

# Earth Science

Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. MS-

ESS2-1.

- 1 All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1) ESS2.A

Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. MS-

ESS2-2.

- 1 The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2) ESS2.A:
- 2 Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. (MS-ESS2-2) ESS2.C

Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. MS-

ESS2-3.

- 1 Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. (HS.ESS1.C GBE) (secondary to MS-ESS2-3) ESS1.C
- 2 Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. (MS-ESS2-3) ESS2.B

Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. MS-

ESS2-4.

- 1 Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS-ESS2-4) ESS2.C:
- 2 Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4) ESS2.C

Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. MS-ESS2-5.

- 1 The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MSESS2-5) ESS2.C
- 2 Because these patterns are so complex, weather can only be predicted probabilistically. (MS-ESS2-5) ESS2.D

**Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. MS-ESS2-6.**

- 1 Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6) ESS2.C**

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- 2 Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6) ESS2.D**

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- 3 The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6) ESS2.D**