VM.1.3 Solve problems involving velocity and other quantities that can be represented by vectors.

MACC.912.S-IC Make Inferences and Justify Conclusions

MACC.912.S-IC.2 Make inferences and justify conclusions from sample surveys, experiments, and observational studies

MACC.912.S-IC.2.6 Evaluate reports based on data.

Course: 2003400 Nuclear Radiation

GENERAL INFORMATION

Course Number:	2003400
Course Title:	Nuclear Radiation
Abbreviated Title:	NUCLEAR RADI
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.1	Cite evidence used to develop and verify the scientific theory of the Big Bang (also known as the Big Bang Theory) of the origin of the universe.
SC.912.E.5.2	Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.
SC.912.E.5.3	Describe and predict how the initial mass of a star determines its evolution.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.5.7	Relate the history of and explain the justification for future space exploration and continuing technology development.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.6.6	Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.15.2	Discuss the use of molecular clocks to estimate how long ago various groups of organisms diverged evolutionarily from one another.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.14	Assess the need for adequate waste management strategies.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.17	Assess the effectiveness of innovative methods of protecting the environment.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence,

5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.

SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.

SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**

LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2003390 Physics 1 Honors

GENERAL INFORMATION

Course Number:	2003390
Course Title:	Physics 1 Honors
Abbreviated Title:	PHYS 1 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
Honors:	Yes
General Notes:	While the content focus of this course is consistent with the Physics I course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.2	Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.
SC.912.E.5.6	Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.

SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.8	Explain entropy's role in determining the efficiency of processes that convert energy to work.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.13	Relate the configuration of static charges to the electric field, electric force, electric potential, and electric potential energy.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.
SC.912.P.10.17	Explore the theory of electromagnetism by explaining electromagnetic waves in terms of oscillating electric and magnetic fields.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.10.22	Construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors.
SC.912.P.12.1	Distinguish between scalar and vector quantities and assess which should be used to describe an event.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.

SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.6	Qualitatively apply the concept of angular momentum.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.8	Recognize that Newton's Laws are a limiting case of Einstein's Special Theory of Relativity at speeds that are much smaller than the speed of light.
SC.912.P.12.9	Recognize that time, length, and energy depend on the frame of reference.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**

LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.A-CED	**Creating Equations**
MACC.912.A-CED.1	**Create equations that describe numbers or relationships**
MACC.912.A.CED.1.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**

MACC.912.N-Q.1 **Reason quantitatively and use units to solve problems.**

MACC.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

MACC.912.N-VM **Vector and Matrix Quantities**

MACC.912.N-VM.1 **Represent and model with vector quantities**

MACC.912.N.VM.1.1 Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., **v**, |**v**|, ||**v**||, v).

MACC.912.N.VM.1.2 Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

MACC.912.N.VM.1.3 Solve problems involving velocity and other quantities that can be represented by vectors.

MACC.912.S-IC **Make Inferences and Justify Conclusions**

MACC.912.S-IC.2 **Make inferences and justify conclusions from sample surveys, experiments, and observational studies**

MACC.912.S-IC.2.6 Evaluate reports based on data.

Course: 2003385 Physics 1 for Credit Recovery

GENERAL INFORMATION

Course Number:	2003385
Course Title:	Physics 1 for Credit Recovery
Abbreviated Title:	PHYS 1 CR
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Varies
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	*Credit Recovery courses are credit bearing courses with specific content requirements defined by Next Generation Sunshine State Standards and/or Common Core State Standards. Students enrolled in a Credit Recovery course must have previously attempted the corresponding course (and/or End-of-Course assessment) since the course requirements for the Credit Recovery course are exactly the same as the previously attempted corresponding course. For example, Geometry (1206310) and Geometry for Credit Recovery (1206315) have identical content requirements. It is important to note that Credit Recovery courses are not bound by Section 1003.436(1)(a), Florida Statutes, requiring a minimum of 135 hours of bona fide instruction (120 hours in a*

school/district implementing block scheduling) in a designed course of study that contains student performance standards, since the students have previously attempted successful completion of the corresponding course. Additionally, Credit Recovery courses should ONLY be used for credit recovery, grade forgiveness, or remediation for students needing to prepare for an End-of-Course assessment retake.

Instructional Practices
Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:
1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.2 Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.

SC.912.E.5.6 Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:
1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.

SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.13	Relate the configuration of static charges to the electric field, electric force, electric potential, and electric potential energy.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.10.22	Construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors.
SC.912.P.12.1	Distinguish between scalar and vector quantities and assess which should be used to describe an event.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.9	Recognize that time, length, and energy depend on the frame of reference.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1 Key Ideas and Details

LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**

LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.N-VM	**Vector and Matrix Quantities**
MACC.912.N-VM.1	**Represent and model with vector quantities.**
MACC.912.N-VM.1.3	Solve problems involving velocity and other quantities that can be represented by vectors.

Course: 2003380 Physics 1

GENERAL INFORMATION

Course Number:	2003380
Course Title:	Physics 1
Abbreviated Title:	PHYS 1
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.2	Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.
SC.912.E.5.6	Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe

	that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.13	Relate the configuration of static charges to the electric field, electric force, electric potential, and electric potential energy.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.

SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.10.22	Construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors.
SC.912.P.12.1	Distinguish between scalar and vector quantities and assess which should be used to describe an event.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.9	Recognize that time, length, and energy depend on the frame of reference.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**

LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**

MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.N-VM	**Vector and Matrix Quantities**
MACC.912.N-VM.1	**Represent and model with vector quantities.**
MACC.912.N-VM.1.3	Solve problems involving velocity and other quantities that can be represented by vectors.

Course: 2003360 Chemistry 2 Honors

GENERAL INFORMATION

Course Number:	2003360
Course Title:	Chemistry 2 Honors
Abbreviated Title:	CHEM 2 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.17.17	Assess the effectiveness of innovative methods of protecting the environment.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.2	Describe the important structural characteristics of monosaccharides, disaccharides, and polysaccharides and explain the functions of carbohydrates in living things.
SC.912.L.18.3	Describe the structures of fatty acids, triglycerides, phospholipids, and steroids. Explain the functions of lipids in living organisms. Identify some reactions that fatty acids undergo. Relate the structure and function of cell membranes.
SC.912.L.18.4	Describe the structures of proteins and amino acids. Explain the functions of proteins in living organisms. Identify some reactions that amino acids undergo. Relate the structure and function of enzymes.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.

SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.10	Describe oxidation-reduction reactions in living and non-living systems.
SC.912.P.8.12	Describe the properties of the carbon atom that make the diversity of carbon compounds possible.
SC.912.P.8.13	Identify selected functional groups and relate how they contribute to properties of carbon compounds.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.8	Explain entropy's role in determining the efficiency of processes that convert energy to work.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**

MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2003350 Chemistry 1 Honors

GENERAL INFORMATION

Course Number:	2003350
Course Title:	Chemistry 1 Honors
Abbreviated Title:	CHEM 1 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	While the content focus of this course is consistent with the Chemistry I course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.17.15 Discuss the effects of technology on environmental quality.

SC.912.L.17.19 Describe how different natural resources are produced and how their rates of use and renewal limit availability.

SC.912.L.18.12 Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.5 Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.

SC.912.N.2.2 Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as

	questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.

SC.912.P.8.6	Distinguish between bonding forces holding compounds together and other attractive forces, including hydrogen bonding and van der Waals forces.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.8.8	Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
SC.912.P.8.9	Apply the mole concept and the law of conservation of mass to calculate quantities of chemicals participating in reactions.
SC.912.P.8.10	Describe oxidation-reduction reactions in living and non-living systems.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.8.12	Describe the properties of the carbon atom that make the diversity of carbon compounds possible.
SC.912.P.8.13	Identify selected functional groups and relate how they contribute to properties of carbon compounds.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.8	Explain entropy's role in determining the efficiency of processes that convert energy to work.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.12.10	Interpret the behavior of ideal gases in terms of kinetic molecular theory.
SC.912.P.12.11	Describe phase transitions in terms of kinetic molecular theory.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.

SC.912.P.12.13 Explain the concept of dynamic equilibrium in terms of reversible processes occurring at the same rates.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1 Key Ideas and Details

LACC.910.RST.1.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.

LACC.910.RST.1.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.

LACC.1112.RST.1 Key Ideas and Details

LACC.1112.RST.1.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

LACC.1112.RST.1.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

LACC.910.RST.2 Craft and Structure

LACC.910.RST.2.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

LACC.910.RST.2.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

LACC.1112.RST.2 Craft and Structure

LACC.1112.RST.2.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

LACC.910.RST.3 Integration of Knowledge and Ideas

LACC.910.RST.3.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

LACC.1112.RST.3 Integration of Knowledge and Ideas

LACC.1112.RST.3.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

LACC.910.RST.4 Range of Reading and Level of Text Complexity

LACC.910.RST.4.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2003345 Chemistry 1 for Credit Recovery

GENERAL INFORMATION

Course Number:	2003345
Course Title:	Chemistry 1 for Credit Recovery
Abbreviated Title:	CHEM 1 CR
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Number of Credits:	One credit (1)
Course Length:	Varies
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	*Credit Recovery courses are credit bearing courses with specific content requirements defined by Next Generation Sunshine State Standards and/or Common Core State Standards. Students enrolled in a Credit Recovery course must have previously attempted the corresponding course (and/or End-of-Course assessment) since the course requirements for the Credit Recovery course are exactly the same as the previously attempted corresponding course. For example, Geometry (1206310) and Geometry for Credit Recovery (1206315) have identical content requirements. It is important to note that Credit Recovery courses are not bound by Section 1003.436(1)(a), Florida Statutes, requiring a minimum of 135 hours of bona fide instruction (120 hours in a school/district implementing block scheduling) in a designed course of*

study that contains student performance standards, since the students have previously attempted successful completion of the corresponding course. Additionally, Credit Recovery courses should ONLY be used for credit recovery, grade forgiveness, or remediation for students needing to prepare for an End-of-Course assessment retake.

Instructional Practices
Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:
1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.18.12 Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:
1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.

SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.6	Distinguish between bonding forces holding compounds together and other attractive forces, including hydrogen bonding and van der Waals forces.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.8.8	Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
SC.912.P.8.9	Apply the mole concept and the law of conservation of mass to calculate quantities of chemicals participating in reactions.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.12.10	Interpret the behavior of ideal gases in terms of kinetic molecular theory.
SC.912.P.12.11	Describe phase transitions in terms of kinetic molecular theory.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.
SC.912.P.12.13	Explain the concept of dynamic equilibrium in terms of reversible processes occurring at the same rates.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.K12.MP.4	**Model with Mathematics**
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2003340 Chemistry 1

GENERAL INFORMATION

Course Number:	2003340
Course Title:	Chemistry 1
Abbreviated Title:	CHEM 1
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Number of Credits:	One credit (1)
Course Length:	One Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.6	Distinguish between bonding forces holding compounds together and other attractive forces, including hydrogen bonding and van der Waals forces.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.8.8	Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
SC.912.P.8.9	Apply the mole concept and the law of conservation of mass to calculate quantities of chemicals participating in reactions.

SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.12.10	Interpret the behavior of ideal gases in terms of kinetic molecular theory.
SC.912.P.12.11	Describe phase transitions in terms of kinetic molecular theory.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.
SC.912.P.12.13	Explain the concept of dynamic equilibrium in terms of reversible processes occurring at the same rates.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2003320 Physical Science Honors

GENERAL INFORMATION

Course Number:	2003320
Course Title:	Physical Science Honors
Abbreviated Title:	PHY SCI HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
Honors:	Yes
General Notes:	While the content focus of this course is consistent with the Physical Science course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.17.19 Describe how different natural resources are produced and how their rates of use and renewal limit availability.

SC.912.L.17.20 Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

SC.912.L.18.12 Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.5 Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.

SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.1	Differentiate among the four states of matter.

SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.3	Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.8.8	Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.

SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.12.1	Distinguish between scalar and vector quantities and assess which should be used to describe an event.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.6	Qualitatively apply the concept of angular momentum.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.10	Interpret the behavior of ideal gases in terms of kinetic molecular theory.
SC.912.P.12.11	Describe phase transitions in terms of kinetic molecular theory.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

LACC.910.RST.2.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

LACC.1112.RST.2 Craft and Structure
LACC.1112.RST.2.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

LACC.910.RST.3 Integration of Knowledge and Ideas
LACC.910.RST.3.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

LACC.1112.RST.3 Integration of Knowledge and Ideas
LACC.1112.RST.3.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

LACC.910.RST.4 Range of Reading and Level of Text Complexity
LACC.910.RST.4.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

LACC.1112.RST.4 Range of Reading and Level of Text Complexity
LACC.1112.RST.4.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

LACC.910.WHST.1 Text Types and Purposes
LACC.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.1 Text Types and Purposes
LACC.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.3 Research to Build and Present Knowledge
LACC.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3 Research to Build and Present Knowledge
LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.A-CED Creating Equations
MACC.912.A-CED.1 Create equations that describe numbers or relationships
MACC.912.A.CED.1.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*

MACC.912.F-IF Interpreting Functions
MACC.912.F-IF.3 Analyze functions using different representations.

MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.N-VM	**Vector and Matrix Quantities**
MACC.912.N-VM.1	Represent and model with vector quantities
MACC.912.N.VM.1.3	Solve problems involving velocity and other quantities that can be represented by vectors.

Course: 2003310 Physical Science

GENERAL INFORMATION

Course Number:	2003310
Course Title:	Physical Science
Abbreviated Title:	PHY SCI
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Physical Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.

SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.3.3	Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
SC.912.N.3.4	Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.4	Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and

	electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.
SC.912.P.8.5	Relate properties of atoms and their position in the periodic table to the arrangement of their electrons.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.8.8	Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.

SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.10	Interpret the behavior of ideal gases in terms of kinetic molecular theory.
SC.912.P.12.11	Describe phase transitions in terms of kinetic molecular theory.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**

LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2002540 Solar Energy Honors

GENERAL INFORMATION

Course Number:	2002540
Course Title:	Solar Energy Honors
Abbreviated Title:	SOLAR ENERGY HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Elective
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.
SC.912.E.6.6	Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.E.7.2	Analyze the causes of the various kinds of surface and deep water motion within the oceans and their impacts on the transfer of energy between the poles and the equator.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.12	Discuss the political, social, and environmental consequences of sustainable use of land.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.17	Assess the effectiveness of innovative methods of protecting the environment.
SC.912.L.17.18	Describe how human population size and resource use relate to environmental quality.
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation

and interpretation of graphical representations of data, including data tables and graphs),

7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a

	substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.12	Describe the properties of the carbon atom that make the diversity of carbon compounds possible.
SC.912.P.8.13	Identify selected functional groups and relate how they contribute to properties of carbon compounds.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**

MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2002530 Marine Science 2 Honors

GENERAL INFORMATION

Course Number:	2002530
Course Title:	Marine Science 2 Honors
Abbreviated Title:	MARINE1 SCI 2 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
Honors:	Yes
General Notes:	While the content focus of this course is consistent with the Marine Science 2 course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text- specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.7.2	Analyze the causes of the various kinds of surface and deep water motion within the oceans and their impacts on the transfer of energy between the poles and the equator.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.
SC.912.E.7.4	Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
SC.912.E.7.8	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.15	Discuss the effects of technology on environmental quality.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.

SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe

	that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**

MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2002520 Marine Science 2

GENERAL INFORMATION

Course Number:	2002520
Course Title:	Marine Science 2
Abbreviated Title:	MARINE SCI 2
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.7.4	Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.
SC.912.E.7.8	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences),

9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.

SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**

LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course : 2002510 Marine Science 1 Honors

GENERAL INFORMATION

Course Number:	2002510
Course Title:	Marine Science 1 Honors
Abbreviated Title:	MARINE SCI 1 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
Honors:	Yes
General Notes:	While the content focus of this course is consistent with the Marine Science I course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.17.1	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.3	Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.

SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.17.17	Assess the effectiveness of innovative methods of protecting the environment.
SC.912.L.17.18	Describe how human population size and resource use relate to environmental quality.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.

LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**

LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.

Course: 2002500 Marine Science 1

GENERAL INFORMATION

Course Number:	2002500
Course Title:	Marine Science 1
Abbreviated Title:	MARINE SCI 1
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.17.1	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.3	Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.7	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations,

3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.

SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2002490 Forensic Sciences 2

GENERAL INFORMATION

Course Number:	2002490
Course Path:	Section:Grades PreK to 12 Education Courses» Grade Group:Grades 9 to 12 and Adult Education Courses » Subject:Science » SubSubject:Integrated Sciences »
Course Title:	Forensic Sciences 2
Course Section:	Grades PreK to 12 Education Courses
Abbreviated Title:	FORC SCI 2
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Elective
Course Level:	2
Status:	State Board Approved
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.L.14.4	Compare and contrast structure and function of various types of microscopes.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.11	Classify and state the defining characteristics of epithelial tissue, connective tissue, muscle tissue, and nervous tissue.
SC.912.L.14.12	Describe the anatomy and histology of bone tissue.
SC.912.L.14.13	Distinguish between bones of the axial skeleton and the appendicular skeleton.
SC.912.L.14.14	Identify the major bones of the axial and appendicular skeleton.
SC.912.L.14.15	Identify major markings (such as foramina, fossae, tubercles, etc.) on a skeleton. Explain why these markings are important.
SC.912.L.14.16	Describe the anatomy and histology, including ultrastructure, of muscle tissue.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.43	Describe the histology of the respiratory system.
SC.912.L.14.44	Describe the physiology of the respiratory system including the mechanisms of ventilation, gas exchange, gas transport and the mechanisms that control the rate of ventilation.
SC.912.L.14.46	Describe the physiology of the digestive system, including mechanical digestion, chemical digestion, absorption and the neural and hormonal mechanisms of control.
SC.912.L.14.47	Describe the physiology of urine formation by the kidney.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.11	Discuss the technologies associated with forensic medicine and DNA

	identification, including restriction fragment length polymorphism (RFLP) analysis.
SC.912.L.16.12	Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning).
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.18.3	Describe the structures of fatty acids, triglycerides, phospholipids, and steroids. Explain the functions of lipids in living organisms. Identify some reactions that fatty acids undergo. Relate the structure and function of cell membranes.
SC.912.L.18.4	Describe the structures of proteins and amino acids. Explain the functions of proteins in living organisms. Identify some reactions that amino acids undergo. Relate the structure and function of enzymes.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.8.8	Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
SC.912.P.8.10	Describe oxidation-reduction reactions in living and non-living systems.
SC.912.P.8.13	Identify selected functional groups and relate how they contribute to properties of carbon compounds.
SC.912.P.10.4	Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.
SC.912.P.10.7	Distinguish between endothermic and exothermic chemical processes.
SC.912.P.10.13	Relate the configuration of static charges to the electric field, electric force, electric potential, and electric potential energy.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength,

	frequency, and energy, and relate them to phenomena and applications.
SC.912.P.12.1	Distinguish between scalar and vector quantities and assess which should be used to describe an event.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.6	Qualitatively apply the concept of angular momentum.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**

LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.N-VM	**Vector and Matrix Quantities**
MACC.912.N-VM.1	**Represent and model with vector quantities**

MACC.912.N.VM.1.3 Solve problems involving velocity and other quantities that can be represented by vectors.

Course: 2002480 Forensic Sciences 1

GENERAL INFORMATION

Course Number:	2002480
Course Title:	Forensic Sciences 1
Abbreviated Title:	FORC SCI 1
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Elective
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.L.14.1	Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science.
SC.912.L.14.2	Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport).
SC.912.L.14.4	Compare and contrast structure and function of various types of microscopes.
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.11	Classify and state the defining characteristics of epithelial tissue, connective tissue, muscle tissue, and nervous tissue.
SC.912.L.14.12	Describe the anatomy and histology of bone tissue.
SC.912.L.14.34	Describe the composition and physiology of blood, including that of the plasma and the formed elements.
SC.912.L.14.35	Describe the steps in hemostasis, including the mechanism of coagulation. Include the basis for blood typing and transfusion reactions.
SC.912.L.14.51	Describe the function of the vertebrate integumentary system.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.11	Discuss the technologies associated with forensic medicine and DNA identification, including restriction fragment length polymorphism (RFLP) analysis.
SC.912.L.16.12	Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning).
SC.912.L.17.1	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.

SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.4	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.

SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.P.8.1	Differentiate among the four states of matter.
SC.912.P.8.2	Differentiate between physical and chemical properties and physical and chemical changes of matter.
SC.912.P.8.7	Interpret formula representations of molecules and compounds in terms of composition and structure.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.8.12	Describe the properties of the carbon atom that make the diversity of carbon compounds possible.
SC.912.P.10.1	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.12.1	Distinguish between scalar and vector quantities and assess which should be used to describe an event.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.3	Interpret and apply Newton's three laws of motion.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.9	Recognize that time, length, and energy depend on the frame of reference.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	Analyze functions using different representations
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-VM	**Vector and Matrix Quantities**
MACC.912.N-VM.1	Represent and model with vector quantities
MACC.912.N.VM.1.3	Solve problems involving velocity and other quantities that can be represented by vectors.

Course: 2002450 Integrated Science 3 Honors

GENERAL INFORMATION

Course Number:	2002450
Course Title:	Integrated Science 3 Honors
Abbreviated Title:	INTEG SCI 3 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	While the content focus of this course is consistent with the Integrated Science 3 course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons.

3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.

SC.912.N.2.2 Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.

SC.912.N.2.4 Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.

SC.912.N.2.5 Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations

	that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.E.5.8	Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools.
SC.912.E.5.9	Analyze the broad effects of space exploration on the economy and culture of Florida.
SC.912.E.6.4	Analyze how specific geologic processes and features are expressed in Florida and elsewhere.
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.
SC.912.E.7.8	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.2	Discuss the use of molecular clocks to estimate how long ago various groups of organisms diverged evolutionarily from one another.
SC.912.L.15.3	Describe how biological diversity is increased by the origin of new species and how it is decreased by the natural process of extinction.
SC.912.L.15.4	Describe how and why organisms are hierarchically classified and based on evolutionary relationships.
SC.912.L.15.5	Explain the reasons for changes in how organisms are classified.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.8	Describe the scientific explanations of the origin of life on Earth.

SC.912.L.15.10	Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
SC.912.L.17.2	Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.

SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.P.8.10	Describe oxidation-reduction reactions in living and non-living systems.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.13	Investigate and explain the relationship among current, voltage, resistance, and power.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.
SC.912.P.10.17	Explore the theory of electromagnetism by explaining electromagnetic waves in terms of oscillating electric and magnetic fields.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.10.22	Construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.6	Qualitatively apply the concept of angular momentum.

SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.10	Interpret the behavior of ideal gases in terms of kinetic molecular theory.
SC.912.P.12.11	Describe phase transitions in terms of kinetic molecular theory.
SC.912.P.12.13	Explain the concept of dynamic equilibrium in terms of reversible processes occurring at the same rates.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**

LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**
LACC.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
LACC.1112.WHST.3	**Research to Build and Present Knowledge**
LACC.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.
MACC.912.F-IF	**Interpreting Functions**
MACC.912.F-IF.3	**Analyze functions using different representations.**
MACC.912.F-IF.3.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MACC.912.N-Q	**Quantities**
MACC.912.N-Q.1	**Reason quantitatively and use units to solve problems.**
MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MACC.912.S-IC	**Make Inferences and Justify Conclusions**
MACC.912.S-IC.2	**Make inferences and justify conclusions from sample surveys, experiments, and observational studies**
MACC.912.S-IC.2.6	Evaluate reports based on data.
MACC.912.N-VM	**Vector and Matrix Quantities**
MACC.912.N-VM.1	**Represent and model with vector quantities**

MACC.912.N-VM.1.3 Solve problems involving velocity and other quantities that can be represented by vectors.

Course: 2002445 Integrated Science 3 for Credit Recovery

GENERAL INFORMATION

Course Number:	2002445
Course Title:	Integrated Science 3 for Credit Recovery
Abbreviated Title:	INTEG SCI 3 CR
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	R
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	*Credit Recovery courses are credit bearing courses with specific content requirements defined by Next Generation Sunshine State Standards and/or Common Core State Standards. Students enrolled in a Credit Recovery course must have previously attempted the corresponding course (and/or End-of-Course assessment) since the course requirements for the Credit Recovery course are exactly the same as the previously attempted corresponding course. For example, Geometry (1206310) and Geometry for Credit Recovery (1206315) have identical content requirements. It is important to note that Credit Recovery courses are not bound by Section 1003.436(1)(a), Florida Statutes, requiring a minimum of 135 hours of bona fide instruction (120 hours in a school/district implementing block scheduling) in a designed course of*

study that contains student performance standards, since the students have previously attempted successful completion of the corresponding course. Additionally, Credit Recovery courses should ONLY be used for credit recovery, grade forgiveness, or remediation for students needing to prepare for an End-of-Course assessment retake.

Instructional Practices
Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:
1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1 Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:
1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

SC.912.N.1.2 Describe and explain what characterizes science and its methods.

SC.912.N.1.3 Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.E.5.9	Analyze the broad effects of space exploration on the economy and culture of Florida.
SC.912.E.6.4	Analyze how specific geologic processes and features are expressed in Florida and elsewhere.
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.
SC.912.E.7.8	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.

SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.10	Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.

SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.
SC.912.P.8.10	Describe oxidation-reduction reactions in living and non-living systems.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.6	Qualitatively apply the concept of angular momentum.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.10	Interpret the behavior of ideal gases in terms of kinetic molecular theory.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.

LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
LACC.1112.RST.4	**Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**
LACC.910.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.1112.WHST.1	**Text Types and Purposes**
LACC.1112.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
LACC.910.WHST.3	**Research to Build and Present Knowledge**

LACC.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3 Research to Build and Present Knowledge

LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF Interpreting Functions

MACC.912.F-IF.3 Analyze functions using different representations.

MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q Quantities

MACC.912.N-Q.1 Reason quantitatively and use units to solve problems.

MACC.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2002440 Integrated Science 3

GENERAL INFORMATION

Course Number:	2002440
Course Title:	Integrated Science 3
Abbreviated Title:	INTEG SCI 3
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	2
Course Status:	SBE Approval Pending
General Notes:	Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence. 4. Emphasizing students supporting answers based upon evidence from the text. 5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.2	Describe and explain what characterizes science and its methods.
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
SC.912.N.1.6	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.2	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.2.5	Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations

	that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.
SC.912.N.3.2	Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science.
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.
SC.912.E.5.9	Analyze the broad effects of space exploration on the economy and culture of Florida.
SC.912.E.6.4	Analyze how specific geologic processes and features are expressed in Florida and elsewhere.
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.
SC.912.E.7.8	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.
SC.912.L.15.1	Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change.
SC.912.L.15.6	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
SC.912.L.15.10	Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools.
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.

SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.
SC.912.L.16.8	Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
SC.912.L.17.5	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
SC.912.L.17.6	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.L.18.12	Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent.

SC.912.P.8.10	Describe oxidation-reduction reactions in living and non-living systems.
SC.912.P.10.2	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity.
SC.912.P.10.3	Compare and contrast work and power qualitatively and quantitatively.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.

SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.11	Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.
SC.912.P.10.16	Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.
SC.912.P.10.18	Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.12.5	Apply the law of conservation of linear momentum to interactions, such as collisions between objects.
SC.912.P.12.6	Qualitatively apply the concept of angular momentum.
SC.912.P.12.7	Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving.
SC.912.P.12.10	Interpret the behavior of ideal gases in terms of kinetic molecular theory.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1	**Key Ideas and Details**
LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

LACC.910.RST.2.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

LACC.1112.RST.2 **Craft and Structure**
LACC.1112.RST.2.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

LACC.910.RST.3 **Integration of Knowledge and Ideas**
LACC.910.RST.3.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

LACC.1112.RST.3 **Integration of Knowledge and Ideas**
LACC.1112.RST.3.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

LACC.910.RST.4 **Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10 By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.

LACC.1112.RST.4 **Range of Reading and Level of Text Complexity**
LACC.1112.RST.4.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

LACC.910.WHST.1 **Text Types and Purposes**
LACC.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.1 **Text Types and Purposes**
LACC.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.3 **Research to Build and Present Knowledge**
LACC.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3 **Research to Build and Present Knowledge**
LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF **Interpreting Functions**
MACC.912.F-IF.3 **Analyze functions using different representations.**
MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q **Quantities**
MACC.912.N-Q.1 **Reason quantitatively and use units to solve problems.**

MACC.912.N-Q.1.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MACC.912.N-Q.1.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Course: 2002430 Integrated Science 2 Honors

GENERAL INFORMATION

Course Number:	2002430
Course Title:	Integrated Science 2 Honors
Abbreviated Title:	INTEG SCI 2 HON
Course Path:	Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Science » SubSubject: Integrated Sciences »
Course Section:	Grades PreK to 12 Education Courses
Number of Credits:	One credit (1)
Course Length:	Year
Course Type:	Core
Course Level:	3
Course Status:	SBE Approval Pending
General Notes:	While the content focus of this course is consistent with the Integrated Science 2 course, students will explore these concepts in greater depth. In general, the academic pace and rigor will be greatly increased for honors level course work. Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).
Special Notes:	Instructional Practices Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis: 1. Ensuring wide reading from complex text that varies in length. 2. Making close reading and rereading of texts central to lessons. 3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.

4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

NEXT GENERATION SUNSHINE STATE STANDARDS

HE.912.C.1.3	Evaluate how environment and personal health are interrelated.
HE.912.C.1.4	Analyze how heredity and family history can impact personal health.
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. pose questions about the natural world, 2. conduct systematic observations, 3. examine books and other sources of information to see what is already known, 4. review what is known in light of empirical evidence, 5. plan investigations, 6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. pose answers, explanations, or descriptions of events, 8. generate explanations that explicate or describe natural phenomena (inferences), 9. use appropriate evidence and reasoning to justify these explanations to others, 10. communicate results of scientific investigations, and 11. evaluate the merits of the explanations produced by others.
SC.912.N.1.5	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations.
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).
SC.912.N.2.3	Identify examples of pseudoscience (such as astrology, phrenology) in society.0
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.
SC.912.N.3.1	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer.

SC.912.E.5.3	Describe and predict how the initial mass of a star determines its evolution.
SC.912.E.5.5	Explain the formation of planetary systems based on our knowledge of our Solar System and apply this knowledge to newly discovered planetary systems.
SC.912.E.5.6	Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other.
SC.912.E.7.2	Analyze the causes of the various kinds of surface and deep water motion within the oceans and their impacts on the transfer of energy between the poles and the equator.
SC.912.E.7.4	Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.
SC.912.E.7.7	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
SC.912.L.14.5	Explain the evidence supporting the scientific theory of the origin of eukaryotic cells (endosymbiosis).
SC.912.L.14.6	Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.
SC.912.L.14.7	Relate the structure of each of the major plant organs and tissues to physiological processes.
SC.912.L.14.26	Identify the major parts of the brain on diagrams or models.
SC.912.L.14.27	Identify the functions of the major parts of the brain, including the meninges, medulla, pons, midbrain, hypothalamus, thalamus, cerebellum and cerebrum.
SC.912.L.14.36	Describe the factors affecting blood flow through the cardiovascular system.
SC.912.L.14.52	Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics.
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation.
SC.912.L.16.1	Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance.
SC.912.L.16.2	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
SC.912.L.16.3	Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information.
SC.912.L.16.4	Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring.

SC.912.L.16.5	Explain the basic processes of transcription and translation, and how they result in the expression of genes.
SC.912.L.16.7	Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology.
SC.912.L.16.9	Explain how and why the genetic code is universal and is common to almost all organisms.
SC.912.L.16.10	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.16.12	Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning).
SC.912.L.16.13	Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy.
SC.912.L.16.14	Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction.
SC.912.L.16.16	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
SC.912.L.16.17	Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic variation.
SC.912.L.17.9	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.
SC.912.L.18.1	Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules.
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.
SC.912.L.18.8	Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration.
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.
SC.912.L.18.10	Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell.
SC.912.L.18.11	Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity.
SC.912.P.8.6	Distinguish between bonding forces holding compounds together and other attractive forces, including hydrogen bonding and van der Waals forces.

SC.912.P.8.8	Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions.
SC.912.P.8.9	Apply the mole concept and the law of conservation of mass to calculate quantities of chemicals participating in reactions.
SC.912.P.8.11	Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH.
SC.912.P.8.12	Describe the properties of the carbon atom that make the diversity of carbon compounds possible.
SC.912.P.8.13	Identify selected functional groups and relate how they contribute to properties of carbon compounds.
SC.912.P.10.5	Relate temperature to the average molecular kinetic energy.
SC.912.P.10.6	Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.
SC.912.P.10.9	Describe the quantization of energy at the atomic level.
SC.912.P.10.10	Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).
SC.912.P.10.12	Differentiate between chemical and nuclear reactions.
SC.912.P.10.14	Differentiate among conductors, semiconductors, and insulators.
SC.912.P.10.15	Investigate and explain the relationships among current, voltage, resistance, and power.
SC.912.P.10.20	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another.
SC.912.P.10.21	Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver.
SC.912.P.10.22	Construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors.
SC.912.P.12.1	Distinguish between scalar and vector quantities and assess which should be used to describe an event.
SC.912.P.12.2	Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time.
SC.912.P.12.4	Describe how the gravitational force between two objects depends on their masses and the distance between them.
SC.912.P.12.11	Describe phase transitions in terms of kinetic molecular theory.
SC.912.P.12.12	Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction.

RELATED STANDARDS/BENCHMARKS

LACC.910.RST.1 Key Ideas and Details

LACC.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
LACC.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks attending to special cases or exceptions defined in the text.
LACC.1112.RST.1	**Key Ideas and Details**
LACC.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
LACC.1112.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
LACC.910.RST.2	**Craft and Structure**
LACC.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
LACC.910.RST.2.5	Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
LACC.1112.RST.2	**Craft and Structure**
LACC.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.
LACC.910.RST.3	**Integration of Knowledge and Ideas**
LACC.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
LACC.1112.RST.3	**Integration of Knowledge and Ideas**
LACC.1112.RST.3.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
LACC.910.RST.4	**Range of Reading and Level of Text Complexity**
LACC.910.RST.4.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
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LACC.1112.RST.4.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
LACC.910.WHST.1	**Text Types and Purposes**

LACC.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.1112.WHST.1 Text Types and Purposes

LACC.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LACC.910.WHST.3 Research to Build and Present Knowledge

LACC.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

LACC.1112.WHST.3 Research to Build and Present Knowledge

LACC.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

MACC.912.F-IF Interpreting Functions

MACC.912.F-IF.3 Analyze functions using different representations.

MACC.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

MACC.912.N-Q Quantities

MACC.912.N-Q.1 Reason quantitatively and use units to solve problems.

MACC.912.N-Q.1.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

MACC.912.N-Q.1.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

MACC.912.S-IC Make Inferences and Justify Conclusions

MACC.912.S-IC.2 Make inferences and justify conclusions from sample surveys, experiments, and observational studies

MACC.912.S-IC.2.6 Evaluate reports based on data.

MACC.912.N-VM Vector and Matrix Quantities

MACC.912.N-VM.1 Represent and model with vector quantities

MACC.912.N-VM.1.3 Solve problems involving velocity and other quantities that can be represented by vectors.