



Marine Science 2 (#2002520)

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Course Number: 2002520	Course Path: Section: Grades PreK to 12 Education Courses > Grade Group: Grades 9 to 12 and Adult Education Courses > Subject: Science > SubSubject: Marine Sciences > Abbreviated Title: MARINE SCI 2
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	

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).

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.

Literacy Standards in Science

Secondary science courses include reading standards for literacy in science and technical subjects 6-12 and writing standards for literacy in history/social studies, science, and technical subjects 6-12. The courses also include speaking and listening standards. For a complete list of standards required for this course click on the blue tile labeled course standards. You may also download the complete course including all required standards and notes sections using the export function located at the top of this page.

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.

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.7.4:	<p>Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.</p> <p>Remarks/Examples: Describe how latitude, altitude, topography, prevailing winds, proximity to large bodies of water, vegetation and ocean currents determine the climate of a geographic area.</p>
SC.912.E.7.8:	<p>Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior,...</p> <p>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. energy alternatives, conservation, migration, storm preparedness).</p>
SC.912.E.7.9:	<p>Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon,...</p> <p>Remarks/Examples: Explain how the oceans act as sources/sinks of heat energy, store carbon dioxide mostly as dissolved HCO₃⁻ and CaCO₃ as precipitate or biogenic carbonate deposits, which have an impact on climate change.</p>
SC.912.L.17.4:	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
SC.912.L.17.5:	<p>Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic)...</p> <p>Remarks/Examples: Annually assessed on Biology EOC. Also assesses SC.912.L.17.2; SC.912.L.17.4; SC.912.L.17.8; SC.912.N.1.4.</p>
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...
SC.912.L.17.13:	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.16:	<p>Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff,...</p> <p>Remarks/Examples: Integrate HE.912.C.1.3. Evaluate how environment and personal health are interrelated; and, HE.912.C.1.5. Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases.</p>
SC.912.L.18.2:	Describe the important structural characteristics of monosaccharides, disaccharides, and polysaccharides and explain the...
SC.912.N.1.1:	<p>Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do...</p> <p>Remarks/Examples:</p> <p style="text-align: center;">Florida Standards Connections for 6-12 Literacy in Science For Students in Grades 9-10</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>LAFS.910.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>LAFS.910.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.</p> <p style="text-align: center;">For Students in Grades 11-12</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>LAFS.1112.WHST.1.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>LAFS.1112.WHST.3.9 Draw evidence from informational texts to support analysis, reflection, and research.</p> <p style="text-align: center;">Florida Standards Connections for Mathematical Practices</p> <p>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.</p>

	<p>MAFS.K12.MP.7: Look for and make use of structure. MAFS.K12.MP.8: Look for and express regularity in repeated reasoning.</p>
SC.912.N.1.2:	<p>Describe and explain what characterizes science and its methods.</p> <p>Remarks/Examples: Science is characterized by empirical observations, testable questions, formation of hypotheses, and experimentation that results in stable and replicable results, logical reasoning, and coherent theoretical constructs.</p> <p>Florida Standards Connections: MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others.</p>
SC.912.N.1.3:	<p>Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on...</p> <p>Remarks/Examples: Assess the reliability of data and identify reasons for inconsistent results, such as sources of error or uncontrolled conditions.</p> <p>Florida Standards Connections: MAFS.K12.MP.2: Reason abstractly and quantitatively; MAFS.K12.MP.3: Construct viable arguments and critique the reasoning of others</p>
SC.912.N.1.4:	<p>Identify sources of information and assess their reliability according to the strict standards of scientific investigation.</p> <p>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.</p> <p>Florida Standards Connections: LAFS.910.RST.1.1 / LAFS.1112.RST.1.1.</p>
SC.912.N.1.5:	<p>Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.</p> <p>Remarks/Examples: Recognize that contributions to science can be made and have been made by people from all over the world.</p>
SC.912.N.1.6:	<p>Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.</p> <p>Remarks/Examples: Collect data/evidence and use tables/graphs to draw conclusions and make inferences based on patterns or trends in the data.</p> <p>Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them.</p>
SC.912.N.1.7:	<p>Recognize the role of creativity in constructing scientific questions, methods and explanations.</p> <p>Remarks/Examples: Work through difficult problems using creativity, and critical and analytical thinking in problem solving (e.g. convergent versus divergent thinking and creativity in problem solving).</p> <p>Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them; and MAFS.K12.MP.2: Reason abstractly and quantitatively.</p>
SC.912.N.2.1:	<p>Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria...</p> <p>Remarks/Examples: Science is the systematic and organized inquiry that is derived from observations and experimentation that can be verified or tested by further investigation to explain natural phenomena (e.g. Science is testable, pseudo-science is not; science seeks falsifications, pseudo-science seeks confirmations.)</p>
SC.912.N.2.4:	<p>Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is...</p> <p>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.</p> <p>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.</p>
SC.912.N.2.5:	<p>Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the...</p> <p>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.</p>
SC.912.N.3.1:	<p>Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence...</p> <p>Remarks/Examples: Explain that a scientific theory is a well-tested hypothesis 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>
SC.912.N.3.5:	<p>Describe the function of models in science, and identify the wide range of models used in science.</p> <p>Remarks/Examples: Describe how models are used by scientists to explain observations of nature.</p> <p>Florida Standards Connections: MAFS.K12.MP.4: Model with mathematics.</p>
SC.912.N.4.1:	<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>

	MAFS.K12.MP.1: Make sense of problems and persevere in solving them, and MAFS.K12.MP.2: Reason abstractly and quantitatively.
	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and...
SC.912.N.4.2:	<p>Remarks/Examples: Identify examples of technologies, objects, and processes that have been modified to advance society, and explain why and how they were modified. Discuss ethics in scientific research to advance society (e.g. global climate change, historical development of medicine and medical practices).</p> <p>Florida Standards Connections: MAFS.K12.MP.1: Make sense of problems and persevere in solving them, and MAFS.K12.MP.2: Reason abstractly and quantitatively.</p>
	Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total...
SC.912.P.10.2:	<p>Remarks/Examples: Use calorimetry to illustrate conservation of energy. Differentiate between the different types of systems and solve problems involving conservation of energy in simple systems (Physics). Explain how conservation of energy is important in chemical reactions with bond formation and bond breaking (Chemistry).</p>
	Describe the measurable properties of waves and explain the relationships among them and how these properties change when the...
SC.912.P.10.20:	<p>Remarks/Examples: Describe the measurable properties of waves (velocity, frequency, wavelength, amplitude, period, reflection and refraction) and explain the relationships among them. Recognize that the source of all waves is a vibration and waves carry energy 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>
LAFS.1112.RST.1.1:	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author...
LAFS.1112.RST.1.2:	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text...
LAFS.1112.RST.1.3:	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks;...
LAFS.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...
LAFS.1112.RST.2.5:	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the...
LAFS.1112.RST.2.6:	Analyze the authors purpose in providing an explanation, describing a procedure, or discussing an experiment in a text,...
LAFS.1112.RST.3.7:	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video,...
LAFS.1112.RST.3.8:	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and...
LAFS.1112.RST.3.9:	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a...
LAFS.1112.RST.4.10:	By the end of grade 12, read and comprehend science/technical texts in the grades 1112 text complexity band independently and...
LAFS.1112.SL.1.1:	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with...
LAFS.1112.SL.1.2:	Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in...
LAFS.1112.SL.1.3:	Evaluate a speakers point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among...
LAFS.1112.SL.2.4:	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can...
LAFS.1112.SL.2.5:	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to...
LAFS.1112.WHST.1.1:	Write arguments focused on discipline-specific content. Introduce precise, knowledgeable claim(s), establish the significance of...
LAFS.1112.WHST.1.2:	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or...
LAFS.1112.WHST.2.4:	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and...
LAFS.1112.WHST.2.5:	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on...
LAFS.1112.WHST.2.6:	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to...
LAFS.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...
LAFS.1112.WHST.3.8:	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess...
LAFS.1112.WHST.3.9:	Draw evidence from informational texts to support analysis, reflection, and research.
LAFS.1112.WHST.4.10:	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day...
MAFS.912.F-IF.2.4:	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the...
MAFS.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...
MAFS.912.G-MG.1.2:	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
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...
MAFS.912.N-Q.1.3:	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MAFS.912.S-IC.2.6:	Evaluate reports based on data.
	Represent data with plots on the real number line (dot plots, histograms, and box plots).
MAFS.912.S-ID.1.1:	<p>Remarks/Examples: In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.</p>
	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile...
MAFS.912.S-ID.1.2:	<p>Remarks/Examples: In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.</p>
	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme...
MAFS.912.S-ID.1.3:	<p>Remarks/Examples: In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.</p>
MAFS.912.S-ID.1.4:	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages...
MAFS.912.S-ID.2.5:	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the...
	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Fit a function to the...
	Remarks/Examples:

[MAFS.912.S-ID.2.6:](#)

Students take a more sophisticated look at using a linear function to model the relationship between two numerical variables. In addition to fitting a line to data, students assess how well the model fits by analyzing residuals.

[ELD.K12.ELL.SC.1:](#)

English language learners communicate information, ideas and concepts necessary for academic success in the content area of...

[ELD.K12.ELL.SI.1:](#)

English language learners communicate for social and instructional purposes within the school setting.

Related Certifications

[Biology \(Grades 6-12\)](#)

[Chemistry \(Grades 6-12\)](#)

[Physics \(Grades 6-12\)](#)

[Earth/Space Science \(Grades 6-12\)](#)

[Science \(Secondary Grades 7-12\)](#)

There are more than 1012 related instructional/educational resources available for this on CPALMS. Click on the following link to access them: <https://www.cpalms.org/Public/PreviewCourse/Preview/13110>