Observing Chemical Reactions

Introduction:

In this experiment you are going to mix two different chemicals together and observe what, if anything happens. Making careful observations is a critical skill that you will employ throughout the year while doing experiments. Observations you will make that tend to indicate *chemical reactions* are, among others, changes in color, odor and/or temperature, gas evolution, and the formation of new solids.

Safety:

1. **It is imperative that you wear goggles while performing these procedures. You must keep them on the entire time you are at the lab bench, even if your group is finished. Move away from the lab work area if you wish to remove them.**

2. **Follow all directions exactly as written, unless otherwise notified. Do not ever perform any unauthorized procedures. Listen throughout the lab for further instructions from your teacher.**

3. **You will be using, among other things, acids and bases in these procedures, both of which have the potential to cause injury. Always treat all chemicals with respect, as if they are dangerous. Never assume anything is "safe" because you think you know what is in the container.**

Before you begin:

1. You should spend no more than two minutes on any one step in the procedure.

2. Record all observations for each step of every procedure. Make sure to be complete in your observations. Instead of writing "turned red", write "turned from blue to red" for example.

3. When you see capital *M* following a number, such as "1.0*M*", it is referring to the "molarity" of the solution. This is the solution's concentration. The bigger the number, the more concentrated the solution is.

4. At the conclusion of each procedure, rinse all solutions down the drain.

Procedure:

1. Fill a small test tube one-third full (about an inch) with a 1.0*M* HCl solution. Add a single turning of magnesium metal to the test tube. Record all of your observations. Note any temperature change?

2. Fill a small test tube one-third full (about an inch) with water and using tweezers, add a single stone of CaC_2. Place a lit match to the mouth of the test tube. Record your observations.

3. Fill a small test tube one-third full (about an inch) with a 0.1*M* $CuCl_2$ solution. Using a wood splint as a spatula, add a small amount of solid Fe (iron) to the test tube. Record your observations.

4. (a) Fill a small test tube one-third full (about an inch) with 0.1*M* $CuSO_4$ solution and add a few drops of 1.0*M* NaOH solution. Tap gently with your index finger to insure proper mixing.

4. (b) Now add drop-by-drop some 1.0*M* HCl solution until the solution clears.

5. (a) Fill a small test tube one-third full (about an inch) with water from a squeeze bottle. Add 3-4 drops of Bromthymol Blue to the test tube and two drops of 1.0*M* HCl. Use a disposable pipette to insure proper mixing.

5. (b) Now add drop-by-drop some 1.0 *M* NaOH to the solution until a color change is observed. Use a disposable pipette to insure proper mixing.

5. (c) Change the color of the solution back to yellow by adding 1.0*M* HCl drop by drop. Use a disposable pipette to insure proper mixing.

6. (a) Fill a small test tube one-third full (about an inch) with a 0.1*M* H_2SO_4 solution. Using a wood splint as a spatula, add a small amount of solid $NaHCO_3$ (baking soda) to the test tube. Record your observations.

6. (b) Now place a lit match into the mouth of the test tube. (Do not drop the match in.) Record your observations.

7. Fill a small test tube one-third full (about an inch) with 0.1*M* $CaCl_2$ solution and add a few drops of a 0.1*M* H_2SO_4 solution.

8. Add about an inch of water to a small beaker and add a level teaspoon of solid NH_4Cl. Swirl the beaker to dissolve the solid. Note any temperature change.