



ENERGY, WORK, AND MOVEMENT

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Time Frame:	Standards:
Two 40-minute periods 2 nd Grade	2.S.1.6.1 Identify questions to be investigated 2.S.1.6.2 Make observations 2.S.1.6.3 Analyze information and evidence 2.S.1.6.4 Communicate observations
Objectives:	
The students will determine that it takes energy to move an object, and that energy is often converted from one form to another.	
Background Information:	
<p>Energy is all around us, all the time. The word energy can have a number of meanings, but the most basic is “energy is the ability to do work.” Used in that definition, work refers to the movement of matter from one point to another. For example, we do work when we move a pan from the stove to the table and energy is the ability to do that work.</p> <p>Energy can be known by different names depending on its source. Light, whether it comes from the sun or a light bulb is radiant energy. Gravitational energy is the force which holds objects to the earth. Food and fuel contain stored chemical energy, while objects which are hot contain thermal energy. A machine with moving parts is said to have mechanical energy. Charged objects are filled with electrical energy and radioactive objects contain nuclear energy.</p>	
Materials:	
<ul style="list-style-type: none">• Copies of handout Energy: <i>What in the World is it?</i>• Five or six ping-pong balls• Box• Stick• Hand-held hair dryer• Wind up and/or battery-operated toy	

Procedure:

1. Introduce the class to the more scientific meanings of the words “energy” and “work.”

- A. Read the following to the class:

This is a story about the world we live in. Everyday-whether it’s cloudy or bright-the sun shines on our world creating heat and light that support plant and animal life. The heat and light from the sun makes our food grow, creates the wind and water power, and even many millions of years ago, was the source of energy for the decayed plants and animals that became fossil fuels called oil, coal, and natural gas.

The people in our world go to their jobs, go to school, and they play. And, when the sun sets at night, they are tired and they say, “Whew, I am out of energy!” In the morning, after a good night’s sleep and a big breakfast, the in our world feel “full of energy” again.

- B. Give each student a copy of the handout, *Energy: What in the world is it?* Discuss how the picture shows all kinds of energy.

Energy is the power to make things move, energy creates light, and energy makes heat. Energy is the ability to do work. And, in the scientific terms, work is not just those things we do like scrubbing the kitchen floor. Work is done anytime a force causes an object to change its movement, shape, or composition.

- C. Have the students complete the following handout:
 1. Outline in purple, everything that moves.
 2. Color yellow, things that give light.
 3. Outline, in blue, every place where work is happening.
 4. Color red, things that give off heat.
 5. Outline, in orange, all the areas in the house that are using electricity

2. After students have been introduced to the scientific meanings of “energy” and “work” have them apply what they’ve learned to a simple classroom activity.
 - A. Place ping pong balls in the box. Ask the students to consider all the ways that the balls could be made to move. If possible, try each suggestion and ask where the energy came from.
 - B. Move the balls by hand. Develop the energy conversion cycle of where the hand’s energy comes from (human energy, food, solar). If we put food beside the balls, can they move? Or can sunshine move the balls? The energy needs to be converted in order to do work-move the balls.
 - C. Move the balls with a stick. Where did the energy come from? Can the stick move the balls all by itself?
 - D. Move the balls with a blast of air from a blow-dryer. Where did the energy come from? (electricity or wind)
 - E. Tip the box to move the balls. Where did the energy come from? (human energy)
 - F. If the balls are placed on a tilted surface, what happens? What energy was working then? (gravity)
 - G. Use the wind up toy. Where does the energy come from? (mechanical energy) Demonstrate the battery-operated toy. Where does the energy come from? (battery-chemical energy to electrical energy to mechanical energy)
 - H. Discuss the energy sources of appliances in the classroom. For example: clock, projector, television. Emphasize that in order for work to be done-things to move-energy must be used (converted)

Assessment:

1. Make a list on the board of each type of energy demonstrated with the ping-pong balls and toy. Allow students to go back and try each demonstration, matching it to the right type of energy used.
2. Have students give examples of using energy to do work.

Additional Content:

See attached file, Energy: *What in the World is it?*

References:

National Energy Foundation-Resources for Educators
Energy Fun-Integrated Learning Activities-Primary
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