

Angled Light Investigation

Standards Addressed:

Develop and use a model of the Sun-Earth-Moon system to describe the cyclic patterns of lunar phases, eclipses of the Sun and Moon, and seasons. Examples of models could be physical, graphical, or conceptual. (ESS1.A, ESS1.B)

Plan and carry out an investigation to determine the relationship between temperature, the amount of heat transferred, and the change of average particle motion in various types or amounts of matter. Emphasize recording and evaluating data, and communicating the results of the investigation. (PS3.A)

You can also easily add graphing into this activity.

Background: Students often struggle to understand that the angle of light, effects the amount of light reaching the Earth. While the sun stays stationary, Earth is tilted about 23.5 degrees. In the summer, the Northern hemisphere is tilted towards the sun, resulting in direct energy hitting the Earth. This direct energy, combined with longer days, explains why it's hotter in the summer. By contrast, in winter, the Northern hemisphere is tilted away from the sun resulting in indirect light. This angled light results in less energy and combined with the shorter daytime hours, results in cooler temperatures.

This is a tricky concept to model. By using the Solar Science Stations, students should hopefully be able to put a number to this concept. For example, at noon, in August, at 90 degrees I have the highest energy reading, versus 45 degrees.

This activity can be expanded and done once a month, hopefully in the same spot and then graphed. How does the 90 degree angle output change from August to December. Hopefully students will see that we are no longer changing the degree on the box, so therefore it is the sun that is actually lower in the sky.

Question: How does the angle of light effect the amount of energy produced?

Hypothesis: Light entering the solar box through _____ degrees will result in the highest reading on the volt meter.

Materials:
Solar Science Stations
Thermometer

Sunlight

Procedures:

Take measurements at the same place using the following angles once a month.

Date	Time	0°	45 °	90°	135°	180°	Temp.

Conclusion:

1. How did the angle of light, effect the amount of energy produced?

2. How did the month you recorded temperatures effect the energy out put?
