

## **PHYSICAL AND CHEMICAL CHANGES LAB**

### **Pre-Lab Discussion:**

Chemistry is the study of matter and the changes it undergoes. These changes can be divided into 2 classes: physical changes and chemical changes. In a physical change, one or more physical properties of a substance are altered. Examples of such physical properties are: size, shape, color, and state of matter. Grinding, melting, dissolving, and evaporating are all physical changes. No new substance or substances are formed as a result of a physical change.

A chemical change results in the formation of one or more “new” substances. These new substances differ in chemical properties and composition from the original substance. Iron rusting and paper burning are two examples of chemical change.

This experiment will help you understand the differences between physical and chemical changes and to recognize each type of change when it occurs.

The **purpose** of this lab is to distinguish between physical and chemical changes.

### **Equipment and Materials:**

Goggles	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	NaCl
Well plates	Mortar and pestle	HCl (0.1 M)
Evaporating dish	Water dropper	$\text{AgNO}_3$ (0.1M)
Ceramic square	Paper (5 cm square)	Mg ribbon (Mg)
Micro spatula	Wire gauze	Hot plate
Candle	Matches	Vinegar
Tiny test tube with wax already in it	Test tube clamp	Baking soda
Hot plate		

### **Procedure:**

After completing **each step**, fill in the information in table 1.

#### **Station1**

1. Place a small amount of candle wax into a tiny test tube that already has wax in it (scrape it off a tile using a micro spatula).

2. Hold the test tube with a test tube holder and heat the outside of the test tube with an aim and flame lighter until the wax melts.

**CLEANUP:** Leave the test tube with wax stuck in it in the lab station.

3. Secure a candle to a ceramic square and allow it to burn for 30 seconds.

### **Station 2**

1. Tear a piece of paper into pieces.

2. Place the pieces of paper on wire gauze and ignite them with a match.

**CLEANUP:** match and burned paper go in the trash (NOT in the sink)

### **Station 3**

1. Add a micro spatula of NaCl (Sodium Chloride) to a well in the well plate. Mix it with about 3-4 drops of water and stir it with a tooth pick.

2. Add 2 drops of AgNO<sub>3</sub> (Silver nitrate) to the mixture that you just made in the previous step.

**CLEANUP:** pour down the sink and wash the well plate

### **Station 4**

1. Cut a small piece of Mg (Magnesium) ribbon.

2. Place the piece of Mg in a well in the well plate and add a few drops of HCl (Hydrochloric Acid). **Use extreme care when handling acids!**

**CLEANUP:** wait until all the Mg has reacted (add more acid if necessary) and then pour down the sink with running water. Rinse well.

### **Station 5**

1. Use a mortar and pestle to grind a small scoopula of CuSO<sub>4</sub>·5H<sub>2</sub>O (Copper sulfate pentahydrate) (this is one complete substance—the H<sub>2</sub>O is attached to the CuSO<sub>4</sub>) into a powder.

**CLEANUP:** You do NOT need to clean out the mortar or pestle.

2. Place the ground powder into an evaporating dish and heat **gently** over a hot plate until it turns white (don't let it turn brown).

3. When it cools add a drop of water. Explain what you think is happening on table 1.

**CLEANUP:** When it cools, dump the solid into the trash. Wipe with a paper towel.

### **Station 6**

1. Add a few drops of vinegar into a well in the well plate. Add 1 micro spatula of baking soda (sodium bicarbonate).

**CLEANUP:** Pour the new product down the sink. Rinse the well plate with water.

Name: \_\_\_\_\_

## Physical and Chemical Changes Lab

**Table 1**

Reaction	P or C?	Your Observations	New substance formed
Scraping wax with spatula			
Melting Candle Wax			
Burning a Candle			
Tearing Paper			
Burning Paper			
Dissolving NaCl			
Mixing NaCl with AgNO <sub>3</sub>			
Cutting Mg ribbon			
Mixing HCl with Mg			
Grinding CuSO <sub>4</sub> ·5H <sub>2</sub> O			
Heating CuSO <sub>4</sub> ·5H <sub>2</sub> O			
Adding water to CuSO <sub>4</sub>			
Mixing Vinegar and Sodium bicarbonate (baking soda)			

**Discussion Questions:**

1. Name 2 possible indications that a chemical change has taken place. Give one example from this experiment.
2. Chemical change involves the formation of “new” substances. Briefly describe the “new” substance(s) that formed for your chemical change example from the previous question.
3. A real-life example of physical change

A real-life example of a chemical change

