



Solar Cell Discovery

Subject: This lesson explores the basic properties and uses of a solar panel.

Grade Levels: 4–8

Lesson length: 45 minutes

Authors: Tiffany Rowlands, Brian Tracy

The solar panel is becoming an increasingly popular form of alternative energy around the world. Why you may ask? Simply put, solar power makes sense- it's abundant, and nearly free to use. The majority of our global population lives within 24 degrees of the Equator, making solar-harnessing opportunities plentiful and the mass production of solar energy possible. This is especially important for developing countries where approximately 1.3 billion people lack access to electricity. In this lesson, participants use a fan motor and solar panel to make measurements in different directions and angles. (North, flat; North, perpendicular; North, 45 degrees, South, flat, etc.).

Objectives

- ➔ *Students will learn which angle they should set their solar panel to obtain the maximum voltage as well as types of energy used.*

Materials

- Solar cell (suggested 1V, 400 mA)
- Hobby motor with fan blades (suggested 1.5 to 3.0 Vdc, at 330 mA)

- Multimeter
- Alligator clips
- Worksheet
- Red and black pen or pencil
- Pencil

Instructions

Using the materials provided, connect the solar panel to the fan motor using the alligator clips (colored wire clips). Once the motor begins to run, complete the questions below.

- 1) Draw your design that shows how the items you used are connected. On your design, label each item and the color of the wires.
- 2) On the diagram that you drew above, identify where each of the following forms of energy is present:
 Light Mechanical Electrical Chemical Heat
- 3) Where does the energy that powers the fan motor come from?

We will go outside and take measurements and observations. You will place the solar panel in various directions: North, South, East, West, NW, SW, etc. After you place the panel in different directions and angles write down the motion of the fan, as well as the reading from the multimeter.

	0° 	45° 	90° 	Additional angles (35°)
North				
South				
East				
West				
Additional direction (Southwest)				

- 4) How long do you predict the motor will remain running, if left as you have it connected? Explain why you think so.
- 5) What was the angle in which your panel was facing at which the fan spun the fastest? What was the reading of your multimeter at that angle?
- 6) If you were to hang a panel on your home, where and which direction would you hang it? Why?

- 7) If you were to reverse the wires (alligator clips), what do you predict will happen and why?
- 8) Test your prediction
- 9) What were your results?

Work with a partner(s), combine your clips and use more than one solar panel to power a fan.

- 10) What do you notice about the fan's speed?
- 11) What type of circuit did you make? How do you know?