

Earth and Environmental Science

Earth's Place in the Universe

1 Explain how Earth's position relative to the sun influences conditions on Earth. [ESS.EES.1](#)

- 1 Use models to illustrate the formation of the solar system. [ESS.EES.1.1](#)
- 2 Use mathematics and computational thinking to analyze Earth's motion through space. [ESS.EES.1.2](#)
- 3 Use models to illustrate how the sun produces energy. [ESS.EES.1.3](#)
- 4 Construct an explanation to infer how incoming solar radiation interacts with Earth systems to support life. [ESS.EES.1.4](#)

Earth's Systems

1 Analyze how the geosphere is shaped by plate tectonics and the rock cycle. [ESS.EES.2](#)

- 1 Use models to explain how mantle convection powers plate tectonics. [ESS.EES.2.1](#)
- 2 Analyze and interpret data to predict locations of volcanoes and earthquakes based on plate boundaries. [ESS.EES.2.2](#)
- 3 Use models to explain how plate tectonics influence topography. [ESS.EES.2.3](#)
- 4 Carry out investigations to explain how the rock cycle and rates of weathering, erosion, and soil formation influence Earth's systems. [ESS.EES.2.4](#)
- 5 Analyze and interpret data to explain how volcanic activity influences changes in Earth's atmosphere, geosphere, biosphere, and hydrosphere. [ESS.EES.2.5](#)

2 Analyze how the interactions between the hydrosphere and atmosphere transfer energy and influence climate. [ESS.EES.3](#)

- 1 Carry out investigations to explain the properties of water. [ESS.EES.3.1](#)
- 2 Use models to explain how water is an agent of energy transfer. [ESS.EES.3.2](#)
- 3 Analyze and interpret data to explain how major greenhouse gases influence climate. [ESS.EES.3.3](#)
- 4 Analyze and interpret data to attribute how atmospheric composition and surface conditions influence heat retention in the troposphere. [ESS.EES.3.4](#)
- 5 Construct an explanation to conclude that heat exchange between the ocean and atmosphere results in local, regional, global weather phenomena, and climate patterns. [ESS.EES.3.5](#)

3 Analyze the connections between the biosphere and other Earth systems (geosphere, hydrosphere, atmosphere). [ESS.EES.4](#)

- 1 Use models to explain how abiotic/biotic interactions shape various ecosystems. [ESS.EES.4.1](#)
- 2 Analyze and interpret data to explain how carbon cycling influences various ecosystems. [ESS.EES.4.2](#)
- 3 Analyze and interpret data to explain past climate trends. [ESS.EES.4.3](#)
- 4 Construct an explanation to predict how potential future changes in abiotic factors could impact biodiversity and species distribution. [ESS.EES.4.4](#)
- 5 Obtain, evaluate and communicate information to explain how biodiversity impacts ecosystem resilience. [ESS.EES.4.5](#)

Earth and Human Activity

1 Evaluate how human consumption patterns impact Earth's systems. [ESS.EES.5](#)

- 1 Analyze and interpret data to explain the impacts of land use on Earth's systems. [ESS.EES.5.1](#)
- 2 Analyze and interpret data to evaluate how human use of ground and surface waters impacts water quality and availability in river basins, wetlands, estuaries, and aquifers. [ESS.EES.5.2](#)
- 3 Construct an argument to evaluate the ways that human activities influence atmospheric composition. [ESS.EES.5.3](#)
- 4 Construct an argument to evaluate the benefits and trade-offs of using non-renewable or renewable energy sources for electricity production and transportation fuels. [ESS.EES.5.4](#)
- 5 Construct an argument to evaluate potential solutions that will ensure sustainable consumption of Earth's resources. [ESS.EES.5.5](#)
- 6 Construct an argument to evaluate a range of solutions to mitigate impacts of human activities on Earth's systems. [ESS.EES.5.6](#)

2 Analyze how Earth's systems impact humans and the biosphere. [ESS.EES.6](#)

- 1 Analyze and interpret data to infer how use of natural resources impacts ecosystems and human populations, including human health. [ESS.EES.6.1](#)
- 2 Construct an argument to infer how some natural hazards (such as flooding and wildfires) are increasing in frequency and intensity due to human activities. [ESS.EES.6.2](#)
- 3 Construct an argument to explain how natural hazards and other environmental problems may impact some human populations more than others. [ESS.EES.6.3](#)