

Group # _____

Name _____

Period ____ Date ____/____/____

Lab Ch 7 • Single Replacement Reactions

Lab Partners: _____

READ Prelab #1-3 – Must be done before you enter lab

Objectives:

- Execute and observe different types of chemical reactions
- Qualitatively identify products of these chemical reactions
- Write balanced chemical equations for these chemical reactions

Safety:



- Use caution with burner.
- In this investigation you will be working with open flames, heating chemicals, handling acids, and producing gaseous products.
- Remember never to smell a chemical directly.
- Wear safety goggles and aprons at all times when working in the lab.
- Be very careful with solutions, especially acids and silver nitrate.

Pre-Lab: Classification of Chemical Reactions (Must be done before lab)

1. Write the general formula for a single replacement reaction. (Use letters like A, B, C, etc)

2. What is a precipitate reaction?

3. What is a gas evolution reaction?

Laboratory Procedure:

1. Reaction of Cu and Silver Nitrate
 - a. Place one piece of Cu wire in a test tube then add about 5mL of aqueous AgNO₃ solution. Make sure part of the copper wire is sticking out of the solution so you can see difference of the wire before and after reaction. **Be careful with Silver Nitrate - will stain your hands, clothing, papers. Rinse your hands after handling.**
 - b. Allow the reaction to take place for at least 5 minutes. Make observations in Data Table below

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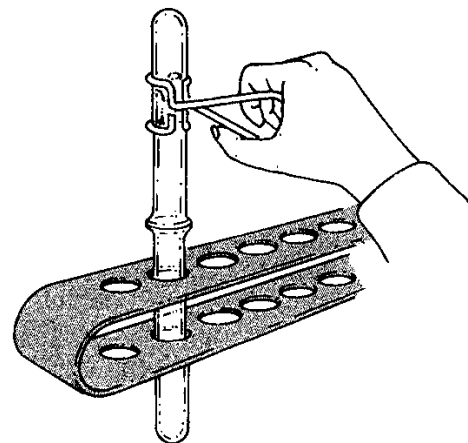
Name _____

Period ___ Date ___/___/___

	Observations <u>Observations should include color changes, odor, produced precipitate, produced gas, etc... Be descriptive!!!</u>
Reaction	
Balanced Equation: Don't forget to balance charges first!! Include States of Matter!!	$\text{Cu}_{(s)} + \text{AgNO}_{3(aq)} \rightarrow$ <u>Use your solubility rules and Activity Series for help.</u>
Question:	Is copper more active than silver? _____

2. Reaction of Zinc and Hydrochloric Acid

- Place one piece of "mossy" Zn in a test tube and add about 10 drops of aqueous 6 M HCl. **Be careful with Acid.**
- Set the test tube in the test tube holder.
- Add one more small piece of **Zn metal** to the test tube.
- As soon as you drop the Zn**, using a test tube holder, invert a dry second test tube over the mouth of the test tube in which the reaction is taking place. (See picture below) Collect the gas produced.
- Light a wooden splint.
- See the diagram to the right. Remove the inverted tube after 30 seconds and quickly insert a **burning** wood splint into the mouth of the tube. (About $\frac{1}{4}$ of the way – Don't touch the liquid)
- Did you hear anything? a pop? (A "pop" indicates the reaction **produced hydrogen gas.**)
- Note the appearance of the substance in the reaction test tube. Make observations in Data Table below



	Observations <u>Observations should include color changes, odor, produced precipitate, produced gas, etc... Be descriptive!!!</u>
Reaction	

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Balanced Equation: Don't forget to balance charges first!! Include States of Matter!!	$\text{Zn}_{(s)} + \text{HCl}_{(aq)} \rightarrow$ <p style="text-align: center;"><u>Use your solubility rules and Activity Series for help.</u></p>
Question:	Is zinc more active than hydrogen? _____

3. Reaction of Zinc and Magnesium Sulfate

- Place one piece "mossy" Zn in a test tube and add about 5mL of aqueous magnesium sulfate, MgSO₄, solution.
- Allow the reaction to take place for at least 5 minutes. Make observations in Data Table below

	<p style="text-align: center;"><u>Observations</u> <u>Observations should include color changes, odor, produced precipitate, produced gas, etc... Be descriptive!!!</u></p>
Reaction	
Balanced Equation: Don't forget to balance charges first!! Include States of Matter!!	$\text{Zn}_{(s)} + \text{MgSO}_{4(aq)} \rightarrow$ <p style="text-align: center;"><u>Use your solubility rules and Activity Series for help.</u></p>
Question:	Is zinc more active than magnesium? _____

4. Copper Nitrate and Zinc

- Place one piece of "mossy" Zn in a test tube and add about 5mL of aqueous Cu(NO₃)₂.
- Allow the reaction to take place for at least 5 minutes. Make observations in Data Table below

	<p style="text-align: center;"><u>Observations</u> <u>Observations should include color changes, odor, produced precipitate, produced gas, etc... Be descriptive!!!</u></p>
Reaction	

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Balanced Equation: Don't forget to balance charges first!! Include States of Matter!!	$\text{Zn}_{(s)} + \text{Cu}(\text{NO}_3)_2_{(aq)} \rightarrow$ <p style="text-align: center;"><u>Use your solubility rules and Activity Series for help.</u></p>
Question:	Is zinc more active than copper? _____

5. Reaction of penny (Cu) and Nitric Acid – **Perform in the FUME HOOD!!**
(Lab benches #1-4 use back Fume hood and Lab benches #5-8 use front Fume hood)
- Take an evaporating dish and penny to hood.
 - Gently place a penny on the evaporating dish and add about 5-10 drops of concentrated nitric acid. **(BE VERY CAREFUL WITH THIS ACID).**
 - Allow the reaction to take place for at least 2 minutes.
 - Take penny off evaporating dish and rinse with water. Notice the difference of penny before and after. Make observations in Data Table below
 - Pour the liquid left in evaporating dish in the waste beaker (in hood). Be careful not to get liquid on skin.** Clean the dish.
 - Is iron more active than copper? _____

	<u>Observations</u> <u>Observations should include color changes, odor, produced precipitate, produced gas, etc... Be descriptive!!!</u>
Reaction	
Balanced Equation: Don't forget to balance charges first!! Include States of Matter!!	$\text{Cu}_{(s)} + \text{HNO}_3_{(aq)} \rightarrow$ <p style="text-align: center;"><u>Use your solubility rules and Activity Series for help.</u></p>
Question:	Is copper more active than hydrogen? _____

Cleaning and Disposal:

- Solids go in the trash
- Clean ALL equipment with LAB Equipment soap & brushes
- Dry dishes for next lab group and place test tubes upside down on test tube rack.
- Clean Lab BENCH with small soap bottle and sponge.
- Wash hands with hand soap.
- Let me know when you are ready. Do not get unprotected until dismissed.