# Metathesis Reactions

**Introduction:** A *metathesis (double displacement*) reaction involves the reaction of two compounds to form two new compounds. In effect, the compounds change partners with each other. This experiment will provide you with opportunities to observe several of these metathesis reactions.

**Purpose:** To observe the formation of new substances in metathesis reactions and to create a solubility chart of common ionic compounds.

**Hazardous chemicals:** silver nitrate, iron (III) chloride, sodium hydroxide, sulfuric acid, and hydrochloric acid

**Equipment:** Well plate, test tubes

**Chemicals:**

solid sodium sulfite (use only in hood)
6 M ammonium hydroxide (use only in hood)
0.1 M ammonium chloride
0.1 M calcium chloride
0.1 M calcium nitrate
0.1 M copper sulfate
6 M hydrochloric acid
12 M hydrochloric acid (use only in hood)
0.1 M iron (III) chloride
0.1 M lead (II) nitrate
6 M nitric acid (use only in hood)
0.1 M potassium iodide
0.1 M potassium phosphate
0.1 M silver nitrate
0.1 M sodium carbonate
0.1 M sodium chloride
10 % sodium hydroxide
3 M sulfuric acid (use only in hood)
0.1 M zinc nitrate

**Procedure:**

1. Plan your experiment and label well plates and test tubes as needed.
2. Mix chemicals together in various combinations, two chemicals at a time.
3. Observe each of the mixtures and record any evidence of a reaction.
4. Describe the appearance and color of any product that forms.
5. Some reactions must be done in the hood:
    a. Mix 1 g solid sodium sulfite to 3 mL of water, shake to dissolve. Add about 1 mL conc 12 M hydrochloric acid one drop at a time.
    b. In a test tube mix 6M ammonium hydroxide and 3M sulfuric acid.
6. Analyze your results.
7. Clean up all equipment and dispose of all chemicals as instructed.

**Questions: For each reaction...**

1. What evidence is there that a chemical change occurred?

2. Write a balanced equation for the reaction and identify any precipitates or evolved gases.

3. Look up any products on the Internet and take notes on properties and appearance of these products.

4. Use the data you have collected to create a solubility chart. (chart template is provided as a separate file.)

**ALL OBSERVATIONS AND DATA SHOULD BE RECORDED DIRECTLY INTO YOUR LABORATORY NOTEBOOK.**