Energy is Everywhere!

Key Words: energy, source

Desired Outcomes

Goals:
S2P2. Students will identify sources of energy and how the energy is used.
   a. Identify sources of light energy, heat energy, and energy of motion.
   b. Describe how light, heat, and motion energy are used.
S2CS1. Students will be aware of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.
   a. Raise questions about the world around them and be willing to seek answers to some of the questions by making careful observations and measurements and trying to figure things out.
S2CS3. Students will use tools and instruments for observing, measuring, and manipulating objects in scientific activities.
   a. Use ordinary hand tools and instruments to construct, measure, and look at objects.
S2CS5. Students will communicate scientific ideas and activities clearly.
   b. Draw pictures (grade level appropriate) that correctly portray features of the thing being described.
ELA2R3. The student acquires and uses grade-level words to communicate effectively.
   a. Reads a variety of texts and uses new words in oral and written language.
   d. Determines the meaning of unknown words on the basis of context.
ELA2R4. The student uses a variety of strategies to gain meaning from grade-level text.
   f. Distinguishes fact from fiction in a text.
   g. Interprets information from illustrations, diagrams, charts, graphs, and graphic organizers.

Understandings:
Students will understand that…
- energy is something that causes things to change and do work;
- light from the sun creates energy;
- things that produce heat are sources of energy; and
- energy allows objects to move or change.

Essential Questions:
- Why is the sun important?
- How do you know if something has energy?
- Can you see energy? How do we know it exists?
- How do you use energy in your home?
Students will know…
• the sun is the Earth’s greatest source of energy;
• we use light and heat energy in our everyday lives; and
• when objects move, energy is used.

Students will be able to…
• identify sources of light energy;
• identify sources of heat energy;
• identify sources of motion; and
• describe how objects use energy.

Lesson Hook:
In Advance: Create a bulletin board entitled, “Coming Soon…ENERGY!” Over a period of two weeks, ask students to bring in pictures or objects to display that relate to their perception of energy. This should involve very little teacher direction. Let the children formulate their own ideas. As objects begin to come in, post them in related areas on the board (group food items together, exercise together, fossil fuels together, etc.). At the start of your unit, discuss their ideas about what energy is and why it is difficult to describe (because it is intangible). Post the definition of energy on the board and revisit their items on the bulletin board. Do they all still fit? Let students know that energy is a very broad topic and that as second graders, they will only be learning about light energy, heat energy, and energy of motion.

At the start of your unit: Kite Flying ~ Exploring the Energy of Motion
Collect enough plastic grocery bags for each student in your classroom. Tie the handles together with a piece of yarn, leaving a long length of yarn to serve as the handle. Take your “kites” outside and allow students to explore ways to make their kites fly. Upon returning to the classroom, have your students consider the following questions:
1. Why did the kite fly?
2. Why did certain kites fly better than others?
3. Could the kite fly without the student moving?

Assessment

Performance Tasks:
Read Two Bad Ants, by Chris Van Allsburg. Discuss the story with the students to ensure comprehension and how it relates to this unit on energy sources and uses. Have students imagine that they are Chris Van Allsburg’s book editor. As an editor, it is your job to make the book desirable for kids, parents, and teachers to buy. After reading the book, you feel that one thing could be added to this book to make it more appealing to young readers: an informational page on sources of energy experienced by the characters. Mr. Van Allsburg gives you permission to add this to the end of his book. It is your job to write a brief explanation of the three types of energy including examples of energy found in this book and how the ants experienced the “uses” of each type of energy. How would you explain light energy? When did the ants experience heat energy? Were the ants ever forced into the energy of motion? In a one-page addition to this book, describe the sources and uses of heat, light, and motion energy so that other students reading this book will have a better understanding of the science behind the fiction.
### Other Evidence:
- Flip-Books
- Group activities
- Class discussion
- Collage development
- Matching pictures
- Constructed response – What is energy and why is it so hard to define?

### Plan of Action

#### Learning Activities:
- **Read** *Jack’s Kite*, by Yvonne Jagtenberg or *Curious George Flies a Kite*, by H.A. Rey after Lesson Hook. Discuss the conditions necessary for a kite to fly. Make a “T” chart for students to list things that do and do not make kites fly. Students should understand that energy must be given to the kite, or more easily understood that energy must be given to motion.
- **Read** *Energy Makes Things Happen* (Let’s Read and Find Out Science 2), by Kimberly Brubaker Bradley or other non-fiction text that explores what energy is and how we use energy in our daily lives. Create a flip book with information about the three sources of energy:

<table>
<thead>
<tr>
<th>LIGHT</th>
<th>HEAT</th>
<th>MOTION</th>
</tr>
</thead>
</table>

On the inside flaps, have students list examples of each type of energy and select one example to illustrate.

- Learning more about motion energy:
  - Make a simple water wheel to demonstrate the energy of motion. [http://tech.worlded.org/docs/lowell/waterwheel1.htm](http://tech.worlded.org/docs/lowell/waterwheel1.htm).

- Learning more about heat energy:
  - Pop a bag of popcorn on a hot plate or in the microwave. Discuss with students what changes are taking place? Discuss the transfer of heat energy from the source (heat element) to the recipient (popcorn kernels). Read *The Popcorn Book*, by Tomie dePaola for additional information and support.

- Learning more about light energy:
  - Have students explore with solar calculators. What makes them work? Once this has been established, have students come up with three methods that take away the light energy – how to make it NOT work. Read *Energy from the Sun*, by Allan Fowler for additional information and support.

- Create a collage of pictures from various media that identifies the three sources of energy students have studied. Students will present their collage, describing the uses of energy that have been depicted. Use “Energy Collage” checklist and rubric for assessment.
Additional Resources:

Websites

- [www.eia.doe.gov/kids/](http://www.eia.doe.gov/kids/)
- [www.need.org](http://www.need.org) – Go to the section for students. Choose games and activities. Select Energy Infobooks Activities for five individual handouts for students. Students have to circle the objects that people use for light, circle objects that don’t use the Sun’s energy to grow, circle objects that need people power, etc.
- [http://www.energy.gov/foreducators.htm](http://www.energy.gov/foreducators.htm) Department of Energy
Energy Collage

CHECKING FOR UNDERSTANDING:

Pictures found for the following sources of energy:

- _______ light energy
- _______ heat energy
- _______ energy of motion

Presentation/Description of uses of each type of energy:

**Light Energy**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No ability to interpret the use of energy as pictured</td>
<td>Little ability to interpret the use of energy as pictured</td>
<td>Good ability to interpret the use of energy as pictured</td>
<td>Excellent ability to interpret the use of energy as pictured</td>
</tr>
</tbody>
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**Heat Energy**

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**Energy of Motion**

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Have students cut out the following pictures and arrange into uses of light energy, heat energy, or energy of motion. Some pictures may fit into two categories.

**Key:**
- **Light Energy:** Sun, solar calculator
- **Heat Energy:** fire, grilling, hot air balloon
- **Energy of Motion:** Water wheel, kite, running
Two Bad Ants
by Chris Van Allsburg

Editor in Chief: ____________________________________________

Informational Background on Sources and Uses of Energy
Assessment Checklist

Please circle the appropriate choice, according to student work, for each of the items below:

Description

Light Energy: Not accurately described Accurately described
Heat Energy: Not accurately described Accurately described
Energy of Motion: Not accurately described Accurately described

Examples Identified

Light Energy: Inaccurate example identified Accurate example identified
Heat Energy: Inaccurate example identified Accurate example identified
Energy of Motion: Inaccurate example identified Accurate example identified

Writing Conventions

Below grade level On grade level Above grade level
writing conventions used writing conventions used writing conventions used