

## Educational Materials

A Student Exploration of the Impacts of Climate Change on Human Health in the United States



### Climate Change | A Human Health Perspective

#### Next Generation Science Standards

The 5E instructional model was used to develop a sequence of activities designed to build on students' knowledge to enable them to prepare for the following high school performance expectations for life science, earth science and/or engineering design. This unit, if successfully completed, integrates multiple science and engineering practices, disciplinary core ideas, and cross cutting concepts. For more information see the National Research Council's report *A Framework for K-12 Science Education: Practices, Cross-Cutting Concepts, and Core Ideas*.

NGSS Performance Expectations	Disciplinary Core Ideas		Science and Engineering Practices	Crosscutting Concepts
<p><b>Life Science</b> HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. HS-LS4-6. Create or revise a simulation to test solutions for mitigating adverse impacts of human activity on biodiversity.</p> <p><b>Earth Science</b> 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-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.</p> <p>HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.</p> <p><b>Engineering Design</b> HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for</p>	<p><b>Life Science</b> <b>From Molecules To Organisms: Structures And Processes (Ls1)</b> Ls1.A: Structure And Function Ls1D: Information Processing</p> <p><b>Ecosystems: Interactions, Energy, And Dynamics (Ls2)</b> Ls2a: Interdependent Relationships In Ecosystems Ls2.B: Cycles Of Matter And Energy Transfer In Ecosystems Ls2.C : Ecosystem Dynamics, Functioning, And Resilience</p> <p><b>Ls3: Heredity: Inheritance And Variation Of Traits (Ls3)</b> Ls3.B: Variation Of Traits</p> <p><b>Biological Evolution: Unity And Diversity (Ls4)</b> Ls4.B: Natural Selection Ls4.C: Adaptation</p>	Engage	Analyzing and interpreting data Asking questions and defining problems Constructing explanations Using mathematics and computational thinking	Patterns Cause and Effect Scale, proportion and quantity Stability and change Structure and Function
		Explore	Constructing explanations Developing and using models Obtaining, evaluating, and communicating information	Patterns Cause and Effect Scale, proportion and quantity Stability and change Structure and Function Systems and System Models
		Explain	Asking questions and defining problems Constructing explanations Developing and using models Obtaining, evaluating, and communicating information	Patterns Cause and Effect Stability and change Structure and Function Systems and System Models

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<p>societal needs and wants.</p> <p>HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.</p> <p>HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.</p> <p>HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.</p>	<p>Ls4.D: Biodiversity And Humans</p> <p><b>Earth And Space Science</b></p> <p><b>Earth's Systems (Ess2)</b></p> <p>Ess2.A: Earth Materials And Systems</p> <p>Ess2.C: The Roles Of Water In Earth's Surface Processes</p> <p>Ess2.D: Weather And Climate</p> <p>Ess2.E: Biogeology</p> <p><b>Earth And Human Activity (Ess3)</b></p> <p>Ess3.A: Natural Resources</p> <p>Ess3.B: Natural Hazards</p> <p>Ess3.C: Human Impacts On Earth Systems</p> <p>Ess3.D: Global Climate Change</p>	<p><b>Extend</b></p>	<p>Constructing explanations (for science) and designing solutions (for engineering)</p> <p>Engaging in argument from evidence</p> <p>Obtaining, evaluating, and communicating information</p>	<p>Cause and Effect</p> <p>Scale, proportion and quantity</p> <p>Stability and change</p> <p>Structure and Function</p> <p>Systems and System Models</p>
	<p><b>Evaluate</b></p>	<p>Asking questions (for science) and defining problems (for engineering)</p> <p>Constructing explanations (for science) and designing solutions (for engineering)</p> <p>Engaging in argument from evidence</p> <p>Obtaining, evaluating, and communicating information</p> <p>Planning and Carrying Out Investigations</p> <p>Using mathematics and computational thinking</p>	<p>Patterns</p> <p>Cause and Effect</p> <p>Scale, proportion and quantity</p> <p>Stability and change</p> <p>Structure and Function</p> <p>Systems and Models</p>	