BENCHMARK SC.D.1.4.1

Strand D	Processes that Shape the Earth
Standard 1	The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.
Benchmark SC.D.1.4.1	The student knows how climatic patterns on Earth result from an interplay of many factors (Earth's topography, its rotation on its axis, solar radiation, the transfer of heat energy where the atmosphere interfaces with lands and oceans, and wind and ocean currents).
Item Type(s)	MC, SR
Benchmark Clarification	The student evaluates environmental factors to determine their effect on weather patterns.
Content Limits	Items will NOT require the student to know the names of specific topographical features or geographic locations. Items may assess the student's understanding of hurricanes as a model of geophysical interactions.
Stimulus Attributes	Items may provide the student with data in chart, diagram, or map form.
Response Attributes	None specified.
Sample MC Item	On Florida's Atlantic beaches during the summer, winds tend to blow from the ocean during the day and from the land at night. Which of the following statements explains the patterns of these Florida winds? A. The tides alter the wind direction patterns. B. The land heats up more slowly than the water. ★C. The land heats up more rapidly than the water. D. The water evaporates more rapidly from the ocean.

Sample SR Item

Scientists have found that oceans can influence the temperature of nearby landmasses. Coastal landmasses tend to have more moderate temperatures in summer and winter than inland landmasses at the same latitude.

Considering the influence of ocean temperatures, explain why inland temperatures vary in summer and winter to a greater degree than coastal temperatures.

Correct and Complete Response

The temperature of ocean water affects the temperature of the air above it. Oceans heat up and cool down more slowly than land. In the summer, the ocean temperature heats up slowly so the air temperature of the nearby coastal landmasses remains cooler than the inland temperature. In the winter, the ocean temperature cools down slowly. This keeps the air temperature of nearby coastal landmasses warmer than the inland temperature.

BENCHMARK SC.D.1.4.2

Strand D	Processes that Shape the Earth
Standard 1	The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.
Benchmark SC.D.1.4.2	The student knows that the solid crust of Earth consists of slow-moving, separate plates that float on a denser, molten layer of Earth and that these plates interact with each other, changing the Earth's surface in many ways (e.g., forming mountain ranges and rift valleys, causing earthquake and volcanic activity, and forming undersea mountains that can become ocean islands).
Item Type(s)	MC, SR
Benchmark Clarification	The student identifies and explains how the movements of tectonic plates produce specific geological features.
Content Limits	Items will NOT require the student to identify specific topographic features.
Stimulus Attributes	Items may use maps depicting plate boundaries with arrows showing directional movement.
Response Attributes	Items may require response in the form of graphs, maps, or tables.
Sample MC Item	Earthquakes occur in many regions of the world. Why are there no major earthquakes in Florida? A. Earthquakes cannot occur on a peninsula. B. Florida is over a hot spot where no earthquakes occur. C. Earthquakes cannot occur in limestone sedimentary rock. ★ D. There are no tectonic plate boundaries located near Florida.

Sample SR Item

The Mid-Atlantic Ridge in the Atlantic Ocean has been studied by scientists for many years. The formations produced by the Mid-Atlantic Ridge yield clues to the composition of Earth's crust.

Part A In what direction are the two oceanic plates at the Mid-Atlantic Ridge moving in relation to each other?

Part B Explain how a volcano can be produced by the movement of these plates.

Correct and Complete Response

Part A The oceanic plates are moving away from each other.

Part B When only a thin layer of crust is present between these spreading plates, magma may be released. The lava may then rise and spread upward and outward, forming a volcano.

BENCHMARK SC.D.1.4.3

Strand D	Processes that Shape the Earth
Standard 1	The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.
Benchmark SC.D.1.4.3	The student knows that changes in Earth's climate, geological activity, and life forms may be traced and compared.
Item Type(s)	MC
Benchmark Clarification	The student identifies that life forms have changed over time due to abiotic factors.
Content Limits	Items may assess the student's knowledge of fossil formation and the location of fossils in layers of Earth's crust. Items may address the theory of plate tectonics and the movement of plates over long periods of time.
Stimulus Attributes	None specified.
Response Attributes	None specified.
Sample MC Item	The discovery of 300-million-year-old fossilized tropical plants in the coal deposits of Pennsylvania has led scientists to which conclusion? A. Solar radiation was at lower levels 300 million years ago. B. Pennsylvania was at the bottom of the ocean 300 million years ago. C. The plants were able to tolerate much colder temperatures 300 million years ago. ★D. The North American plate was located close to the equator 300 million years ago.

BENCHMARK SC.D.2.4.1

Strand D	Processes that Shape the Earth
Standard 2	The student understands the need for protection of the natural systems on Earth.
Benchmark SC.D.2.4.1	The student understands the interconnectedness of the systems on Earth and the quality of life. This benchmark also assesses SC.G.2.4.4.[6]
Item Type(s)	MC, SR
Benchmark Clarification	The student identifies, explains, and describes the relationships between organisms and their habitat on both local and global scales.
Content Limits	Items may assess the student's understanding of the effects of pollution or other forms of environmental degradation.
Stimulus Attributes	None specified.
Response Attributes	None specified.
Sample MC Item	As the human population increases, more land will be necessary to support the additional numbers of people. What effect will this have on natural communities of plants and animals? A. Plant and animal populations will increase with the human populations. B. There will be an increase in animals because agricultural fields make more food available. C. Native animals and plants will move to other areas, so their populations will not be affected. ★ D. As more resources are converted to human use, the populations of native plants and animals will decline.

[6] The complete text for SC.G.2.4.4 is "The student knows that the world ecosystems are shaped by physical factors that limit their productivity."

Sample SR Item

The prickly pear cactus was spreading uncontrollably in Australia before the cactus moth was imported. The cactus moth feeds exclusively on the prickly pear cactus. Now the population levels of the moth and cactus are both low and have reached a dynamic equilibrium. Explain how the cactus moth population and the prickly pear cactus population are interrelated.

Correct and Complete Response

The cactus moth has no food source other than the prickly pear cactus. If more cacti were to grow, the current moth population would feed, grow, and reproduce more quickly than the cacti. If the cactus population decreases, the moths' numbers would also decrease since the cactus is the moths' sole source of food. Therefore, the moth population keeps pace with the cactus population.