First three labs.

We will be obeying the octet rule. You are divided into groups of 6.

Your task is to perform three investigations:

1. Determination of the specific heat of two metals.

2. Determination of the heat of solution (in Joules/mol) of two solutes.

3. Determination of the heat of neutralization for a strong acid and base.

( in joules per mole)

It is probably best to have one 2 person group on the specific heat of metals lab, one group on heat of solution, and one on heat of neutralization.

You will have test tubes for the metals, graduated cylinders, insulated coffee cups, thermometers, balances, stirring rods, two metals, two solid solutes, and solutions of 2 molar HCl and 2 molar NaOH. You will also have a boiling water bath, and test tube clamps.

You will write your own three procedures, and construct your own data sheets. The team will produce three lab reports, each with all 8 names on it.

Helpful hints

Use about 25 grams of the metal, and about 30.0 mL of water in the spec. heat experiment. You might want to find the MASS of the water to avoid using density calculations. The specific heat of water is 4.18 J/go .

In the heat of solution experiment, use about 10 grams of each solute, and about 50 mL of water. Remember when calculating that the total mass in your heat equation is the mass of the water + the mass of the solute. You need to determine all masses to at least two decimal places. The solutes affect the specific heat of the mixture. Use a value of 3.85 Joule/go instead of 4.18.

In the heat of neutralization experiment, use 50.0 mL of each reageant. Take the temperature of each before you mix them; if they are not the same initial temperature use the average value as your initial temperature. Use 3.90 Joul/go as the specific heat of the mixture.

There is a correction for heat lost or gained by the cup. My colleagues at Brooklyn College have calculated it to be 19.0 J/o . Heat gained or lost by your solutions will always be: $mc∆t+19.0∆t$

Questions to think about:

What is the initial temperature of the metal in the spec heat experiment?

How many moles of water are formed in your neutralization?

How long should you wait before taking your final temperature reading?

The report. Three reports from each team of 6. Each has a title (the purpose of the investigation) method, data, calculations, and final results. The correct values are obtainable via the Internet, so % errors can be calculated.