

Experiment Procedure

Many substances encountered in our daily lives are either acidic or basic. It is possible to perform these tests at home as well as scientific methods to separate them. Let's start with the definition of acid and base.

What is Acid?

An acid is a substance that, when mixed with water, gives off hydrogen ions and turns our indicator paper, known as litmus paper, red.

What is Base?

A base is a substance that, when mixed with water, gives off hydroxide ions and turns our indicator paper, known as litmus paper, blue.

When examining substances, we not only look at whether they are acids or bases but also need to know their strength. This is important because the importance of these in the mixtures we use is significant. Acids and bases have found their way into our daily lives, even in our meals. Therefore, using these acids and bases by looking at their strengths and quantities is of great importance. For example, if we mix acids and bases in a dish we are preparing, a reaction will occur, resulting in salt. Therefore, the amount and place of use of the substances we use are important.

Studies have shown that the majority of the foods consumed by people are acidic. Almost all of the cleaning products we use are basic. Now it's time to learn whether substances are acidic or basic.

We can determine whether substances are acidic or basic by using the pH system, which we determine based on the strength of hydrogen atoms in a substance. For this, we can use a scale or an indicator substance that we will use only as a marker.

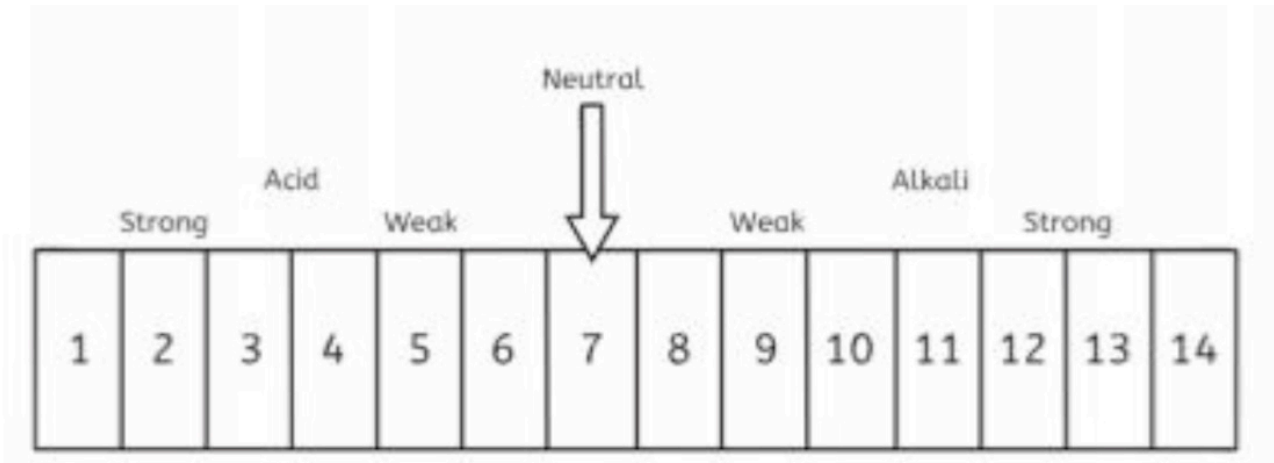
What is an Indicator?

Indicators are substances that can distinguish whether a solution is acidic or basic, not as numerical data but as acid or base. In our experiment, we will use blue-red litmus paper and cabbage juice as indicators.



pH (Power of Hydrogen) - What Is It?

pH is the method of determining the amount of hydrogen within a substance. For this purpose, pH strips with 4 colors and a pH meter will be used. The pH meter contains whole numbers between 1 and 14. Values between 1 and 6 indicate that the solution is acidic, 7 means the solution is neutral, and values between 8 and 14 indicate that the solution is basic. If the pH increases, the alkalinity of the solution increases, and if the pH value decreases, the acidity of the solution increases.



Experiment Section:

In the experiment, first, we will determine whether our solutions are acidic or basic using litmus paper and cabbage juice. Afterward, we will measure the degrees of our acids and bases using pH paper.

Experiment 1: Preparation of Solutions

In our experiment, we will use 6 different substances as solutions. These are Lemon Juice, Bleach, Salty Water, Alcohol, Baking Soda, and Clean Water.

Experiment 2: Litmus Paper Test

We will pour each of these 6 different solutions into separate beakers. Then, we will dip litmus paper into each one and observe the color changes. Substances turning blue litmus paper into red are defined as acids, and those turning red litmus paper into blue are defined as bases.

Experiment 3: Cabbage Juice Test

Now, in the same beakers, we will test with cabbage juice. First, we need to extract the juice from our red cabbage by grating or passing it through a cutting robot. Then, we should pour a small amount of this cabbage juice into the solution whose acidic or basic nature we want to determine. If the solution turns close to red, it is acidic; if it turns close to blue, it is basic. If the solution's color is close to that of cabbage juice, it is neutral.

Experiment 4: Grading Test with pH Paper

In this stage of the experiment, we need to prepare the solutions we used again. We will dip pH strips into each of the newly prepared solutions. Then, we will compare these strips with the pH

meter chart. The number at the corresponding place where our measured pH strip matches the pH meter will be the pH level of our solution. For example, if the colors on the pH strip dipped in lemon juice match the colors at the 3rd place on the pH meter, we can say that the pH value of lemon juice is 3. Based on the information given above, we can classify lemon juice as an acid since it is between 1 and 6. Also, since it is close to 1, lemon juice can be classified as a strong acid. In this way, we can accurately find the pH values of all our solutions.

You can also turn the substances you are curious about into solutions and use any test method you like to find out whether they are acidic or basic.