In this lab you will relate written equations, including the states of matter, to observed reactions. You will also build upon your understanding of types of chemical reactions and review writing formulas and balancing equations.

**Create a data table with the following for each reaction:**

1. A hypothesized balanced equation, including physical states of matter.
2. A place to record safety or cleanup reminders and/or tips for a successful reaction.
3. A place to record observations of the reaction and tests done to the products.
4. A place to record evidence of a chemical reaction and possible driving forces for the reaction.
5. The type of reaction (as categorized in Chapter 5).

**Important Background Info:**

* a glowing splint is a piece of wood that has been set on fire and blown out, but is still glowing red at the end.
* a flaming splint is a piece of wood that has been set on fire and is still on fire.
* a glowing splint goes out in the presence of carbon dioxide
* a glowing splint burns brighter in the presence of oxygen
* a flaming splint pops in the presence of hydrogen
* a catalyst is not a reactant nor a product; it makes the reaction happen faster

**REACTIONS**

**A:** Light a Bunsen burner. (methane gas = CH4) What evidence is there that a reaction has occurred?

**B:** Use tongs to hold one end of a piece of copper wire in the outer cone of a Bunsen burner for 1 minute. Let cool and observe. Try cleaning off the wire using steel wool. What evidence is there that a reaction has occurred?

**C:** Add 1-2 ml of 10% hydrogen peroxide solution to a test tube. Add 3 drops NaI solution (this substance acts as a catalyst, not a reactant). Wait approx 45 seconds until many bubbles are being produced & then perform a glowing splint test. What evidence is there that a reaction has occurred? Test tube should be rinsed out in sink and reused. Dispose of splint waste in appropriate waste container.

**D:** Place one clean piece of copper wire into one well of a well plate and fill the well with silver nitrate solution. Wait at least one minute. What evidence is there that a reaction has occurred? Rinse well plate using wash bottle to dispose of products in the appropriate waste container.

**E:** Obtain a new, clean, dry test tube. Add a pinch of sodium carbonate to it. Add approx. 1 mL of 3M hydrochloric acid to the test tube. Immediately insert a glowing splint into the test tube without letting it touch the reactants. What evidence is there that a reaction has occurred? Place used test tube and splint waste in appropriate waste containers.

**F:** Add a small scoop of copper (II) carbonate to a COOL test tube. While holding the test tube with a test tube holder, gently heat the copper (II) carbonate using a Bunsen burner. While the reaction is occurring, insert a glowing splint into the test tube without letting the splint touch the solid. What evidence is there that a reaction has occurred? Dispose of test tube contents and splint waste in appropriate containers.

**G:** Place several drops of potassium nitrate on a watch glass. Add several drops of sodium acetate. What evidence is there that a reaction has occurred? Rinse off watch glass in the sink to be reused.

**H:** Place several drops of hydrochloric acid on watch glass. Use tongs to *briefly* swirl solid FeS cylinder in acid. What evidence is there that a reaction has occurred? Rinse off watch glass in the sink to be reused.

**I:** Place several drops of cobalt (II) chloride on a watch glass. Choose the aqueous reactant from those provided (ammonium nitrate or sodium hydroxide) that will cause a precipitate to form. What evidence is there that a reaction has occurred? Rinse off watch glass in the sink to be reused.

**J:**  Place several drops of iron (III) sulfate and potassium hydroxide on a watch glass. What evidence is there that a reaction has occurred? Rinse off watch glass in the sink to be reused.

**K:**  Based on observations of in-class reactions of hydrochloric acid with Cu, Mg and Zn, determine the most reactive of these three metals. Place one clean piece of this metal into one well of a well plate and carefully fill the well with 3M HCl. Use a test tube holder to immediately cover the well with an inverted test tube and after 7-10 seconds, quickly perform a flaming splint test on the gas still in the inverted test tube. What evidence is there that a reaction has occurred? Rinse well plate using wash bottle to dispose of products in the appropriate waste container.

**L:**  TO BE PERFORMED IN CLASS BY INSTRUCTOR…record detailed observations of the flaming splint test for the reaction of sodium and water.