

ENERGIZED

BIG IDEA 10: FORMS OF ENERGY

BENCHMARKS AND TASK ANALYSIS

SC.2.P.10.1 Discuss that people use electricity or other forms of energy to cook their food, cool or warm their homes, and power their cars.

The student:

- makes real world connections to how electricity and energy are used.

SC.2.N.1.1 Raise questions about the natural world, investigate them in teams through free exploration and systematic observations, and generate appropriate explanations based on those explorations.

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SC.2.N.1.5 Distinguish between empirical observation (what you see, hear, feel, smell, or taste) and ideas or inferences (what you think).

KEY QUESTION

How can we use the energy from the sun to cook?

TEACHER BACKGROUND INFORMATION

Energy comes in many different forms: (e.g., mechanical, energy of position and motion; electrical, energy of moving electrons; chemical, energy stored in chemical bonds; thermal, heat energy - the energy of moving and vibrating molecules; nuclear, energy contained in the nuclei of atoms; and radiant, energy that travels in waves like sunlight.

A solar oven can reach temperatures of 275 degrees, hot enough to cook food and to kill germs in water. A general rule for cooking in a solar oven is to get the food in early and don't worry about overcooking. Expect the cooking time to take about twice as long as conventional methods, and allow about one half hour to preheat.

MATERIALS

Per group

aluminum foil
scissors
thermometer
plastic wrap
glue
cardboard (pizza boxes works best for the design),
wooden sticks
food to cook (suggestions include heating marshmallow, making smores, or English muffin pizzas)
science notebook

SAFETY

With any activity involving heat use extreme caution when handling teacher supervision is needed at all times with this activity.

Oven mitts or tongs are suggested to retrieve the food items from the ovens.

Make sure food is thoroughly heated.

Grade 2, Big Idea 10

Orange County Public Schools June 2009



TEACHING TIPS

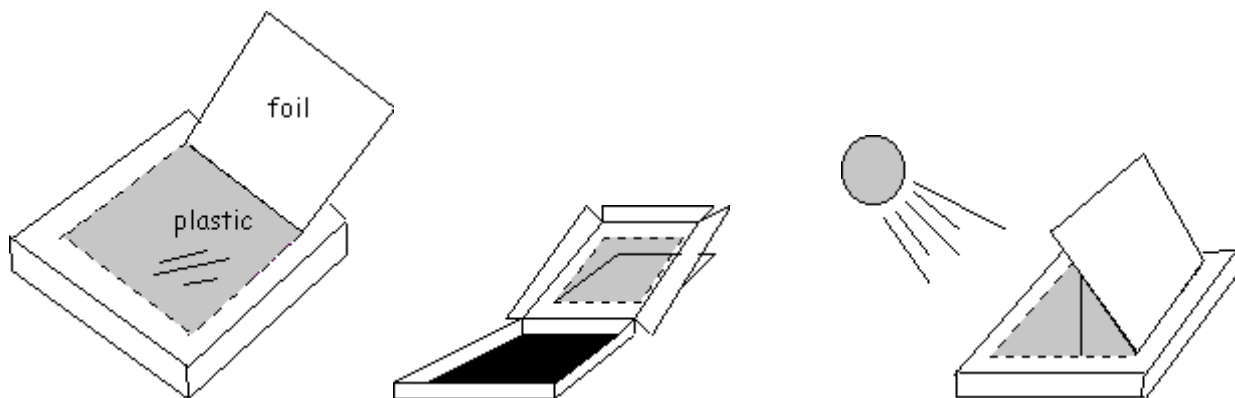
You may want to pre-make a solar oven for students to use as a model.

ENGAGE

1. Ask: *Where do we get energy from?* (electricity, sun, water, wind)
2. Introduce students to the vocabulary terms renewable energy and non-renewable energy. Create a tree map to classify energy forms as renewable and non-renewable.
3. Ask: *How do we use these different energy sources?*
4. Explain to students that there are different energy sources used for heating homes and cooking. Ask: *Do you know what type of energy source is used in your home?*
5. Discuss ways that students could conserve the energy that they use in their homes or at school. Ask: *Are there any alternative forms of energy that you could use in your house?*
6. Inform students that they are going to make their own solar ovens that will use the sun's energy to cook.

EXPLORE

1. Have students work in groups.
2. Give each pair of students some cardboard, aluminum foil, plastic wrap, scissors, glue, wooden sticks, thermometer.
3. Allow students ample time to complete their constructions. An example of a pizza box solar oven is offered below, but students can explore different construction styles to focus the sun light in the solar oven.
4. When all of the students have completed their creations, have them take the solar ovens outside.
5. Have students place the food items and thermometer in the oven. Leave the ovens outside (allow enough time for the food to heat up) and then return periodically during the day to check the temperature and status of the food.
6. Instruct students to record their observations and discoveries in their science notebooks.



EXPLAIN

1. Throughout the activity, ask questions such as:
What changes do you observe? How has the temperature changed?
2. Have students analyze their oven design and modify it for improved cooking.

EXTEND AND APPLY

Have students work in groups to design a solar water heater. Have students predict how hot they can get water in an aluminum can in 45 minutes by using their solar heater. Test predictions and have students share findings with the class.

ASSESSMENT

Have each pair of students shares their results with the class.

Have students examine why some oven designs were more effective than others.