



Name \_\_\_\_\_

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

### 4<sup>th</sup> of July “Combustion in 2 Different Gases” (from Al Guenther’s Science Solutions)

**BACKGROUND:** As you probably know, air contains a gas, which is necessary when you want to burn something (combustion). Most living organisms also need this same gas. What is the name of the gas that is diffused in the alveoli in your lungs during respiration and is exchanged for carbon dioxide?

The name of this gas is \_\_\_\_\_ and its symbol is \_\_\_\_\_.

In the next 30 minutes you are going to do an experiment that seems impossible. You are going to burn something in a gas that is used to extinguish fires! This gas makes the bubbles in soda, is used in pellet and paintball guns, and is in the air you exhale. This gas is carbon dioxide. What is its formula?

\_\_\_\_\_ What is in carbon dioxide that is needed for burning (combustion)? \_\_\_\_\_

**CAUTION: Goggles and aprons are mandatory!** Do not look directly at the burning metal!

**MATERIALS:** 2 magnesium strips, tongs, matches, red and blue litmus paper, water dropper, watch glass, graduated cylinder, small beaker, vinegar, baking soda, pickle jar, cardboard lid, goggles and apron

**PROCEDURE:** 1. Holding it in tongs, light a match and lower it into the pickle jar. **DO NOT DROP IT!**

Does it keep burning? \_\_\_\_\_ Explain why. \_\_\_\_\_

2. Raise your hand and Mr. Logan will bring you an Mg strip. The name for Mg is \_\_\_\_\_. Hold the Mg strip in the tongs and have Mr. Logan light it with the torch. Lower the Mg into the jar.

**DO NOT DROP IT!** Does it keep burning? \_\_\_\_\_ Explain why \_\_\_\_\_

Is the burning of Mg endothermic, exothermic or non-thermic? \_\_\_\_\_ Why? \_\_\_\_\_

3. Drop the “ash” onto the watch glass and rub some between your fingers. What color is it? \_\_\_\_\_

What elements make up this substance? \_\_\_\_\_ and \_\_\_\_\_  
(Hint: What element did you begin with and what element, needed for combustion, is in the air)

Name the white substance \_\_\_\_\_ (named from the 2 elements that make it up)

4. Complete the balanced chemical equation below, which describes what happened in your pickle jar:



5. Put 25 mL of CH<sub>3</sub>COOH (acetic acid-vinegar) into your graduated cylinder. Put 40 mL NaHCO<sub>3</sub> (baking soda) into your small beaker. Pour the baking soda into your pickle jar. Have the cardboard lid in one hand and pour the acetic acid into the pickle jar with baking soda in it. Cover with the cardboard lid immediately. Describe what happens when the acetic acid met the baking soda?

\_\_\_\_\_ What is the formula for the gas that forms? \_\_\_\_\_

6. Is the gas forming reaction endothermic, exothermic or non-thermic? \_\_\_\_\_ (feel the jar)

**You have formed CO<sub>2</sub> in the jar! Remember that it is a gas and it will escape if you are careless.**

7. Holding it in tongs, light a match, slide the cardboard lid aside (part way) and lower it into the pickle jar. DO NOT DROP IT! Pull out the match and Immediately slide the cardboard lid over the jar.

Does it keep burning? \_\_\_\_\_ Explain why. \_\_\_\_\_

8. Raise your hand and Mr. Logan will bring you an Mg strip. Hold the strip in the tongs, have Mr. Logan light it with the torch. Lower the Mg into the jar with the newly formed gas. DO NOT DROP IT!

Explain what happened this time? \_\_\_\_\_

9. Drop the “ash” onto the watch glass and rub some between your fingers. What color is it? \_\_\_\_\_

What color do you find in addition to the white substance from before? \_\_\_\_\_

What element make up this new substance? \_\_\_\_\_ (Hint: Remember you combined Mg with CO<sub>2</sub> and there is only one element in this group that is different from before.)

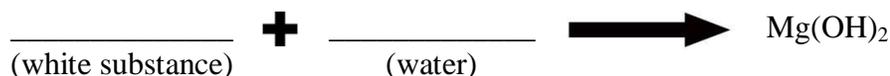
10. Complete the balanced chemical equation below, which describes what happened in your pickle jar:



11. Add several drops of water to the white “ash” on the watch glass and stir. When most of the white substance is dissolved, lay red and blue litmus paper in it. What is the solution in your watch glass?

\_\_\_\_\_ (Hint: If red strip turns blue it is alkaline (base), if blue turns red the liquid is acid.)

12. Complete the balanced equation that shows what happened when you mixed water and the “ash”



13. The product of the previous chemical equation is Mg(OH)<sub>2</sub>. Explain (in detail) why it is a base.

\_\_\_\_\_

### CLEAN UP:

14. Rinse the watch glass and the jar with water, dry them off, and put a new paper towel the tray
15. Throw the litmus paper in the garbage.  
(Remember: no solid down the sinks please!)
16. Put the tongs, water dropper, cardboard lid and sealed litmus paper back in each tray.
17. Fold the aprons and put the goggles back in the drawer.

