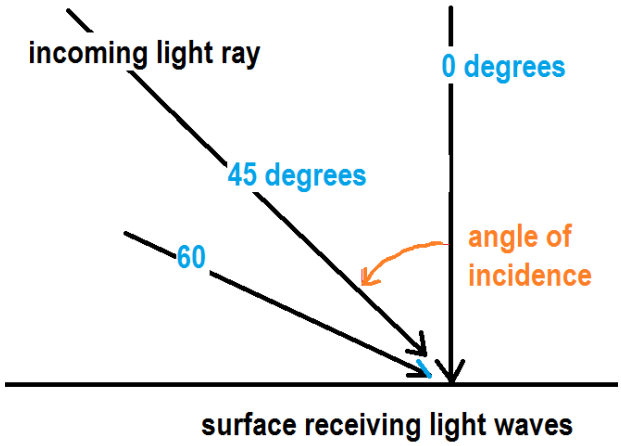
SUN WAVE ANGLES & ENERGY TRANSFER /25



NAME _____ HR__

SCIENTIFIC QUESTION:

How does the angle of incidence of the sun affect the heat energy in the hydrosphere, geosphere, and atmosphere?

HYPOTHESIS : *I think* _____

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PART 1

PROCEDURE:

1. Place a piece of graph paper on a clipboard and hold it standing up.
2. Set up a flashlight 10 cm away from the center of your graph paper.
3. Draw a faint circle around the area receiving the electromagnetic waves
4. Count the cm2 and record here _____
5. Keeping the flashlight in the exact same position, tilt your clipboard backward about 45 degrees. Make sure that the distance from the flashlight to the center of the graph paper is still 10 cm.
6. Draw a faint circle around the area receiving the electromagnetic waves
7. Count the cm2 and record here _____

ANALYSIS:

1. What did you notice about the area covered by the light rays from the first setup to the second set up?

2. In which setup is the light more concentrated?

3. When the light is less concentrated, what could you say about the overall amount of energy falling on each square of surface energy?

4. If the sun were hitting the earth straight on, what could you say about the amount of heat it can deliver?

5. If the sun were hitting the earth at an angle, what could you say about the amount of heat it can deliver?

PART 2

CAUTION!! The solar panels are expensive and fragile. Do not get them too close to the light because it can melt the circuits, rendering them useless.

PROCEDURE:

1. Connect a solar panel to a volt meter using the black and red wires. Plug the black wire into the "COM" and red wire into the "VΩ" holes in the bottom right of the voltmeter.
2. Connect the other end of the wires to the solar panel using alligator clips. Make sure you clip to the left and the right of the same solar panel (there are 2 panels on each device). Red wire to '+' and Black wire to '-'
3. Place the solar panel directly over the globe's equator (0 degrees latitude)
4. Place your light source 1.5 ft away from the globe. You may need to prop it up on a couple of books to get it pointed straight at the equator.
5. The panel should be directly facing the light (perpendicular).
6. Set the voltmeter to DCV 2 and take a reading. Record in the chart below.
7. Now move the panel to 15 degrees N and repeat # 4,5,6
8. Do the same for 30 degrees N, 45, 60, and 90 (north pole)

	0	15 N	30N	45N	60N	90N
AMOUNT OF LIGHT RECEIVED						

ANALYSIS:

1. **HOW** did the light's intensity change as you moved north?

2. **WHY** did the light's intensity change as you moved north? (hint: concentration)

3. Is the sun heating the atmosphere, hydrosphere, and geosphere evenly?

4. Where is the atmosphere, hydrosphere, and geosphere heated most intensely?

5. What happens to the atmosphere at 0 degrees latitude?

6. What happens to the atmosphere at 90 degrees latitude?

7. What happens to the hydrosphere at 0 degrees latitude?

8. What happens to the hydrosphere at 90 degrees latitude?

9. If the sun COULD heat everything evenly, what would the consequence be?

CONCLUSION:

10. Answer the scientific question at the start of this lab. A good **argument** is a statement of fact backed up by **evidence**. Be sure to include data from this lab as your evidence (2pts)

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