

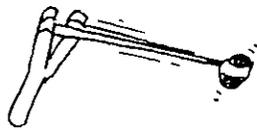
ENERGY IS

Grades 4-6

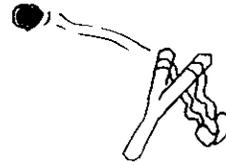
1. Not potential
or kinetic



2. Potential energy



3. Kinetic energy



Overview

The teacher demonstrates potential and kinetic energy using a sling shot and ping pong ball. The students and teacher look at and discuss different types and sources of energy (see materials). Using 4 by 6 note cards and rubber bands, students demonstrate kinetic and potential energy. *Optional activity: the presenter hooks up a battery to a light bulb.*

Objectives

- Students will demonstrate an ability to recognize potential and kinetic energy.
- Students will develop an understanding that energy occurs in different forms.
- Students will be able to name four different types of energy.
- Students will develop an understanding that energy is the capacity to do work (move objects) or produce change.

Vocabulary

Energy: the ability to work or produce change

Kinetic energy: Energy of motion

Potential energy: An object that is not in motion, but could be due to its position is known as having potential energy

Materials

For the presenter:

- sling shot and ping pong ball or rubber band and folded paper wad
- samples of the following energy sources on a tray:
 - Light (flashlight and sunlight)
 - Oil (e.g., a can of it)
 - Wood (a piece of wood)
 - Plant or (a picture of a cherry or apple tree)
- Wind (e.g., a fan or outdoor wind)
- Falling water (faucet or pour water from a pitcher into a glass)
- overhead transparencies of Energy Evaluation worksheet and Index Cards

Optional Activity

- a battery-operated toy
- the necessary batteries to operate it.
- a battery (dry cell)
- 1.2 volt bulb
- a short 6 inch solid bare copper wire

For each student

- 1 - 2 puff balls also called pom poms (buy a package at a craft's store)
- 1 - 2 rubber bands
- One 4 x 6 lined index card
- scissors and a ruler
- energy evaluation worksheet

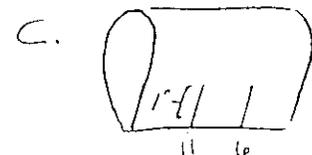
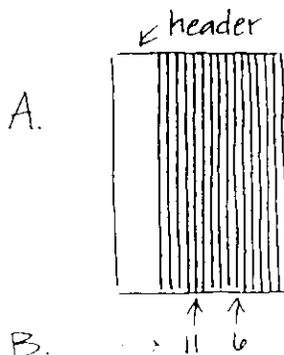
Getting Ready

Make index card (see next page) and energy evaluation transparencies(attached) for the overhead. Make copies of the evaluation worksheet. Have all materials arranged on a table for easy access.

Procedures

1. Share the objectives with the students.
2. The teacher places a ping pong ball in a sling shot. First, pull the ball back only about one to two inches so there is slack in the sling. Ask the students what will happen when you let go. (*Anticipated answer: The students will tell you that the ball will not travel through the air, but will drop to the floor.*) They will most likely encourage you to pull the sling shot all the way back.
3. Explain to the students that there are two types of energy: *kinetic* and *potential*. Have a student read these vocabulary words and their definitions from the blackboard / overhead.
4. Now pull the sling shot with the ping pong ball as far back as possible, but don't aim it at any students rather aim it at a corner or other safe place. Ask the students what type of energy you are demonstrating. (*Anticipated answer: "potential"*)
5. Tell the students that when you release the sling shot, they are to call out the name of the type of energy that they see. Release it and let the ping pong ball fly through the air in a safe direction. (*Anticipated Response: kinetic*)
6. Ask the students to look at the samples of energy that you have and to explain which ones are energy sources used by people to provide body energy, to grow food, to run machines, and to heat buildings. Have them explain how each sample is a source of energy.
7. Explain that energy is all around us in different forms, and read them the definition from the overhead/blackboard: *Energy is often defined as the ability to work or produce change.* Give a few examples of energy or energy products in the classroom such as: the light from a light bulb or the sun (*radiant energy*), something dropped onto a desk (*gravitational energy*), food (*potential chemical energy*), a machine with moveable parts (*mechanical energy*).
8. Pass out index cards. (See the drawings below and directions on next page)

Index Card Drawings



Cut up one inch on both and 11th line.



9. Steps for project:

- a. Have the students place their index cards with the line side up and the header on the left side. (Demonstrate.) Have the students start counting from the line on the right side to the left side, marking the 6th line and 11th line with a pen or pencil. With a pencil, they are to draw in one inch on the 6th & 11th line. (It is a good idea to have a note card transparency to demonstrate on the overhead.
- b. Have each student hold their card top edge to the bottom edge without creasing or folding the card completely in half. The lines are to be on the outside and the blank side is on the inside.
- c. Holding their cards in this position, the students are to cut up one inch on each pencil line.
- d. They are to open up their cards, and with the “lines side” facing up, they are to fasten a rubber band around each center cut tab.
- e. Only when every student has his or her card set up with the rubber bands fastened to it, you ask if kinetic or potential, is represented as you hold the corners down? (*Anticipated answer: “potential”*)
- f. *“On the count of three, let your cards go and call out the type of energy. 1, 2, and 3.”* (*Anticipated answer: “kinetic!”* as their cards flap into the air.)

Closure

Have the students pair up. While explaining potential and kinetic energy to each other they are to use their rubber bands and cards to demonstrate these terms.

Optional Activity 1

(Some teachers might choose not to do this fun activity with their students because it may be difficult to get them to settle back down.)

Explain to the students that they can now demonstrate potential and kinetic energy by using a rubber band to shoot the puff balls at each other. Establish the rules by telling the students that anyone shooting into someone’s face or in any way not using the rubber bands and puff balls appropriately will lose their puff ball and rubber band. Pass out the puff balls and allow the students to demonstrate potential and kinetic energy.

Optional Activity 2

Materials

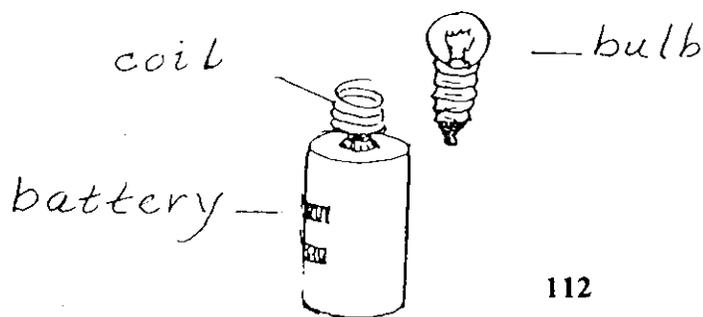
- a battery-operated toy
- the necessary batteries to operate it.
- a battery (dry cell)
- 1.2 volt bulb
- a short 6 inch solid bare copper wire.

Objective

- The students will develop an understanding of how energy occurs in different forms by observing an example of chemical energy which is converted to mechanical energy.

Procedures

1. Show the students a battery-operated toy without a battery. Ask them what is needed for it to operate (*to move*). They will most likely tell you that it needs a battery. Next explain that it is energy that has the ability to move an object or to produce change. Remind them that energy is what lights a light bulb, and the chemical energy from the battery enables the toy to move (*electrical energy*). A light bulb giving off light is an example of energy producing a change. The moving toy is an example of energy working by moving an object.
2. Ask the students if a battery is an example of *potential* or *kinetic* energy. Help them understand that because a battery contains stored energy that has not been used, it is an example of potential energy.
3. Put the battery into the toy and operate the toy. Ask the students what types of energy are occurring as they observe the toy. Explain that chemical energy is traveling from the battery to the toy, and both mechanical and kinetic energy are occurring as the toy moves.
4. Take the copper wire and wind it along the groove of the bulb and bend the wire around the battery. Tape the end of the wire against the negative pole of the battery. (See sketch)



5. Turn the bulb to the right until the bulb lights.
6. Tell the students that the class is going to discuss the different types of energy involved in lighting the light bulb.
7. Again, ask the what type of energy is stored in the battery. (**Potential**). Ask them if they know what type of energy the battery converts the chemical energy into. (**Electrical**)
8. Electricity is a form of what type of energy? (**Kinetic**) Now to review the types of energy, tell them you are going to twice make some statements with blanks in them, and the second time you make the statement you will point to them to call out loud the word that goes into the blank.)

Statements: A battery contains ___(blank)___ energy. (**Potential**)
 A battery converts chemical energy into ___(blank)___ energy. (**Electrical**)
 Electricity is a form of ___(blank)___ energy. (**Kinetic**)
 The light bulb converts electrical energy into ___(blank)___ and ___(blank)___ energy. (**Light, Heat**)

Closure

Pass out an evaluation to each group of four students. Show the students the overhead with the examples of energy and have the students decide if each example is (**P**) potential or (**K**) kinetic and complete the Word Choice.

Answers

1.K, 2.K, 3.P, 4.K, 5.K, 6.P, 7.K, 8.P
 1. Potential, 2. Electrical, 3. Kinetic, 4. Light, Heat

Clean Up

The classroom needs to be left just as it was. Give each group specific clean up tasks, and compliment the groups/students.

Supplementary Activities

For a future art lesson, the students can create mobiles that display several different sources of energy.