

## pH Pre-Lab

### ACIDS and BASES

#### Introduction

Many common substances are either acids or bases. Some acids, like stomach acid are necessary for our health, while others, like sulfuric acid are dangerous and can cause burns and other injuries. Baking soda is a common, weak base used in our homes, while sodium hydroxide, a strong base, is hazardous to skin and eyes.

The easiest way to determine if a substance is acidic or a basic is to use an indicator. Indicators are organic molecules that change color in an acid or a base. When an indicator is placed on paper, it provides a fast way to determine if a substance has acidic or basic properties. The most common acid/base indicator paper is called litmus paper, so a litmus test is the first test used to determine acidic or basic properties. If the litmus paper does not change color, the substance is neutral,

How can we determine the strength of an acid or base? The strength of an acid or base is measured in pH which is the concentration of the hydrogen ion ( $H^+$ ). A high pH indicates a strong base, while a low pH indicates a strong acid. A pH of seven indicates a neutral substance (like water).

#### Objectives

The Students will:

- ✘ use litmus paper to test for an acid, base or neutral substance.
- ✘ use pH paper to test for the pH of a substance.
- ✘ explain the difference between test using litmus paper and pH paper.
- ✘ compile and evaluate the data in a class data table.

#### Materials

- ✘ two pieces of litmus paper (one pink and one blue)
- ✘ a 2" piece of pH paper
- ✘ pH color chart

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

### Procedure -1 Are You Acidic or Basic?

1. Take two pieces of litmus paper (1 pink, 1 blue) and place about one inch of each paper in your mouth.
2. Wait 5 seconds, then take out the papers and see if either changed color. You will determine whether your saliva is acidic or basic.

(Red to Blue means basic ; Blue to Red means acidic, no change mean neutral)

Are you acidic or basic? \_\_\_\_\_ Class totals Acidic \_\_\_\_\_ Basic \_\_\_\_\_

Your saliva will test acidic, basic or neutral. The red litmus paper will turn slightly blue for a base. The blue litmus paper will turn slightly pink in an acid. If nothing happens, it is neutral. In order to determine how acidic or basic you are, you need to use pH paper, which changes color to indicate the pH. pH paper is treated with a broad range indicator that changes color with varying pH. (This pH value is an approximate value based on color comparison. More exact pH values are found using pH meters or by titration using acids and bases)

### Procedure-2 How acid or basic are you?

1. Tear off a piece of pH paper about 1 in. long.
2. Place part of it in your mouth and wait about five seconds.
3. Remove the paper and compare the color with the pH color chart at your table.

**(Do not let the paper dry because the colors change as the paper dries)**

How acidic or basic are you? What was the pH? \_\_\_\_\_

Use the data table below to compile the information for the class.

| Litmus Paper |         |      | pH Paper |               |         |
|--------------|---------|------|----------|---------------|---------|
| Acid         | Neutral | Base | Below 6  | Between 6 & 7 | Above 8 |
|              |         |      |          | 7 & 8         |         |

### Questions

1. How many people tested acidic, basic or neutral with litmus paper?  
Which group was larger?
2. Was there a pattern in the results for the whole class? If so, what was it?
3. What substances could affect the outcome of the litmus test? (food, drinks etc.)
4. What were the results with the pH paper? How many people were in each pH range?
5. Was there any pattern in the pH values for whole class? If so, what was it?
6. Make a data table of your results.