



SOLAR ENERGY FOR THE CLASSROOM



Provided by Pierce Cedar Creek Institute
www.cedarcreekinstitute.org

Activity Overview

Grade Level: 6-8

General Description

Students will collect solar energy on different sizes of solar collectors to determine how surface area affects the solar energy potential of a PV system.

Learning Outcome

Students will demonstrate an understanding of why surface area of the solar collector affects the PV system's performance.

Science Content Standards

Content Area: Constructing New Scientific Knowledge (C) I.1.1

Standard: All students will generate scientific questions about the world based on observation.

Content Area: Constructing New Scientific Knowledge (C) I.1.2

Standard: All students will design and conduct scientific investigations.

Content Area: Constructing New Scientific Knowledge (C) I.1.3

Standard: All students will use tools and equipment appropriate to scientific investigations.

Content Area: Waves and Vibrations (PWV) IV.4.4

Standard: All students will describe ways in which light interacts with matter

Content Area: Changes in Matter (PCM) IV.2.4

Standard: All students describe common energy transformations in every day situations.

The Effect of PV Size on Solar Energy Potential

Background

A solar panel is a collection of solar cells. Although each solar cell provides a relatively small amount of power, many solar cells spread over a large area can provide enough power to be useful. Solar panels need to have a lot of surface area that can be pointed towards the sun. More exposed surface area means more electricity can be converted from light energy from the sun.

Materials

- Large disposable pie plate (per student work group)
- Small disposable pie plate (per student work group)
- Black paint
- 2 thermometers (per student work group)
- Metric measuring cup (per student work group)
- Clear plastic food wrap
- Newspapers
- 2 styrofoam cups (per student work group)
- Masking tape
- Water



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Methods

1. Paint both pie plates black.
2. When the paint dries, add 100 ml of water to each pie plate.
3. Record the temperature of the water in each plate.
4. Wrap plastic tightly over them.
5. Tape the plastic securely.
6. Place each on a stack of newspapers in the sun for 10 minutes.
7. Pour the water into Styrofoam cups and measure the temperatures, recording the temperatures below.

| Temperature (in degrees Celsius) | | | |
|----------------------------------|-------|-------|-------|
| Before | | After | |
| Large | Small | Large | Small |
| | | | |

Discussion/Assessment

- Using the information collected during this activity, have students determine which plate collected the greatest amount of solar energy (which plate got hotter).
- Have students discuss how the surface area of a solar collector affects a PV system's performance.
- Have students discuss how these concepts would be applied when designing a solar energy system.

Source: This activity was adapted from a *Solar Energy Research and Education Foundation-SEREF* activity.