Shocking Solar

Objectives

Understand how photovoltaic panels work.
Understand how to optimize solar panel efficiency.
Work with series and parallel circuits.

Skill Level: Middle school or high school.	**Prep time:** Minimal **Class time:** Multiple class periods

Materials

See activities materials listed in the link below. Each of the activities below requires one small photovoltaic panel and multi-meter per group. See the materials lists for additional materials.

Background Information

Solar panels have become much more popular in recent years. A decrease in panel costs and the availability of incentives to install panels has created a boom in panel installations. Installing a solar panel is not as easy as bolting it onto a roof. A solar engineer needs to account for the building orientation, latitude, temperature, and other factors to optimize the installation.

This set of activities guides students through a series of investigations that help them determine the

factors that lead to the most efficient installation. See the unit plan Photovoltaic Efficiency for additional background information about solar power as a renewable source.

Engage

Ask students to think about the rooftop of their school. If they were asked to install solar panels, where would they install them? What would ensure that they produced the most electricity?

Explore

Experiment Questions:
What factors affect photovoltaic panel efficiency?

Procedure:

Have students complete the following activities with the photovoltaic panel (advanced):

1) Solar Angles and Tracking Systems lesson with A New Angle on Photovoltaic Efficiency Activity

2) The Temperature Effect lesson with Ice, Ice, PV Activity

3) Concentrating Solar Power lesson with Concentrating the Sun with Photovoltaics Activity

Explain

What factors affected photovoltaic efficiency? What types of designs could optimize these factors?

Elaborate

Given the results of the above activities, ask students to design a solar panel system that maximized energy output. Can all of the factors be used at the same time to improve efficiency?

Resources

Resources Used:

Teach Engineering. One of the best K12 engineering education web sites with lots of unit and lesson plans.