Purpose:
To understand the effects of heat on matter

Materials

What a State We're In!

1. 2 thermometers
2. 1 clear balloon
3. 1 roll duct tape
4. 1 Pyrex container (beaker)
5. 1 hot plate
6. 1 clock with second hand
7. 1 per student graph paper
8. 1 ring stand (something to hold up the thermometers)
9. Computer with spread sheet program

Procedure:

1. Before students arrive set up as follows:
    a. Fill balloon with water. Stick bulb end of one thermometer in balloon and seal with duct tape
    b. Freeze balloon and thermometer (over night is best, but it will freeze in one hour)
2. Fill beaker ¾ full of water
3. Put beaker on hot plate
4. Assign one student to be time keeper, one to be ice thermometer reader, one to be water thermometer reader, and one to record data on the spread sheet. Have all other students record data on a chart at their desk.
5. Use ring stand to suspend both thermometers in the beaker
6. Heat beaker
7. Record temperature change and all other observations every 30 seconds until the water in the balloon begins to boil (about 8 minutes)
8. Graph data

Results
The temperature rises as heat is added to the beaker. Temperatures plateau while the ice and water are changing state

Conclusion
Heat, like all kinds of energies makes molecules move. As you add heat the water and ice molecules move faster and run into each other. The faster the molecules move the harder they hit each other. The harder they hit each other the farther apart they become. The farther apart they become, the harder it gets to hold on to each other. That's why ice turns to water and water turns to steam.
When you graph the data you will notice that as ice is changing into water there is no increase in temperature even though you are putting in additional heat at the same rate. The same thing happens as water turns to steam. There's no increase while ice is changing into water or when water is changing into steam because the heat you're putting into the system is being used to change the state of the water. This proves that it does take energy to change state.