



Earth Systems Curriculum Pacing Guide

The Nature of Our Universe; The Formation of Our Solar System and the Planets

Crosscutting Concepts: Cause and Effect; Scale, Proportion, and Quantity; Systems and System Models; Energy and Matter; Stability and Change

Topics: Formation of the universe, our galaxy, and our solar system; Elemental foundations of planets; Tools of Astronomy; Stars and Stellar evolution; Differences between inner and outer planets; Importance of the habitable zone within a star system, Cosmology; Our Sun, Earth, Moon system

Estimated Time: 4 weeks

Anchoring Phenomenon	Standard	Instructional Segment	Disciplinary Core Ideas	Science and Engineering Practices	Instructional Notes
<p><i>Hurricanes, but more specifically, The Great Red Spot on Jupiter</i></p> <p><i>Students will use their mapping skills to estimate the size of the Great Red Spot while studying a to-scale model of the solar system</i></p>	SES1. a	Teacher, I've Shrunk the Solar System	<p>From A Framework for K-12 Science Education:</p> <p style="text-align: center;"><i>By the end of 12th grade</i></p> <p>ESS1.A: THE UNIVERSE AND ITS STARS</p> <ul style="list-style-type: none"> ● The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years. ● The sun is just one of more than 200 billion stars in the Milky Way galaxy, and the Milky Way is just one of hundreds of billions of galaxies in the universe. ● The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. 	<ul style="list-style-type: none"> ● Constructing explanations ● Obtaining, evaluating, and communicating information 	<p>Background:</p> <p>By the end of this unit, students are using the following language in their speaking and writing during EXPLAIN or ELABORATE.</p> <ul style="list-style-type: none"> ● Nebular hypothesis ● The Sun - our star ● Terrestrial planets ● Gas planets ● Dwarf planets ● Asteroids ● Comets ● Geocentric theory ● Heliocentric theory



			<p>ESS1.B: EARTH AND THE SOLAR SYSTEM</p> <ul style="list-style-type: none">● Kepler’s laws describe common features of the motions of orbiting objects, including their elliptical paths around the sun.● Orbits may change due to the gravitational effects from, or collisions with, other objects in the solar system.● Cyclical changes in the shape of Earth’s orbit around the sun, together with changes in the orientation of the planet’s axis of rotation, both occurring over tens to hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on Earth. These phenomena cause cycles of ice ages and other gradual climate changes. <p>ESS1.C: THE HISTORY OF PLANET EARTH</p> <ul style="list-style-type: none">● Radioactive decay lifetimes and isotopic content in rocks provide a way of dating rock formations and thereby fixing the scale of geological time.● Continental rocks, which can be older than 4 billion years, are generally much older than rocks on the ocean floor, which are less than 200 million years old.		
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This instructional segment will connect to Resources and Our Environment