Michigan Alternate Content Standards - Science

Earth and Space Sciences: Grades 9-12

Space Systems

1 **Use a model to observe and describe that reactions inside the Sun release energy as radiation, and some of this radiation reaches Earth.** EE.HS-ESS1-1-3

- H Use a model to describe that reactions inside the Sun release energy as radiation, and some of this radiation reaches Earth. EE.HS-ESS1-H.1-3
- M Use a model to trace the path of solar radiation (as heat and light) from the Sun to Earth. EE.HS-ESS1-M.1-3
- L Use a model of the solar system (Sun, Earth, Moon) to identify the Sun as the source of heat and/or light for Earth. EE.HS-ESS1-L.1-3

2 **Given models or illustrations of the Sun, Earth, and Earth's moon, identify that the Sun holds Earth in orbit and Earth holds its moon in orbit due to differences in mass that cause gravitational forces.** EE.HS-ESS1-4

- H Given models or illustrations of the Sun, Earth, and Earth's moon, identify that the Sun holds Earth in orbit and Earth holds its moon in orbit due to differences in mass that cause gravitational forces. EE.HS-ESS1-H.4
- M Given scaled models or illustrations, identify that planets orbit the Sun because it has greater mass or exerts greater gravitational force. EE.HS-ESS1-M.4
- L Given scaled models of Earth and the moon, identify the moon as the object orbiting Earth. EE.HS-ESS1-L.4

History of Earth

1 **Use models to identify evidence of past and current tectonic plate movement and explain the relative ages of rocks in Earth's crust.** EE.HS-ESS1-5_2-1-2

- H Use models to identify evidence of past and current tectonic plate movement and explain the relative ages of rocks in Earth's crust. EE.HS-ESS1-5_2-1-H.2
- M Given a simulation or demonstration, identify the effects of tectonic plates colliding (volcano eruptions, earthquake, etc.) EE.HS-ESS1-5_2-1-M.2
- L Use models to identify past effects of tectonic plate collisions (i.e., a volcano, earthquakes). EE.HS-ESS1-5_2-1-L.2

2 **Use models of the layers of Earth to show that the Earth formed over a long period of time.** EE.HS-ESS1-6-2-3

- H Use models of the layers of Earth to show that the Earth formed over a long period of time. EE.HS-ESS1-H.6-2-3
- M Use a model to identify Earth's crust, mantle, outer core, and inner core. EE.HS-ESS1-M.6-2-3
- L Use a model to identify the layer of Earth on which people live. EE.HS-ESS1-L.6-2-3

Earth's Systems

1 **Participate in an investigation to identify the effects of water on earth materials (such as soil, sand, rocks, etc.).** EE.HS-ESS2-5

- H Participate in an investigation to identify the effects of water on earth materials (such as soil, sand, rocks, etc.). EE.HS-ESS2-H.5
- M Use a model or simulation to identify erosion as the interaction of water and earth materials (such as soil or gravel). EE.HS-ESS2-M.5
- L In a demonstration of water's effect on soil or gravel, identify which material acted on the other (i.e., water washed away the soil). EE.HS-ESS2-L.5

2 **Use evidence to describe a simple carbon cycle between two or more Earth systems (hydrosphere, atmosphere, geosphere, and biosphere).** EE.HS-ESS2-6-7

- H Use evidence to describe a simple carbon cycle between two or more Earth systems (hydrosphere, atmosphere, geosphere, and biosphere). EE.HS-ESS2-H.6-7
- M Use a model or illustration to describe the dependence on oxygen and/or carbon dioxide between people and plants. EE.HS-ESS2-M.6-7
- L Use a model or illustration of the interdependency between plants and people to identify that people breathe in oxygen. EE.HS-ESS2-L.6-7

Weather and Climate

1 **Use weather data to describe changes in local, regional, and global climate.** EE.HS-ESS3-5_2-4

- H Use weather data to describe changes in local, regional, and global climate. EE.HS-ESS3-5_2-H.4
- M Use descriptions and illustrations to identify weather patterns in a given region. EE.HS-ESS3-5_2-M.4
- L Given weather and non-weather data, identify the weather data. EE.HS-ESS3-5_2-L.4

Human Sustainability

1 **Use evidence to describe how natural resources, natural hazards, and climate change affect human populations.** EE.HS-ESS3-1

- H Use evidence to describe how natural resources, natural hazards, and climate change affect human populations. EE.HS-ESS3-H.1
- M Given evidence about natural resources or natural hazards in an area, identify one or more positive and/or negative ways that humans may be affected. EE.HS-ESS3-M.1
- L Given a model, identify a natural resource and/or a natural hazard. EE.HS-ESS3-L.1

2 **Participate in investigations to determine and/or describe a solution that best results in reducing the human impact on a natural resource.** EE.HS-ESS3-2-4

- H Participate in investigations to determine and/or describe a solution that best results in reducing the human impact on a natural resource. EE.HS-ESS3-H.2-4
- M Given a natural resource, identify a human activity that demonstrates conservation or a reduced human impact on that natural resource. EE.HS-ESS3-M.2-4
- L Match a human activity or behavior to a natural resource it is intended to conserve. EE.HS-ESS3-L.2-4

3 **While exploring and asking questions about biodiversity, use evidence to describe the effects of human populations on biodiversity and the sustainable use of natural resources (students are not expected to define biodiversity).** EE.HS-ESS3-3-6

- H While exploring and asking questions about biodiversity, use evidence to describe the effects of human populations on biodiversity and the sustainable use of natural resources (students are not expected to define biodiversity). EE.HS-ESS3-H.3-6
- M Given evidence about a human population and a natural resource being used, identify whether the resource will increase, decrease, or remain the same (sustainable use). EE.HS-ESS3-M.3-6
- L Given a picture of a human development (population), identify a natural resource that is being used. EE.HS-ESS3-L.3-6