

## Energy is Everywhere

Lesson plan for grades K-2

Length of lesson: 1 Period (60 minutes)

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### SOURCES AND RESOURCES:

- US Energy Information Administration: Basics of Energy  
[http://www.eia.gov/kids/energy.cfm?page=about\\_home-basics](http://www.eia.gov/kids/energy.cfm?page=about_home-basics)
- Bradley, Kimberly Brubaker (2002). *Energy Makes Things Happen*. HarperCollins Publishers, New York, NY
- 2003 US Dept. of Energy: Energy Efficiency & Renewable Energy, Intro to Energy  
<http://www.eere.energy.gov/basics/>

### POTENTIAL CONCEPTS TEKS ADDRESSED THROUGH THIS LESSON:

§112.11.b Matter and Energy Grade K: 6A, 9B

§112.12.b Matter and Energy Grade 1: 6A

§112.13.b Force, Motion, and Energy Grade 2: 6A

### PERFORMANCE OBJECTIVES (in order of increasing difficulty to permit tailoring to various age groups):

Students will be able to:

- Report several different types of energy, including heat, wind, fuel, and solar energy.
- Classify everyday objects according to the type of energy they use
- Order these same objects by the amount of energy each consumes
- Describe the growth of a plant in terms energy concepts introduced in the lesson

### MATERIALS (per group of four):

- *Energy Makes Things Happen* by Kimberly Brubaker Bradley
- 2 Copies of the included flash card sets: [PDF](#) [PowerPoint](#)
- A small household plant

### CONCEPTS:

**Energy** is the capacity of a system to do **work**.

When a force causes an object to be displaced by a distance, **work** has been done on that object.

**Thermal** energy is energy that involves the usage or production of heat. **Solar** energy, similarly, is energy of or pertaining to the sun.

A **fuel** is something that is consumed to produce energy such as gasoline or firewood.

**BACKGROUND:**

This lesson is meant to introduce the concept of energy directly from both experiential sources and definition. As with most science concepts in early elementary school, energy is presented in the selected literature through day-to-day experiences relevant to the students' lives. The activities in this lesson intended to reinforce and expand upon this approach. Also, the author of the book does include the physical definition of energy in her book, but she does not focus on this. Neither does this lesson focus on defining energy. However, the work that objects do is invoked in some of the discussion questions in the activities. In this lesson, work is not explained in terms of forces, but rather it is associated with the students' everyday understanding of the word as pertaining to labor, movement, or mechanical energy. The reason for these questions is to help prepare the students with future encounters with the jargon of physics in higher grade levels. Finally, energy as a measurable quantity is hinted at during the Elaborate section. While no measurements are carried out, this activity is included to realize how energy can be spent in the universe alongside the fact that it cannot be destroyed. This, too, can help lay down the foundations for the students' later exposure to the study of limited resources and sustainability.

**PREPARATION:**

Have as many necessary sets of flash cards cut and ready prior to the lesson. Also, obtain a copy of the literature, and familiarize yourself with any sections that may require special attention with your class. Of special note is the gravitational potential energy of a rock on pp. 18-19. Potential energy was not included in the activities of this lesson, for this topic is not a part of most curricula until higher grade levels. However, it is worth emphasizing to the class that the hill described is not what is consuming energy. Rather, the slope makes it possible for the rock to release energy it had stored. This can be compared to the author's examples of a candle that is allowed to release its energy when it is lit or how food releases energy for our bodies after we eat.

**ENGAGE: (20 minutes)**

Gather the students sitting down in an area away from their desks. Before mentioning the book to be read, begin by asking the students what their experiences with energy are. That is, if the topic is new, you might ask what they think the word energy means. For a younger grade level, it may be better to ask what they first think about when the word energy is mentioned. Additionally, you may ask how they think energy affects their daily lives. Further still, you might choose the approach of simply stating that they use energy every single day, and they are even using it as you speak the words.

Next, introduce the book and read aloud for the students. Given the details of the illustrations in this book, it is recommended to pause frequently to go over the actions in the images. A great example is on pages 4-5, where several children are described doing different activities that, not coincidentally, ***use different types of energy***. For younger audiences, this may also help by re-engaging the students with questions like, "Where is

the boy with the sailboat?” For advanced or older students, you may ask, “How do you think the boy/girl doing \_\_\_\_\_ is using energy?” The focus of the author, and also of this activity, is to introduce energy and its use in daily life.

Ask:

What is energy, in your own words?

What do you think of when we say energy?

Can you name some things that use energy? **OR** You use energy every single day. Can you think of some ways how?

Note to teachers: Page 6 contains, “Energy can be used to do work.” Depending on the learning level of the students, you may decide to stress this point, as it is used to *define* energy, without explicitly defining energy. This is immediately following the illustrations mentioned above, so some probing questions relating to this question may be:

“How did the girl with the baseball use her energy to do work?”

“What are some ways that you used energy just *this morning* to do work?”

“Does brushing your teeth use energy? Why or why not? Are you doing work? How?”

### **EXPLORE: (10 minutes)**

1. Have the students return to their desks, and have them group into pairs. It may be easiest to assign pairs with the people in proximity to their desks.
2. Explain to the students that they will be working with flash cards. They will be working as pairs to sort and group their set of cards based on types of energy. This represents a key transition point of the lesson – from defining what energy is to classifying different types of energy based on what they heard from the storybook.
3. Do remind the students about the main idea of the reading (what energy actually is, and different types of energy), but do not give any further explicit instructions. It is very likely that some students will begin to sort groups by *type* of energy involved, but different classification (such as by those involving people) might lead into different discussions in the next section.
4. Some students may have difficulty; engage them to find similarities between two flash cards (e.g. the RC car and the lamp) as you walk around the classroom. Or, remind them of how the story explained many different types of energy in the world.

### **EXPLAIN : (10 minutes)**

Regain the students’ attention using your regular protocol. In my experiences with the younger grade levels, it may be a good idea to have them also place their hands on their laps or a different instruction to keep from

playing with the materials during this discussion section. Have all or a select number of groups present their team's results to the class.

- If the grouping is unrelated to the topic, try to redirect thoughts. For example, "So what can we say about the kind of energy described in your first group?"
- What about the pictures on the cards caused you to group them together?
- Is energy being used to do work in any of your groups? Which ones? How is it being used?
- What kind of energy is being used to heat this teakettle?
  - How do we heat a teakettle?
    - Where does the energy in the stove come from? Wood?

**ELABORATE: (10 minutes)**

1. Now, the students will return to their work in pairs to group the flash cards by energy use.
2. Author K.B. Bradley illustrates how energy is used in many different ways including the sun shining, the swinging of a baseball, the burning of firewood, and even eating food.
3. At instructor's discretion, have the students either:
  - a. Order their subsets of cards from the activity by increasing or decreasing energy consumption
  - b. Order the entire set by energy consumption
  - c. Both a and b

On pp. 30-31, K.B. Bradley writes about the conservation of energy. This second activity is aimed at probing the students to reason about how much energy objects and people in the world use after it has been established that nearly *everything* in the world uses energy. By reminding the students of how energy never disappears, this can lead into further questions in higher grades such as the origin of the sun's energy and also discussions that introduce new vocabulary like sustainability.

**EVALUATE: (10 minutes)**

A pitfall of introducing the concept of energy is that for many students, even into the undergraduate level, energy seems to be just that. A concept. Throughout the lesson, the instructor should emphasize that energy is a very real quantity in the universe that we depend on for life itself. A great example incorporating several types of energy is that of a plant. With students still at their desks, present the plant to the class, and ask students what is needed to grow a plant starting from a seed. Have the students write their responses in their journals—relating their answers to the energy concepts from the book and the activity. I suggest putting slide 3 from the Powerpoint file up on an overhead to help students through this activity. The key evaluative point here is that students should be able to make the connection between the solar energy that has been translated into energy stored within the plant's tissues. The fact that Slide 3 has both trees and vegetables may encourage students to make the energy connection between the sun, plants receiving sunlight to grow, and humans eating plants to grow and do work.













