



Earth Systems Curriculum Pacing Guide

Earth's Composition and Structure

Crosscutting Concepts: Patterns; Cause and Effect; Energy and Matter

Topics: Fundamental aspects of matter, states of matter, and combinations of matter; Minerals; Igneous, Sedimentary, and Metamorphic Rock; rock formation; plate tectonics and rock formation

Estimated Time: 8 weeks

Anchoring Phenomenon	Standard	Instructional Segment	Disciplinary Core Ideas	Science and Engineering Practices	Instructional Notes
<p>Options:</p> <ol style="list-style-type: none"> 1. Give students a random set of rocks and let them make observations. This is good for those in the coastal plains where there are few to no rocks. 2. Show students a video of an active volcano, such as the recent activity in Hawaii or Iceland. 	<p>SES2. d SES4. a, b, c, d, e</p>	<p>Rockin' Around (the Cycle)</p>	<p>From <i>A Framework for K-12 Science Education</i>: <i>By the end of 12th grade</i></p> <p>ESS2.A: EARTH MATERIALS AND SYSTEMS</p> <ul style="list-style-type: none"> ● Evidence from deep probes and seismic waves, reconstructions of historical changes in Earth's surface and its magnetic field, and an understanding of physical and chemical processes lead to a model of Earth with a hot but solid inner core, a liquid outer core, a solid mantle and crust. ● The top part of the mantle, along with the crust, forms structures known as tectonic plates. ● The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's orbit, tectonic events, ocean 	<ul style="list-style-type: none"> ● Asking questions and defining problems ● Analyzing and interpreting data ● Using mathematics and computational thinking ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information 	<p>Background: 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"> ● Sedimentary ● Igneous ● Metamorphic ● plate tectonic ● continental collision ● subduction zone ● mid-ocean ridge ● transformation fault



			<p>circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.</p> <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. ● Tectonic processes continually generate new ocean seafloor at ridges and destroy old seafloor at trenches. Although active geological processes, such as plate tectonics and erosion, have destroyed or altered most of the very early rock record on Earth, other objects in the solar system, such as lunar rocks, asteroids, and meteorites, have changed little over billions of years. Studying these objects can provide information about Earth's formation and early history. 		<ul style="list-style-type: none"> ● Hotspot ● passive zone ● radiometric dating ● rates of erosion ● rates of deposition ● varve count ● relative age ● Superposition ● original horizontality ● cross-cutting relations ● original lateral continuity ● relative age ● Superposition ● original horizontality ● cross-cutting relations ● original lateral continuity
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This instructional segment will connect to The Formation of Our Solar System and the Planets