**H8: Mixing Ice and Water**

**Materials:**
- ice, hot water, room temperature water, styrofoam cups, temperature probes

**Initial Instructions and questions:**

1. Get a large cup of ice, add some room temperature water to create an ice slurry. Put both probes in the cup. Take data while you stir gently until an equilibrium temperature is reached? Record your final temperature and print out your graph.

2. Dump the first cup in the sink and get another large cup of ice and another cup about half full of hot water. You are going to slowly add hot water until all the ice melts. But first, make a prediction. What do you think the temperature of the ice and water mixture will do as you add hot water?

3. You should set your experiment time to 10 minutes, so you have plenty of time to acquire all the data. Use one probe to keep track of the hot water temperature and the other to track the ice temperature. Add a little hot water and stir until the temperature stops changing. Then add some more water and do the same thing. Use only a little water each time so that you can add hot water five to ten times before all the ice is melted. After all the ice melts add more hot water and keep tracking the temperature. Put notes on your graph, either with the computer or by hand afterwards, indicating when hot water was added.

**Guide to notes in your lab notebook:**

1. Did the results agree with your prediction? If not, how did they differ?
2. At 0 °C is water a solid or a liquid?
3. How do your results relate to your previous work with heat?
4. What does this teach us about adding heat and changes in temperature?

**Practice problems:**

1. Interestingly, the specific heat of ice is not the same as that of water. It is only half as large at 0.5 cal/g•°C. Ice can exist at any temperature below 0°C. How much heat is required to bring a 10-g ice cube at -18 °C to its melting point of 0°C?

2. You have 100 mL of water at 22 °C and have hot water available at 62 °C. How much of the hot water should you add to produce water at 32 °C?

3. You mix 100 g of water at 80 °C with 100 g of an unknown substance at 20 °C. The final temperature is 70 °C. What is the specific heat of the unknown substance?