Study Guide for film:

Where Does Energy Come From?

Vocabulary

- natural gas — a chemical that comes from very deep in the ground
- furnace — a structure in your house that generates heat
- refineries — a huge place that changes oil into useful things
- generator — a machine that makes electricity
- power plant — a building where electricity is made
- turbines — a special fan used for turning generators
- dam — a huge wall holding back a river
- geothermal — heat that comes from within the earth
- solar cells — cells that change sunlight into electricity

Comprehension Questions

1. Where does chemical energy come from?
2. Name two kinds of energy discussed in the movie.
3. How is natural gas used?
4. According to the movie, what is found in an underground lake?
5. Name two kinds of fuel used to keep warm.
6. What type of energy do we use many times a day?
7. Name three ways you use this kind of energy.
8. Can one generator make enough energy for all of the houses in your town?
9. What do most power plants use to make electricity?

10. How do solar cells make electricity?

Activities:

- **Make a turbine (generated by water)**

Supplies:

1. A quart milk carton
2. String
3. A nail
4. Water in another larger container
5. Masking tape

Steps:

1.)

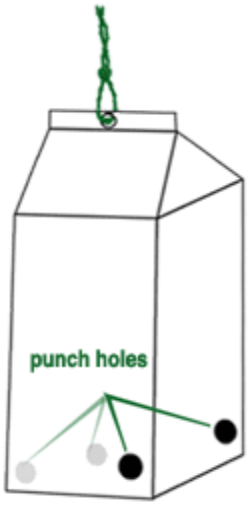
Using the nail, punch a hole in the bottom right corner of each side of the milk carton.

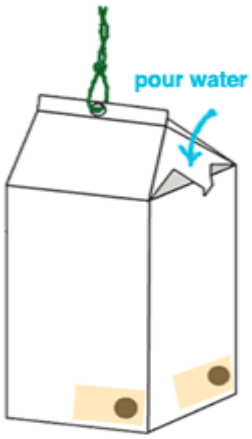
Punch another hole exactly in the middle of the top section of the carton

2.)

Push the string through the top hole of the carton and tie securely so the carton will hang from the string.

Tape up each hole with masking tape.





3.) Go outside and hang the carton from a low tree branch or another place when the carton can hang freely and you won't mind if the ground gets wet underneath.

Fill the carton with water.

4.) Pull off the tape on one corner. Watch what happens.

Pull off the tape on two corners opposite each other. Watch what happens.

Pull off the tape on all corners and watch what happens.

Sir Issac Newton discovered the principle that for every action there is an equal and opposite reaction. This is called his Third Law. The water pours out of the small hole and its force pushes the carton in the opposite direction. This is what makes it turn. The more holes there are, the faster the carton turns.

This is similar to some turbines. Some turbines use water or steam that is forced a high speed through many small holes to turn a turbine around. The turbine is connected by a shaft to an electrical generator, which makes electricity when it is turned.

Activity #2

- **Solar heating**

Materials:

40 empty rinsed soda cans, 20 sheets of black construction paper, 20 sheets of white paper, 40 thermometers, clay and scotch tape.

1. Give each student two empty soda cans.
2. Put a thermometer inside each can.
3. Pack clay around the opening of the can sealing it.
4. Tape white paper around one can.
5. Tape black paper around the other can.
6. Leave the cans on their sides out on the playground.

- **Recording**

1. After experiment is complete, have students share their individual responses in a class forum.
2. Ask what the two temperatures generally showed (i.e. degrees).
3. Ask for explanations as to why they think the thermometer in the can covered with black paper had a higher temperature.
4. Students then write about their experiment results in a paragraph format including a hypothesis and a detailed result of the experiment.

Activity #3

❖ Energy Mobile

Materials:

Note cards, hangers, string, crayons, and 10 black markers

Procedure:

1. Have students complete a graphic organizer listing two kinds of energy and three sources of energy that create electricity.
2. On index cards (that have a hole punched in the top center) have students draw pictures of each item listed.
3. Then have them draw a picture of a sun on a separate index card.
4. Using permanent back markers, have students label their cards with one word per card. Examples of a wind mills, dams, coal burning, solar panels, etc.)
5. Hand out hangers with 5 evenly dispersed strings attached to them.
6. Students then attach their note cards to the strings tying them through the holes.
7. This step should be completed after school. Hang the mobiles from the spaces between the ceiling tiles in your classroom. Bend the hook part of the hanger to expedite securing the hangers to the ceiling.