



***Investigating Earth Systems* Correlation to the Iowa Core Curriculum Standards**

Science As Inquiry

Benchmark	Location/Page where Standard is found
Identify and generate questions that can be answered through scientific investigations.	
Students should develop the ability to refine and refocus broad and ill-defined questions. An important aspect of this ability consists of clarifying questions and inquiries and directing them toward objects and phenomena that can be described, explained, or predicted by scientific investigations.	A73-76, RL1-6, RL7-14, RL15-28, RL34-44, RL45-51, RL52-57, DP1-7, DP8-21, DP2-29, DP30-40, F1-7, A1-4, A15-25, W21-31
Students should develop the ability to connect their questions with scientific ideas, concepts, and quantitative relationships that guide investigations.	RL15-28, RL34-44, RL45-51, DP8-21, DP22-29, A15-25, W21-31
Design and conduct different kinds of scientific investigations.	
Students understand that different kinds of questions suggest different kinds of scientific investigations.	RL15-28, RL45-51, DP1-7, DP8-21, DP22-29, DP30-40, A15-25, S1-5, S26-34, W21-31
Students should develop general abilities such as making systematic observations, taking accurate measurements, and identifying and controlling variables.	RL15-28, RL34-44, RL45-51, DP8-21, DP22-29, DP30-40, A15-25, W21-31
Students should develop the ability to clarify ideas that are influencing and guiding their inquiry, and to understand how those ideas compare with current scientific knowledge.	RL15-28, RL34-44, RL45-51, DP8-21, DP22-29, DP30-40, A15-25, W21-31
Students formulate questions, design investigations, execute investigations, interpret data, use evidence to generate explanations, propose alternative explanations, and critique explanations and procedures.	RL1-6, RL7-14, RL15-28, RL34-44, RL45-51, RL52-57, DP1-7, DP8-21, DP2-29, DP30-40, F1-7, A1-4, A15-25, CW1-7,
Students use appropriate safety procedures when conducting investigations	CW1-7, CW27-30, CW48-53, CW60-64, RL1-3, RL15-23, RL29-31, RL34-40, RL45-48, RL52-54, DP1-3, DP8-16, DP22-24, DP30-34, F1-3, F8-

	14, F28-34,
<i>Understand that different kinds of questions suggest different kinds of scientific investigations.</i>	
Some investigations involve observing and describing objects, organisms and events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models	RL15-28, RL34-44, RL45-51, DP8-21, DP22-29, A15-25, W21-31
Select and use appropriate tools and techniques to gather, analyze and interpret data.	
The use of tools and techniques, including computers, will be guided by the questions asked and the investigations students design. Students should be able to access, gather, store, retrieve, and organize data, using computer hardware and software designed for these purposes	RL15-28, RL34-44, RL45-51, DP8-21, DP22-29, A15-25, W21-31
Incorporate mathematics in scientific inquiry.	
Mathematics is used to gather, organize and present data and to construct convincing explanations	A8-11, A15-21, A26-28, A33-38, A46-49, A73-77, CW14-17, CW22-29, CW37-43, CW48-59, CW83-86, DP1-7, DP8-21, DP30-40, DP41-45, DP51-53, DP61-69, F8-13; RL15-23, RL34-39, RL45-48, W1-4, W9-11, W15-20, W21-27, W32-36, W42-44, W48-51, W57-63
Use evidence to develop descriptions, explanations, predictions, and models.	
Students should base their explanations on observations and they should be able to differentiate between description and explanation.	RL1-6, RL15-28, RL45-51, DP8-21, DP22-29, DP30-40, DP61-69, F1-7, A15-25, W21-31
Developing explanations establishes connections between the content of science and the contexts in which students develop new knowledge.	RL1-6, RL15-28, RL45-51, DP8-21, DP22-29, DP30-40, DP61-69, F1-7, A15-25, W21-31
Models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or are too vast to be changed deliberately, or are potentially dangerous.	DP1-7, DP22-29, DP30-34, CW1-13, CW60-68, RL1-6, RL34-40, F1-7, F28-40, F19-24, A26-28, CW48-53,
Different models can be used to represent the same thing.	A1-7, A8-11, A15-21, A26-28, A33-38, A46-49, A55-59, A73-77, CW14-17, CW37-43, CW48-53, CW83-86; DP1-7, 8-

	15, DP22-24, DP30-34, DP41-45, DP51-59, DP61-69, F19-24, f28-34; RL7-11, RL34-39, RL45-48, W21-27, W32-36, W42-44, W48-51, W57-63
Think critically and logically to make the relationships between evidence and explanations.	
Students decide what evidence should be used and develop the ability to account for anomalous data	RL15-28, DP61-69
Students should be able to review data from an experiment, summarize the data, and form a logical argument between cause and effect relationships.	RL1-6, RL15-28, RL45-51, DP8-21, DP22-29, DP30-40, DP61-69, A15-25, W21-31
Students should begin to state some explanations in terms of relationships between two or more variables	RL15-28, RL34-44, RL45-51, DP8-21, DP22-29, DP30-40, A15-25, W21-31
Recognize and analyze alternative explanations and predictions.	
Students should develop the ability to listen to and respect the explanations proposed by other students. They should remain open to and acknowledge different ideas and explanations, be able to accept the skepticism of others, and consider alternative explanations	RL15-28, RL29-33, DP8-21, DP61-69, A1-4, A15-25, W21-31
Communicate and defend procedures and explanations.	
Students should become competent in communicating experimental methods, describing observations and summarizing the results of investigations. Explanations can be communicated through various methods.	RL15-28, DP8-21, DP22-29, DP30-40, F1-7, A1-4, A26-32, A33-45, A46-54, W21-31

Earth and Space Science

Benchmark	Location/Page where Standard is found
<i>Understand and apply knowledge of the structure and processes of the earth system and the processes that change the earth and its surface.</i>	
The solid earth consists of layers including a lithosphere; a hot, convecting mantle and a dense metallic core.	DP8-21, DP41-50, DP51-60,
Tectonic plates constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events, such as earthquakes, volcanic eruptions, and mountain building, are results of these plate motions.	RL7-14, RL15-28, RL29-33, RL34-44, RL45-51, RL52-57, RL58-62, DP8-21, DP22-29, DP30-40, DP41-50, DP51-60, DP61-69, W9-14, W15-20,

	W21-31, CW69-78, CW79-87
Land forms are the result of a combination of constructive and destructive forces. Constructive forces include crustal deformation, volcanic eruption, and deposition of sediment, while destructive forces include weathering and erosion.	DP: 8-21, 22-29, 30-40, 41-50, 51-60, 61-69, RL7-14, RL15-28, RL29-33, RL34-44, RL45-51, RL52-57, RL58-62, W9-14, W15-20, W21-31
Some changes in the earth can be described as the “rock cycle.” Rocks at the earth’s surface weather, forming sediments that are buried, then compacted, heated, and often re-crystallized into new rock. Eventually, those new rocks may be brought to the surface by the forces that drive plate motions, and the rock cycle continues.	RL1-6, RL7-14, RL15-28, DP8-21, DP22-29, DP41-50, DP61-69, F8-18,
Soil consists of weathered rocks and decomposed organic matter from dead plants, animals, and bacteria. Soils are often found in layers, with each having a different chemical composition and texture.	RL1-6, RL7-14, RL15-28, RL29-33, F8-18
Living organisms have played many roles in the earth system, including affecting the composition of the atmosphere, producing some types of rocks, and contributing to the weathering of rocks.	RL163-198, RL203-228, RL261-274
<i>Understand and apply knowledge of the water cycle, including consideration of events that impact groundwater quality.</i>	
Water, which covers the majority of the earth’s surface, circulates through the crust, oceans, and atmosphere in what is known as the “water cycle.” Water evaporates from the earth’s surface, rises and cools as it rises to higher elevations, condenses as rain or snow, and falls to the surface where it collects in lakes, oceans, soil and in soil and rocks underground.	W21-31, CW48-59
Water is a solvent. As it passes through the water cycle, especially as it moves on the earth’s surface and underground, it dissolves minerals and gases and carries them to the oceans, rivers, and other surface water	A28-30, CW48-59, W21-31
Natural and human forces can contribute to contamination of surface water and groundwater	Throughout Water as a Resource. Specifically the questions found in the section of the Review and Reflection section called “Thinking About the Earth System” Investigations that support this standard: R 58-62 W1-8, 9-14, 57-62
<i>Understand and apply knowledge of earth history based on physical evidence</i>	

The earth processes we see today including erosion, movement of tectonic plates, and changes in atmospheric composition are similar to those that occurred in the past.	RL7-14, RL15-28, RL29-33, RL34-44, RL45-51, RL52-57, RL58-62, DP8-21, DP51-60, DP61-69, W9-14, W15-20, W21-31, DP22-29, DP30-40, DP41-50
Earth history is also influenced by occasional catastrophes such as the impact of an asteroid or a comet.	A50-51
Fossils provide important evidence of how life and environmental conditions have changed	DP51-60, DP61-69, F1-7, 8-18, CW69-78, 79-87
<i>Understand and apply knowledge of the earth's atmospheric properties and how they influence weather and climate.</i>	
The atmosphere is a mixture of nitrogen, oxygen, and trace gasses that include water vapor. The atmosphere has different properties at different elevations.	CW1-12, CW22-36
Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate because water in the oceans holds a large amount of heat.	CW14-21, CW22-36, CW37-47
Clouds, formed by the condensation of water vapor, affect weather and climate	CW1-13, CW48-59
<i>Understand and apply knowledge of the components of our solar system</i>	
The earth is the third planet from the sun in a system that includes the moon, the sun, seven other planets and their moons, and smaller objects, such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system.	A5-9, A15-25, A26-32, A33-45, A46-54, A55-72, A73-77
Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system. Gravity alone holds us to the earth's surface and explains the phenomena of the tides	A15-25
The sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle. Seasons result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the earth's rotation on its axis and the length of the day	A1-73
Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses	A5-9, A33-45