

Name: _____

Earth Science

Lab 18: Absorption and Radiation of Land and Water

Date: _____

Introduction: Approximately 70% of the earth's surface is covered in water. The unequal rates of the heating of land and water cause temperature conditions which significantly affect local and world-wide weather patterns.

Objective: You will be able to describe the comparative rates at which water and land surfaces heat and cool.

Vocabulary:

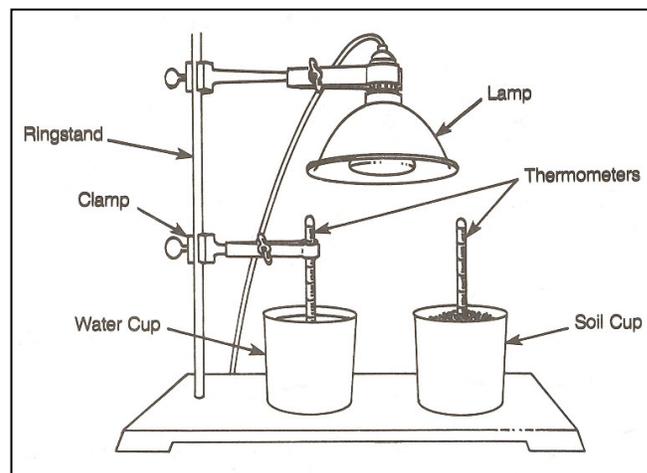
Specific Heat - _____

Radiative balance - _____

Heat Equator - _____

Procedures:

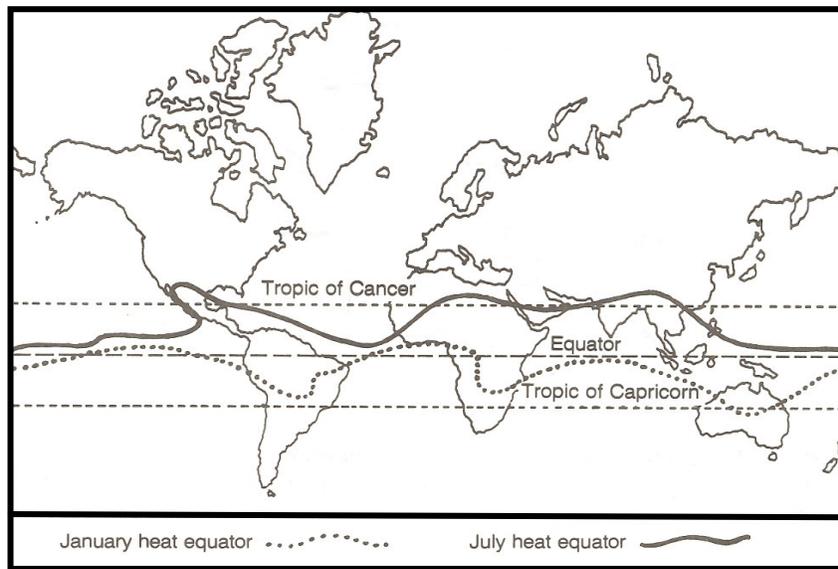
1. Make sure you have the following at your lab station; a beaker of water, a beaker of dirt, two thermometers, and a light source. If not, get the need equipment form your teacher.
2. Place a thermometer in each cup making sure that the bulb is just below the surface of the cup's content.
3. Allow the thermometer time to adjust to the contents of the beakers. Once the temperature has stopped changing, record this temperature in your chart for time 0.
4. Place the two beakers under the heat lamp and adjust the lamp so that both beakers will receive equal energy.
5. Turn on the heat lamp, and record the temperature of each beaker every minute for ten minutes.
6. At the end of 10 minutes, turn the heat lamp off, and **TURN THE LAMP AWAY** from your beakers.
7. Continue reading and recording the temperatures of both beakers every minute for another 10 minutes.
8. Plot a graph showing both sets of date on one set of axes. Set your graph up appropriately.



Discussion Questions:

1. How did the heat energy received by the beaker of soil compare to the heat energy received by the beaker of water? _____
2. Which beaker heated more rapidly? _____
3. Which beaker cooled more rapidly? _____
4. Which material is a better absorber and radiator of heat energy? _____
5. Which material has the highest specific heat? _____
6. By 3:00 p.m. on a summer day, would air be cooler over ocean water or nearby land? _____
7. Referring to question 6, how would the density of the air over the ocean compare to the density of air over the nearby land? _____

The Earth's Heat Equators



8. Why does the heat equator for January bend farther into the Southern Hemisphere over the continents of South America and Africa than it bends over the ocean areas? _____

9. Why does the heat equator mover farther north in July than it moves south in January? _____

10. How do water and land surfaces differ in their abilities to absorb and radiate heat energy? _____
