



Earth/Space Science (#2001310)

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Course Number: 2001310	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 > Abbreviated Title: EARTH/SPA SCI
Number of Credits: One (1) credit	Course Length: Year (Y)
Course Type: Core Academic Course	Course Level: 2
Course Status: Course Approved	
Graduation Requirement: Equally Rigorous Science	

VERSION DESCRIPTION

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).

Science and Engineering Practices (NRC Framework for K-12 Science Education, 2010)

- Asking questions (for science) and defining problems (for engineering).
- Developing and using models.
- Planning and carrying out investigations.
- Analyzing and interpreting data.
- Using mathematics, information and computer technology, and computational thinking.
- Constructing explanations (for science) and designing solutions (for engineering).
- Engaging in argument from evidence.
- Obtaining, evaluating, and communicating information.

GENERAL NOTES

English Language Development ELD Standards Special Notes Section:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate information, ideas and concepts for academic success in the content area of Science. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link:

<http://www.cpalms.org/uploads/docs/standards/eld/SC.pdf>

For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at sala@fldoe.org.

Additional Instructional Resources:

A.V.E. for Success Collection is provided by the Florida Association of School Administrators: [http://www.fasa.net/4DCGI/cms/review.html?](http://www.fasa.net/4DCGI/cms/review.html?Action=CMS_Document&DocID=139)

[Action=CMS_Document&DocID=139](http://www.fasa.net/4DCGI/cms/review.html?Action=CMS_Document&DocID=139). Please be aware that these resources have not been reviewed by CPALMS and there may be a charge for the use of some of them in this collection.

Course Standards

Integrate Standards for Mathematical Practice (MP) as applicable.

- MAFS.K12.MP.1.1 Make sense of problems and persevere in solving them.
- MAFS.K12.MP.2.1 Reason abstractly and quantitatively.
- MAFS.K12.MP.3.1 Construct viable arguments and critique the reasoning of others.
- MAFS.K12.MP.4.1 Model with mathematics.
- MAFS.K12.MP.5.1 Use appropriate tools strategically.
- MAFS.K12.MP.6.1 Attend to precision.
- MAFS.K12.MP.7.1 Look for and make use of structure.
- MAFS.K12.MP.8.1 Look for and express regularity in repeated reasoning.

Name	Description
SC.912.E.5.1:	<p>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.</p> <p>Remarks/Examples: Explain evidence to support the formation of the universe, which has been expanding for approximately 15 billion year (e.g. ratio of <u>gases</u>, red-shift from distant <u>galaxies</u>, and cosmic background radiation).</p>
SC.912.E.5.2:	<p>Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.</p> <p>Remarks/Examples: Identify patterns that influence the formation, hierarchy, and motions of the various kinds of objects in the solar system and the role of <u>gravity</u> and inertia on these motions (include the Sun, Earth, and <u>Moon</u>, planets, satellites, comets, <u>asteroids</u>, star clusters, <u>galaxies</u>, <u>galaxy</u> clusters). Recognize that the universe contains many billions of <u>galaxies</u>, and each <u>galaxy</u> contains many billions of stars. Recognize that constellations are contrived associations of stars that do not reflect functional relationships in space.</p> <p>Florida Standards Connections: MAFS.K12.MP.7: Look for and make use of structure.</p>
SC.912.E.5.3:	<p>Describe and predict how the initial mass of a star determines its evolution.</p> <p>Remarks/Examples: Compare and contrast the <u>evolution</u> of stars of different masses (include the three outcomes of stellar <u>evolution</u> based on <u>mass</u>: black hole, <u>neutron</u> star, white dwarf). Differentiate between the different types of stars found on the Hertzsprung-Russell diagram and the balance between gravitational collapse and nuclear <u>fusion</u> in determining the color, brightness, and life span of a star.</p>
SC.912.E.5.4:	<p>Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.</p> <p>Remarks/Examples: Describe the physical properties of the Sun (sunspot cycles, solar flares, prominences, layers of the Sun, coronal <u>mass</u> ejections, and <u>nuclear</u> <u>reactions</u>) and the impact of the Sun as the main source of external <u>energy</u> for the Earth.</p>
SC.912.E.5.5:	<p>Explain the formation of planetary systems based on our knowledge of our Solar System and apply this knowledge to newly discovered planetary systems.</p> <p>Remarks/Examples: Describe how evidence from the study of our Solar System and newly discovered extra solar planetary systems supports the Nebular theory of the formation of planetary systems.</p>
SC.912.E.5.6:	<p>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.</p> <p>Remarks/Examples: Explain that Kepler's <u>laws</u> determine the <u>orbits</u> of objects in the solar system and recognize that Kepler's <u>laws</u> are a direct consequence of Newton's <u>Law</u> of Universal Gravitation and <u>Laws</u> of <u>Motion</u>.</p>
SC.912.E.5.9:	<p>Analyze the broad effects of space exploration on the economy and culture of Florida.</p> <p>Remarks/Examples: Recognize the economic, technical and social benefits of spinoff technology developed through the space program.</p>
SC.912.E.5.11:	<p>Distinguish the various methods of measuring astronomical distances and apply each in appropriate situations.</p> <p>Remarks/Examples: Determine which units of measurement are appropriate to describe distance (e.g. astronomical units, parallax, and <u>light</u> years).</p> <p>Florida Standards Connections: MAFS.K12.MP.5: Use appropriate tools strategically and MAFS.K12.MP.6: Attend to precision.</p>
SC.912.E.6.1:	<p>Describe and differentiate the layers of Earth and the interactions among them.</p> <p>Remarks/Examples: Recognize the importance of the study of seismic wave data and how it can be used to determine the internal structure, <u>density</u> variations, and dynamic processes between Earth's layers.</p>
SC.912.E.6.2:	<p>Connect surface features to surface processes that are responsible for their formation.</p> <p>Remarks/Examples: Identify various landforms (e.g. <u>dunes</u>, lakes, sinkholes, aquifers) and describe how they form (<u>erosion</u>, physical/chemical weathering, and <u>deposition</u>). Explain how sea level changes over time have exposed and inundated continental shelves, created and destroyed inland seas, and shaped the surface of the Earth.</p>
SC.912.E.6.3:	<p>Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.</p> <p>Remarks/Examples: Discuss the development of plate tectonic theory, which is derived from the combination of two theories: continental drift and seafloor spreading. Compare and contrast the three primary types of plate boundaries (convergent, divergent, and transform). Explain the origin of geologic features and processes that result from plate tectonics (e.g. <u>earthquakes</u>, volcanoes, trenches, mid-ocean ridges, island arcs and chains, hot spots, <u>earthquake</u> distribution, tsunamis, mountain ranges).</p>
SC.912.E.6.4:	<p>Analyze how specific geologic processes and features are expressed in Florida and elsewhere.</p> <p>Remarks/Examples: Describe the effect of ocean and Gulf water currents, gravel mining, beach <u>erosion</u>, <u>dune</u> development, aquifers and ground water, salt water</p>

	intrusion, springs, and sink holes on the formation of the Florida peninsula. Explain the effects of <u>latitude</u> , elevation, topography (land surface type), proximity to large bodies of water, and temperature of ocean currents, on climate in Florida.
SC.912.E.6.5:	Describe the geologic development of the present day oceans and identify commonly found features. Remarks/Examples: Describe the topography of the ocean floor and how it formed (e.g. plate tectonics, sea level changes).
SC.912.E.7.1:	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon. Remarks/Examples: Describe that the Earth system contains fixed amounts of each stable chemical element and that each element moves among reservoirs in the solid earth, oceans, <u>atmosphere</u> and living <u>organisms</u> as part of biogeochemical cycles (i.e., nitrogen, water, carbon, oxygen and phosphorus), which are driven by <u>energy</u> from within the Earth and from the Sun.
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. Remarks/Examples: Explain how surface and deep-water circulation patterns (Coriolis effect, La Niña, El Niño, Southern Oscillation, upwelling, ocean surface cooling, freshwater influx, <u>density</u> differences, Labrador <u>Current</u> and Gulf Stream) impact <u>energy</u> transfer in the <u>environment</u> .
SC.912.E.7.3:	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere. Remarks/Examples: Interactions include transfer of <u>energy</u> (biogeochemical cycles, <u>water cycle</u> , ground and surface waters, photosynthesis, radiation, plate tectonics, <u>conduction</u> , and <u>convection</u>), storms, winds, waves, <u>erosion</u> , currents, <u>deforestation</u> and wildfires, hurricanes, tsunamis, volcanoes.
SC.912.E.7.4:	Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans. Remarks/Examples: Describe how <u>latitude</u> , altitude, topography, prevailing winds, proximity to large bodies of water, vegetation and ocean currents determine the climate of a geographic area.
SC.912.E.7.5:	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions. Remarks/Examples: Use <u>models</u> , weather maps and other tools to predict weather conditions and differentiate between accuracy of short-range and long-range weather forecasts.
SC.912.E.7.6:	Relate the formation of severe weather to the various physical factors. Remarks/Examples: Identify the causes of severe weather. Compare and contrast physical factors that affect the formation of severe weather events (e.g. hurricanes, tornados, flash floods, thunderstorms, and drought).
SC.912.E.7.7:	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change. Remarks/Examples: Explain the possible natural (e.g. increased global temperature, wildfires, volcanic dust) and anthropogenic mechanisms (e.g. air pollution, <u>acid</u> rain, greenhouse <u>gases</u> , burning of <u>fossil</u> fuels) and the effects of these mechanisms on 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. Remarks/Examples: Describe and discuss the conditions that bring about floods, droughts, wildfires, thunderstorms, hurricanes, rip currents, and tsunamis and how these conditions can influence human behavior (e.g. <u>energy</u> alternatives, conservation, migration, storm preparedness).
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. Remarks/Examples: Annually Assessed on Biology EOC. Also assesses SC.912.L.15.10 SC.912.N.1.3 SC.912.N.1.4 SC.912.N.1.6 SC.912.N.2.1 SC.912.N.3.1 and SC.912.N.3.4 .
SC.912.L.15.8:	Describe the scientific explanations of the origin of life on Earth. Remarks/Examples: Annually assessed on Biology EOC. Also assesses SC.912.N.1.3 , SC.912.N.1.4 , and SC.912.N.2.1 .
	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: <ol style="list-style-type: none"> 1. Pose questions about the natural world, (Articulate the purpose of the investigation and identify the relevant scientific concepts). 2. Conduct systematic observations, (Write procedures that are clear and replicable. Identify observables and examine relationships between test (independent) variable and outcome (dependent) variable. Employ appropriate methods for accurate and consistent observations; conduct and record measurements at appropriate levels of precision. Follow safety guidelines). 3. Examine books and other sources of information to see what is already known, 4. Review what is known in light of empirical evidence, (Examine whether available empirical evidence can be interpreted in terms of existing knowledge and models, and if not, modify or develop new models). 5. Plan investigations, (Design and evaluate a scientific investigation). 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), (Collect data or evidence in an organized way. Properly use instruments, equipment, and materials (e.g., scales, probeware, meter sticks, microscopes, computers) including set-up, calibration, technique, maintenance, and storage). 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.

Remarks/Examples:

Florida Standards Connections for 6-12 Literacy in Science
 For Students in Grades 9-10

LAFS.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.

LAFS.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.

LAFS.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.

LAFS.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

LAFS.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.

For Students in Grades 11-12

LAFS.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.

LAFS.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.

LAFS.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.

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

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

Florida Standards Connections for Mathematical Practices

- MAFS.K12.MP.1: Make sense of problems and persevere in solving them.
- MAFS.K12.MP.2: Reason abstractly and quantitatively.
- MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others. [Viable arguments include evidence.]
- MAFS.K12.MP.4: Model with mathematics.
- MAFS.K12.MP.5: Use appropriate tools strategically.
- MAFS.K12.MP.6: Attend to precision.
- MAFS.K12.MP.7: Look for and make use of structure.
- MAFS.K12.MP.8: Look for and express regularity in repeated reasoning.

[SC.912.N.1.1:](#)

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

Remarks/Examples:

Read, interpret, and examine the credibility and validity of scientific claims in different sources of information, such as scientific articles, advertisements, or media stories. Strict standards of science include controlled variables, sufficient sample size, replication of results, empirical and measurable evidence, and the concept of falsification.

Florida Standards Connections: [LAFS.910.RST.1.1](#) / [LAFS.1112.RST.1.1](#).

[SC.912.N.1.4:](#)

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

Remarks/Examples:

Recognize that contributions to science can be made and have been made by people from all over the world.

[SC.912.N.1.5:](#)

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

Remarks/Examples:

Collect data/evidence and use tables/graphs to draw conclusions and make inferences based on patterns or trends in the data.

Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them.

[SC.912.N.1.6:](#)

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.

Remarks/Examples:

Recognize that ideas with the most durable explanatory power become established theories, but scientific explanations are continually subjected to change in the face of new evidence.

Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others.

[SC.912.N.2.4:](#)

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.

Remarks/Examples:

Recognize that scientific questions, observations, and conclusions may be influenced by the existing state of scientific knowledge, the social and cultural context of the researcher, and the observer's experiences and expectations. Identify possible bias in qualitative and quantitative data analysis.

[SC.912.N.2.5:](#)

<p>SC.912.N.3.1:</p>	<p>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.</p> <p>Remarks/Examples: Explain that a scientific theory is a well-tested <u>hypothesis</u> supported by a preponderance of empirical evidence.</p> <p>Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them and, MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others.</p>
<p>SC.912.N.3.5:</p>	<p>Describe the function of models in science, and identify the wide range of models used in science.</p> <p>Remarks/Examples: Describe how <u>models</u> are used by scientists to explain <u>observations</u> of nature.</p> <p>Florida Standards Connections: MAFS.K12.MP.4: <u>Model</u> with mathematics.</p>
<p>SC.912.N.4.1:</p>	<p>Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.</p> <p>Remarks/Examples: Recognize that no single universal step-by-step scientific method captures the complexity of doing science. A number of shared values and perspectives characterize a scientific approach.</p> <p>MAFS.K12.MP.1: Make sense of problems and persevere in solving them, and MAFS.K12.MP.2: Reason abstractly and quantitatively.</p>
<p>SC.912.P.10.4:</p>	<p>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.</p> <p>Remarks/Examples: Explain the mechanisms (<u>convection</u>, <u>conduction</u> and radiation) of <u>heat</u> transfer. Explain how <u>heat</u> is transferred (<u>energy in motion</u>) from a region of higher temperature to a region of lower temperature until equilibrium is established. Solve problems involving <u>heat</u> flow and temperature changes by using known values of specific <u>heat</u> and/or phase change constants (latent <u>heat</u>). Explain the phase transitions and temperature changes demonstrated by a heating or cooling curve.</p>
<p>SC.912.P.10.10:</p>	<p>Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).</p> <p>Remarks/Examples: Recognize and discuss the effect of each <u>force</u> on the structure of <u>matter</u> and the evidence for it.</p>
<p>SC.912.P.10.11:</p>	<p>Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues.</p> <p>Remarks/Examples: Identify the three main types of radioactive decay (alpha, beta, and gamma) and compare their properties (composition, <u>mass</u>, charge, and penetrating power). Explain the concept of half-life for an isotope (e.g. C-14 is used to determine the age of objects) and calculate the amount of a radioactive substance remaining after an integral number of half-lives have passed. Recognize that the <u>energy</u> release per gram of material is much larger in nuclear <u>fusion</u> or <u>fission</u> reactions than in chemical reactions due to the large amount of <u>energy</u> related to small amounts of <u>mass</u> by equation $E=mc^2$.</p>
<p>SC.912.P.10.16:</p>	<p>Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies.</p> <p>Remarks/Examples: Explain that moving electric charges produce <u>magnetic forces</u> and moving <u>magnets</u> produce electric <u>forces</u>. Recognize the Lorentz <u>force</u> is the <u>force</u> on a point charge due to electromagnetic fields and occurs in many devices, including <u>mass</u> spectrometers.</p>
<p>SC.912.P.10.18:</p>	<p>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.</p> <p>Remarks/Examples: Describe the <u>electromagnetic spectrum</u> (i.e., radio waves, microwaves, <u>infrared</u>, <u>visible light</u>, <u>ultraviolet</u>, <u>X-rays</u> and gamma rays) in terms of <u>frequency</u>, <u>wavelength</u> and <u>energy</u>. Solve problems involving <u>wavelength</u>, <u>frequency</u>, and <u>energy</u>.</p>
<p>SC.912.P.10.19:</p>	<p>Explain that all objects emit and absorb electromagnetic radiation and distinguish between objects that are blackbody radiators and those that are not.</p> <p>Remarks/Examples: Recognize the Planck function allows examination of the radiation emitted by an object as a function only of its temperature.</p>
<p>SC.912.P.10.20:</p>	<p>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.</p> <p>Remarks/Examples: Describe the measurable properties of waves (<u>velocity</u>, <u>frequency</u>, <u>wavelength</u>, <u>amplitude</u>, <u>period</u>, reflection and refraction) and explain the relationships among them. Recognize that the source of all waves is a <u>vibration</u> and waves carry <u>energy</u> from one place to another. Distinguish between transverse and longitudinal waves in mechanical media, such as springs and ropes, and on the earth (seismic waves). Describe sound as a longitudinal wave whose speed depends on the properties of the medium in which it propagates.</p>
<p>SC.912.P.12.2:</p>	<p>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.</p> <p>Remarks/Examples: Solve problems involving distance, <u>velocity</u>, speed, and <u>acceleration</u>. Create and interpret graphs of 1-dimensional <u>motion</u>, such as position versus time, distance versus time, speed versus time, <u>velocity</u> versus time, and <u>acceleration</u> versus time where <u>acceleration</u> is constant.</p> <p>Florida Standards Connections: <u>MAFS.912.N-VM.1.3</u> (+) Solve problems involving velocity and other quantities that can be represented by vectors.</p>
<p>SC.912.P.12.4:</p>	<p>Describe how the gravitational force between two objects depends on their masses and the distance between them.</p> <p>Remarks/Examples:</p>

	Describe Newton's <u>law</u> of universal gravitation in terms of the <u>attraction</u> between two objects, their masses, and the inverse square of the distance between them.
LAFS.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.
LAFS.910.RST.1.2:	Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
LAFS.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.
LAFS.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.
LAFS.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).
LAFS.910.RST.2.6:	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
LAFS.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.
LAFS.910.RST.3.8:	Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
LAFS.910.RST.3.9:	Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
LAFS.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.
LAFS.910.SL.1.1:	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. <ul style="list-style-type: none"> a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.
LAFS.910.SL.1.2:	Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
LAFS.910.SL.1.3:	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.
LAFS.910.SL.2.4:	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
LAFS.910.SL.2.5:	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
LAFS.910.WHST.1.1:	Write arguments focused on discipline-specific content. <ul style="list-style-type: none"> a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented.
LAFS.910.WHST.1.2:	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. <ul style="list-style-type: none"> a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).
LAFS.910.WHST.2.4:	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
LAFS.910.WHST.2.5:	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
LAFS.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.
LAFS.910.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.
LAFS.910.WHST.3.8:	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
LAFS.910.WHST.3.9:	Draw evidence from informational texts to support analysis, reflection, and research.

LAFS.910.WHST.4.10:	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
ELD.K12.ELL.SC.1:	English language learners communicate information, ideas and concepts necessary for academic success in the content area of Science.
ELD.K12.ELL.SI.1:	English language learners communicate for social and instructional purposes within the school setting.
MAFS.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. ★
MAFS.912.N-Q.1.3:	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. ★

Related Certifications

Science (Secondary Grades 7-12)
Chemistry (Grades 6-12)
Earth/Space Science (Grades 6-12)
Physics (Grades 6-12)
Middle Grades General Science (Middle Grades 5-9)

There are more than 1011 related instructional/educational resources available for this on CPALMS. Click on the following link to access them: <http://www.cpalms.org/Public/PreviewCourse/Preview/13093>