

**SECTION 2 ACTIVITIES**

**Activity 6: Solar Circuits**

**ACTIVITY TYPE:** Science-Kit Lab

**OVERVIEW:** Students are introduced to solar energy.

**GOAL:** Students are introduced to solar-electric (or photovoltaic [PV]) cells and learn how solar energy can be converted to mechanical energy.

**SUBJECTS:** Math and Science

**TIME:** 1-2 hours

**SETTING:** Outside on a sunny day.

**MATERIALS:** The following materials are included in your science kit: photovoltaic (PV) cells, propellers, motors, sound boards, LED light bulbs, and pumps.

**KEY VOCABULARY:** Circuit, electricity, energy, photovoltaic cell, renewable resource, solar energy, solar radiation, and sun.

CORRELATIONS TO STANDARDS	
NATIONAL	<p><b>Science as Inquiry – 1:</b> Abilities necessary to do scientific inquiry.</p> <p><b>2:</b> Understandings about scientific inquiry and using tools to measure results.</p> <p><b>Science and Technology – 1:</b> Understandings about science and technology.</p>
IDAHO	<p><b>Science – Goal 1.2:</b> Understand concepts and processes of evidence, models, and explanations.</p>
OREGON	<p><b>Grade 5 Science – Energy:</b> Identify forms of various types of energy and their effects on matter. Describe energy transfer.</p> <p><b>Grade 3 Science – Energy:</b> Identify common types and uses for energy</p>
WASHINGTON	<p><b>Science – Application 3.1 Designing Solutions:</b> Apply knowledge and skills of science and technology to design solutions to human problems.</p>

**ABOUT THE AUTHORS:** Founded in 1998, Bonneville Environmental Foundation (BEF) is essentially a non-profit business. Through the sales and marketing of green power products (known as carbon offsets) BEF gives individuals and businesses a way to participate in solving our most pressing environmental issues. All of the net revenues, or “profits,” that the organization makes are reinvested in projects that restore damaged watersheds and support the development and understanding of renewable energy technologies such as solar, wind, and biomass.

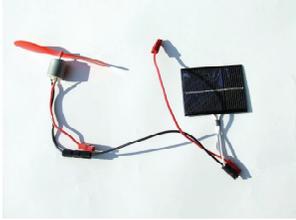


## \* ACTIVITY 6: SOLAR CIRCUITS

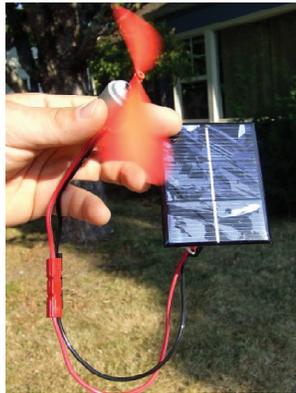
source: Bonneville Environmental Foundation (BEF)

### Solar Circuits

#### ANSWER KEY



Connect the quick disconnects by plugging the red wires together and the black wires together. If your set of PV cells does not have quick disconnects, use the alligator clips provided in the set to clip the wires together in the same fashion.



The fan is in motion with the positive wires (red) connected together and the negative (black) connected together. Connecting the wires red to black will cause the fan to spin in the opposite direction.

#### Questions

1. What happens when the solar panel is turned away from the light?  
**The speed of the fan slows and stops if the sunlight is blocked completely from the PV cell.**
2. Observe the rotation of the propeller blades. Which way are they turning?  
**When the red wire is connected to the red wire and the black to the black, the fan spins in a clockwise direction.**
3. What happens to the propeller when the wires are attached to the opposite poles?  
**The fan will spin in the opposite direction.**
4. Does the angle of the cell in relation to the sun make a difference in how fast the propeller turns?  
**The propeller spins slower when it is angled away from the sun.**
5. What would happen if several cells were hooked together? How would you do that?  
**The motor will spin faster. The wires can be hooked together by connecting them red to red and black to black.**
6. What happens if you hook up the sound board? Now try an LED bulb.  
**The sounds out of the circuit board will bend if the cell is tilted away from the sun. The LED will light brighter when faced towards the light.**

