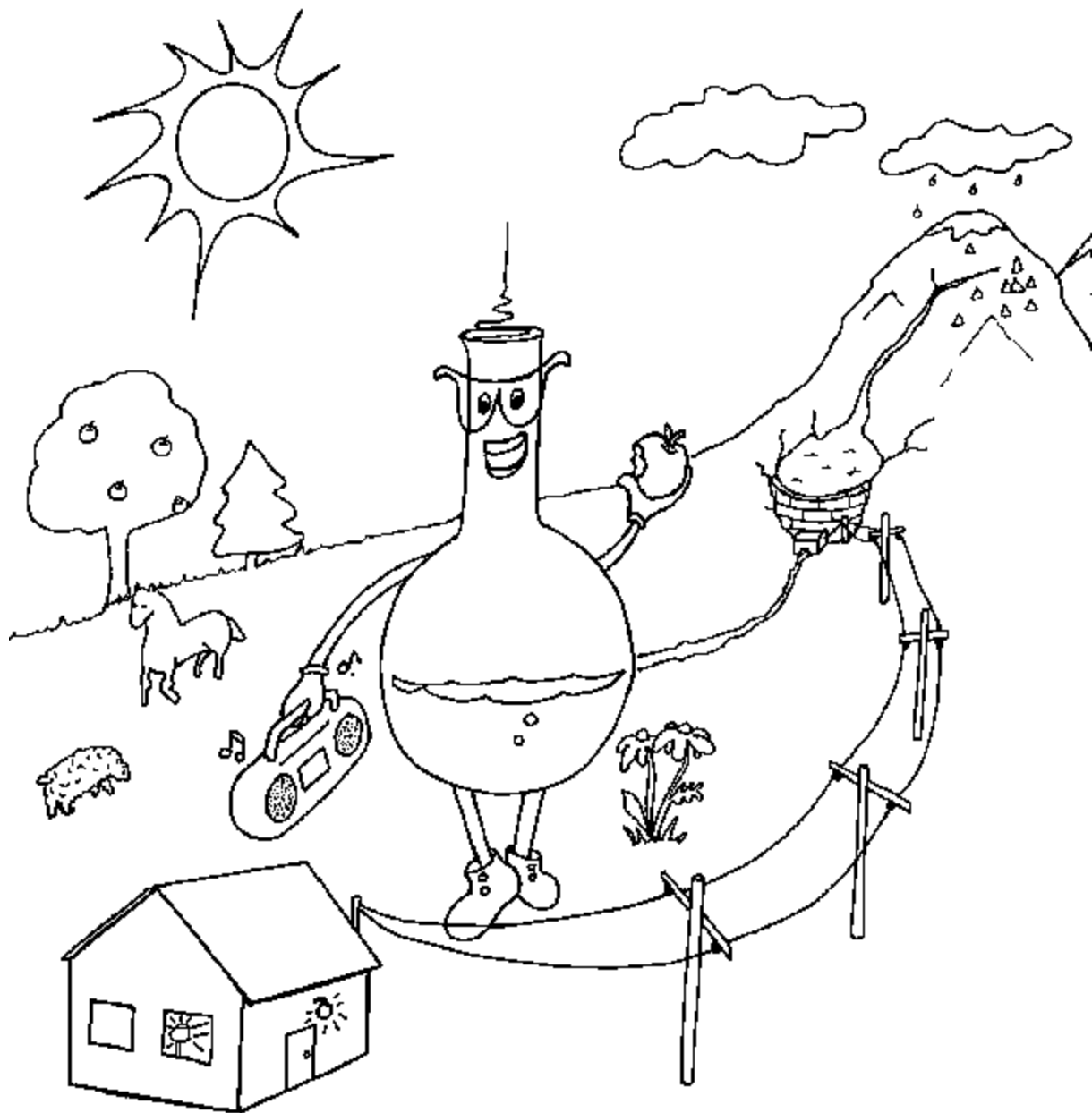


Professor Beaker's

# Energy in Our Lives

Designed for Grade 1



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# Chapter A - Energy and Sources of Energy

## Background Science for the Educator

### Educator's Notes:

Many primary level educators are uncomfortable teaching science because they lack a strong science background. Much of the information in the 'Background Science for the Educator' sections is not intended for classroom presentation, but is supplied to give the educator a solid grounding in the subject.

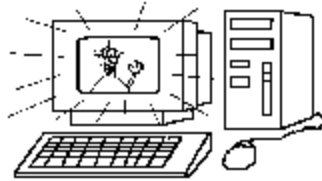
### What is Energy?

Energy is the capacity to do work. To do work, a person, animal, plant or device must use energy. Energy is the fuel needed for the body or device to function and do work.

All around us, we see evidence of energy being used to do work. A person sweeping the floor uses energy to move the broom. A computer uses energy to light up the monitor screen and run the computer components. A light bulb uses energy to illuminate. A plant growing on the windowsill uses energy to grow. Anything that is growing, moving, giving off heat, light or sound uses energy.



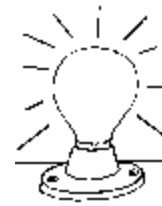
sweeping



computer operating



growing  
plant



illuminated  
bulb

### What is Work?

Work is done when a force moves something through a distance. Work cannot be done without energy. When work is done, energy is converted from one form to another. Holding a heavy weight on an outstretched arm is not work. Work is often done on a level that is not visible to the naked eye. For example, a plant that is growing is doing work.

### What Is an Energy Form?

Energy comes in different forms. Examples of energy forms include: 1) electrical energy; 2) sound energy; 3) light energy; 4) chemical energy; and 5) mechanical energy. A toaster uses electrical energy. A bicycle uses mechanical energy. Our bodies use chemical energy from the food we eat. A device may convert the input form of energy into another energy form. For example, a toaster uses electrical energy, which it converts into heat, to toast bread. More discussion about energy forms is found in Chapter B.

### What is Power?

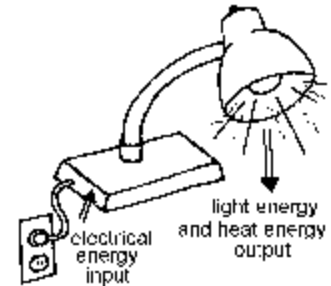
Power is the rate at which energy is converted from one form to another. It is a way to

## Forms of Energy and Devices

Everything that grows, moves, or gives off heat, light or sound uses energy. However, the form of energy used is not always the same. A person cannot be plugged into a wall outlet to use electrical energy to do work. A light bulb cannot eat food to gain energy to glow. Different devices need different forms of energy.

Many modern devices use the electrical form of energy to do work. People and animals use chemical energy stored in the food they eat. Some devices use mechanical energy, such as the movement of muscles, to pump up a tire.

When a device does work, the energy it uses is changed into another form of energy. An electric light bulb glows when electrical energy is supplied. The electrical energy is changed by the light bulb into light energy. The light bulb also gives off heat energy as well as light energy. A hair dryer changes electrical energy into heat energy (warm air) and sound energy (noise).



Energy does not disappear when used in a device; it just changes into another form.

**Activity to do:** Find the energy input and output from a radio.

Turn on a radio. Answer the questions below.

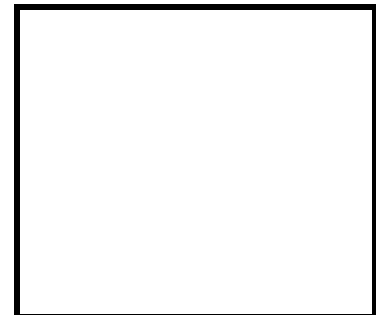
Draw a picture of your radio, in the box.

1. What is the energy input? (what gives the radio power?)

\_\_\_\_\_

2. What is the energy output? (what do you hear?)

\_\_\_\_\_



My radio

Forms of Energy and Devices - Take home page

Teacher's name \_\_\_\_\_ date: \_\_\_\_\_

I worked with \_\_\_\_\_ (child's name) to discover the energy input and output.

Did the child appear to understand about energy input and output from a radio?

**G** yes

**G** somewhat

**G** no

\_\_\_\_\_ (name of person who did the activity with the child)

name: \_\_\_\_\_

activity #10

## Feeling Cold?

1. Circle the sense that tells you that your body is feeling cold.
2. Circle with red, the pictures that show the 3 best ways to get warmer without wasting energy.

### Senses



sight



hearing



touch



smell



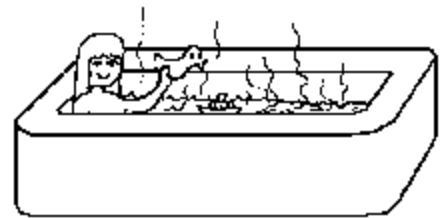
taste



do exercises



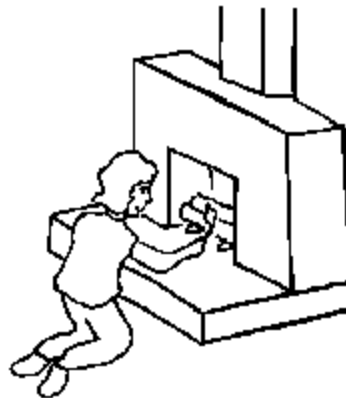
put on a sweater



have a hot bath



turn on a heater



light a fire



hug a friend

**Materials** supplied with this unit (enough for one activity #2 device)

- 2 metal washers (2.5 cm diameter to slip over the dowel)
- wire (to make a spring) -28 cm (11") long
- wooden dowel ( cm diameter; ") - 20 cm (7¾") long

### 1. Build a Device That Uses Energy from Muscles

see work sheet, page 99

Purpose of activity: to follow directions and to build a device that performs a specific task using energy provided by muscles.

Students follow the instructions provided to build a fan.

#### Materials (for a single fan):

one craft stick or popsicle stick

one piece of bristol board or cardboard cut into a square of 12 cm x 12 cm (5"x 5") size

a piece of bristol board larger than 12 cm x 12 cm (5"x 5")

crayons/ribbons/stickers for decorating fan

glue

tape (masking, transparent or duct)

a pencil

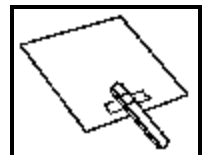
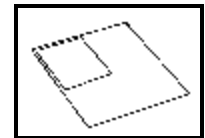
a pair of scissors

#### Educator's Notes:

*The corners of the cardboard square may be rounded for safety.*

#### Method:

1. Place the cardboard/bristol board square onto a sheet of bristol board.
2. Use a pencil to trace around the square on to the bristol board under it.
3. Use scissors to cut out the traced bristol board square.
4. Use crayons, stickers, ribbons to decorate one side of the bristol board square.
5. Place the popsicle stick on the middle of the blank side so half of the stick extends beyond the edge of the bristol board square.
6. Glue the popsicle stick in place on the bristol board square.
7. Put a piece of tape across the popsicle stick to fix it more securely to the bristol board.
8. Wait until the glue is dry before you try out your fan.



#### Educator's Notes:

*Alternatively, the students may make an accordion folding fan if such a fan is better suited to the students' skills. Instructions for a folding fan are given on the take home page (page 108).*

#### Follow up questions:

- a. Does your device keep you cool? What do you have to do to make it work? *[move it]*
- b. Where does the energy come from to make the fan move? *[muscles. a mechanical]*