Name _____ **Earth Science**

Lab 16: Heat Transfer by Conduction **Date** _____

Introduction: The transfer of heat is constantly occurring in all parts of Earth. Conduction is the transfer of heat directly from molecule to molecule.

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

Vocabulary:

Conduction

Rate of change

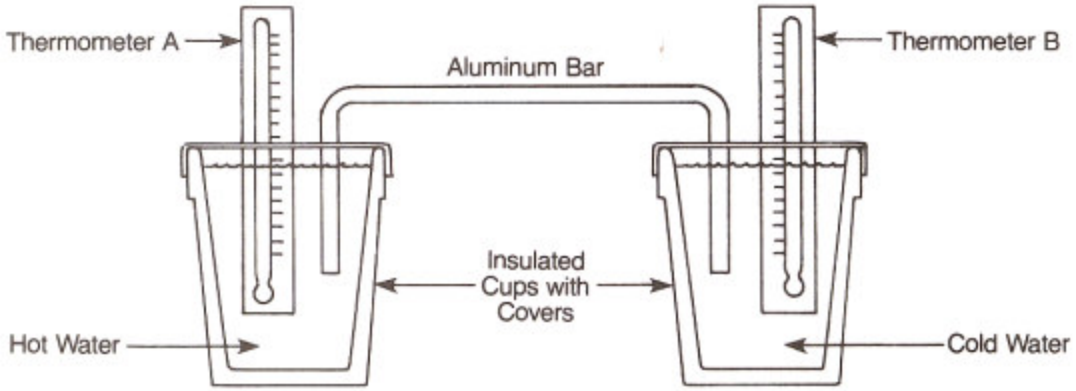
Calorimeter

Conservation of energy

Procedure:

1. Note starting temperatures of thermometers, place them through styrofoam lids so they do not slide out and will be under the surface of the water.
2. Assemble the equipment as illustrated in the diagram below.
3. Fill one insulated cup with cold water and the other with HOT water. Quickly replace the lid assembly.
4. When the thermometer in the HOT cup reaches its maximum temperature, record that temperature under time 0 in the data table, as well as that of the cold cup.
5. Connect the two cups with the metal bar and start your stopwatch.
6. Take temperature readings every minute for a total of 20 minutes.
7. Graph the recorded data, drawing both curves on one set of axes. Use time for your independent variable.

Diagram



Data Table

Time in minutes	0	1	2	3	4	5	6	7	8	9	10
Temp of HOT cup											
Temp of COLD cup											

Time in minutes	11	12	13	14	15	16	17	18	19	20
Temp of HOT cup										
Temp of COLD cup										

Questions:

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

   _____

2. Which calorimeter lost energy? _____

3. Which calorimeter was a heat source?

   _____

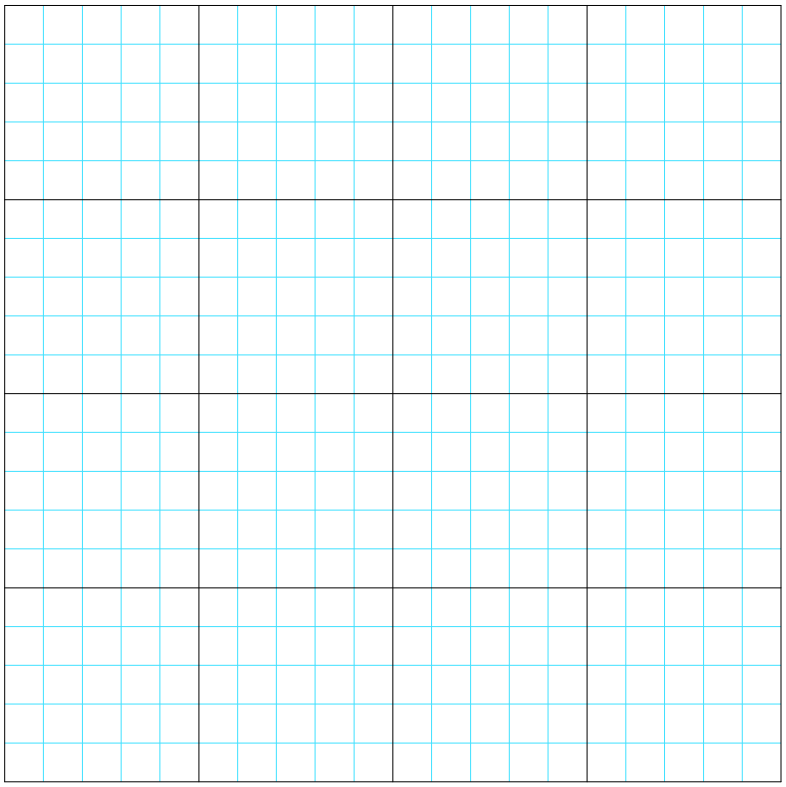
4. In which direction does heat energy flow?

   _____

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 gained by the other cup. _____

   _____

7. How does your graph show that there is a change in the *rate* of 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 prediction 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. _____

    _____

12. Explain how heat energy is transferred from the water in one calorimeter to the water of the other calorimeter. _____

    _____