Lab # _____ The Soda Acid Fire Extinguisher

Name _____
Mod ____ Student Number ____
Date _____

Purpose: to construct a working model of the soda acid extinguisher and be able to explain its operation

Materials: widemouth bottle, 1 hole stopper with glass tube, dilute hydrochloric, acid (HCl), baking soda ($NaHCO_3$), H_2O, small glass vial, bucket, triple beam balance, graduated cylinder, safety glasses, laboratory apron

Procedure: Read each set of directions carefully. Check off each of the following steps as they are completed.

1. Measure 5 g of $NaHCO_3$ into a clean widemouth bottle. To this add 100 ml of H_2O. Set the bottle aside.

2. Fill a small glass vial 3/4 full of HCl. Carefully lower the vial down into the bottle, being careful not to allow the acid to empty into the $NaHCO_3$ and water. Place the stopper and glass tube securely on the bottle.

3. (DO NOT POINT THE GLASS TUBE IN ANOTHER PERSON'S DIRECTION.) Holding the stopper tightly with your fingers, invert the bottle over the bucket.

Observations: Use the space below to describe the reaction that took place. Include a labeled drawing on the back of this paper.

EXPLAINATION: The bottle contains a solution of baking soda water and a small vial of acid. When turned upside down (inverted) the acid reacts with the baking soda releasing bubbles of carbon dioxide (CO_2). These bubbles rise to the surface of the liquid collecting in the air space. The addition of the CO_2 creates pressure above the liquid pushing the water out the glass tube.

Follow-up assignment:

1. Make a drawing of the REAL soda acid extinguisher found in the classroom. You may take it apart for examination.

   a. Label all parts.
   b. Label all chemicals (both liquid and solid) that would normally be found within the extinguisher.

2. Why must the extinguisher be turned upside down?

3. What is the function of the acid?

4. What pushes the liquid out of the extinguisher.

5. DO NOT use this extinguisher upon which classes of fires?