

NAME: _____ PERIOD: _____ DATE: _____

LAB PARTNERS: _____ LAB #24

HEAT TRANSFER

INTRODUCTION

Energy is constantly moving between objects or regions by the processes of conduction, convection, and/or radiation. The transfer of heat energy causes all changes to occur above and below the earth's surface.

OBJECTIVES

During this laboratory investigation you will:

1. Measure heat flow from one region to another by observing temperature changes in two calorimeters (Styrofoam cups) of water at different temperatures.
2. Explain what caused the flow of heat energy.

APPROXIMATE TIME 2 Periods

MATERIALS

2 Insulated Styrofoam cups with covers	Boiling Water
2 Thermometers	Room Temperature Water
1 Aluminum bar	Graph Paper

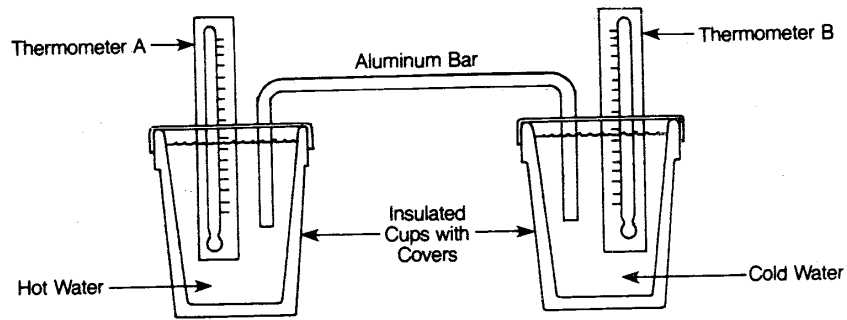
HAZARDOUS LAB PROCEDURE!

*YOU WILL BE WORKING WITH BOILING WATER IN THIS LABORATORY EXERCISE.
BE EXTREMELY CAREFULLY NOT TO TOUCH ALUMINUM BAR OR SPILL THE HOT WATER.*

PROCEDURES

1. Carefully slide each thermometer through the slit in the covers of the calorimeters. Then slide the aluminum bar through the larger slots in both covers.
2. Fill one cup approximately 3/4 full with room temperature water.
3. Your instructor will now come to each lab group and pour the boiling water into the second cup.
4. Place the two covers with the bar and thermometers into the hot and cold water cups.
5. When the thermometer in the hot cup **STOPS RISING**, record this temperature under the time 0 on the data table. At exactly the same time record the temperature of the cold cup.
6. Continue taking temperature readings for both cups at 1-minute intervals for a total of 20 minutes.
7. Think about the hot and cold water cups. What do you think will happen in this experiment? Write a **SHORT HYPOTHESIS** on what may happen?

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8. Using two different colored pencils, graph the recorded data drawing both curves on the same graph. Label each curve.
 9. Answer lab questions 1-8.



DATA TABLE

TIME IN MINUTES	0	1	2	3	4	5	6	7	8	9	10
Temperature of Hot Cup °C											
Temperature of Cold Cup °C											

TIME IN MINUTES	11	12	13	14	15	16	17	18	19	20	
Temperature of Hot Cup °C											
Temperature of Cold Cup °C											

LABORATORY QUESTIONS

1. Which cup lost heat energy? _____
2. Which cup gained heat energy? _____
3. By what process was the heat transferred between cups? _____
4. Compare the amount of energy lost by one cup with the amount of energy gained by the other cup.

5. Explain why all the heat lost by one cup **WAS NOT** gained by the other cup.

6. How could you change the equipment to increase the rate of heat transfer from the hot cup to the cold cup?

7. **CONCLUSION:** Using a short paragraph write about what you learned in this lab.