

Sunny Rays and Angles

Name _____

Problem: How does the angle of a light source affect the rate at which the temperature of a surface changes?

Materials

Books	scissors
watch or clock	100-W incandescent lamp
black construction paper	graph paper
ruler	3 thermometers or temperature probes
pencil	tape
protractor	

Procedure

1. Cut a strip of black construction paper 5 cm by 10 cm. Fold the paper in half and tape two sides to form a pocket. **(Already completed for you)**
2. Place the bulb of a thermometer inside each pocket.
3. Place the pockets with thermometers close together as shown in your textbook. Place one thermometer in a vertical position (90° angle), one at a 45° angle, and the third one in a horizontal position (0° angle). Use a protractor to measure the angles. Support the thermometers with books.
4. Position the lamp so that it is 30 cm from each of the thermometer bulbs. Make sure the lamp will not move during the activity.
5. **Before turning on the light!** In the data table, record the temperature on all three thermometers. (All three temperatures should be the same.)
6. Switch on the lamp. In the data table, record the temperature on each thermometer every minute for 15 minutes. **CAUTION:** *Be careful not to touch the hot lampshade or lightbulb.*
7. After 15 minutes, switch off the lamp.

reserved.

Data Table:

Time (min)	Temperature °C		
	0° angle	45° angle	90° angle
Start 0 minutes			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Sunny Rays and angles Lab- Analyze and Conclude

Write an answer for each question.

1. **Controlling Variables** In this experiment, what was the independent variable? _____

What was the dependent variable?

2. **Graphing** Graph your data. Label the horizontal axis and vertical axis of

your graph, as shown in the sample graph in your textbook. Use solid, dashed, and dotted lines to show the results from each thermometer, as shown in the key in your textbook.

3. According to your data, at which angle did the temperature increase most?

4. At which angle did the temperature increase least?

5 What part of Earth's surface does each thermometer represent? (look at your notes from class)

6. **Drawing Conclusions** How does this experiment explain the seasons on Earth?
