pH Lab

Background Information

Many common household solutions contain acids and bases. Acid-base indicators, such as litmus and red cabbage juice, turn different colors in acidic and basic solutions. They can, therefore, be used to show if a solution is acidic or basic. An acid turns blue litmus paper red, and a base turns red litmus paper blue. The acidity of a solution can be expressed using the pH scale. Acidic solutions have pH values less than 7, basic solutions have pH values greater than 7, and neutral solutions have a pH value equal to 7.

In this experiment, you will use litmus and a pH meter to determine the pH values of household substances. After adding red cabbage juice to the same substances, you will determine the different colors of red cabbage juice indicator over the entire pH range.

Procedure

1) Put on your safety goggles and proper lab clothes. You must obey all lab rules.

Part I Litmus Tests

2) Label 6 test tubes with the numbers 1-6 and place them in a test-tube rack.

3) Measure about 3 mL (two fingers) of vinegar into test tube #1. Refer to the data table and fill each of the test tubes 2-6 to about the same level with its respective solution.

4) Get two pieces of blue litmus paper and cut them into thirds. You will have six pieces total. Put them in a row on a paper towel. Do the same for red litmus paper.

5) Use a stirring rod to transfer one drop of vinegar to a small piece of blue litmus paper on the paper towel. Repeat this and put a second drop on the same paper. Transfer one drop to a piece of red litmus paper on the paper towel. Record the results. Clean and dry the stirring rod each time.

6) Test solutions 2-6 using the same procedure. Be sure to clean and dry the stirring rod each time.

Part II pH Tests

7) Get a pH meter, remove the cover, and turn it on.

8) Fill a small beaker with distilled water to use to rinse the pH probe end. Rinse it before and after insertion into any solution to be tested.

9) Get one of the 6 solutions in the test tube. Insert the pH meter into the test tube. When the pH reading stabilizes, record the pH value.

10) Cap the pH probe, shut it off, and return it to the rack.

Part III Red Cabbage Juice Indicator

11) *After* you have finished the Part I litmus tests, add about 3 mL of red cabbage juice indicator to each of the 6 test tubes. Record your observations. Dispose of the test-tube contents.

Name _____ Period _____

Partner _____ Date _____

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Prelab Questions

1) What color will red litmus paper turn in base?

2) What color will red litmus paper turn in acid?

3) What color will blue litmus paper turn in base?

4) What color will blue litmus paper turn in acid?

5) Name something that an acid will not dissolve?

Data

Test Tube	Solution	Blue Litmus	Red Litmus	Red Cabbage Juice COlor	pH
1	vinegar				
2	ammonia				
3	lemon juice				
4	soft drink				
5	drain cleaner				
6	baking soda				

Post Lab Questions

1) Which of the household solutions tested are acids? How can you tell?

2) Which of the solutions are bases? How can you tell?

3) What color(s) is red cabbage juice indicator in acids? What about in bases?

4) Can red cabbage juice indicator be used to determine the strength of acids and bases? Explain.

5) List advantages and disadvantages of litmus paper and red cabbage juice indicators.