

## ***Recognizing the Evidence of a Chemical Change Lab***

### **Background Information**

When two or more chemicals are mixed, a reaction often occurs in which new substances are formed. This is known as a chemical reaction. This reaction only occurs when the groups of atoms (molecules) are broken down, and the individual members (atoms) are rearranged to form different molecules.

Heating or cooling may cause atoms to rearrange with respect to one another, but each molecule remains intact. If the molecules are not broken down, no chemical reaction has occurred. Instead, this is known as a **physical change**. A true **chemical change** can be identified by any of several observable changes including a change in color, odor, or temperature and the formation of either a gas (bubbles in solution) or a precipitate (ppt), and/or light being emitted.

### **Pre-Lab Questions** – answer in your lab notebook

1. How will you distinguish a chemical change from a physical change?
2. Why is it important to always wear closed toe shoes in the lab?

### **Procedure**

You will conduct this lab by visiting *stations*. Using your data table, carry out the following reactions and record a “yes” or “no” if each reaction is or is not accompanied by each kind of change. Include any details you think are important (be observant!). Also record if you think the change is **chemical** or **physical**.

1. To about 2 mL of acetic acid (measure with 10 mL graduated cylinder & pour into a 100 mL beaker), add a pinch of baking soda using the metal scoopula.
2. To about 5 mL of tap water (measure with graduated cylinder & pour into beaker), add 20-30 pellets of ammonium nitrate. Stir in a 150 mL beaker using a glass stirring rod.
3. Place 25-30 drops of potassium dichromate solution (orange) and place in a test tube. Add a few drops of silver nitrate (brown bottle).
4. Place 20-25 drops of copper II sulfate solution (blue) and place in a test tube. Add a few drops of sodium hydroxide (clear).
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  - a. Measure 5 mL of tap water using a graduated cylinder. Place 1 pellet of sodium hydroxide and water in a test tube. Stir the solution with a glass stirring rod until the pellet dissolves. Observe. Save this portion of the experiment to use in step 5b.
  - b. To the test tube from 5a, add three drops of phenolphthalein solution. Observe.
  - c. ~~DEMO To the test tube from 5b, add 5 mL of hydrochloric acid. Continue adding HCl until you see a change. Now, wash out the test tube well.~~
6. Add 25-30 drops of cobalt chloride solution (pink) to an empty test tube. Add 5-10 drops of sodium hydroxide solution (clear).
7. Add a small strip of magnesium (Mg) to a test tube containing 30-40 drops of hydrochloric acid.

**Note: Reactions 8 – 9 will be done as demonstrations in the fume hood and may be changed.**

8. Place a small amount of 30% hydrogen peroxide into a flask. Add a pinch of manganese dioxide.
9. Place a penny (minted prior to 1983) in a glass petri dish and add nitric acid to the dish.

*Data Table: Recognizing the Evidence of Chemical Changes*

*Hint: A precipitate is when a solid forms from the mixture of two liquids, in this case.*

<b>Station</b>	<b>Color change?</b>	<b>Precipitate formed? (ppt)</b>	<b>Gas formed? (bubbles)</b>	<b>Temperature Change?</b>	<b>Other change?</b>	<b><u>Chemical or physical change?</u></b>
1						
2						
3						
4						
5a						
5b						
5c DEMO						
6						
7						
8 DEMO						
9 DEMO						

\*To receive full credit, you must fill-out your ENTIRE data table – leave nothing blank\*