

## Treasure Coast Science Scope and Sequence 2012-2013

Course: Earth and Space Science

Course Code: 2001310

Quarter: Q3

**Topic(s) of Study** Earth's Age, Properties and Processes

**Bodies of Knowledge:** Earth and Space, Life Science, Nature of Science

**Standard(s):** 7: Earth Systems and Patterns, 15: Diversity and Evolution of Living Organisms

**Essential Questions:** How does the advancement of technology and equipment shaped our understanding of the origins of our Earth and its structures. Why is the theory of evolution so controversial? How do scientists design an investigation to answer a scientific question and communicate their findings?

[Concept Map\(s\): Click here](#)

[Resources: Click here](#)

[Syllabus: Click here](#)

[CCSS Literacy Standards: Click here](#)

NGSSS	OUTLINE OF CONTENT (CONCEPT/SKILLS)	TARGETS
<p>SC.912.E.6.1 Describe and differentiate the layers of Earth and the interactions among them. Cognitive Complexity: Moderate</p> <p>SC.912.E.6.2 Connect surface features to surface processes that are responsible for their formation. Cognitive Complexity: Moderate</p> <p>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. Cognitive Complexity: High</p> <p>SC.912.E.6.4 Analyze how specific geologic processes and features are expressed in Florida and elsewhere. Cognitive Complexity: High</p> <p>SC.912.E.6.5 Describe the geologic development of the present day oceans and identify commonly found features. Cognitive Complexity: Moderate</p>	<p>I Layers of the Earth</p> <p>A. Lithosphere</p> <ol style="list-style-type: none"> <li>1. Crust</li> <li>2. Upper mantle</li> </ol> <p>B. Aesthenosphere</p> <ol style="list-style-type: none"> <li>1. Mid Mantle</li> <li>2. Lower Mantel</li> </ol> <p>C. Core</p> <ol style="list-style-type: none"> <li>1. Inner Core</li> <li>2. Outer Core</li> </ol> <p>II Origins of the Earths morphology – land and water</p> <p>A. Continental Drift</p> <p>B. Plate Tectonics</p> <ol style="list-style-type: none"> <li>1. Convergent boundaries (subduction) <ol style="list-style-type: none"> <li>a. Type 1</li> <li>b. Type 2</li> <li>c. Type 3</li> </ol> </li> <li>2. Divergent boundaries</li> <li>3. Transverse boundaries</li> </ol> <p>III Surface features related to surface processes</p> <p>A. Deep trenches and volcanic islands</p>	<ul style="list-style-type: none"> <li>• Describe and differentiate the layers of Earth and the interactions among them (I)</li> <li>• Identify and locate the Earths major tectonic plates (II)</li> <li>• Describe the subsurface processes that occur that result in the movement of tectonic plates (II)</li> <li>• Compare and contrast the various types of plate boundaries(II)</li> <li>• Analyze the surface features associated with the various plate boundaries(II)</li> <li>• Differentiate among the many terrestrial topographical features (III)</li> <li>• Describe the geologic processes that have and continue to shape Florida(IV)</li> <li>• Differentiate among the many oceanic topographical features(V) Compare and contrast the various geologic features found in Florida and explain their formation(IV)</li> <li>• Define the Theory of Evolution and describe the supporting evidences(VI)</li> <li>• Compare and contrast the current explanations for the origins of life on Earth(VI)</li> </ul>

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<p>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. Cognitive Complexity: High</p> <p>SC.912.L.15.8 Describe the scientific explanations of the origin of life on Earth. Cognitive Complexity: Moderate</p> <p>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: Cognitive Complexity: High</p> <ol style="list-style-type: none"> <li>1. pose questions about the natural world,</li> <li>2. conduct systematic <u>observations</u>,</li> <li>3. examine books and other sources of information to see what is already known,</li> <li>4. review what is known in <u>light</u> of empirical evidence,</li> <li>5. plan <u>investigations</u>,</li> <li>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</li> </ol>	<p>where boundaries collide (Convergent type 1)</p> <p>B. Mountains and volcanic activity where boundaries collide (Convergent type 2)</p> <p>C. Mountains where boundaries collide (Convergent Type 3)</p> <p>D. Mid ocean ridges and seismic activity where boundaries depart (Divergent)</p> <p>E. Fractures and earthquakes where plates move past each other (Transform)</p> <p>IV Geologic processes in Florida</p> <p>A. Karst topography</p> <ol style="list-style-type: none"> <li>1. Caves</li> <li>2. Springs</li> <li>3. Aquifer</li> <li>4. Subsidence</li> </ol> <p>V Geologic Oceanic Features</p> <p>A. Mid-ocean ridges</p> <p>B. Trenches</p> <p>C. Subduction zones</p> <p>D. Abyssal Plains</p> <p>E. Continental Shelf</p> <p>F. Continental Slope</p> <p>G. Continental Rise</p> <p>H. Sea Mount</p> <p>VI Theory of Evolution – the process in which inherited characteristics within a population change over generations such that new</p>	<p><b>Objectives below are from Quarter 1A and should be embedded in this topic of study.</b></p> <ul style="list-style-type: none"> <li>• Define a scientific problem or question based on the specific body of knowledge correlated to the Earth/Space Science course.</li> <li>• Use appropriate reference materials to support scientific investigations of various types, such as systematic observation or experiments</li> <li>• Explain that science is based on evidence based facts</li> <li>• Differentiate between science and pseudoscience</li> <li>• Justify conclusions based upon all the available evidence, not on expressed opinions</li> <li>• Describe the role consensus plays in the historical development of a theory in Earth/Space Science</li> <li>• Give examples of how advances in technology have affected scientific theories and laws</li> <li>• Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals</li> <li>• Distinguish between a scientific theory and a general claim.</li> <li>• Distinguish between laws and theories by understanding that laws describe <i>the what</i> and theories explain <i>the why</i></li> <li>• Compare and contrast the terms that describe examples of scientific knowledge such as: theory, law, hypothesis, and model.</li> <li>• Give examples of how advances in</li> </ul>
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<p>tables and graphs),</p> <ol style="list-style-type: none"> <li>7. pose answers, explanations, or descriptions of events,</li> <li>8. generate explanations that explicate or describe natural phenomena (inferences),</li> <li>9. use appropriate evidence and reasoning to justify these explanations to others,</li> <li>10. communicate results of scientific <u>investigations</u>, and</li> <li>11. evaluate the merits of the explanations produced by others.</li> </ol> <p>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. Cognitive Complexity: Low</p> <p>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). Cognitive Complexity: High</p> <p>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,</p>	<p>species sometimes arise. It is supported by:</p> <ol style="list-style-type: none"> <li>A. Fossil record</li> <li>B. Comparative embryology</li> <li>C. Biogeography</li> <li>D. Molecular biology</li> <li>E. Observed evolutionary change</li> </ol> <p>VII Explanations for the origin of life on Earth</p> <ol style="list-style-type: none"> <li>A. Life appeared spontaneously</li> <li>B. Life evolved from simpler organisms</li> <li>C. It's unknowable</li> <li>D. It came from outer space</li> </ol>	<p>technology have affected scientific theories and laws.</p> <ul style="list-style-type: none"> <li>• Distinguish the difference between a scientific law and theory vs. a societal law</li> </ul>
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and religion. Cognitive Complexity: High

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. Cognitive Complexity: High

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. Cognitive Complexity: Moderate

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. Cognitive Complexity: Moderate