



Resources and Our Environment

Students will explore the impact manmade and natural occurrences have on natural resources and the environment and the impact these have on life on Earth.	
Student Science Performance	
Grade or course: 9-12 Earth Systems	Title:
Topic: Geological and Environmental Impacts on Natural Resources	Impacts on Natural Resources
<p>Performance Expectation for GSE: SES6. Obtain, evaluate, and communicate information about how life on Earth responds to and shapes Earth's systems.</p> <ol style="list-style-type: none"> Construct an argument from evidence that describes how life has responded to major events in Earth's history (e.g., major climatic change, tectonic events) through extinction, migration, and/or adaptation. Construct an explanation that describes how biological processes have caused major changes in Earth's systems through geologic time (e.g., nutrient cycling, atmospheric composition, and soil formation). Ask questions to investigate and communicate how humans depend on Earth's land and water resources, which are distributed unevenly around the planet as a result of past geological and environmental processes. Analyze and interpret data that relates changes in global climate to natural and anthropogenic modification of Earth's atmosphere and oceans. 	
<p>Performance Expectations for Instruction: The GSE for Earth Systems requires that students continually develop and use models in order to better explain concepts across the various instructional segments. Students will also be provided models and asked to interpret and analyze data from these models that will further reinforce core concepts. In Earth Systems, models commonly consist of scaled and unscaled 2 and 3-dimensional surface and cross-sectional maps. Students will:</p> <ul style="list-style-type: none"> Explore how our actions affect natural resources. Describe what non-fuel resources are mined from the Earth, and what they are used for Quantify the impact of mineral and rock resources on society and the environment Estimate the rate of loss in non-renewable resources on a human time-scale <p><u>Additional notes on student supports</u></p>	
<p>Materials</p> <ul style="list-style-type: none"> Access to the internet Additional resources beyond those listed in the Instructional Segment Guide: Using GIS and Climate Risks Information to analyze the Vulnerability of Coastal Counties in Louisiana and Mississippi Marsh Loss Due to Cumulative Impacts of Hurricane Isaac and the Deepwater Horizon Oil Spill in Louisiana 	
<p><i>Students will continuously obtain, evaluate, and communicate information. This is not a linear process. Students will communicate through writing and discussions to allow for formative assessment. This benefits the teacher, student, and whole group to guide instruction to clarify misconceptions or extend content.</i></p>	
Engaging Learners	<p>Phenomenon <i>Students will research and observe the impacts hurricanes have on people. Hurricane Irma could be used, or more recent storms: EPA Hurricane Irma Killer Hurricanes from NOVA- PBS</i></p>



	<p><i>Obtaining</i> Students can recall personal impacts from Irma or other hurricanes, how residents prepared, what their experiences were during the hurricane, and how they responded after the storm had passed. Students research the impact of Hurricane Irma on Georgia and local area. Remember Irma touched every county in Georgia, but Irma may not be personal for students who recently moved to Georgia.</p> <p><i>Communicating</i> Students will write a summary of their personal preparation (or if they were not involved, they can draw on an experience they had in another situation like this or pretend) for Irma and impact on the environment and natural resources in the area or produce an information pamphlet. This summary is the beginning of the exploration of impacts hurricanes and other natural disasters have on natural resources. Allow students to input personal emotions and information.</p> <p><i>Some options to the pamphlet are storyboards of their experiences or a news article.</i></p> <p><i>Evaluating</i> Students will write an article describing how the hurricane impacted their lives as well as including how this event might have impacted the organisms in the area. Consider having students evaluate impacts in other areas as well. There are multiple resources, such as Our World in Data that could be included; as well as books and articles on this subject.</p> <p>Did students include information about how the event caused a problem with getting what they needed-- water, food, air conditioning, gasoline, etc.? Have them discuss how to prepare for the future and watch for preparations and changes by officials for the area-- emergency shelters, news alerts, etc.</p> <p>Was their area serviced by FEMA or GEMA? What is in place currently for people in their area during a natural disaster or catastrophic event?</p>
<p>Exploring and Explaining</p>	<p><i>Obtaining</i> Students will research what caused the extinction of the dinosaurs. NOVA - The Day the Dinosaurs Died is an engaging program you can watch either the whole program or part of it.</p> <p><i>Communicating</i> Have student research what happened to the dinosaurs and how life changed after that. Construct an argument from evidence that describes how life has changed since that occurrence in the Earth's history. Students will use this information to respond to major events in Earth's history (e.g., major climatic change, tectonic events) through extinction, migration, and/or adaptation.</p> <p>After students have researched what happened to the dinosaurs, they will</p>



	ask questions to investigate and communicate evidence that describes how life responded to this major event Earth's history through extinction, migration, and/or adaptation.
	<i>Evaluating:</i> Students will write an argument paper to describe the changes in life and climate on earth after this major event.
Obtaining	Students will gather data and then relate the changes in global climate that have occurred and might occur with the depletion of natural resources. Potential resource: Natural resources mini-research project
Elaborating	Phenomenon Show a chart of the increase in carbon dioxide over the past 400,000 years. Ask students to discuss what they are seeing.
	<i>Obtaining:</i> Students will research information about the increase of Carbon and Carbon Dioxide over the last 500 years. What caused the changes as well as look at the patterns in the increase and decrease of these in the atmosphere.
	<i>Evaluating:</i> students will construct an argument that uses the evidence gained to present information gained to argue for or against global warming, climate change and the environmental changes that this could bring.
Evaluation	Assessment of Student Learning
	<i>Communicating and evaluating</i> The students will write a formal letter to the President of the United States, the EPA, coal industry and/or any other group they discovered during their research discussing the impact of increased CO ₂ and carbon in our atmosphere and provide solutions. Expect students to use evidence with data, rather than opinions. <i>Teacher Notes: Grade the letter according to the data and formal format of the writing.</i>
SEP, CCC, DCI	Science Essentials
Science and Engineering Practices	<ul style="list-style-type: none"> ● Asking questions and defining problems ● Analyzing and interpreting data ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information
Crosscutting Concepts	<ul style="list-style-type: none"> ● Patterns ● Cause and Effect ● Scale, Proportion, and Quantity ● Systems and System Models ● Stability and Change
Disciplinary Core Ideas	From A Framework for K-12 Science Education :



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| | <ul style="list-style-type: none">• ESS3.A: NATURAL RESOURCES• ESS3.C: HUMAN IMPACTS ON EARTH SYSTEMS |
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Additional Supports for struggling learners:

The following supports are suggestions for this lesson and are not the only options to support students in the classroom. These supports target students that struggle with science material, this lesson or a previous lesson. These are generalized supports and do not take the place of IEP accommodations as required by each student’s Individualized Education Program.

General supports for the following categories:

Reading:

1. Provide reading support by reading aloud or doing partner reads
2. Have the teacher model what they are thinking when reading the text
3. Annotate the text with students so that they may refer to it as they work through the lab

Writing:

1. The teacher can provide a sentence starter for the students.
2. The teacher can give students an audience to write to (i.e. Write a letter to your sibling explaining this topic).
3. The teacher can provide constructive feedback during the writing process to help students understand the expectations.

Math:

1. Provide calculators as needed.
2. Provide graph paper as needed.

Supports for this specific lesson if needed:

Performance expectations for instruction:

1. The teacher should provide information to students in various formats to reach as many students as possible.
2. The students should be given adequate time to complete each part of the lesson.
3. The students should be allowed to express their knowledge in various formats.
4. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material.

Engage:

1. The teacher should consider showing news hurricane coverage from one of the recent hurricanes.
2. The teacher can then have students make a list of personal impacts of a hurricane on their home and family.
3. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. These formats could include writing, drawing or creating a presentation.
4. The teacher should consider giving sentence starters for any writing that they students need to complete.



5. The teacher should consider using a text to speech program or video to aid in struggling readers accessing the material.
6. The teacher should consider providing students with resources to use for their research.

Exploring/Explaining:

1. The teacher should consider providing students with an organizer to record observations, research, questions and begin their argument.
2. The teacher should remind students what a scientific argument is and what can be used as evidence to support their argument.
3. The teacher should consider giving students question stems.
4. The teacher should consider using a speech to text program or videos to help struggling readers access their material.
5. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. These formats could include writing, drawing or creating a presentation.
6. Students may need additional time to construct their arguments and explanations.

Elaborating:

1. The teacher should have clear and consistent guidelines for class discussion. This should help students feel safe in the classroom and be more likely to participate in the class discussion.
2. The teacher should consider providing students with resources to use for their research.
3. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. These formats could include writing, drawing or creating a presentation.
4. Students may need additional time to complete their assignment.

Evaluating:

1. The teacher should be sure to provide multiple ways for the students to communicate their knowledge of the material. These formats could include writing, drawing or creating a presentation.
2. Students may need additional time to complete their assignment.
3. The teacher should consider providing students a rubric to self-assess their work.