Specific Heat Lab

Name:_____
Date:_____ **Per:**_____

Introduction

In the summer you place an ice cube in a glass of water. You notice that after a white the water gets colder and the ice cube seems to disappear. What is going on? Well the water lost energy to the ice cube (which cooled the water down) and this made the ice cube melt because the ice cube absorbed energy from the water. In this lab, you are going to explore the relationship between heat released from an object and the heat absorbed by the surroundings. The object you will be working with is a penny and the surroundings will be water.

Procedure

1. Mass a penny and record the mass in your data table.
2. Mass an empty Styrofoam calorimeter. Record the mass in your data table.
3. Add about 50mL of water to your cup using a graduated cylinder.
4. Mass the cup with the water and record the mass in your data table.
5. Place the cardboard "lid" on your Styrofoam calorimeter and insert the thermometer through the available space.
6. Record the initial temperature of the water in the Styrofoam cup. Leave the thermometer in the calorimeter.
7. Use tongs to CAREFULLY heat a penny in the hottest part of the flame of a Bunsen burner for 2-3 minutes.
8. Rotate the lid off of the calorimeter and CAREFULLY transfer the penny to the calorimeter, quickly replacing the lid.
9. Watch the temperature of the water until it stabilizes. Record the highest temperature that the water reaches.
10. Clean up your lab area then begin the analysis questions.

Data Table

Mass of Penny	
Mass of Empty Calorimeter	
Mass of Calorimeter + 50mL of water	
Mass of Water	
Initial Temperature of Water	
Final Temperature of Water and Penny	

Helpful Formulas:

$$-q_{\text{released by penny}} = q_{\text{absorbed by water}}$$

$$q = mc\Delta T$$

q= heat m= mass c= specific heat $\Delta T = T_{final} - T_{initial}$

$$c_{water} = 4.184 J/g°C$$

$$c_{copper} = 0.3845 J/g°C$$

Calculations

1. Calculate the mass of the water in the beaker and record it in the appropriate spot on the data table.

2. Calculate the temperature change of the water.

3. Calculate the amount of heat absorbed by the water.

4. Calculate the heat released by the penny.

5. Calculate the temperature change of the penny.

6. Calculate the initial temperature of the penny.

Conclusions

The water absorbed _____ Joules of energy from the hot penny.

The penny released _____J of energy to the cool water.

The initial temperature of the penny, once we took it out of the Bunsen burner was _____ °C.