

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

Period: \_\_\_\_\_

Seat#: \_\_\_\_\_

**Required Sections:** (Refer to R-5 for guidelines and requirements. Make note of any specific changes given by your teacher in class)

**Prelab:** Prelab Questions, Hypothesis (If, Then, Because!), Materials, Reagent Table, Procedures, set up Data Tables before class.

**During Lab:** Data section – Fill out your data table that is already set up from the prelab.

**Post-lab:** Discussion Questions Section (done in lab notebook), Post-Lab Two Pager (done on separate worksheet).

**REMINDER - USE R-5 TO ENSURE YOU FOLLOW ALL GUIDELINES/EXPECATIONS/ REQUIREMENTS**

**Purpose:**

To compare and contrast how magnesium and calcium react with water and hydrochloric acid, and to explain the observed reactions using knowledge of periodic trends.

**Prelab Questions** - Do not recopy the questions, just paraphrase them into your answer well enough that it will remind me what the question was about.

- 1) What is the definition of a group?
- 2) Name the different groups of the periodic table (not 1A, 2A, etc..., say the actual names of the groups):
- 3) What is the definition of reactivity?
- 4) Based on what you have already learned regarding periodic trends, should magnesium or calcium be more reactive?

**Hypothesis:**

Answer the purpose – do you think magnesium or calcium will be more reactive? It should be in an “If, Then, Because” format. You need to think about the “Because” part – it should be explaining the periodic trends, not just stating what the trend is!

**Materials** - Remember that a \* means it should be in your reagent table

\* 2 pieces of Mg metal ribbon (2-3 cm)

\* 2 small chunks of Ca metal

Forceps

\* Phenolphthalein indicator

Distilled or Deionized H<sub>2</sub>O

50mL beakers x4

\* 1.0M HCl

[Google Folder with Most MSDS Files](https://tinyurl.com/2cyva3ku)

<https://tinyurl.com/2cyva3ku>

To help speed up your reagent table!



[Flinn's MSDS Website](https://www.flinnsci.com/sds/)

<https://www.flinnsci.com/sds/>

For anything that isn't in my Google folder.



**Procedure** – Remember to make a flow chart, include diagrams/drawings of steps/equipment etc. Google “flow chart procedures” if you are not familiar with how to make a flow chart. You aren't just drawing boxes around all your sentences!

**Water portion of lab:**

- 1) Put on your safety goggles.
- 2) Place 15 mL of distilled water in a 50mL beaker.
- 3) Put 1-2 drops of phenolphthalein indicator into the 50mL beaker.  
(Phenolphthalein turns pink in the presences of a base)  
**CAUTION:** Phenolphthalein solution is poisonous and flammable. Do not get it in your mouth; do not swallow any. Be sure there are no flames in the lab when you are using it.
- 4) Obtain a piece of magnesium ribbon from your teacher.
- 5) Add the magnesium to the 50mL beaker.
- 6) Carefully observe the reaction – look for the signs of a rxn (color change, temperature change, gas being formed, solid being formed, light being emitted). Record any observations and any signs of a rxn you observe, be sure to include observations about the magnitude and the speed of the rxn.
- 7) Place 15 mL of water in a 50ml beaker
- 8) Put 1-2 drops of phenolphthalein indicator into the 50mL beaker.
- 9) Using forceps obtain a small chunk of Ca and put it into your 50 mL beaker.  
**CAUTION:** Do not touch the Ca with your hands. Use forceps!
- 10) Carefully observe the rxn – look for the signs of a reaction (color change, temperature change, gas being formed, solid being formed, light being emitted). Record any observations and any signs of a rxn. you observe, be sure to include observations about the magnitude and the speed of the rxn.

### Acid portion of lab:

11) Place 15mL of 1.0 M HCl in a 50mL beaker, and 15 mL of 1.0 M HCl in a second 50 ml beaker.

**DO NOT ADD PHENOLPHTHALEIN TO THE ACID BEAKERS!**

**IT WON'T CHANGE COLOR IN THE ACID SO IT IS NOT USEFUL TO ADD.**

12) Obtain a piece of Mg ribbon and obtain a small chunk of Ca, as described in steps 4 and 9.

13) Place the Mg in a 50mL beaker and the Ca chunk in the other 50mL beaker.

14) Carefully observe the rxn – look for the signs of a rxn (color change, temperature change, gas being formed, solid being formed, light being emitted). Record any observations and any signs of a rxn you observe, be sure to include observations about the magnitude and the speed of the rxn.

*\*Note\* - the reaction with acid and water should be similar, but the acid will be a more obvious/violent reaction than with water. We are doing both just so you can see that the pattern is the same for the metals in both substances, and because it is kind of fun to see it be a bigger reaction. 😊*

### Disposal and Cleanup

Your teacher will provide disposal and cleanup instructions.

**Data Table** - Remember to use enough space, make it look professional, etc!

Make your own data table! Remember, you need to make sure your data table has all required elements! A sample is provided below. You will need to add a descriptive title, etc. The one shown here is not adequate!

<b>Descriptive Title</b>		
	<b>Reaction with H<sub>2</sub>O</b>	<b>Reactions with HCl</b>
<b>Mg</b>	<i>Sample Table</i>	
<b>Ca</b>		

**Post Lab Discussion Questions** – To be done AFTER the lab is done. Do not recopy the questions, just paraphrase them into your answer well enough that it will remind me what the question was about.

- 1) Which metal reacted faster with water? With Acid?
- 2) Make a statement about the trends in reactivity as you move down the column of alkaline earth metals.
- 3) Predict the reactivity of beryllium, strontium, barium and radium based on your observations in this lab.
- 4) Why would it be dangerous to touch even a small amount of radium with your hands? Your answer should NOT be about radioactivity...think about the chapter we are on right now and the point of the lab! What would the radium react with in your skin?
- 5) Barium and radium metals are stored in containers filled with oil. Why are they not stored in regular containers? What is the oil preventing them from reacting with in the air?
- 6) Group VIIA (The halogens – nonmetallic elements) reactivity decreases as the atomic number increases. Explain why this group of elements is opposite Group IA.
- 7) This lab explored one periodic trends – reactivity, but there are lots of periodic trends. Indicate whether the following properties increase or decrease from left to right across the periodic table.
  - a. Atomic radius
  - b. Ionization energy
  - c. Electronegativity
- 8) Rank the following elements in the various was listed below: sulfur, oxygen, neon, aluminum.
  - a. Increasing atomic radius
  - b. Increasing ionization energy
  - c. Increasing electronegativity