INSTRUCTOR _____ *PERIOD* ____ *NAME* _____

PARTNER _____

TOPIC V: Energy in Earth Processes

LAB 5-2: HEAT TRANSFER BY CONDUCTION

INTRODUCTION: The transfer of heat is constantly occurring in all parts of the earth. In the previous lab you learned how energy is transferred through the process of radiation. When there is a temperature difference between two objects or regions in contact, there will be an energy transfer by conduction.

OBJECTIVE: You will be able to measure and explain heat flow by means of conduction from one region to another.

VOCABULARY:

conduction:

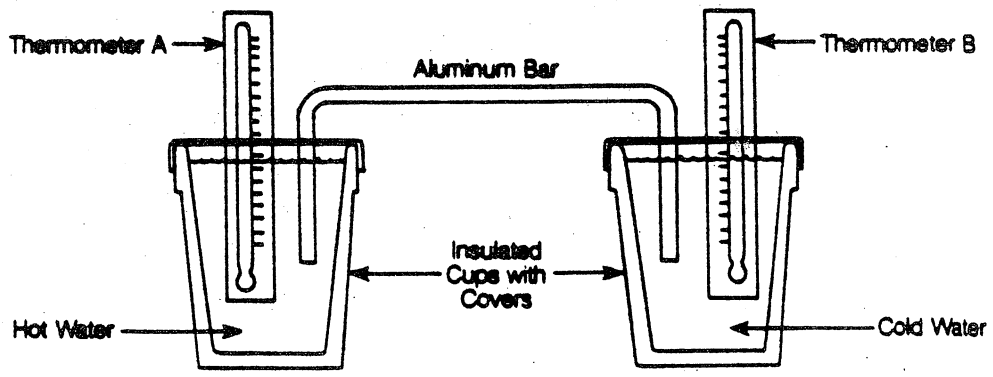
rate of change:

calorimeter:

conservation of energy:

PROCEDURE:

1. Calibrate the thermometers as directed by your instructor.
2. Assemble the equipment as illustrated by the diagram below.



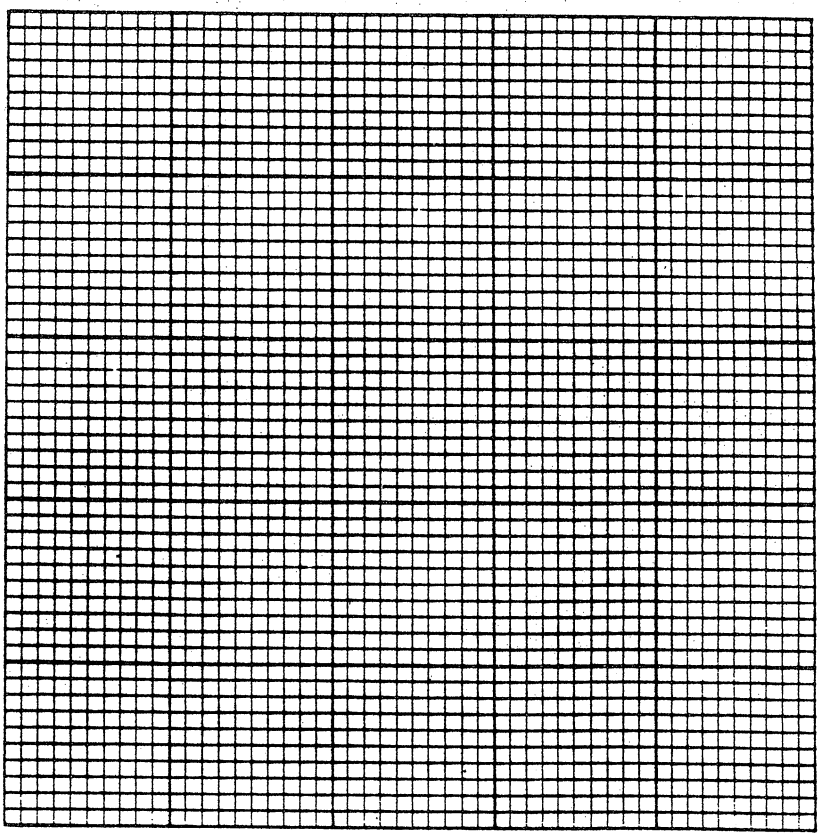
3. Fill one insulated cup with cold water and the other with boiling water. Quickly replace the lid assembly.
4. When the thermometer in the "hot" cup reaches its highest point, record this temperature under Time 0 on your Report Sheet. At exactly the same time your partner should read and record the temperature of the "cold" cup.
5. Continue taking temperature readings for both cups at one minute intervals for a total of 20 minutes.
6. Graph the recorded data, drawing both curves on one set of axes. Use time for the horizontal axis.

REPORT SHEET

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

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

HEAT TRANSFER BY CONDUCTION GRAPH



DISCUSSION QUESTIONS: *(Answer in Complete Sentences)*

1. At the start which calorimeter had the most potential energy?

2. Which calorimeter lost energy?

3. Which calorimeter was a heat source?

4. In which direction did the heat energy flow?

5. Compare the amount of energy lost by one cup to the amount of energy gained by the other cup.

6. Explain the difference between the amount of energy lost by one cup and amount of energy gained by the other.

7. How does your graph show that there is a change in the *rate* of the heat lost or gained as time passed?

8. How did the *rate* of heat loss from the hot cup change during the experiment?

9. If the experiment were left standing for 24 hours, what predictions could you make about the temperatures of the cups?

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

11. Explain why there is a change in rate of energy exchange as time passes.

CONCLUSION: Explain *how* heat energy is transferred from the water in one calorimeter to the water of the other calorimeter.

NOTES