Using Litmus Paper to Test Acids and Bases

Introduction

Litmus paper is commonly used to determine if a solution is acidic or basic. Follow this simple procedure to determine the pH of household chemicals.

Concepts

- Acids vs. bases
- Indicators
- pH scale

Materials

Beaker, 50-mL
Household chemicals
Litmus blue test papers
Litmus red test papers

Safety Precautions

Some household chemicals are toxic by ingestion or inhalation and are skin and eye irritants. Avoid contact of all solutions with eyes and skin and clean up spills immediately. All food-grade items that have been brought into the lab are considered laboratory chemicals and are for lab use only. Do not taste or ingest any material in the lab and do not remove any remaining food items after they have been used in the lab. Wear chemical splash goggles, chemical-resistant gloves, and a chemical-resistant apron. Wash hands thoroughly with soap and water before leaving the laboratory. Follow all laboratory safety guidelines. Please review current Safety Data Sheets for additional safety, handling, and disposal information.

Procedure

1. Pour a small volume (10–20 mL) of the chemical to be tested into a 50-mL beaker.
2. Place a stirring rod in the solution.
3. Obtain a strip of litmus blue test paper and touch the wet portion of the stir rod to the strip.
4. Observe the color change, if any, and record results.
5. Repeat steps 3 and 4 using litmus red test paper.
6. Repeat steps 1–5 using a clean beaker for each solution to be tested.

Disposal

Please consult your current *Flinn Scientific Catalog/Reference Manual* for general guidelines and specific procedures, and review all federal, state and local regulations that may apply, before proceeding. Used litmus paper may be thrown in the trash according to Flinn Suggested Disposal Method #26a.

Connecting to the National Standards

This laboratory activity relates to the following National Science Education Standards (1996):

Unifying Concepts and Processes: Grades K–12
Evidence, models, and explanation
Constancy, change, and measurement
Content Standards: Grades 5–8
Content Standard A: Science as Inquiry
Content Standard B: Physical Science, properties and changes of properties in matter
Content Standards: Grades 9–12
Content Standard A: Science as Inquiry
Content Standard B: Physical Science, structure and properties of matter, chemical reactions

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Tips

- Dissolve solid substances in a small amount of distilled or deionized water. Tablets may be crushed with a mortar and pestle or between layers of waxed paper.
- This activity is an excellent and fun way to introduce acids and bases along with their application in industry, health, and the environment.

Discussion

Acids are compounds that release hydrogen ions (H^+) in solution. Acids are corrosive, sting if they contact broken skin, and taste sour. Bases are compounds that release hydroxide ions (OH^-) in solution. Bases feel slippery as solutions, are corrosive, and have a bitter taste. (*Note:* Taste should never be used to identify a lab chemical, and chemicals should not be touched with the bare skin.)

To express the concentration of hydrogen ions in solution, a term called pH (potential of hydrogen) is used. The pH scale ranges from 0–14. If the concentration of H^+ ions is greater than the concentration of OH^- ions, then the substance is considered acidic and has a pH value lower than 7. Conversely, if the concentration of OH^- ions is greater than the concentration of H^+ ions, then the substance is basic and has a pH value greater than 7. If the H^+ and OH^- ion concentrations are equal (as in pure water, H_2O), the substance is neutral, with a pH value of 7. Figure 1 provides pH values for some common substances.

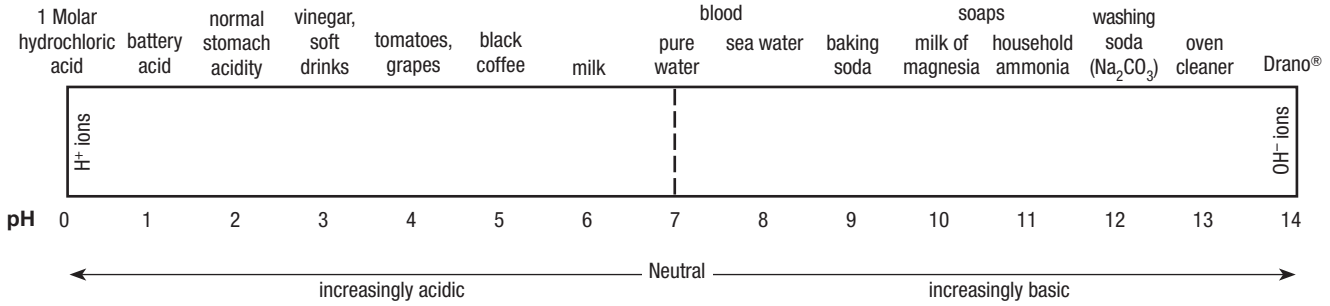

Figure 1. pH Values for Some Common Substances

Materials for *Using Litmus Paper to Test Acids and Bases* are available from Flinn Scientific, Inc.

Catalog No.	Description
AP7744	Litmus Acid–Base Indicator Strips
AP7923	Litmus Blue Test Papers, 100 strips per vial
AP7945	Litmus Red Test Papers, 100 strips per vial

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.