The following instructional plan is part of a GaDOE collection of Unit Frameworks, Performance Tasks, examples of Student Work, and Teacher Commentary. Many more GaDOE approved instructional plans are available by using the Search Standards feature located on GeorgiaStandards.Org.

Georgia Performance Standards Framework for Earth Science – Grade 6

Unit: Human Impact

Inquiry Task

Distinguishing Between Renewable and Non-renewable Resources

Standards (Content and Characteristics):

S6E5. Students will investigate the scientific view of how the earth’s surface is formed.
   j. Describe methods for conserving natural resources such as water, soil, and air.

S6E6. Students will describe various sources of energy, their uses and conservation.
   b. Identify renewable and nonrenewable resources.

S6CS2. Students will use standard safety practices for all classroom laboratory and field investigations.
   a. Follow correct procedures for use of scientific apparatus.
   b. Demonstrate appropriate techniques in all laboratory situations.
   c. Follow correct protocol for identifying and reporting safety problems and violations.

S6CS3. Students will use computation and estimation skills necessary for analyzing data and following scientific explanations.
   a. Analyze scientific data by using, interpreting, and comparing numbers in several equivalent forms, such as integers and decimals.
   b. Use metric input units (such as seconds, meters, or grams per milliliter) of scientific calculations to determine the proper unit for expressing the answer.
   d. Draw conclusions based on analyzed data.

S6CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.
   a. Observe and explain how parts are related to other parts in systems such as weather systems, solar systems, and ocean systems including how the output from one part of a system (in the form of material, energy, or information) can become the input to other parts. (For example: El Nino’s effect on weather)

S6CS6. Students will communicate scientific ideas and activities clearly.
   c. Organize scientific information using appropriate tables, charts, and graphs, and identify relationships they reveal.

S6CS9. Students will investigate the features of the process of scientific inquiry.
   Students will apply the following to inquiry learning practices:
Georgia Performance Standards Framework for Earth Science – Grade 6

a. Scientific investigations are conducted for different reasons. They usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations.

b. Scientists often collaborate to design research. To prevent bias, scientists conduct independent studies of the same questions.

c. Accurate record keeping, data sharing, and replication of results are essential for maintaining an investigator’s credibility with other scientists and society.

d. Scientists use technology and mathematics to enhance the process of scientific inquiry.

e. The ethics of science require that special care must be taken and used for human subjects and animals in scientific research. Scientists must adhere to the appropriate rules and guidelines when conducting research.

Enduring Understandings:

• Renewable resources can be replenished within a relatively short time period.
• Non-renewable resources form very slowly, over millions of years. When present supplies are used, there will be no more.
• The Earth’s resources can be reduced or used up if humans don’t use conservation strategies.
• Through conservation strategies, people can slow down the degradation of the environment and the depletion of non-renewable resources.

Essential Question(s):

• Which strategies that your family could use to conserve energy would be easiest and why?
• How might it be possible to run out of a non-renewable resource? Give examples.

Pre-Assessment:

Two Choices:

1. Students brainstorm how to measure electricity use in the home. Brainstorm responses may include: analyze electric bill; read tags on electrical appliances to determine energy use; monitor home electricity use by electric meter.

2. Introduce the video, Kilowatt Ours, by providing the following information: Did you know that by recycling a single aluminum can we conserve enough energy to power a regular TV for a whole hour? Did you know that if every home in America used just one energy efficient light bulb that we would instantly cut greenhouse gas emissions by 1 trillion pounds per year? Show the video Kilowatt Ours (VHS or DVD) Jeff Barrie (2004) 35 min. distributed by the Video Project Educational Videos.

| Outcome/ Performance Expectations | Identify the learning goals for this inquiry-based task. Students will be able to describe methods for conserving natural resources such as air. Students will be able to evaluate energy conservation strategies. Students will be able to compare/contrast environmental consequences of fossil fuel use and renewable energy use. |
| Write a concept statement...How would you formulate an expert idea? | List examples of how students may incorporate their ideas into experiments. The Earth’s resources can be reduced or used up if humans don’t use conservation strategies. Through conservation strategies, people can slow down the degradation of the environment and the depletion of non-renewable resources. |
| Write a concept statement / question...What kind of situation would cause this concept to become apparent in students’ understanding? | Write questions or statements to assist students develop and explain their ideas (i.e. aid in conceptualizing their knowledge-making exploration). How much electrical energy does your household use? How can we measure electrical energy use? Where does electricity come from (the source of electrical power)? Students should be reminded of the hazards of electricity. When reading the electric meter, students should have parental supervision and should not attempt to touch or open the covering of the electric meter. |
| Identify necessary data and observations...What data would demonstrate the mastery of the concept by ALL students in the classroom? | Identify relevant observations and data collected by students to aid in conceptualizing their knowledge-making exploration. In addition, lists misconceptions that arise and may prohibit students internalizing their own understandings, and what steps should a teacher take to overcome these misconceptions? Students determine for themselves how they would go about measuring the amount of electricity that is used in their own homes. The teacher guides the students in their research and facilitates the discussion from the brainstorming session. For example, students could use the internet and/or contact the local utility company to arrive at a procedure to monitor home electricity use. Students determine costs of electricity use. |

| Write procedures that will cause students to organize data…**Test a procedure using known concepts.** | **List sample procedural statements that students may use to organize their data.**  
After students have collected their data, they can spend time developing a conservation plan specific to their homes. Conservation plans should be feasible and easy to carry out. It is a good idea to get parents involved in this activity (it has the potential to decrease the monthly utility bill!) |
|---|---|
| **Write questions or activities to use or apply the concept (represent, model, visualize, or design new experiments).** | Teacher should raise the level of student awareness that each time we turn on a light, we may be making a contribution to global warming, particularly if the electricity we use is generated from a coal-burning (fossil-fuel) plant. This also helps students relate effects of a fossil fuel on global atmospheric change.  
- Which strategies that your family could use to conserve energy would be easiest and why?  
- How might if be possible to run out of a renewable resource? Give examples. |
| **Homework/Extension** |  
- Suggest two non-renewable energy sources to replace electricity generated from coal-burning plants. Discuss limitations for each non-renewable energy source.  
- Using simple calculations, students’ data can be evaluated in terms of the number of pounds of carbon dioxide that is produced from their homes and the volume that this corresponds to.  
Video to relate energy production to atmospheric change, *What’s Up with the Weather* (NOVA/Frontline, WGBH Boston, 2000).  
*Video Kilowatt Ours* (VHS or DVD) Jeff Barrie (2004) 35 mins. Published by the Video Project Educational Videos.  
*Kilowatt Ours* is a film that demonstrates how easy it is to conserve energy that is produced from traditional sources as well as the many ways the average consumer can easily become part of the renewable energy revolution. The film reveals the connection between personal choices and energy use. Website address, http://store.videoproject.com/kil-881-v.html |
| **Instructional Tasks Accommodations for ELL Students** |  
- Adjust teacher talk to increase comprehensibility: face students, pause frequently, paraphrase often  
- Give students more direct information to help them understand how to attack the task  
- Increase % of student talk about topic (more content related)  
- Relate content to real life  
- Provide student with outline of procedure steps |

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<tr>
<th>Instructional Tasks Accommodations for Students with Disabilities</th>
<th>Instructional Tasks Accommodations for Gifted Students</th>
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<tbody>
<tr>
<td>• Offer an alternative mode of response (oral)</td>
<td>• Use flexible seating arrangements to allow for creativity as some students generate original ideas and higher order thinking skills while moving</td>
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<td>• Provide peer partner</td>
<td>• Invite students to explore different points of view and compare the different perspectives</td>
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<td>• Give students a checklist of the questions/steps in the task to check off steps as they complete them</td>
<td>• Determine where students’ interest lie on this particular topic and capitalize on this inquisitiveness</td>
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<td>• Provide sentence starters such as “The easiest way my family can conserve energy is to…”</td>
<td>• Brainstorm with students about what types of projects they would like to explore to extend their learning beyond the classroom</td>
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<tr>
<td>• Break work into manageable parts</td>
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