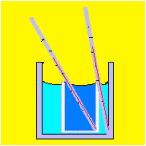
**THERMAL EQUILIBRIUM**  
  
**Purpose**  
To measure temperature, and to create and use a graph to predict thermal equilibrium.  
  
**Concept**  
In an isolated system, objects with different temperatures tend to converge. Hot objects lose thermal energy and colder objects gain thermal energy.

**Materials**  
500 ml beaker, 250 ml beaker, hot water, cold water, 2 thermometers

**Procedure**  
1. Place a 250 ml beaker inside a 500 ml beaker, and place a thermometer in each beaker.  
2. Fill the small beaker with hot, colored water. Determine the temperature of the colored water.  
3. Slowly pour cold water into the 500 ml beaker until the water is the same height in both beakers. Record the temperature in the 500 ml beaker.  
4. Record the temperature in both beakers every 30 seconds.   
5. Start making your graph after 5 minutes has gone by.  
  


**Observations and Data:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  | | --- | --- | --- | --- | | **Time (s)** | **Temp. (C)** | **Time (s)** | **Temp. (C)** | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |

**Analysis**  
1. Plot your data on the following page for both beakers on the same graph with temperature on the vertical axis and time on the horizontal.

2. Describe each curve.  
3. From your graph, predict what the temperature of the hot water will be after 20 minutes. Compare your prediction to the actual temperature of the hot water after 20 minutes.

4. From your graph predict how long it will take both liquids to reach thermal equilibrium.

