

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

**CHEMISTRY**  
**CHEMICAL REACTIONS LAB #1**

Watch the video: <https://www.youtube.com/watch?v=QH91PHkuy48>

- There are ten chemical reactions. The narrator identifies the reaction number (1 to 10) and the reactants involved in the reaction. The reactants are provided for you.
- Carefully observe what happens to the reaction mixture during the chemical reaction. Write your observations.
- Your observations should include descriptions of color changes, gases evolving (bubbles), cloudiness or formation of solids from liquids, fire or flames, or any other evidence.

	Reactants	Observations What happened?
1	Barium chloride + Sodium sulfate $\text{BaCl}_{2(\text{aq})} + \text{Na}_2\text{SO}_{4(\text{aq})} \rightarrow$	
2	Magnesium + Oxygen gas $\text{Mg}_{(\text{s})} + \text{O}_{2(\text{g})} \xrightarrow{\text{Heat}}$	
3	Zinc + Hydrochloric acid $\text{Zn}_{(\text{s})} + \text{HCl}_{(\text{aq})} \rightarrow$	
4	Sodium carbonate + Hydrochloric acid $\text{Na}_2\text{CO}_{3(\text{aq})} + \text{HCl}_{(\text{aq})} \rightarrow$	
5	Potassium chromate + Hydrochloric acid $\text{K}_2\text{CrO}_{4(\text{aq})} + \text{HCl}_{(\text{aq})} \rightarrow$	
6	Hydrogen peroxide (Manganese dioxide) $\text{H}_2\text{O}_2 \xrightarrow{\text{MnO}_2}$	

7	Iron + Copper (II) sulfate $\text{Fe}_{(s)} + \text{CuSO}_{4(aq)} \rightarrow$	
8	Copper (II) nitrate + sodium phosphate $\text{Cu}(\text{NO}_3)_{2(aq)} + \text{Na}_3\text{PO}_{4(aq)} \rightarrow$	
9	Magnesium + Nitric acid $\text{Mg}_{(s)} + \text{HNO}_{3(aq)} \rightarrow$	
10	Copper + Silver nitrate $\text{Cu}_{(s)} + \text{AgNO}_{3(aq)} \rightarrow$	

### Identify the type of chemical reactions

Looking at reaction side of the chemical equations. The reactants are provided for you. Which types of reactions are happening in this video experiment based on the starting compounds and elements?

- Combination reaction (synthesis):** two smaller or simpler substances come together to make one larger, more complex substance.  

$$\text{A} + \text{B} \rightarrow \text{AB}$$
- Combustion reaction:** An organic compound or a hydrocarbon combines with oxygen gas to form new products. Heat is usually released during the process.  

$$\text{Organic compound} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{heat}$$

$$\text{Hydrocarbon} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{heat}$$
- Decomposition reaction:** one larger or complex substance breaks apart to form two or more smaller or simpler substances. Decomposition usually requires the addition of **heat** or a **catalyst**.  

$$\text{AB} \rightarrow \text{A} + \text{B}$$
- Single replacement, cation exchange reaction:** A metal reacts with an ionic compound (metal is usually solid, ionic compound is usually dissolved). The metal atoms replace the cations (metals) that were originally in the ionic compound.  

$$\text{A} + \text{BC} \rightarrow \text{B} + \text{AC}$$

- **Single replacement, anion exchange reaction:** A nonmetal reacts with an ionic compound. (ionic compound is usually dissolved). The nonmetal atoms replace the anions (nonmetals) that were originally in the ionic compound.



- **Double replacement reaction:** Two dissolved ionic compounds react with each other. The cations and anions in the two original compounds exchange places to form two new compounds. One of the new compounds will form a **new phase** and separate from the solution (solid, liquid, or gas). The other new compound remains dissolved and inert (**spectator ions**).



Choose which type of chemical reaction will happen based on the reactants (starting compounds).

	Reactants	Type of Reaction
1	$\text{BaCl}_{2(aq)} + \text{Na}_2\text{SO}_{4(aq)} \rightarrow$	
2	$\text{Mg}_{(s)} + \text{O}_{2(g)} \xrightarrow{\text{Heat}}$	
3	$\text{Zn}_{(s)} + \text{HCl}_{(aq)} \rightarrow$	
4	$\text{Na}_2\text{CO}_{3(aq)} + \text{HCl}_{(aq)} \rightarrow$	
5	$\text{K}_2\text{CrO}_{4(aq)} + \text{HCl}_{(aq)} \rightarrow$	
6	$\text{H}_2\text{O}_2 \xrightarrow{\text{MnO}_2}$	
7	$\text{Fe}_{(s)} + \text{CuSO}_{4(aq)} \rightarrow$	
8	$\text{Cu}(\text{NO}_3)_{2(aq)} + \text{Na}_3\text{PO}_{4(aq)} \rightarrow$	
9	$\text{Mg}_{(s)} + \text{HNO}_{3(aq)} \rightarrow$	
10	$\text{Cu}_{(s)} + \text{AgNO}_{3(aq)} \rightarrow$	

### Follow-up Questions

Write your answers in complete sentences. Read the information from above and from your notes to help you answer the questions.

What is a precipitate?

How do you know a precipitate is forming during a chemical reaction?

What is a catalyst?

What are spectator ions?