

ACTIVITIES

Student Activities *continued*

8 Once groups are done measuring at each station, the teacher should offer the following formula to be used to calculate which combination could produce the most electricity:

$$V \times I = \text{power of the cell} \\ (\text{Volts} \times \text{amps})$$

Students should work this equation for each station they visited, on their notebook paper.

9 Based on their observations, students should write positives and negatives about solar energy.

(Hint, what resource does this use? How powerful is the sun? How dangerous is the use of this power?)

ASSESSMENT

For Student Assessment, use:

- Group participation,
- Notebook papers,
- and summaries.



TEACHERS GUIDE



SOLAR CELL
ITEM # 1000- SERIES

ENERGY - ELECTRICITY

These solar cells are used to power small motors and other devices which draw small amounts of current. Can be used individually or connected for more voltage or parallel for more current.

- How does light create electricity?
- What tasks can be made easier if one is able to use light to make electricity?

Materials

- Several solar cells
 - 2 leads with alligator clips per cell
 - enough Led lights for each cell
 - 1 lamp with a 150W bulb, 1 lamp w/100W bulb, 1 w/75W bulb, 1w/60W bulb, and a nightlight,
 - Voltmeter and an ammeter per station.
- (These lamps should be set up in numbered stations around the room.)

Goals & Objectives

Students will:

- state that energy is constant, and can be converted from various forms to electricity.
- hook up solar cells under various conditions or light sources to mimic various levels of sunlight.
- calculate the power of the cell in each of the lighting conditions.
- synthesize observations to be able to express positives and negatives about solar power.

DISCUSSION

Enrichment Activities

- 1 Groups could use the Internet to read and summarize articles about where solar energy is being used, what dangers or difficulties it presents, and why this kind of energy is attractive.



ACTIVITIES

- 1 Split students into as many groups as you have cells for, 1 cell per group.
- 2 Tell students that energy always exists, from several sources. Electricity can be converted from these sources, making electricity a secondary source of power.
- 3 One way to harness energy and convert it to electricity is to use a photovoltaic cell. This is a device that absorbs and then channels energy from that light (usually the sun, but other bright lights can work) into wires that send the electricity to the item needing power.
- 6 The teacher should then demonstrate how to hook up a voltmeter and after that an ammeter to measure the amount of power available and the amount of current flowing, respectively. (Voltage is the energy potential, like water pressure, while current is like the flow rate of water past a certain point.) Tell students to take these measurements at each station, and write their answers down on notebook paper next to the number that represents the station. Use the instructions that came with your meters to be sure you are in the correct range, on DC voltages, etc. Supervise students carefully as they measure!

Turn off the classroom lights.

- 4 Using one group's cell, demonstrate how to hook the cell to an item you wish to the Led light. Place the cell directly under the 150W lamp at that station and allow students to look, then do the same under the nightlight. Students should note that the display is brighter under the brighter bulb.
- 5 Ask for volunteers to explain the difference in the LED's performance. (The more light the cell brings in, the more electricity it can produce, which increases voltage.)

Note

It is always best to DO an experiment ahead of time to be able to best present it to the class.



- 7 Next, each group should be given 2 leads and a solar cell. They are to go to each, hook up the solar cell to first one meter and then the other, while the cell is directly under the lamp. Write their findings.

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