

Hot Calorimeter Lab

Purpose: The purpose of this lab is to determine the specific heat capacity of an unknown material using the temperature change of water.

Materials:

Hot Plate	500 mL beaker
Styrofoam Coffee Cup	250 mL beaker
Coffee Cup Lid	~1000 mL tap water
three Thermometers	Tongs

Procedure:

1. This lab deals with glassware and hot water. Goggles, lab aprons, pants, and close-toed shoes must be worn at all times. Long hair must be tied back. If there is a spill or broken glass, back away and contact the teacher immediately.
2. In a 250 mL beaker, add 100 mL room temperature water. Insert a thermometer into the water and place the beaker on the lab bench.
3. Using tongs, place an unknown metal on a scale and record the mass.
4. Then add the unknown metal to the 250 mL beaker with room temperature water and wait for the reading on the thermometer to stabilize.
5. Fill a 500 mL beaker with 250 mL water and place it on a hot plate on high heat until the solution boils.
6. Using gloves and beaker tongs, remove the 500 mL beaker from the hot plate and pour all the boiling water into the coffee cup.
7. Using tongs, quickly and carefully add the unknown metal to the coffee cup, cap the coffee cup with a lid and insert a thermometer into the mouthpiece of the coffee cup lid.
8. Wait for the temperature on the thermometer to stabilize.
9. Record your information on the Calorimeter Worksheet tables. Discard the used water, remove the mass using tongs, and repeat the procedure two more times.

Cold Calorimeter Lab

Purpose: The purpose of this lab is to determine the specific heat capacity of an unknown material using the temperature change of water.

Materials:

Ice	500 mL beaker
Styrofoam Coffee Cup	250 mL beaker
Coffee Cup Lid	~500 mL tap water
three Thermometers	Tongs

Procedure:

1. Goggles, lab aprons, pants, and close-toed shoes must be worn at all times. Long hair must be tied back. If there is a spill or safety issue, back away and contact the teacher immediately.
2. In a 250 mL beaker, add 100 mL room temperature water and about 55 g ice (the solution should rise to ~150 mL). Insert a thermometer into the water and place the beaker on the lab bench.
3. Using tongs, place an unknown metal on a scale and record the mass.
4. Then add the unknown metal to the 250 mL beaker with ice water and wait for the reading on the thermometer reading to stabilize.
5. In a 500 mL beaker, measure 250 mL room temperature water. Insert a thermometer and wait for the thermometer reading to stabilize.
6. Pour the 250 mL room temperature water into the coffee cup.
7. Using tongs, quickly and carefully add the unknown metal to the coffee cup, cap the coffee cup with a lid and insert a thermometer into the mouthpiece of the coffee cup lid.
8. Wait for the temperature on the thermometer to stabilize.
9. Record your information on the Calorimeter Worksheet tables. Discard the used water, remove the mass using tongs, and repeat the procedure two more times.

Calorimetry Worksheet

Data Table

Trial	Mass Object (g)	Initial Temp Object (C)	Initial Temp Water (C)	Final Temp Object (C)	Final Temp Water (C)
1					
2					
3					
Average:					

Using the average values from your trials, calculate the specific heat capacity of your unknown metal. Show all your work below: