

NAME: _____ PERIOD: _____ DATE: _____

LAB PARTNERS: _____ LAB #27

HEAT TRANSFER

PHENOMENON:

Conduction in metals <https://youtu.be/6byqNP3Tif0>

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.



SEP's: Throughout this lab, the following SEP's (Science Engineering Practices) will be touched upon: HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

APPROXIMATE TIME : 2 Periods

MATERIALS

2 Insulated Styrofoam cups with covers 2
Thermometers
1 Aluminum bar
1 Wood spoon or popsicle stick

Boiling Water
Room Temperature Water
Graph Paper
1 Metal spoon

Beaker Butter
Stopwatch
1 Plastic spoon

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 Fill the beaker with boiling water and use the butter, stopwatch, wood spoon or Popsicle stick, 1 metal spoon, and 1 plastic spoon for this experiment. Your objective is to find out which material is a better conductor of heat and which is the worst conductor of heat.

2. Write up your procedures and the conclusion of your results

LABORATORY QUESTIONS

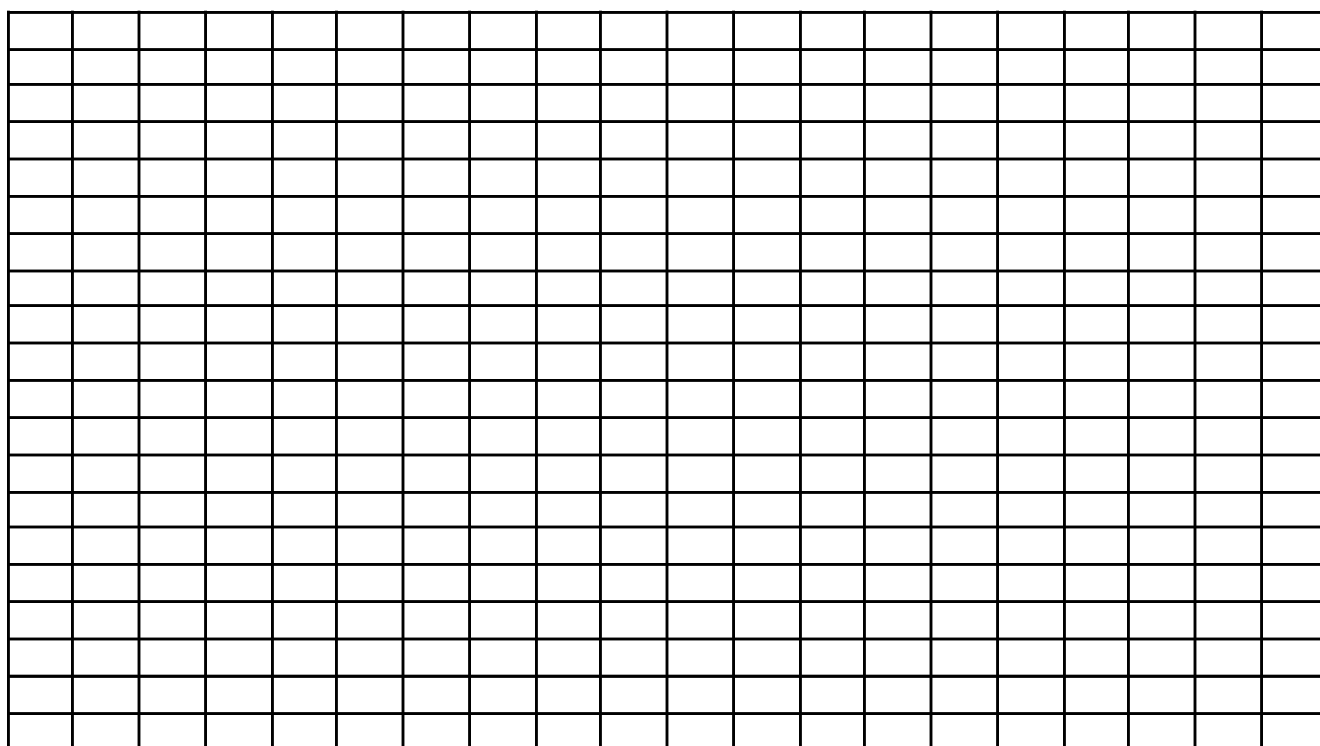
1. Which cup lost heat energy? _____
2. Which cup gained heat energy? _____
3. By what process was the heat transferred between cups? _____
4. Compare the amount of energy lost by one cup with the amount of energy gained by the other cup.

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.

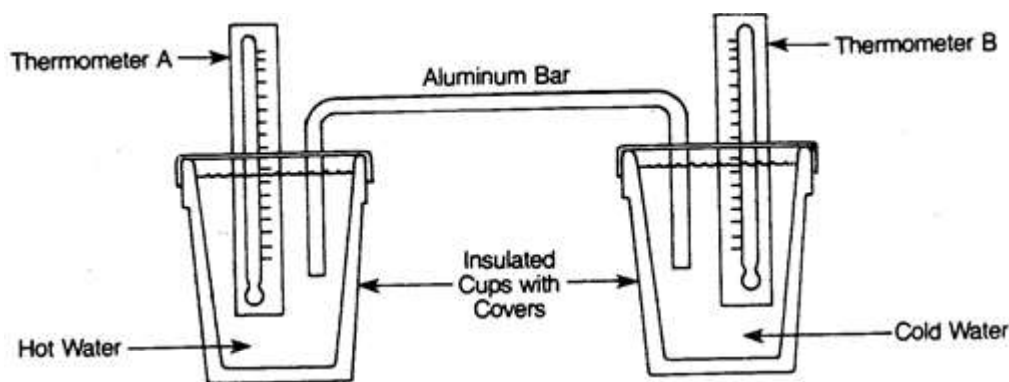
8. Using two different colored pencils for hot cup and cold cup, graph the recorded data drawing both curves on the same graph. Label each curve. (time on X-axis)



PROCEDURES 2

- 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.
- Fill one cup approximately 3/4 full with room temperature water.
- Your instructor will now come to each lab group and pour the boiling water into the second cup.
- Place the two covers with the bar and thermometers into the hot and cold water cups.
- 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.
- Continue taking temperature readings for both cups at 1-minute intervals for a total of 20 minutes.
- 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?

- Using two different colored pencils for hot cup and cold cup, graph the recorded data drawing both curves on the same graph. Label each curve.
- 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											