

Name _____

Due Date _____

Partners _____

ANGLE OF INSOLATION

Objective: In this lab, we investigate how the angle of the Sun in the sky, or the "angle of insolation," affects the intensity of insolation and the temperature of the surface of the Earth. The angle of insolation, from 0° at the horizon to 90° directly overhead (zenith), has a direct effect on the intensity of insolation. This, in turn, directly affects the surface temperature. The three major factors which affect the angle of insolation are 1. Latitude, 2. Season, and 3. Time of day.

VOCABULARY:

insolation:

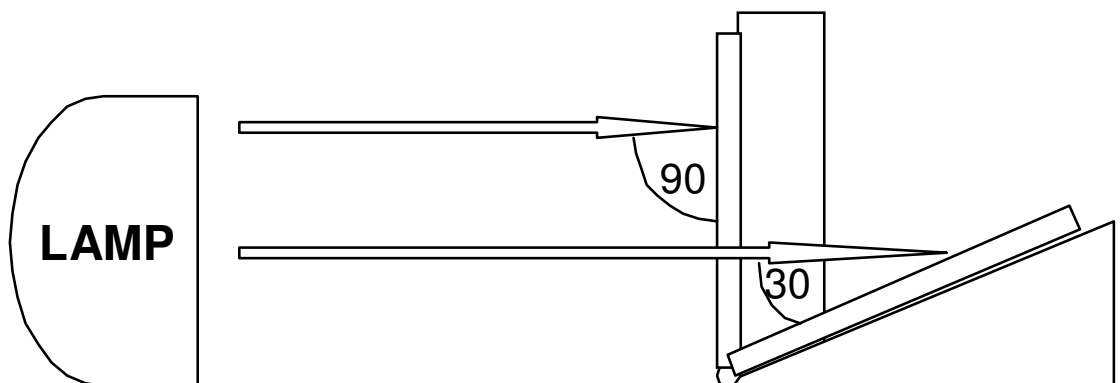
angle of insolation:

intensity:

PROCEDURE:

1. Calibrate your thermometers.
2. Secure the lamp to the ringstand with the light bulb shining straight down toward the lab table.
3. Place one thermometer on each of three supports that will hold them at 30° , 60° and 90° angles to the light rays.
4. The bulbs of the thermometers must:
 - a) all be at the same level
 - b) all be directly under the heat lamps.
5. Take a temperature reading before turning on the heat lamp and enter it under Time 0 on the Report Sheet.
6. Turn on the lamp and record the temperatures every minute for the next 15 minutes.
7. Plot your data on the graph using the same axes for all three curves. Place time on the horizontal axis. Use a different color for each curve and provide a key.

**DON'T LET
THE
TEMPERA-
TURE RISE
 $\geq 45^{\circ}$!
(TURN LAMP
OFF)**



REPORT SHEET

30°	Time	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Temperature (°C)																

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

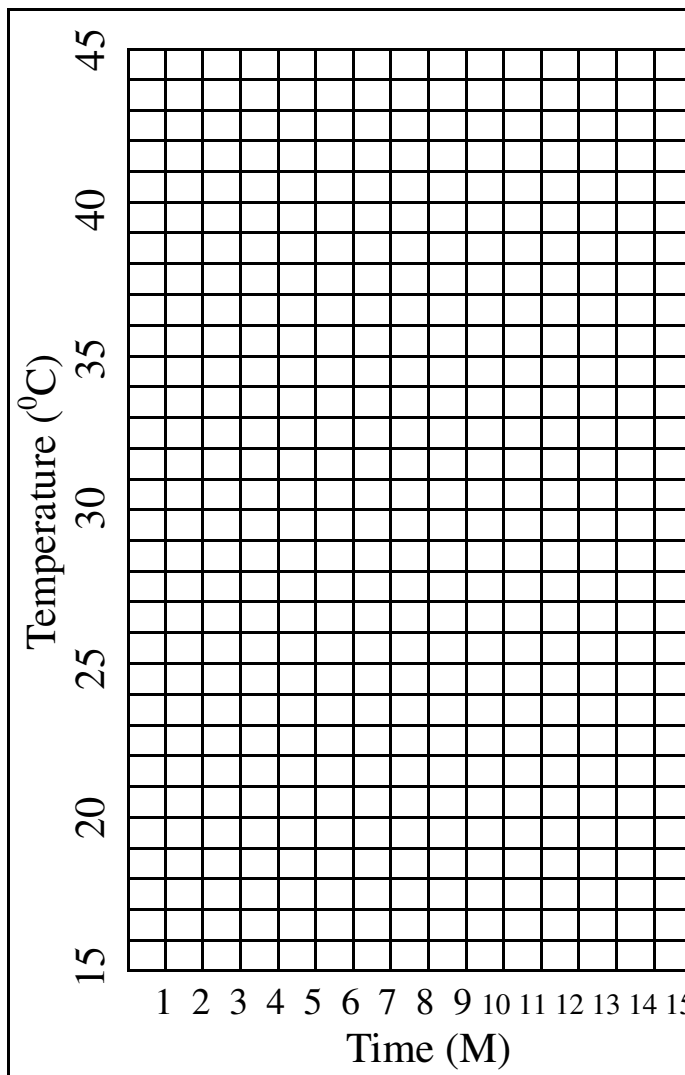
QUESTIONS:

1. The _____ thermometer received the most direct (vertical) rays, so its temperature was _____ than the others.

2. The _____ thermometer received the least direct rays, so its temperature was _____ than the others.

3. The angle of insolation tends to be highest at _____ latitudes, and lowest at _____ latitudes, so high latitudes tend to have _____ temperatures.

4. From the winter solstice (Dec. 21) to the summer solstice (Jun. 21) in NYS, the angle of insolation _____.



CONCLUSION: What is the relationship between the angle of insolation, the intensity of insolation, and the Earth's surface temperature?