**Absorption and Radiation of Heat by Land and Water**

**Problem:** Does the composition of a material influence the rate of heat absorption and radiation?

**Information:** You have already seen how the color of an object can affect the rate at which the sun’s energy is reflected or absorbed. A second factor to be considered is the material of which something is composed. In general, the earth is largely land or water. In this lab you will investigate whether the composition of a material influences the rate of heat absorption and/or radiation.

In this lab a lamp will represent the sun as a source of radiation energy.

* **Absorption:** the receiving of energy; results in an increase in temperature.
* **Radiation**: the giving of energy; results in a decrease in temperature.
* **Equilibrium**: rate of radiation equals the rate of absorption; results in no net temperature change.

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**Materials:**  cups, different materials: dirt, sand and water, thermometers, heat lamp

**Procedure:** (Create and write your own, detailed specific procedure here)

1.

**Results:**

**1. Data Table A.** Create a chart to record your group’s quantitative data (numbers or measurements). Title your chart, Absorption and Radiation of Heat (Land vs. Water)

**Absorption and Radiation of Heat (Land vs. Water)**

**2. Graph A.** Create a line graph showing your results. Time (the independent variable) should be placed on the X-axis (horizontal) and temperature (the dependent variable) should be placed on the Y-axis (vertical).

**Analysis & Conclusion:**

1. Which material (water, sand or dirt) **absorbed** the heat the fastest? Explain how your graph verifies this answer.

2. Which material (water, sand or dirt) **radiated** the heat the fastest? Explain how your graph verifies this answer.

3. Which material **absorbed** the heat the slowest? Explain how your graph verifies this answer.

4. Which material **radiated** the heat the slowest? Explain how your graph verifies this answer.

5. Which material (water, sand or dirt) would be best for storing heat energy? Why?

6. From this experiment, what relationship can you hypothesize between rate of absorption and the rate of radiation?  **(To answer this question, finish the following statements)**

**a.** Materials that absorb heat quickly, radiate heat… \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**b.** Materials that absorb heat slowly, radiate heat…

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