



Solar Effectiveness

Overview

The students will investigate and compare the location of where solar panels are placed and the number of the solar panels.

Arizona State Standards

SC06 S3C2 PO2 Compare possible solutions to best address an identified need or problem.

Objectives

The student will investigate and compare the effectiveness of the number of solar panels and location of those panels.

Background Information

Can more solar energy be collected by increasing the size of the collectors? Typically the amount of solar energy that can be collected is based on the amount of sunlight that is available in a particular area. In central and southern Texas a solar collector with 60 to 80 square feet can provide hot water for the average family. In northern Texas more collector area is needed. One major problem with solar energy is that as it is spread out and very dilute. In order to collect a usable amount of energy, a large area must be exposed to the sun.

Before conducting the activity, ask students to predict the water temperatures they might find at the end of the experiment.

Materials

Small Pot Pie plate- Small Collector
Large Pie plate- Large Collector
Black paint (non-water soluble spray paint is easiest)
Thermometer
Measuring cup
Clear plastic food wrap
Newspapers, Styrofoam cups
Masking tape, water
Candle (teacher's discretion)
Table to record their observations





Procedures

Before conducting the activities, prepare the pie plates by painting their insides black.

1. Add a measured amount of water (100 ml or 1 cup) to each pie plate.
2. Record the temperature of the water in each plate.
3. Wrap plastic tightly around the top of the pie plate, and tape the plastic securely.
4. Place each pie plate on a newspaper in the sun for 10 minutes.
5. Now pour the water into Styrofoam cups and measure the temperatures. Record the temperatures on the table.

	Temperature	
	Before	After
Large Collector		
Small Collector		

6. Gather the entire class' data to improve the reliability of the information.

Have the students answer the following questions with a partner in their science journals.

1. Why paint the plates black?
2. Why use plastic wrap?
3. Why use newspapers?
4. Why pour the water into cups before taking the temperature?
5. Which plate had the hotter water?
6. How can this information help you design a solar collector?
7. Is solar energy free?
8. Using the materials in this experiment, can they design a better collector?
9. Do bigger solar collectors collect more energy than smaller collectors?

As a final wrap have the students work in pairs to create a design that would increase the amount of heat given off by the solar collectors.