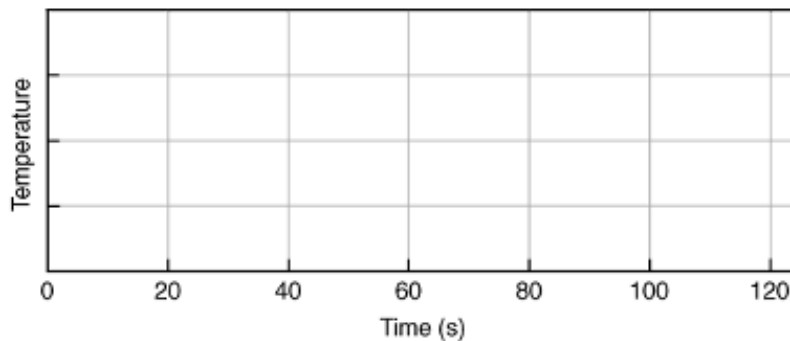


Name _____

**PHYSICS 216 POST-LAB SHEET FOR LAB 1:
INTRODUCTION TO TEMPERATURE AND HEAT**

1. Is it easier to exchange heat between a thermometer and air or between a thermometer and water? What evidence from the lab do you base this answer on?

2. a) A cup of hot chocolate at 90°C is placed in a room where the temperature is kept at 25°C . On the axes below, sketch a graph of the temperature of the hot chocolate vs. time.



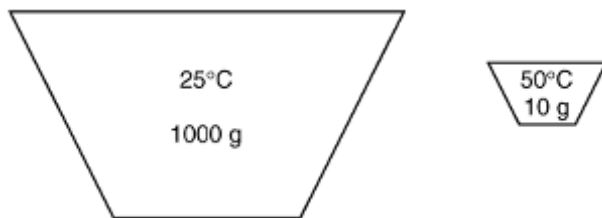
b) Explain the shape of the graph, especially changes in the rate of cooling as the hot chocolate cools down, in terms of your observations in this lab.

c) Another cup of hot chocolate at 90°C is placed in a room where the temperature is kept at 5°C (brrr!). How does the initial rate of cooling of this hot chocolate compare to the initial rate of cooling of the hot chocolate that's placed in the 25°C room? Explain your reasoning.

3. a) The two containers of water below are completely thermally insulated. The water in both containers started at room temperature (20°C), and heat was transferred to both using heating coils until they reached the indicated final temperatures. Which container had more heat transferred to it? Explain how it is possible to transfer different amounts of heat to each container and get the same temperature change.

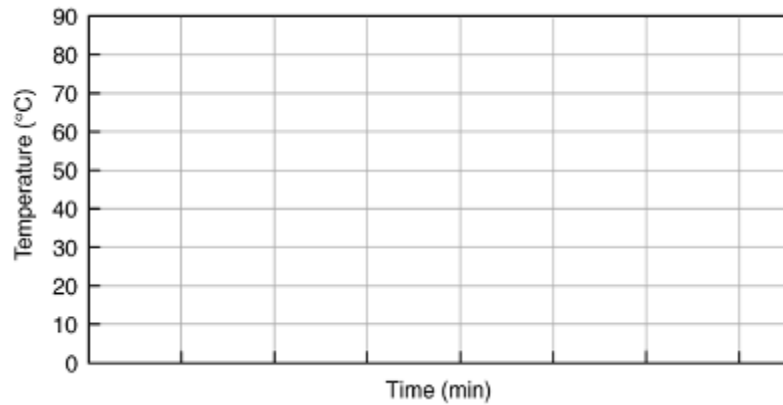


b) The two containers of water below are completely insulated. The water in both containers started at room temperature (20°C), and heat was transferred to both using heating coils until they reached the indicated final temperatures. Which container had more heat transferred to it? Explain your answer.



4. A pot of water is heated on a stove. After the temperature of the water has increased a certain amount (but not to the boiling point), the temperature stops rising even though heat continues to be transferred to the water. Explain how it is possible to transfer heat to the water without changing the temperature. What determines the point at which heat transfer doesn't lead to a further rise in temperature?

5. Draw with a solid line on the axes below the shape of the temperature—time graph that results when you transfer heat at a steady rate to an insulated cup of water that started out at 20°C. Draw with a dashed line on the same axes the shape of the temperature—time graph of the water that results when you put an 80°C solid object in an insulated cup of 20°C water. What is it about heat transfer and its dependence on temperature *difference* that explains the two different shapes of these graphs?



6. Summarize the evidence from this lab that tells you that temperature alone is not enough to describe what is going on when objects at different temperatures are placed in thermal contact with each other. In your own words, what is the difference between temperature and heat?