**Vernier Labquest Extension Investigation 3**

**Grade:** 6 **Kit**: SEPUP Issues & Earth: The Earth in Space **Activity**: 77

**Title of Investigation:** Explaining the Seasons

**Guiding Question**: Why does the tilt of Earth lead to different surface temperatures?

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**Summary of Activity:** Students continue to explore the effect of Earth’s tilt in determining the seasons. Two teacher demonstrations show that light is more concentrated or less spread out, when it strikes a surface at a 90° angle than at any other angle. Using a photovoltaic cell, students explore how the angle of the sunlight striking it affects the amount of solar energy the cell absorbs.

**Possible Extension:** If you were going to install solar panels on your home, would you take into consideration the angle of placement of the panels based upon what you learned today? Would you change the angle of the panels in different seasons?

**Science Standards**:

* + 1. Demonstrate that the seasons in both hemispheres are the result of the inclination of the earth on its axis, which causes changes in sunlight intensity and length of day.

**Equipment used**:

1 solar cell

1 electric motor with flag on axle

2 wire leads with alligator clips (one red and one black)

Vernier Voltage probe

Labquest

**Description of Procedures, notes:**

 Connect the solar cell to the electric motor using diagram. Attach the voltage probe to the metal clips. Hold the solar cell so it directly faces the Sun (see Position A). Gradually tilt the solar cell so that it still gets sunlight but does not directly face the Sun (Position B). Tilt the solar cell back to directly face the Sun. Keeping it directly facing the Sun, move it closer to and farther from the Sun. Describe what happens to the speed of the motor and the reading on the voltage probe.

Position A Position B

Sun Sun

 [See full size image](http://i00.i.aliimg.com/photo/v0/252933752/Solar_cell_panel.summ.jpg)

**Scientific Questions:**

When you tilt the solar cell from position A to Position B, what effect did it have on the speed of the motor attached to the solar cell? What effect did it have on the reading on the voltage probe?

What does this tell you about the amount of the Sun’s energy transferred to the solar cell in the two different positions? Why is the northern hemisphere warmer when it is tilted toward the Sun?