

## Core Lab: Heat Absorption and Radiation of Water and Soil

### Unit 2: Weather Dynamics

In this investigation, you will set up the materials listed below to investigate heat flow in soil and water. Recall that different materials have different heat capacities and this will influence heat flow.

**Hypothesis:** State a hypothesis in the space below.

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**Purpose:** To investigate heat capacities associated with different materials.

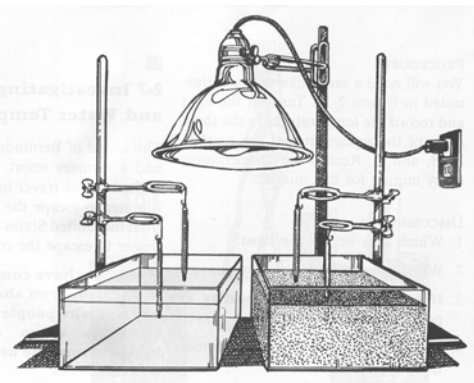
**Materials:** 2 containers for soil and water (small aquariums work well)  
Dry soil/sand  
Water  
200 Watt lamp with reflector  
Ring Stand  
Four thermometers

**Procedure:** Set up the materials as seen in the diagram below. (*Or describe the set up and let the student design their own set up*) During the set up keep the following points in mind;

1. The light source should be no higher than 30 - 40 cm above the containers.
2. The light source is to be located between the two containers.
3. Two thermometers is to be positioned approximately 1 - 2 cm above the soil/sand and water. The remaining two thermometers should be positioned approximately 2 - 3 cm below the surface of the soil/sand and water.

Turn the lamp on and start recording temperatures from the four thermometers and record this data in Table 1. Temperature readings are to be taken every minute for ten minutes. After the tenth reading, turn the lamp off and continue recording temperatures every minute for an additional ten minutes. Record this data in Table 2.

**Diagram:**



**Results:**

Table 1

**Light On**

Temperature (°C)				
Time (min)	Above Water	Within Water	Above Soil/Sand	Within Soil/Sand
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Table 2

**Light Off**

Temperature (°C)				
Time (min)	Above Water	Within Water	Above Soil/Sand	Within Soil/Sand
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

**Discussion:**

1. What do you notice about the temperature of the air above the soil/sand and water for the 20 minute duration? Briefly explain.
2. Which material received more heat from the lamp during the first 10 minutes, the water or the soil/sand? Explain why?
3. Explain why the temperature change in the water and soil/sand occurred at different rates.
4. Which material lost heat the quickest? Explain.
5. Define **heat sink** and **heat source** and explain how the terms relate to the experiment. From your results, which material would be the better heat sink?

