SCH 4C1 LAB: PROPERTIES OF ACIDS AND BASES

In this activity you will investigate (or review) some properties of acids and bases.

Materials:

test tubes (2)	blue and red litmus paper
microtray	dilute acetic acid (vinegar)
glass stirring rod	dilute hydrochloric acid
water	dilute sodium hydroxide
magnesium ribbon	dilute ammonium hydroxide
burning splint	phenolphthalein indicator
	bromthymol blue indicator

Procedure:

Part A: Properties of Acids

1. Prepare a data chart like the one shown below.

	Hydrochloric Acid	Acetic Acid
Blue litmus paper		
Red litmus paper		
Phenolphthalein		
Bromthymol blue		
Magnesium		
Touch test		

2. Label 2 test tubes #1 and #2.
3. Put 4 mL of water into each of the two test tubes.
4. Add 15 drops of hydrochloric acid to the first test tube.
5. Add 15 drops of acetic acid to the second test tube.
6. Gently shake each test tube to mix.
7. Use the glass rod to add a drop of the hydrochloric acid solution to:
   a) a strip of red litmus paper
   b) a strip of blue litmus paper
   c) a drop of phenolphthalein indicator in a microtray well
   d) a drop of bromthymol blue indicator in a microtray well
8. Record your results.
9. Repeat steps 7 and 8 using the acetic acid solution.
10. Add a piece of magnesium ribbon to each test tube and gently shake. Record your observations. Place your thumb over the top of the hydrochloric acid test tube to prevent the gas from escaping. Test the gas produced by bringing a lighted splint up to the mouth of the test tube.
11. Place two drops of the acetic acid solution on your baby finger with the stirring rod. Describe how it feels.

Part 2: Properties of Bases:

1. Prepare a data chart similar to that in Part 1.
2. Repeat steps 2 – 10 from Part 1 using the bases sodium hydroxide and ammonium hydroxide.
3. Put two drops of the sodium hydroxide solution between two of your fingers. Describe how it feels.

Questions:

1. Using your results, summarize the colour of the various indicators used in this lab in the presence of an acid or base. (i.e. blue litmus paper turns _____ in an acidic solution and _____ in a basic solution)
2. The reaction of magnesium with hydrochloric acid (HCl) is an example of a single displacement reaction. Write a complete word equation and a balanced chemical equation to describe this reaction.
3. What gas was produced when Mg metal was placed in the acidic solutions? (Hint: refer to your equation in question 2). How did the burning splint test confirm the identity of the gas?
4. All bases posses common properties because they all form the same ion in solution. What is the name and formula of this ion? Write the dissociation equation for sodium hydroxide, NaOH.
5. Commercial drain cleaners are a mixture of aluminum and sodium hydroxide. These substances react as follows when dissolved in water:

   $Al_{(s)} + NaOH_{(aq)} \rightarrow Na_3AlO_{3(aq)} + H_{2(g)}$

   Balance the skeleton equation. Then explain why this chemical reaction can help clear a clogged drain. (Hint: recall what happened when the gas was produced in the lab).
6. List a common household product in which you would find:
   a) hydrochloric acid
   b) acetic acid
   c) sodium hydroxide
   d) ammonium hydroxide