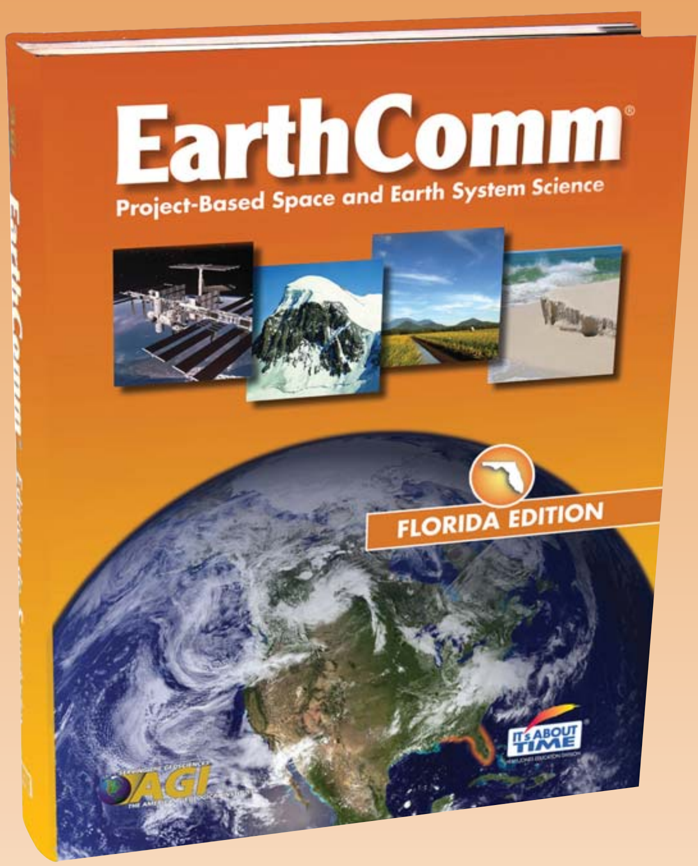
Florida Edition

EarthComm

CORRELATION
FLORIDA DEPARTMENT OF EDUCATION
INSTRUCTIONAL MATERIALS CORRELATION
COURSE STANDARDS



Subject:	Science
Grade Level:	9–12
Course Title:	Earth/Space Science
Course Code:	2001310
Title ID:	1797
Publisher ID:	35-1637714-01

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HERFF JONES EDUCATION DIVISION

Correlation of Florida Next Generation Sunshine State Standards
to
EarthComm: Project-Based Space and Earth System Science

Florida Next Generation Sunshine State Standards Scheme and Descriptor	*EarthComm*
Standard 1: The Practice of Science	
A: Scientific inquiry is a multifaceted activity; The processes of science include the formulation of scientifically investigable questions, construction of investigations into those questions, the collection of appropriate data, the evaluation of the meaning of those data, and the communication of this evaluation.	
B: The processes of science frequently do not correspond to the traditional portrayal of "the scientific method."	
C: Scientific argumentation is a necessary part of scientific inquiry and plays an important role in the generation and validation of scientific knowledge.	
D: Scientific knowledge is based on observation and inference; it is important to recognize that these are very different things. Not only does science require creativity in its methods and processes, but also in its questions and explanations.	
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.	**1. pose questions about the natural world,** *Each section begins with a* Think About It *component. The majority of these ask a question(s) about the natural world. Examples include the following:* Chapter 1, Section 1, p. 8 Chapter 2, Section 7, p. 204 Chapter 3, Section 2, p. 278 Chapter 4, Section 2, p. 380 Chapter 5, Section 1, p. 466 Chapter 6, Section 2, p. 545 Chapter 7, Section 1, p. 622 **2. conduct systematic observations,** *All* Investigate *components include instructions for conducting systematic observations. Examples include the following:* Chapter 1, Section 5, pp. 50–53 Chapter 2, Section 8, pp. 212–213 Chapter 3, Section 2, pp. 278–279 Chapter 4, Section 2, pp. 381–382 Chapter 5, Section 1, pp. 466–467 Chapter 6, Section 1, pp. 536–537 Chapter 7, Section 2, pp. 623–628 **3. examine books and other sources of information to see what is already known,** *Each section ends with an* Inquiring Further *component. Many of these prompt students to examine other sources of information to see what is known. Examples include the following:* Chapter 1, Section 3, p. 39 Chapter 2, Section 8, p. 218 Chapter 3, Section 4, p. 304 Chapter 4, Section 3, p. 397 Chapter 5, Section 2, p. 483 Chapter 6, Section 6, p. 592 Chapter 7, Section 1, p. 633

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	4. review what is known in light of empirical evidence, *Reviews of empirical evidence gathered in investigations appear throughout* EarthComm *in* Chapter Challenges *and* Mini-Challenges*. They also appear within certain sections. Examples include the following:* Chapter 1, Section 7, pp. 77–79 Chapter 2, Section 2, pp. 156–158 Chapter 3, Section 2, p. 286 Chapter 4, Section 2, pp. 381–382 Chapter 5, Section 1, pp. 466–467 Chapter 6, Section 2, p. 547 Chapter 7, Section 2, pp. 623–628 **5. plan investigations,** *Student-planned investigations appear throughout* EarthComm*. Examples include the following:* Chapter 1, Section 6, p. 76 Chapter 2, Section 8, pp. 212–214 Chapter 3, Section 3, pp. 287–288 Chapter 4, Section 2, pp. 381–382 Chapter 5, Section 1, pp. 467–468 Chapter 6, Section 4, pp. 564–566 Chapter 7, Section 1, p. 628 **6. use tools to gather, analyze, and interpret data,** *Students use equipment to collect and measure data throughout* EarthComm*. They also commonly use tables or graphs to analyze data. Examples include the following*: Chapter 1, Section 4, pp. 41–43 Chapter 2, Section 8, pp. 213–214 Chapter 3, Section 2, pp. 279–280 Chapter 4, Section 2, pp. 381–382 Chapter 5, Section 2, pp. 475–476 Chapter 6, Section 1, p. 544 Chapter 7, Section 1, p. 628 **7. pose answers, explanations, or other descriptions of events**, *Students give detailed answers and descriptions of investigation results throughout* EarthComm*. Examples include the following*: Chapter 1, Section 5, pp. 51–52 Chapter 2, Section 11, pp. 234–236 Chapter 3, Section 2, p. 285 Chapter 4, Section 2, pp. 381–382 Chapter 5, Section 1, pp. 466–467 Chapter 6, Section 1, pp. 537–538 Chapter 7, Section 1, p. 632

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	8. generate explanations that explicate or describe natural phenomena (inferences), *Examples appear throughout* EarthComm. *Examples include the following:* Chapter 1, Section 5, pp. 51–52 Chapter 2, Section 11, p. 234 Chapter 3, Section 2, pp. 279–280 Chapter 4, Section 2, pp. 381–382 Chapter 5, Section 1, p. 473 Chapter 6, Section 1, pp. 537–538 Chapter 7, Section 1, p. 632 **9. use appropriate evidence and reasoning to justify these explanations to others,** *Evidence and reasoning are used to justify results throughout* EarthComm. *Examples include the following:* Chapter 1, Section 5, p. 52 Chapter 2, Section 11, p. 234 Chapter 3, Section 7, p. 324 Chapter 4, Section 2, pp. 381–382 Chapter 5, Section 1, p. 473 Chapter 6, Section 1, pp. 537–538 Chapter 7, Section 1, p. 632 **10. communicate results of scientific investigations,** *Students are asked to share their work with their groups or class throughout* EarthComm. *This includes every* Mini-Challenge, Chapter Challenge, *and answers to* Think About It (Again) *questions. Examples include the following:* Chapter 1, Section 3, pp. 30–31 Chapter 2, *Chapter Challenge*, pp. 254–255 Chapter 3, Section 7, p. 324 Chapter 4, Section 2, pp. 381–382 Chapter 5, Section 6, p. 520 Chapter 6, Section 2, p. 554 Chapter 7, Section 2, pp. 635–636 **11. evaluate the merits of the explanations produced by others,** *Explanations are presented as part of the learning process throughout* EarthComm; *evaluating them is an integral part of each chapter's* Mini-Challenge *and* Chapter Challenge. *Examples include the following:* Chapter 1, Section 10, pp. 111–112 Chapter 2, *Chapter Challenge*, pp. 254–255 Chapter 3, Section 7, p. 324 Chapter 4, Section 2, pp. 381–382 Chapter 5, *Chapter Challenge*, pp. 524–525 Chapter 6, *Chapter Challenge*, pp. 610–611 Chapter 7, Section 3, p. 654

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SC.912.N.1.2 Describe and explain what characterizes science and its methods.	*Students apply scientific processes and methods in every section's Investigate. Through these experiences, students gain an appreciation for the characteristics of science and scientific knowledge. Each section provides an opportunity for students to describe and explain how the investigations they conducted and the knowledge they gained is specific to the practice of science. Examples include the following:* Nature of Science, pp. NS2–NS3, NS5–NS6 Chapter 1, Section 5, pp. 50–53 Chapter 2, Section 3, pp. 162–164 Chapter 3, Section 6, pp. 314–316 Chapter 4, Section 2, pp. 380–382 Chapter 5, Section 4, pp. 496–500 Chapter 6, Section 1, pp. 536–538 Chapter 7, Section 5, pp. 666–668
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.	*In every* Chapter Challenge, *students are required to support the results of their investigations and/or projects with evidence as well as critique the* Chapter Challenge *results of other groups and how well they support their findings with evidence. Each section contains an Investigate part which requires students to do the following: observe phenomena, develop hypotheses, design and plan experiments and models, isolate variables, record data, organize their findings, create graphs, interpret results, and develop conclusions and explanations based on evidence. In the* Digging Deeper *sections, students continue to consider lines of evidence and explanations.* Understanding and Applying *encourages students to thoroughly analyze the evidence and explanations they have developed or considered. Through these activities, students apply critical and logical thinking skills as well as consider various explanations related to the concepts introduced in the section. Examples include the following:* Nature of Science, pp. NS2–NS3, NS5–NS6 Chapter 1, Section 7, pp. 78–79, 81, 83–87 Chapter 2, Section 6, pp. 191–200 Chapter 3, Section 6, pp. 315–321 Chapter 4, Section 2, pp. 381–387 Chapter 5, Section 3, pp. 484–492 Chapter 6, Section 3, pp. 556–561 Chapter 7, Section 5, pp. 667–672, 674
SC.912.N.1.4 Identify sources of information and assess their reliability according to the strict standards of scientific investigation.	Nature of Science, pp. NS2 Chapter 1, Section 5, p. 63; Section 7, p. 88 Chapter 2, Section 5, p. 190; Section 8, p. 218 Chapter 3, Section 4, p. 304; Section 7, p. 329 Chapter 4, Section 3, p. 397; Section 8, p. 442 Chapter 5, Section 6, p. 521 Chapter 6, Section 6, p. 592 Chapter 7, Section 1, p. 633; Section 3, p. 654
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.	Nature of Science, pp. NS2 Chapter 1, Section 9, pp. 103–108 Chapter 3, *Extending the Connection*, pp. 358–358B Chapter 5, *Extending the Connection*, pp. 526–526B Chapter 7, Section 3, pp. 649–653

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SC.912.N.1.6 Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.	*Scientific inference is a key component of* EarthComm, *and students are required to make observations and develop explanations based on these observations in the Investigate and* Understanding and Applying *parts of sections. Examples include the following:* Nature of Science, pp. NS2–NS6 Chapter 1, Section 3, p. 39 Chapter 2, Section 5, pp. 180–181 Chapter 3, Section 4, pp. 298–299 Chapter 4, Section 9, p. 444 Chapter 5, Section 4, pp. 496–499 Chapter 6, Section 3, p. 557 Chapter 7, Section 2, p. 635
SC.912.N.1.7 Recognize the role of creativity in constructing scientific questions, methods and explanations.	*Each* Chapter Challenge *requires students to use creativity in solving scientific problems and tasks. Students apply the knowledge gained within the chapter in the development of their own solutions for the* Chapter Challenge*. Many chapters also contain open-ended activities in which students must be creative in coming up with their own scientific questions and/or methods to answer scientific questions. Examples include the following:* Nature of Science, pp. NS1–NS2 Chapter 1, Section 8, p. 99 Chapter 2, Section 1, p. 155 Chapter 3, Section 2, pp. 278–279 Chapter 4, Section 7, p. 428 Chapter 5, Chapter Challenge, pp. 524–525 Chapter 6, Section 5, p. 581 Chapter 7, Section 5, p. 668
Standard 2: The Characteristics of Scientific Knowledge	
A: Scientific knowledge is based on empirical evidence, and is appropriate for understanding the natural world, but it provides only a limited understanding of the supernatural, aesthetic, or other ways of knowing, such as art, philosophy, or religion.	
B: Scientific knowledge is durable and robust, but open to change.	
C: Because science is based on empirical evidence it strives for objectivity, but as it is a human endeavor the processes, methods, and knowledge of science include subjectivity, as well as creativity and discovery.	
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).	Nature of Science, pp. NS2, NS5-NS6 Chapter 2, *Extending the Connection*, pp. 256–256A
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.	Nature of Science, pp. NS5–NS6 Chapter 2, *Extending the Connection*, pp. 256–256A
SC.912.N.2.3 Identify examples of pseudoscience (such as astrology, phrenology) in society.	Nature of Science, pp. NS5–NS6 Chapter 2, *Extending the Connection*, pp. 256–256A

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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.	*In many parts of* EarthComm, *students consider the vigor of scientific knowledge through experimentation and the examination of theories supported by evidence. Examples of how scientific knowledge is subject to change and debate can be found in the following sections:* Nature of Science, pp. NS2–NS6 Chapter 1, Section 2, pp. 24–27; Section 7, pp. 83–84; Section 10, pp. 115–122 Chapter 2, Section 3, pp. 165–168; Section 4, pp. 176–178; Section 5, pp. 182–188; Section 6, pp. 191–199 Chapter 3, Section 5, pp. 308–309; Section 7, pp. 323–327; Section 8, pp. 335–337; *Extending the Connection*, pp. 358–358B Chapter 5, *Extending the Connection*, pp. 526–526B Chapter 7, Section 3, pp. 649–654; Section 6, pp. 678–681
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.	Nature of Science, pp. NS3, NS5–NS6 Chapter 1, Section 7, p. 88; Section 8, p. 93 Chapter 2, Section 3, pp. 166–169; Section 4, pp. 176–178; Section 6, pp. 191–201 Chapter 3, *Extending the Connection*, pp. 358–358B Chapter 5, *Extending the Connection*, pp. 526–526B
Standard 3: The role of Theories, Laws, Hypotheses, and Models	
The terms that describe examples of scientific knowledge, for example: "theory," "law," "hypothesis" and "model" have very specific meanings and functions within 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.	Nature of Science, pp. NS2–NS6 Chapter 1, Section 5, pp. 54–60; Section 7, p. 86 Chapter 2, Section 3, pp. 165–169; Section 4, pp. 176–179; Section 6, pp. 191–200 Chapter 3, Section 8, pp. 335–337 Chapter 4, Section 9, pp. 446–449
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.	Nature of Science, pp. NS4–NS6 Chapter 1, Section 6, pp. 71–73; Section 7, pp. 79–86 Chapter 2, Section 3, pp. 165–168; Section 4, pp. 176–178; Section 6, pp. 194–200 Chapter 3, *Extending the Connection*, pp. 358–358B Chapter 5, Section 2, p. 480; *Extending the Connection*, pp. 526–526B Chapter 7, Section 6, pp. 678–681
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.	Nature of Science, pp. NS4 Chapter 1, Section 3, pp. 32–38; Section 4, pp. 43–47; Section 5, pp. 54–60 Chapter 3, Section 7, pp. 323–328
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.	Nature of Science, pp. NS3–NS5 Chapter 1, Section 3, p. 38

<table>
<tr><th>Florida Next Generation Sunshine State Standards
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<tr><td>SC.912.N.3.5 Describe the function of models in science, and identify the wide range of models used in science.</td><td>Throughout EarthComm, students use a wide range of models to represent phenomena and theories. Examples include the following:
Nature of Science, pp. NS4–NS6
Chapter 1, Section 1, p. 9, pp. 12–16
Chapter 2, Section 4, pp. 172–174, 179
Chapter 3, Section 3, p. 288
Chapter 4, Section 4, pp. 398–399
Chapter 5, Section 1, pp. 466–468
Chapter 6, Section 2, p. 547
Chapter 7, Section 4, p. 656, 663</td></tr>
<tr><td colspan="2">Standard 4: Science and Society</td></tr>
<tr><td colspan="2">As tomorrow's citizens, students should be able to identify issues about which society could provide input, formulate scientifically investigable questions about those issues, construct investigations of their questions, collect and evaluate data from their investigations, and develop scientific recommendations based upon their findings.</td></tr>
<tr><td>SC.912.N.4.1 Explain how scientific knowledge and reasoning provide an empirically based perspective to inform society's decision making.</td><td>Nature of Science, pp. NS1, NS6–NS7
Chapter 1, Section 10, pp. 111–112, 115–123
Chapter 2, Section 8, pp. 213–214, 217–218
Chapter 4, Section 2, pp. 380–388; Section 3, pp. 389–396; Section 5, pp. 408–415; Section 7, p. 429, 431–433; Section 9, pp. 444, 446–450
Chapter 5, Section 5, pp. 507–510, 512–513; Section 6, pp. 515–520
Chapter 6, Section 4, pp. 564–571; Section 5, pp. 576–581; Section 6, pp. 585–592
Chapter 7, Section 5, pp. 667–673, 675; Section 6, pp. 676–682</td></tr>
<tr><td colspan="2">Standard 5: Earth in Space and Time</td></tr>
<tr><td colspan="2">The origin and eventual fate of the Universe still remains one of the greatest questions in science. Gravity and energy influence the development and life cycles of galaxies, including our own Milky Way galaxy, stars, the planetary systems, Earth, and residual material left from the formation of the solar system. Humankind's need to explore continues to lead to the development of knowledge and understanding of the nature of the Universe.</td></tr>
<tr><td>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.</td><td>Chapter 1, Section 3, pp. 29–31, 33–34, 38–39</td></tr>
<tr><td>SC.912.E.5.2 Identify patterns in the organization and distribution of matter in the universe and the forces that determine them.</td><td>Chapter 1, Section 3, pp. 29–39; Section 4, pp. 42–45, 47–49; Section 5, pp. 50–52, 54–63; Section 6, pp. 67–69, 71–76</td></tr>
<tr><td>SC.912.E.5.3 Describe and predict how the initial mass of a star determines its evolution.</td><td>Chapter 1, Section 9, pp. 100–108</td></tr>
<tr><td>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.</td><td>Chapter 1, Section 7, pp. 77–88</td></tr>
<tr><td>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.</td><td>Chapter 1, Section 3, pp. 29, 31–39</td></tr>
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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.	Chapter 1, Section 4, pp. 41–46, 48–49; Section 5, pp. 50–63
SC.912.E.5.7 Relate the history of and explain the justification for future space exploration and continuing technology development.	Chapter 1, Section 10, pp. 109–112, 115–123
SC.912.E.5.8 Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly developed observational tools.	Chapter 1, Section 8, pp. 89, 92, 94–99
SC.912.E.5.9 Analyze the broad effects of space exploration on the economy and culture of Florida.	Chapter 1, Section 10, pp. 110, 112–114, 120–121, 123
SC.912.E.5.11 Distinguish the various methods of measuring astronomical distances and apply each in appropriate situations.	Chapter 1, Section 1, pp. 8–11, 16, 18–19
Standard 6: Earth Structures	
The scientific theory of plate tectonics provides the framework for much of modern geology. Over geologic time, internal and external sources of energy have continuously altered the features of Earth by means of both constructive and destructive forces. All life, including human civilization, is dependent on Earth's internal and external energy and material resources.	
SC.912.E.6.1 Describe and differentiate the layers of Earth and the interactions among them.	Chapter 2, Section 1, pp. 147–153; Section 2, pp. 159–160; Section 3, pp. 162–170; Section 4, pp. 172–179; Section 5, pp. 180–190
SC.912.E.6.2 Connect surface features to surface processes that are responsible for their formation.	Chapter 2, Section 1, pp. 144–154; Section 7, pp. 204–209; Section 8, pp. 212–217; Section 9, pp. 219–225 Chapter 4, Section 1, pp. 368–378; Section 2, pp. 380–388; Section 3, pp. 389–396; Section 4, pp. 398–407; Section 5, pp. 408–415; Section 6, pp. 418–426; Section 7, pp. 427–434; Section 8, pp. 435–441; Section 9, pp. 446–449, p. 451
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.	Chapter 2, Section 2, pp. 157–161; Section 3, pp. 162–170; Section 4, pp. 171–179; Section 5, pp. 180–190; Section 6, pp. 191–200; Section 10, pp. 229–231
SC.912.E.6.4 Analyze how specific geologic processes and features are expressed in Florida and elsewhere.	Chapter 3, Section 1, pp. 266–277; Section 2, pp. 278–286; Section 3, pp. 287–296; Section 4, pp. 297–304; Section 5, pp. 305–311; Section 6, pp. 314–321; Section 7, pp. 323–328; Section 8, pp. 330–338; Section 9, pp. 339–353 Chapter 4, Section 3, pp. 389–396
SC.912.E.6.5 Describe the geologic development of the present-day oceans and identify commonly found features.	Chapter 2, Section 1, pp. 144–147, 150–154; Section 2, p. 159; Section 4, pp. 171–179; Section 5, pp. 180–184; Section 6, pp. 191–198, 200

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Standard 7: Earth Systems and Patterns	
The scientific theory of the evolution of Earth states that changes in our planet are driven by the flow of energy and the cycling of matter through dynamic interactions among the atmosphere, hydrosphere, cryosphere, geosphere, and biosphere, and the resources used to sustain human civilization on Earth.	
SC.912.E.7.1 Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.	Chapter 5, Section 4, pp. 496–500; Section 5, pp. 507, 509–514; Section 6, pp. 515–521 Chapter 7, Section 1, pp. 623–632; Section 2, pp. 634–643; Section 3, pp. 644–651, 653–654; Section 4, pp. 655–663; Section 5, pp. 666–675; Section 6, pp. 676–682
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.	Chapter 5, Section 1, pp. 466–473; Section 2, pp. 475–483; Section 3, pp. 484–493
SC.912.E.7.3 Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.	*Standard addressed implicitly in each* EarthComm *section. Explicit examples of Earth system interactions include the following:* Nature of Science, pp. NS8–NS10 Chapter 1, Section 10, pp. 111–112 Chapter 2, Section 8, p. 212 Chapter 4, Section 9, p. 451 Chapter 5, Section 5, pp. 507, 514 Chapter 6, Section 7, p. 606 Chapter 7, Section 6, p. 677
SC.912.E.7.4 Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.	Chapter 5, Section 4, pp. 496–506; Section 5, pp. 507–514 Chapter 7, Section 1, pp. 622–623, 628–633; Section 2, pp. 635–636, 641–643; Section 3, pp. 649–653
SC.912.E.7.5 Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.	Chapter 6, Section 1, pp. 536–544; Section 2, pp. 545–555; Section 3, pp. 556–561
SC.912.E.7.6 Relate the formation of severe weather to the various physical factors.	Chapter 6, Section 4, pp. 564–572; Section 5, pp. 573–581; Section 6, pp. 585–592; Section 7, pp. 593–603, 605–606
SC.912.E.7.7 Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.	Chapter 7, Section 2, p. 643; Section 3, pp. 644–654; Section 4, pp. 655–663; Section 5, pp. 666–675
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.	Chapter 3, Section 9, pp. 339–353 Chapter 4, Section 3, pp. 389–391, pp. 393–397 Chapter 6, Section 7, pp. 593–602, pp. 605–607
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.	Chapter 7, Section 4, pp. 655–663; Section 5, pp. 666–668, 670–671; Section 6, pp. 677–682

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Standard 8: Matter	
A: A working definition of matter is that it takes up space, has mass, and has measurable properties. Matter is comprised of atomic, subatomic, and elementary particles.	
B: Electrons are key to defining chemical and some physical properties, reactivity, and molecular structures. Repeating (periodic) patterns of physical and chemical properties occur among elements that define groups of elements with similar properties. The periodic table displays the repeating patterns, which are related to the atom's outermost electrons. Atoms bond with each other to form compounds.	
C: In a chemical reaction, one or more reactants are transformed into one or more new products. Many factors shape the nature of products and the rates of reaction.	
D: Carbon-based compounds are building-blocks of known life forms on Earth and numerous useful natural and synthetic products.	
SC.912.P.8.1 Differentiate among the four states of matter.	Nature of Science, pp. NS8–NS10
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.	Chapter 3, *Extending the Connection*, pp. 358–358B
Standard 10: Energy	
A: Energy is involved in all physical and chemical processes. It is conserved, and can be transformed from one form to another and into work. At the atomic and nuclear levels energy is not continuous but exists in discrete amounts. Energy and mass are related through Einstein's equation E = mc2.	
B: The properties of atomic nuclei are responsible for energy-related phenomena such as radioactivity, fission and fusion.	
C: Changes in entropy and energy that accompany chemical reactions influence reaction paths. Chemical reactions result in the release or absorption of energy.	
D: The theory of electromagnetism explains that electricity and magnetism are closely related. Electric charges are the source of electric fields. Moving charges generate magnetic fields.	
E: Waves are the propagation of a disturbance. They transport energy and momentum but do not transport matter.	
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.	Chapter 1, Section 7, pp. 81–83; Section 8, pp. 89–91, 94–99 Chapter 2, Section 3, pp. 163, 166–168 Chapter 5, Section 2, pp. 475–478, 480, 482 Chapter 6, Section 1, pp. 536–537, 539–542
SC.912.P.10.10 Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).	Chapter 4, *Extending the Connection*, pp. 456–456B

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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.	Chapter 1, *Extending the Connection*, pp. 134–134B
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.	Chapter 6, *Extending the Connection*, pp. 612–612B
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.	Chapter 1, Section 8, pp. 89–99
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.	Chapter 1, Section 8, p. 90, 92–97
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.	Chapter 1, Section 8, pp. 90–98
Standard 12: Motion	
A: Motion can be measured and described qualitatively and quantitatively. Net forces create a change in motion. When objects travel at speeds comparable to the speed of light, Einstein's special theory of relativity applies.	
B: Momentum is conserved under well-defined conditions. A change in momentum occurs when a net force is applied to an object over a time interval.	
C: The law of Universal Gravitation states that gravitational forces act on all objects irrespective of their size and position.	
D: Gases consist of great numbers of molecules moving in all directions. The behavior of gases can be modeled by the kinetic molecular theory.	
E: Chemical reaction rates change with conditions under which they occur. Chemical equilibrium is a dynamic state in which forward and reverse processes occur at the same rates.	
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.	Chapter 1, Section 4, pp. 41–45
SC.912.P.12.4 Describe how the gravitational force between two objects depends on their masses and the distance between them.	Chapter 1, Section 5, pp. 55–57 Chapter 2, Section 3, pp. 166, 168

Florida Next Generation Sunshine State Standards Scheme and Descriptor	*EarthComm*
Standard 1: Formulating Questions	
MA.912.S.1.2 Determine appropriate and consistent standards of measurement for the data to be collected in a survey or experiment.	*Appropriate and consistent measurements of data are collected throughout* EarthComm. *Examples include the following:* Chapter 1, Section 6, p. 76 Chapter 2, Section 3, pp. 162–163 Chapter 3, Section 2, pp. 278–279 Chapter 4, Section 2, p. 382 Chapter 5, Section 4, pp. 496–499 Chapter 6, Section 5, p. 581 Chapter 7, Section 3, p. 648
Standard 3: Summarizing Data	
MA.912.S.3.2 Collect, organize, and analyze data sets, determine the best format for the data and present visual summaries from the following: bar graphs line graphs stem and leaf plots circle graphs histograms box and whisker plots scatter plots cumulative frequency (ogive) graphs	*Examples of visual summaries of data sets appear throughout* EarthComm. *Examples include the following:* Chapter 1, Section 5, pp. 52–53; Section 7, pp. 78–79, 87; Section 8, pp. 90–92; Section 9, pp. 101–102 Chapter 2, Section 2, pp. 157–158; Section 9, pp. 219–221 Chapter 4, Section 4, pp. 400–402; Section 6, pp. 418–422; Section 7, p. 428 Chapter 5, Section 6, pp. 515–516 Chapter 7, Section 5, pp. 667, 674

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