**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Specific Heat**

Purpose: To calculate the specific heat of glass marbles and copper.

Materials: 6 marbles, balance, beaker, test tube, test tube holder, cylinder, thermometer, burner, calorimeter.

Pre-lab:

1. Explain what a calorimeter is used for.
2. Define specific heat
3. The specific heat of aluminum is 0.90J/g°C. Do you think the specific heat of the marbles will be higher or lower than aluminum? Justify your answer.
4. Why do we heat the marbles in part one? What is the only piece of data you need from part one?
5. Explain the transfer of heat between the marbles and the water.
6. Write a scientific explanation stating whether the marbles and the copper will heat the water the same amount if they are heated to the same initial temperature.

Claim: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Evidence and Reasoning: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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***Part One: Heating the marbles***

1. Prepare a hot water bath.
2. Mass 6 marbles and place them in a test tube.
3. Place the marbles and the test tube into the water bath.
4. Heat the marbles to at least 80°C. Record that as the initial temperature of the marbles.

***Part Two: Finding the heat transferred to water***

1. While heating the marbles, measure 200mL of room temperature water and place it into the calorimeter.
2. Measure the temperature of the water and record it as the initial temperature of the water.
3. When the marbles are done heating, using test tube holders, pour the marbles into the calorimeter.
4. Cap the calorimeter and place the thermometer through the hole, into the solution.
5. Stir the solution and observe the change in temperature.
6. When the solution’s temperature remains constant for 3 minutes, record the temperature as final temperature of marbles and water.

**Part Three: *Repeat the experiment with copper.***

**Data**

|  |  |  |
| --- | --- | --- |
|  | **Marbles** | **Copper** |
| **Mass of solid** |  |  |
| **Initial temperature of solid** |  |  |
| **Volume of water** |  |  |
| **Initial temperature of water** |  |  |
| **Final temp of water and solid** |  |  |

Marbles Questions:

1. Calculate the change in temperature of the water.
2. Calculate the change in temperature of the marbles.
3. Calculate the heat absorbed by the water (q = mcΔT).
4. The heat absorbed by the water represents an endothermic heat, which should be positive. Record the heat released by the marbles.
5. Using the heat released by the marbles, calculated in question 3, calculate the specific heat of the marbles.
6. The specific heat of glass is actually 0.84J/gC. Calculate the percent error.

Copper Questions:

1. Find the specific heat of copper.
2. Amend your hypothesis statement from the pre-lab questions.