

# Earth and Space Science: Grades 9, 10, 11, 12

Adopted 2022

## Earth's Place in the Universe

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- HS-ESS1-1.** Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation. [HS-ESS1-1](#)
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- HS-ESS1-2.** Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. [HS-ESS1-2](#)
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- HS-ESS1-3.** Communicate scientific ideas about the way stars, over their life cycle, produce elements. [HS-ESS1-3](#)
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- HS-ESS1-4.** Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. [[HS-ESS1-4](#)]
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- HS-ESS1-5.** Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. [HS-ESS1-5](#)
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- HS-ESS1-6.** Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. [HS-ESS1-6](#)
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## Earth's Systems

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- HS-ESS2-1.** Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. [[HS-ESS2-1](#)]
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- HS-ESS2-2.** Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. [HS-ESS2-2](#)
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- HS-ESS2-3.** Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. [HS-ESS2-3](#)
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- HS-ESS2-4.** Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. [HS-ESS2-4](#)
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**HS-ESS2-5.** Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. [HS-ESS2-5](#)

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**HS-ESS2-6.** Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. [HS-ESS2-6](#)

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**HS-ESS2-7.** Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. [HS-ESS2-7](#)

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**HS-ESS2-8.** Construct an explanation of how heat (energy) and water (matter) move throughout the oceans causing patterns in weather and climate. [HS-ESS2-8](#)

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**HS-ESS2-9.** Construct an explanation for how energy from the Sun drives atmospheric processes and how atmospheric currents transport matter and transfer energy. [HS-ESS2-9](#)

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## Human Interaction with Earth's Systems

**HS-ESS3-1.** Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. [HS-ESS3-1](#)

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**HS-ESS3-2.** Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. [HS-ESS3-2](#)

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**HS-ESS3-3.** Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. [HS-ESS3-3](#)

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**HS-ESS3-4.** Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. [HS-ESS3-4](#)

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**HS-ESS3-5.** Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. [HS-ESS3-5](#)

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**HS-ESS3-6.** Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. [HS-ESS3-6](#)

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