



Earth Systems Curriculum Pacing Guide

Processes of Our Climate

Cross-cutting Concepts: Patterns; Cause and Effect; Scale, Proportion, and Quantity; Systems and System Models; Stability and Change

Topics: Fundamental principles of our atmosphere, Weather systems, and the nature of storms and storm systems

Estimated Time 9 weeks

Anchoring Phenomenon	Standard	Instructional Segment	Disciplinary Core Ideas	Science and Engineering Practices	Instructional Notes
Students will read about the Sea Island Storm of 1893. 1893 Sea Island's Hurricane	SES5a, b, c, d, e, f	Making and Interpreting Weather Maps <ul style="list-style-type: none"> ● Fundamental principles of our atmosphere <i>Clouds and precipitation</i> ● The causes of weather and climate ● Weather systems <i>Gathering data and analyzing weather systems</i> ● The nature of storms and storm systems <i>Including recurrent weather</i> 	Frameworks of K-12 Science Education: <i>By the end of 12th grade</i> ESS2.D: WEATHER AND CLIMATE <ul style="list-style-type: none"> ● The foundation for Earth’s global climate system is the electromagnetic radiation from the sun as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems and this energy’s reradiation into space. ● Climate change can occur when certain parts of Earth’s systems are altered. ● Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. ● Global climate models incorporate scientists’ best knowledge of physical and chemical processes and of the interactions of relevant systems. They are tested by their ability to fit past climate variations. Current models predict that, although future regional climate changes will be complex and 	<ul style="list-style-type: none"> ● Asking questions and defining problems. ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data ● Using mathematics and computational thinking ● Constructing explanations (for science) and designing solutions (for engineering) ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating 	Background (includes safety alerts) By the end of this unit, students are using the following language in their speaking and writing during EXPLAIN or ELABORATE.: <ul style="list-style-type: none"> ● Electromagnetic ● Radiation ● Reflection ● Absorption ● storage, and redistribution ● reradiation into space ● Weather ● climate ● air pressure ● global winds ● ocean currents ● Coriolis Effect ● Topography

		<ul style="list-style-type: none"> ● Earth's oceans ● The importance of ocean movement and cycles within oceans that can affect climate ● The marine environment and its interaction with land and freshwater systems 	<p>varied, average global temperatures will continue to rise. The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and the biosphere. Hence the outcomes depend on human behaviors as well as on natural factors that involve complex feedbacks among Earth's systems.</p> <p>ESS3.D: GLOBAL CLIMATE CHANGE</p> <ul style="list-style-type: none"> ● Global climate models are often used to understand the process of climate change because these changes are complex and can occur slowly over Earth's history. <p>ESS2.A: EARTH MATERIALS AND SYSTEMS</p> <ul style="list-style-type: none"> ● Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. A deep knowledge of how feedbacks work within and among Earth's systems is still lacking, thus limiting scientists' ability to predict some changes and their impacts. 	<p>information</p>	<ul style="list-style-type: none"> ● Hurricanes ● Tornadoes ● Thunderstorms ● global climate change/global warming. <p>Additional links: NASA: Building a Hurricane</p>
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This instructional segment will connect to the Surface Processes unit.