Calorimetry

Our goal in this calorimetry experiment is to find the specific heat of copper and the specific heat of steel by making temperature measurements and by using the specific heat theory that we talked about in class.

You may assume that the specific heat of water is known to be 4184 J/kg°C, and that the specific heat of aluminum is known to be 900 J/kg°C.

The basic idea of the experiment is to take the metal with the unknown specific heat (copper or steel), raise its temperature to 100°C by boiling it in water, then place it in another cup with water at room temperature, which is well-insulated from the surrounding air. By measuring the change in temperature, along with relevant masses, you should be able to calculate the specific heat of the metal.

Please submit the following before you leave today. (A separate report for each person, although you may work together in designing the procedure and collecting data.)

1. A readable description of the procedure you will use to find the specific heat of a metal, including the items you will use, the measurements you will take, and the method for calculating the specific heat. (You may want to think this through before you start making measurements. Feel free to ask me about your procedure if you like.)

2. A clear record of the measurements you made.

3. Show your work when making the calculation of specific heat.

4. Your results, that is the values of specific heat for copper and for steel.

5. Compare your results to commonly accepted values of specific heat for copper and steel.

The samples of metal that are available are copper, brass, and steel. Brass is an alloy of copper and zinc. Copper and brass have about the same specific heat, so if you use brass instead of copper, that's fine. We'll just call it copper for the purposes of this experiment. You can tell steel apart from the other metals in two ways. First, it may have started to rust. Second, a magnet is attracted to steel.