



Georgia Department of Education

This segment focuses on renewable and non-renewable resources.	
Student Science Performance	
6th Grade Earth Science	Title:
Topic: Conservation of Natural Resources	Human Energy Needs
<p>Performance Expectation for GSE: S6E6. Obtain, evaluate, and communicate information about the uses and conservation of various natural resources and how they impact the Earth.</p> <p>a. Ask questions to determine the differences between renewable/sustainable energy resources (examples: hydro, solar, wind, geothermal, tidal, biomass) and nonrenewable energy resources (examples: nuclear: uranium, fossil fuels: oil, coal, and natural gas), and how they are used in our everyday lives.</p> <p>b. Design and evaluate solutions for sustaining the quality and supply of natural resources such as water, soil, and air.</p> <p>c. Construct an argument evaluating contributions to the rise in global temperatures over the past century. (<i>Clarification statement:</i> Tables, graphs, and maps of global and regional temperatures, and atmospheric levels of greenhouse gases such as carbon dioxide and methane, should be used as sources of evidence.)</p>	
<p>Performance Expectations for Instruction:</p> <ul style="list-style-type: none"> ● Plan and carry out an investigation to engage, explore and explain the benefits of solar energy panels. ● Construct an argument to support the purchase and use of solar panels. ● Design a plan to show the use of solar energy. The design should include a rationale for using solar energy versus current electricity. Calculations of savings while using solar vs current should be presented in the argument for persuasion of using solar energy. ● Explain why an increased dependence on renewable energy sources is an inevitable part of our future. ● Describe how the depletion of fossil fuels is a serious global issue. ● Classify the Earth's natural resources as either renewable or non-renewable. ● Develop a better understanding of the magnitude of the use/destruction of non-renewable natural resources. ● Understand the impact that the world's population growth has on our natural resources. ● Describe ways in which people can help conserve resources. ● Explain how engineers use microbes to manage carbon. ● Identify at least three biological processes that cycle elements and energy. ● Describe roles that microbes play in carbon management. ● Define photosynthesis, anaerobic digestion and composting. ● Describe how waste can be used as resources. ● describe how changes in Earth's climate alter ocean sediment layers; ● analyze ocean sediment cores for evidence of cycles of climate change; ● use the Paleontological Stratigraphic Interval Construction and Analysis Tool (PSICAT) program to create graphical models of ocean sediment cores; ● communicate to others about the role of atmospheric and oceanic temperatures in climate change; ● infer data based on a model; ● revise prediction based on data collection; ● describe the role of polar ice in climate change, and; ● use data from ocean sediment cores from Antarctica to tell a story about climate change throughout Earth's history. <p><u>Additional notes on student supports</u></p>	

Materials:

Renew-a-bead activity:

1 paper bag containing 100 black and white beads, with black beads representing non-renewable energy resources and white beads representing renewable energy resources; the ratio of black to white small cloth

- extra bag
- calculator
- Internet connection

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.

Engaging Learners

Phenomenon



Teacher Notes: This picture is used at the very beginning of the discussion on the renewable and nonrenewable energy sources. Help students to formulate questions to determine what this image represents and the importance of this panel in today's world.

Obtaining/Evaluating/Communicating: Have students write down anything they know about this image. After students have a list of information about the image, use table discussions to determine a list of renewable and nonrenewable energy terms and questions.

Teacher Notes: After a short discussion as whole group, list the main points of renewable and nonrenewable energy resources on chart paper. This list will provide key concepts as your work through this unit.

Exploring

Obtain

Students will investigate renewable and nonrenewable energy resources and the importance of each in our daily lives. Look for resources that are renewable and nonrenewable and determine the differences between renewable and nonrenewable resources and how we can use them in our everyday life. [Renew-a-bead activity](#) to help students understand the dependence on renewable resources and the depletion of fossil fuels.

Also, renewable resource lesson can be found in these locations: [Renewable energy resources](#), [I Feel Renewed](#), [Bio-recycling](#).

Students will obtain information about solar panels on a “tiny house”. An example video: [Full RV Solar & Inverter Install ~ From Start To Finish](#) (other videos can be found online or experiment/demonstration kits if available).

	<p>Communicate and Evaluate</p> <p>After researching the different types of renewable resources, have them design ways that these types can be used for sustaining the quality and supply of natural resources such as water, soil, and air. Students will communicate through presentations where they have chosen one or the teacher assigns one to present to class.</p>
<p>Explaining Finalizing Model</p>	<p>Obtain</p> <p>Students will research the effects of the burning of fossil fuels and other greenhouse gases and how they have caused the rise in global temperatures over the past century.</p>
	<p>Evaluate</p> <p>Students should evaluate this information and see a correlation between the increase of greenhouse gases and climate change. Writing a short essay using supporting information from their research is an excellent way to do this.</p>
	<p>Communicate</p> <p>Students will talk with each other about the conclusions that they have reached from the research.</p>
<p>Elaborating Applying Model to Solve a Problems</p>	<p>Phenomenon</p> <p>Have students work through the use of ice cores to establish patterns in climate changes with Cool Cores Capture Climate.</p>
	<p>Obtain</p> <p>Climate Change and our Earth and Climate change Wildlife will be used to gather information to construct an argument for the contributions of greenhouse gases as well as specific uses of carbon dioxide and methane that have affected our Earth and the organisms who live here.</p> <p>Teacher Notes: there are online simulations that show greenhouse gases as well, such as The Greenhouse Effect, from PhET Interactive Simulations</p> <p>Evaluate/Communicate:</p> <p>Using the information gathered, students will form sides and using graphs, maps and tables will debate the issue of global warming and climate change.</p>
<p>Evaluation</p>	<p style="text-align: center;">Assessment of Student Learning</p> <ul style="list-style-type: none"> ● Data gathering and analysis ● Essay writing from research ● Lab activities
<p>SEP, CCC, DCI</p>	<p style="text-align: center;">Science Essentials</p>
<p>Science and Engineering Practices</p>	<ul style="list-style-type: none"> ● Asking questions and defining problems ● Constructing explanations and designing solutions ● Engaging in argument from evidence ● Obtaining, evaluating and communicating information
<p>Crosscutting Concepts</p>	<ul style="list-style-type: none"> ● Patterns ● Cause and Effect ● Systems and System Models



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Disciplinary Core Ideas

From [A Framework for K-12 Science Education](#):

- ESS3.A: Natural Resources
- ESS3.D: Global Climate Change

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 activities.

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 ask the student to think about renewable and non-renewable energy resources that they have encountered.
2. The teacher should use intentional and flexible grouping to group students. Best practice is to use data to drive student groupings.
3. The teacher should have clear and consistent guidelines for student discussions. These guidelines should help students feel more comfortable and be more likely to participate.

Exploring:

1. The teacher should consider providing sources to students to find information about renewable and non-renewable resources.
2. The teacher should consider providing students with multiple opportunities to access the material. This access could include articles, videos, text-to-speech or read aloud.
3. Students may need additional time to complete their assignment.

4. The teacher should consider providing students with an organizer to record their research.
5. The teacher should be prepared to repeat directions as needed.
6. 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 verbally explaining.
7. Students may need additional time to complete their assignment.
8. Students should be given multiple options to share their work. These formats could include using technology, gallery walks or presentations.

Explaining:

1. The teacher should consider providing sources to students for research.
2. 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 verbally explaining.
3. The teacher should consider providing students with sentence starters for any writing that needs to be completed.
4. The teacher should consider guiding questions to assist students as they work.
5. The teacher should have clear and consistent guidelines for discussion. These guidelines should help students feel more comfortable and be more likely to participate.
6. Students may need additional time to complete their assignment.

Elaborating:

1. The teacher should consider providing students with multiple opportunities to access the material. This access could include articles, videos, text-to-speech or read aloud.
2. The teacher may need to remind students what comprises a scientific argument.
3. The teacher should use the simulations that are provided in the lesson plan as needed to supplement the material.

Evaluating:

1. The teacher should consider giving students multiple options to express their knowledge. These options could include writing, drawing or designing a presentation.
2. The teacher should complete a formative assessment several times throughout the lesson and re-teach, review and enrich as needed.