Effect of Amount of Light & Wavelength on Solar Cells

Solar cells, also called photovoltaic or PV cells, change sunlight directly to electricity. When sunlight strikes the solar cell, electrons are knocked loose. They move toward the treated front surface. An electron imbalance is created between the front and back. When the two surfaces are joined a current of electricity travels between the negative and positive sides.

What you will need:

- Commercially available solar cell with attached electric motor.
- Plastic wheel or disc to attach to motor
- 15 cm diameter cardboard circle
- Stopwatch
- 1 sheet of black paper and several sheets of coloured transparency film in a variety of colours

What you need to do:

1. Attach the motor to the solar cells as described in the pack instruction.

2. Attach the plastic wheel or disc to the motor by gently pushing the wheel onto the shaft of the motor. Be careful not to break the wires.

3. Glue a 15 cm diameter cardboard circle on the face of the wheel, making sure it is carefully centred.

4. Mark a small dot on the edge of the cardboard wheel. This dot will be used as a frame of reference to measure the speed that the wheel is spinning.

5. Place the solar cell, motor, and wheel in bright sunlight. Observe the spinning motion. (If the motor does not spin the wheel, check the wire connections.)

6. Using the stopwatch and watching the dot, count the number of spins in 15 seconds. Multiply this number by 4 to obtain the number of spins per minute. Record the spinning.

7. Shade half of the solar cell with the black construction paper and repeat the experiment recording your results. Repeat the experiment shading different areas and amounts of the solar cell, recording the results and the amount of shading at each stage.

8. Cover the solar cell with a piece of different coloured transparency film and repeat the experiment carefully recording the results.

Consider these questions:

- How did the spinning motion change when you covered part of the solar cell?

- What effect did covering the cells with coloured fillm have?

- Which colours slowed the spinning the most?

- Which colours slowed the spinning the least?

Shading or Colours	Number of Spins in 15 seconds	Number of Spins in 1 minute
Full Sunlight		
Half Sunlight		
Third Sunlight		
Quarter Sunlight		
No Sunlight		
Red		
Yellow		
Blue		
Green		
Black		