



Watts On Your Mind?

Solar energy educational activities for schools

Activity Overview

Grade Level: 6-8

Activity: M-7

General Description

Students will construct a simple photovoltaic system using a solar cell, motor and a small load, such as a small fan. The teacher will discuss appropriate safety issues, and describe what a solar cell is and how it works. The teacher should explain how to connect the wires from the cell to the motor while demonstrating how to attach the propeller to the motor.

Learning Outcome

Students will learn how a PV cell generates electricity in order to make a photovoltaic system.

Subjects

Science

Process Skills

Observation, measurement, working in teams, and system integration

Duration

60 minutes

Key Vocabulary

Load, orientation, photovoltaic (PV), electricity, solar electricity

Curriculum Standards

Texas (TEKS):

112.22.b.6.8, 112.23.b.7.8, 112.24.b.8.10

Louisiana (LSCS):

PS-M-C2, PS-M-C3, PS-M-C6

Arkansas (ASCF):

3.1.20, 3.1.25

National (AAAS Project 2016):

The Physical Setting – 8th,

The Designed World – 8th

Photovoltaic Energy Systems

Materials

- photovoltaic cells (PV cells)
- propellers
- data sheets
- motors

Method

1. Attach propeller to motor.
2. Attach red wire from motor to red wire on PV cell.
3. Attach black wire from motor to black wire on PV cell.
4. Place solar energy system in sunlight.

Background

Photovoltaic or solar cells are made of silicon (sand). The silicon is heated to extreme temperatures. It is doped with chemicals, usually boron and phosphorous. This sets up an unstable environment within the solar cell. When light strikes the cell, electrons are dislodged and travel along wires placed within the cell. The electrons follow the wire and power whatever load is attached, such as a motor or light. This flow of electrons is electricity.

Photovoltaic cells or solar cells use light to produce electricity. Solar electricity is quiet, clean and non-polluting.



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Discussion/Questions

1. What happened when the solar panel is turned over away from the light?

2. Observe the rotation of the propeller blades. Which way are they turning?

3. What happens to the propeller when the wires are attached red to black?

4. Does the angle of the cell in relation to the sun make a difference in how fast the propeller turns?

5. What would happen if several cells were hooked together?

Assessment

Based on your understanding of the propeller photovoltaic system, design a small, low-voltage toy that could be operating using the same PV cells.