



## EarthComm Correlation to the Louisiana Grade Level Expectations for Earth Science, Grades 9-12

### SCIENTIFIC INQUIRY

Benchmark	Location/Page where Standard is found
<b>The Abilities Necessary to Do Scientific Inquiry</b>	
1. Write a testable question or hypothesis when given a topic (SI-H-A1)	<b>G23-30, G62-73, G74-84, G131-137, U70-80, U90-99, F4-12, F128-137, F138-148, E96-104, E125-135, G122-130, G155-163, E173-181</b>
2. Describe how investigations can be observation, description, literature survey, classification, or experimentation (SI-H-A2)	<b>G52-53, E128-129, G105-109, G110-117, R184-195, F48-51, E136-143, E148-155, E173-181, E182-188</b>
3. Plan and record step-by-step procedures for a valid investigation, select equipment and materials, and identify variables and controls (SI-H-A2)	<b>Throughout, for example: G4-13, G14-22, G74-84, G95-104, G155-163, F2-12, R62-71, R72-83</b>
4. Conduct an investigation that includes multiple trials and record, organize, and display data appropriately (SI-H-A2)	<b>G24, G39, G74, G86, G88, G96, G123-124, G132, G165, 168, U5, U70-72, U82, U92-94, U114, U132-133, U137, U147-148, U156, F5, F14-16, F67, F79, F116, F129-130, F136, F152, F159, F168-169, F175, F181, R5-7, R26, R34, R63, R89, R97-99, R121, R128, R137-138, R147, R157-160, R170, R176, R185-186, R197-198, R202, E15, E29,</b>

	<b>E46, E57, E59, E70, E91, E98</b>
5. Utilize mathematics, organizational tools, and graphing skills to solve problems (SIH-A3)	<b>G116-117, E128-129, E136-143, E170-171, E185-186</b>
6. Use technology when appropriate to enhance laboratory investigations and presentations of findings (SI-H-A3)	<b>U124-126, U131-134, R169-171, R172-176, R184-188, R189-195</b>
7. Choose appropriate models to explain scientific knowledge or experimental results (e.g., objects, mathematical relationships, plans, schemes, examples, role-playing, computer simulations) (SI-H-A4)	<b>R43-52, E125-135, R184-195, R146-155, F128-137, E37-46</b>
8. Give an example of how new scientific data can cause an existing scientific explanation to be supported, revised, or rejected (SI-H-A5)	<b>F13-22, F23-36, F37-47, E117-124, U57-65, G105-109, G110-116</b>
9. Write and defend a conclusion based on logical analysis of experimental data (SI-HA6)	<b>G52-53, E128-129, G105-109, G110-117, R184-195</b>
10. Given a description of an experiment, identify appropriate safety measures (SI-H-A7)	<b>G24, G39, G74, G86, G88, G96, G123-124, G132, G165, 168, U5, U70-72, U82, U92-94, U114, U132-133, U137, U147-148, U156, F5, F14-16, F67, F79, F116, F129-130, F136, F152, F159, F168-169, F175, F181, R5-7, R26, R34, R63, R89, R97-99, R121, R128, R137-138, R147, R157-160, R170, R176, R185-186, R197-198, R202, E15, E29, E46, E57, E59, E70, E91, E98</b>
<b>Understanding Scientific Inquiry</b>	
11. Evaluate selected theories based on supporting scientific evidence (SI-H-B1)	<b>F13-22, F23-36, F37-47, E117-124, U57-65, G105-109, G110-116</b>
12. Cite evidence that scientific investigations are conducted for many different reasons (SI-H-B2)	<b>E28-36, E37-40, E41-46</b>
13. Identify scientific evidence that has caused modifications in previously accepted theories (SI-H-B2)	<b>F45, E37-46, E74-77, G105-109, G110-116</b>

14. Cite examples of scientific advances and emerging technologies and how they affect society (e.g., MRI, DNA in forensics) (SI-H-B3)	<b>R43-52, F37-47, F48-55, F56-62, U153-170</b>
15. Analyze the conclusion from an investigation by using data to determine its validity (SI-H-B4)	<b>G105-109, G110-117, R184-188, R189-195, F88-94, G131-137, G155-163, F113-123, E4-13, G164-171</b>
16. Use the following rules of evidence to examine experimental results: (a) Can an expert's technique or theory be tested, has it been tested, or is it simply a subjective, conclusive approach that cannot be reasonably assessed for reliability? (b) Has the technique or theory been subjected to peer review and publication? (c) What is the known or potential rate of error of the technique or theory when applied? (d) Were standards and controls applied and maintained? (e) Has the technique or theory been generally accepted in the scientific community? (SI-H-B5) (SI-H-B1) (SI-H-B4)	<b>F48-51, E136-143, E148-155, E174-181, E182-188</b>

## EARTH AND SPACE SCIENCE

<b>Benchmark</b>	<b>Location/Page where Standard is found</b>
<b>Energy in Earth's System</b>	
1. Describe what happens to the solar energy received by Earth every day (ESS-H-A1)	<b>R146-155, E117-124, E125-135, F4-12, F13-22, F23-26, F48-55</b>
2. Trace the flow of heat energy through the processes in the water cycle (ESS-H-A1)	<b>R146-155, R156-168, R177-183, R184-195</b>

3. Describe the effect of natural insulation on energy transfer in a closed system (ESSH-A1)	<b>F95-102, F103-112, F113-123</b>
4. Describe the relationship between seasonal changes in the angle of incoming solar radiation and its consequences to Earth's temperature (e.g., direct vs. slanted rays) (ESS-H-A2)	<b>E105-116</b>
5. Explain how the process of fusion inside the Sun provides the external heat source for Earth (ESS-H-A3)	<b>E47-57, E69-79</b>
6. Discuss how heat energy is generated at the inner core-outer core boundary (ESSH-A4)	<b>G85-94</b>
7. Analyze how radiant heat from the Sun is absorbed and transmitted by several different earth materials (ESS-H-A5)	<b>E47-57, E105-116, E117-124, E125-135, E136-143, E156-164, F4-12, F23-36, U131-137, G85-94</b>
8. Explain why weather only occurs in the tropospheric layer of Earth's atmosphere (ESS-H-A5)	<b>F37-47, F48-55, F23-36, F56-61</b>
9. Compare the structure, composition, and function of the layers of Earth's atmosphere (ESS-H-A6)	<b>F48-55, F138-148, F149-157, F158-166, F167-173, F180-185, U131-137, E84-95, E96-104, E156-164, E125-135, E136-143, G31-37, G38-42</b>
10. Analyze the mechanisms that drive weather and climate patterns and relate them to the three methods of heat transfer (ESS-H-A6)	<b>R146-155, E117-124, E125-135, F4-12, F13-22, F23-26, F48-55</b>
11. Describe the processes that drive lithospheric plate movements (i.e., radioactive decay, friction, convection) (ESS-H-A7) (ESS-H-A3) (ESS-H-A4)	<b>G74-84, G85-94, G62-73</b>
12. Relate lithospheric plate movements to the occurrences of earthquakes, volcanoes, mid-ocean ridge systems, and off-shore trenches found on Earth (ESS-H-A7)	<b>G105-117, G4-13, G14-22, G62-73, G147-154, E117-124</b>
<b>Geochemical Cycles</b>	

13. Explain how stable elements and atoms are recycled during natural geologic processes (ESS-H-B1)	E125-135, E136-143, U100-112, U113-119, U131-137, U138-145, U155-162, F56-61, R25-34, R43-52, R53-61, R156-168, R184-195, R196-202
14. Compare the conditions of mineral formation with weathering resistance at Earth's surface (ESS-H-B1)	U70-80, U81-89, U90-99, U110-112, U113-119, U155-162, U97-99
15. Identify the sun-driven processes that move substances at or near Earth's surface (ESS-H-B2)	R169-176, R177-183, U87, U100-112, U113-119, U124-130, U138-145, F95-102, U155
<b>The Origin and Evolution of the Earth System</b>	
16. Use the nebular hypothesis to explain the formation of a solar system (ESS-H-C1)	E7-10, E18-20
17. Determine the relative ages of rock layers in a geologic profile or cross section (ESSH-C2)	G105-117, G4-13, G14-22, G62-73, G147-154, E117-124
18. Use data from radioactive dating techniques to estimate the age of earth materials (ESS-H-C2)	U57-65, E4-13, U49-56, E148-155, E165-172, E173-181, E182-188, E96-104, E138-139
19. Interpret geological maps of Louisiana to describe the state's geologic history (ESSH-C3)	E165-172, E182-188
20. Determine the chronological order of the five most recent major lobes of the Mississippi River delta in Louisiana (ESS-H-C3)	U100-112, U70-80, U81-89, U90-99
21. Use fossil records to explain changes in the concentration of atmospheric oxygen over time (ESS-H-C4)	E125-135, E165-172
22. Analyze data related to a variety of natural processes to determine the time frame of the changes involved (e.g., formation of sedimentary rock layers, deposition of ash layers, fossilization of plant or animal species) (ESS-H-C5)	U49-56, U57-65, U39-48, E165-172, E182-188, E148-155

<b>The Origin and Evolution of the Universe</b>	
23. Identify the evidence that supports the big bang theory (ESS-H-D1)	<b>E4-13</b>
24. Describe the organization of the known universe (ESS-H-D2)	<b>E69-79, E4-13</b>
25. Using the surface temperature and absolute magnitude data of a selected star, locate its placement on the Hertzsprung-Russell diagram and infer its color, size, and life stage (ESS-H-D3)	<b>E69-79</b>
26. Identify the elements present in selected stars, given spectrograms of known elements and those of the selected stars (ESS-H-D4)	<b>E69-79</b>
27. Trace the movement and behavior of hydrogen atoms during the process of fusion as it occurs in stars like the Sun (ESS-H-D5)	<b>E69-79, E4-13</b>
28. Identify the relationship between orbital velocity and orbital diameter (ESS-H-D6) (PS-H-E2)	<b>E28-36</b>
29. Demonstrate the elliptical shape of Earth's orbit and describe how the point of orbital focus changes during the year (ESS-H-D6)	<b>E28-36</b>
30. Summarize how current technology has directly affected our knowledge of the universe (ESS-H-D7)	<b>E58-68, E69-79, E4-13, G155-163, G164-171</b>