## 4 cups with metal bar

1. To begin with, cups A and C were filled with boiling water while B and D were filled with ice water.
2. On the **chart** next to the demonstration, write the time and the temperature in each of the 4 cups.
3. How have the values changed since the measurements previous to yours?
4. Explain what you observe.

Heat Transfer by Conduction (4 cups with metal bar)

Summary – This activity investigates the process of heat transfer by conduction  Temperature changes in hot and cold cups of water that are connected by a metal bar are compared to temperature changes in free standing cups of water.  Conduction always transfers heat from warmer to colder objects.

Materials Needed

- 4 Styrofoam cups with Styrofoam lids
- 4 thermometers that can fit through a slit in the lids into each of the cups
- 1 metal bar that extends from the top of one cup into the top of another
- Boiling water
- Ice
- Data collection sheet

Scientific Questions
How does conduction affect temperature change?

Possible Hypothesis

- Conduction has no effect on temperature change
- Conduction makes the hot water hotter and the cold water colder
- Conduction makes the hot water colder and the cold water hotter

Set up

- Place boiling water in 2 cups, place ice and liquid water in 2 cups
- Cover all cups with Styrofoam lids
- Place the bar between one of the hot and one of the cold cups
- Insert thermometers through slits in lids so that bulb of thermometer is in the middle of the cup

Notes

- Practice reading the temperatures on the thermometers.
- Though the temperatures on the 4 thermometers should be identical before you begin the experiment often they are different.  This can lead to discussions about the importance of instrument calibration and accuracy.