

25 points maximum based on safety, following directions, accuracy, completeness, neatness, on-task, clean up

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

### ***Chemical Reaction Laboratory - Magnesium Burning***

**Purpose:** In this lab activity, students will observe a reaction involving burning the element magnesium with oxygen in the air to produce a new substance named magnesium oxide.

**Equation:** The formula for the chemical reaction is:  $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$

**Equipment and Materials:** safety goggles, Bunsen burner or propane torch, matches or flint striker, tongs, magnesium ribbon, 300 ml beaker or large glass dish.

**Safety Rules:** From pages 572-574 in your textbook <sup>1</sup>, write the numbers of the applicable safety rules for this laboratory. \_\_\_\_\_

#### **Procedure:**

1. The demonstration is set-up far enough away from the students so there is no chance than anyone will get burned.
2. The teacher shows the class the magnesium metal and asks the students to describe its color, physical state, and other properties.
3. With safety goggles on, the teacher places the torch or burner on a stand and lights the burner. A beaker or glass dish is placed on the table below the tip of the burner to catch the burning magnesium.
4. A short piece (6 to 8 cm long) of magnesium ribbon is held by the tongs over the flame.
5. Students observe the reaction, and are asked to describe the color and nature of the material in the beaker.
6. Students record their observations in the space provided below.

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#### **Observations of Physical Properties of Reactants and Product:**

	<u>State</u>	<u>Luster</u> ( <u>Shiny or Dull</u> )	<u>Color</u>	<u>Conducts</u> <u>Electricity(Y/N)</u>	<u>Malleable/Brittle</u>
Mg	_____	_____	_____	_____	_____
O <sub>2</sub>	_____	_____	_____	_____	_____
MgO	_____	_____	_____	_____	_____

**Observations Made During the Reaction:** \_\_\_\_\_

#### **Questions and Problems:**

1. In the space provided rewrite the equation, making it balanced. \_\_\_\_\_  
\_\_\_\_\_
2. Write the balanced equation in sentence form. \_\_\_\_\_  
\_\_\_\_\_
3. What type of reaction occurred? Tell why you know so. \_\_\_\_\_  
\_\_\_\_\_

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1. *Focus on Physical Science*, California Grade 8, Glencoe/McGraw-Hill, Columbus, Ohio (2007).

**Drawing:** In the space provided, make a neat, colored, detailed, and labeled picture of this lab activity.



25 points maximum based on safety, following directions, accuracy, completeness, neatness, on-task, clean up

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

## ***Chemical Reaction Laboratory - Magnesium Burning***

### ***Answer Sheet & Notes***

**Purpose:** In this lab activity, students will observe a reaction involving burning the element magnesium with oxygen in the air to produce a new substance named magnesium oxide.

**Equation:** The formula for the chemical reaction is:  $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$

**Equipment and Materials:** safety goggles, Bunsen burner or propane torch, matches or flint striker, tongs, magnesium ribbon, 300 ml beaker or large glass dish.

**Safety Rules:** From pages 572-574 in your textbook <sup>1</sup>, write the numbers of the applicable safety rules for this laboratory. \_\_\_\_\_

### **Procedure:**

1. The demonstration is set-up far enough away from the students so there is no chance than anyone will get burned.
2. The teacher shows the class the magnesium metal and asks the students to describe its color, physical state, and other properties.
3. With safety goggles on, the teacher places the torch or burner on a stand and lights the burner. A beaker or glass dish is placed on the table below the tip of the burner to catch the magnesium oxide product.
4. A short piece (6 to 8 cm long) of magnesium ribbon is held by the tongs over the flame.
5. Students observe the reaction, and are asked to describe the color and nature of the material in the beaker.
6. Students record their observations in the space provided below.

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### **Observations of Physical Properties of Reactants and Product:**

	<u>State</u>	<u>Luster</u> (Shiny or Dull)	<u>Color</u>	<u>Conducts</u> Electricity(Y/N)	<u>Malleable/Brittle</u>
Mg	Solid	Dull	Grey	Yes	Malleable
O <sub>2</sub>	Gas	None	Colorless	No	Gas
MgO	Solid	Dull	White	No	Brittle

**Observations Made During the Reaction:** Burns with bright white light and turns to white powder

### **Questions and Problems:**

1. In the space provided rewrite the equation, making it balanced.



2. Write the balanced equation in sentence form. Two magnesium atoms combined with one diatomic oxygen molecule to form two molecules of magnesium oxide.
3. What type of reaction occurred? Tell why you know so. A chemical reaction called synthesis. A new substance was formed from two different substances.

## Notes to Teacher or Demonstrator

Some hints on performing the demonstration and points that might be made are as follows:

1. Show the students the strip of magnesium and ask them to describe its color, state of matter, and flexibility. Ask them if they think the strip will conduct electricity; if possible, test the strip to prove that it does.
2. Ask the students to describe the state, color, and flexibility of the oxygen in the air. Ask if the oxygen in the air conducts electricity; if possible test the air to prove that it doesn't.
3. Use a stand to support the propane tank so that your hands are free to hold a strip of magnesium with the tongs. Position the beaker or dish such that you can drop the burning magnesium strip into it after it begins to burn.
4. Ask the students to describe the residue in the beaker: state of matter, color, flexibility.
5. Ask the students what type of reaction took place. Explain that yes, it is chemical, but it is also a type of chemical reaction called synthesis, which means a new material, magnesium oxide, was created by the reaction of two different substances, magnesium and oxygen. Also explain that there are other types of chemical reactions such as decomposition, where one substance is broken down into different substances.
6. Have the students balance the equation. Explain that all chemical reactions must obey the law of conservation of matter so the mass of the magnesium and oxygen we started with must equal the mass of the magnesium oxide we produced. If time permits, explain how scientists use the atomic masses (atomic weights) to determine the amount of magnesium to use to produce a certain mass of magnesium oxide.
7. If time permits, explain the uses of magnesium (eg., in alloys to manufacture aircraft, flares, explosives, etc.) and magnesium oxide (insulator in electronic devices, white standard for paper and other products, etc.).