

Name: _____
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Conceptual Physics: _____
Date: _____

Unit V
Energy
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Thermal Energy Lab

Objective: The purpose of this lab is to study heat and temperature.

Key Concept: $Q = m \times \Delta T \times C$ (Q = heat, m = mass, ΔT = temperature change, C = specific heat)

Define Heat: _____

Define Temperature: _____

Procedure: (Safety: Wear safety glasses.)

1. Use a hot plate to warm 200 ml of water in a 250 ml beaker to a temperature of 45° Celsius.
2. Measure 50 ml of room temperature water and pour it into a styrofoam cup.
3. When the water on the hot plate reaches 45°C, carefully pour it into the calorimeter. Use the hot mitt. **Caution:** the bottom of the beaker will be very hot!
4. Record the temperatures of the water in both the calorimeter and the styrofoam cup.
5. Pour the water from the styrofoam cup into calorimeter two and stir gently.
6. Watch the temperature for two minutes. Record the highest temperature of the mixture.

Data Table

<u>Measurement</u>	<u>Styrofoam Cup</u>	<u>Calorimeter</u>
Volume of water (ml)	_____	_____
Temperature of water (°C)	_____	_____
Temperature of mixture (°C)	_____	_____

7. Calculate the temperature change of the water in calorimeters one and two.

Temperature change = ending temperature – starting temperature ($\Delta T = T_{\text{final}} - T_{\text{initial}}$)

(Remember, the ending temperature is the same for both.)

Calculation Table

<u>Calculation</u>	<u>Styrofoam Cup</u>	<u>Calorimeter</u>
Mass of water (1 ml = 1 g)	_____	_____
Temperature Change (ΔT in °C)	_____	_____
Heat Gained or Heat Lost	_____	_____

8. Find the heat gained or lost for both columns one and two by multiplying the mass of the water by the temperature change by the specific heat for water ($C = 1$). (One calorie is needed for every milliliter and every degree.)

Question

9. Compare the heat gained and the heat lost. Are they different?

Conclusion (Restate the purpose, summarize the procedure, summarize the results.)
