Name: _____
Period: ____

Lab: Testing for Gases

Purpose: To test for the presence of hydrogen, oxygen, and carbon dioxide following a chemical reaction.

Procedure:

I. Testing for Hydrogen

(1) Obtain hydrochloric acid, one piece of magnesium ribbon, and a piece of sand paper.
(2) Carefully pour about 2 cm of hydrochloric acid into a small test tube.
(3) Add the magnesium ribbon to the hydrochloric acid. **In this reaction, the hydrochloric acid (HCl) reacts with magnesium to produce magnesium chloride and hydrogen gas**.
(4) Watch the solution for approximately one minute and record your observations in the table below.
(5) Bring a *burning* wood splint to the opening of the test tube. A "pop" indicates the presence of hydrogen gas. Record your observations in the table below.
(6) Discard the contents of the test tube into the appropriate waste container.

II. Testing for Oxygen

(1) Obtain hydrogen peroxide solution and manganese (IV) oxide.
(2) Carefully pour about 2 cm of hydrogen peroxide into a small test tube.
(3) Add a small amount of manganese (IV) oxide to the hydrogen peroxide. **In this reaction, the hydrogen peroxide (H_2O_2) decomposes into water and oxygen gas**. The manganese (IV) oxide is only added to increase the rate of the reaction.
(4) Watch the solution for approximately one minute and record your observations in the table below.
(5) Bring a glowing wood splint to the opening of the test tube. A *glowing* splint that bursts into flame indicates the presence of oxygen gas. Record your observations in the table below.
(6) Discard the contents of the test tube into the appropriate waste container.

III. Testing for Carbon Dioxide

(1) Obtain acetic acid solution and solid sodium hydrogen carbonate.
(2) Carefully pour about 2 cm of acetic acid into a small test tube.
(3) Put a small scoopful of sodium hydrogen carbonate into the test tube. **In this reaction, acetic acid ($HC_2H_3O_2$) reacts with sodium hydrogen carbonate ($NaHCO_3$) produce water, sodium acetate, and carbon dioxide**.
(4) Watch the solution for approximately one minute and record your observations in the table below.
(5) Bring a *burning* wood splint to the opening of the test tube used to collect the gas. A burning flame that is extinguished indicates the presence of carbon dioxide gas. Record your observations in the table below.
(6) Discard the contents of the test tube into the sink.

Observations:

Change	Observations of Reaction	Results of Gas Test
I. Testing for Hydrogen		
II. Testing for Oxygen		
III. Testing for Carbon Dioxide		

Questions:

(1) (a) Write the formula for the **gas** that is produced in the reaction of magnesium with hydrochloric acid.
(b) Write a balanced chemical equation for the reaction of magnesium with hydrochloric acid (HCl).

(2) (a) Write the formula of the **gas** that is produced in the decomposition of hydrogen peroxide.
(b) Write a balanced chemical equation for the decomposition of hydrogen peroxide (H_2O_2).

(3) (a) Write the formula of the **gas** that is produced in the reaction of acetic acid with sodium hydrogen carbonate.
(b) Write a balanced chemical equation for the reaction of acetic acid ($HC_2H_3O_2$) with sodium hydrogen carbonate ($NaHCO_3$).

Conclusion:

Summarize how to test for hydrogen, oxygen, and carbon dioxide.