LAB: Detecting Carbon Dioxide

date _____

Last Name _____ First _____ per ___

Introduction

The compound carbon dioxide (CO_2) is composed of the elements carbon and oxygen. The atmosphere contains about 1% carbon dioxide. Plants, through the process of ***photosynthesis***, take CO_2 and water (H_2O) and produce sugar ($C_6H_{12}O_6$). Animal including human cells break sugar down to CO_2. This process is known as ***respiration***. The CO_2 produced in respiration is carried away from the cells by the blood to the ***capillaries*** in the lungs. Gas exchange occurs between the capillaries and the ***alveoli sacs*** in the lungs. Finally CO_2 is exhaled when the ***diaphragm muscle*** moves up.

The presents of CO2 can be detected by using the indicator solution bromothymol blue. BTB turns from blue to green to yellow when CO_2 gas is bubbled through it.

Purpose

The purpose of this investigation is to test exhaled breath, air, and the product of the reaction between baking soda and vinegar for the presence of carbon dioxide.

Materials

Per group: 4 small flasks,1 large flask, bromothymol blue solution, 4 straws, air compressor, balloons filled with air, empty balloons, baking soda and vinegar, film canister, prongs, rinse bucket

Procedure

1. Put 25 ml of bromothymol blue solution into a flask. Gently blow through the straw into the solution. Continue blowing until the solution changes color. Record the color change in the table below.
2. Put a fresh 25 ml of BTB solution into the flask. Insert a straw into the mouth of the balloon containing air. Secure with your finger so that no air escapes around the outside of the straw. Insert the tip into the BTB and slowly release the air so that it bubbles through the solution. Record the color change in the table below.
3. Put a fresh 25 ml of BTB solution into the flask. Put 25 grams of baking soda into a larger clean dry flask. Fill a film can with vinegar. Use prongs to place the can into the flask without spilling it. Place a balloon over the mouth of the flask. Tilt the flask so that the vinegar spills into the baking soda. Collect the gas in the balloon and bubble it through the BTB as you did in step 2. Record the color change in the table below.

Data: CO_2 test BTB

GAS	ORIGINAL COLOR	FINAL COLOR	CO_2 presence + or -
Exhaled breath			
Air			
Vinegar + baking soda product			

Analysis:

1. Explain the result of the breath test.

2. Explain the result of the air test.

3. Explain the result of the chemical reaction between baking soda and vinegar test.

4. Which test showed the most CO2?

Conclusion:

Write a paragraph explaining why CO_2 is in exhaled breath.