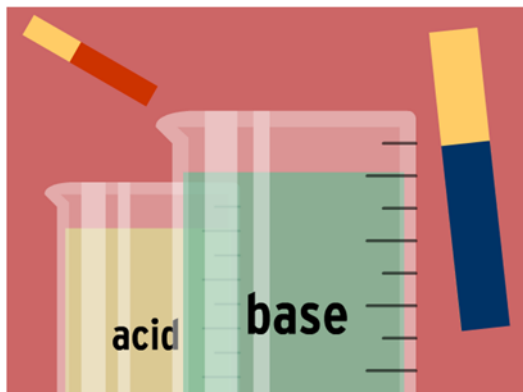


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## Exploring the Unique Differences Between Acids and Bases

Acids and bases are like the yin and yang of the chemical world, each with its own set of characteristics and properties. In this engaging reading passage, we'll embark on a journey to uncover the distinct differences that set acids and bases apart.

### What Are Acids?

Imagine a lemon or vinegar – their sour taste and corrosive nature give you a clue about acids. Acids are compounds that release hydrogen ions ( $H^+$ ) when they are dissolved in water. This release of hydrogen ions makes a solution acidic.

One key characteristic of acids is their sour taste, which is why they're often associated with foods like lemons. Acids can also be quite harmful, capable of corroding metals and causing burns on the skin if not handled with care. Examples of common acids include hydrochloric acid (found in your stomach), sulfuric acid (used in car batteries), and citric acid (found in citrus fruits).

### What Are Bases?

On the flip side, bases have a bitter taste and feel slippery to the touch. When bases dissolve in water, they release hydroxide ions ( $OH^-$ ), making the solution basic or alkaline. This release of hydroxide ions is a defining feature of bases.

Soapy water is an excellent example of a base in action – the slipperiness you feel when washing your hands is due to the presence of a base. Bases are also used in many cleaning products to cut through grease and stains. Common bases include sodium hydroxide (found in drain cleaners), baking soda (a kitchen staple), and ammonia (used in cleaning).

### The pH Scale

Scientists use a scale called the pH scale to measure the acidity or alkalinity of a substance. This scale ranges from 0 to 14, with 7 being neutral. Substances with a pH less than 7 are acidic, while those with a pH greater than 7 are basic.

For example, lemon juice has a low pH (around 2), indicating its strong acidity. In contrast, soap has a higher pH (around 9), signifying its basic nature. Water, with a pH of 7, is considered neutral.

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### Key Differences Between Acids and Bases

- **Taste:** Acids taste sour, while bases taste bitter.
- **Touch:** Acids do not have a distinct feel, but bases feel slippery.
- **Hydrogen Ions:** Acids release hydrogen ions ( $H^+$ ), while bases release hydroxide ions ( $OH^-$ ).
- **pH Level:** Acids have a pH less than 7, while bases have a pH greater than 7.
- **Common Examples:** Acids include substances like lemon juice and hydrochloric acid, while bases include items like soap and baking soda.

### Everyday Uses

Both acids and bases play essential roles in our daily lives:

- **Acids in Food:** Acids are used to add tartness to foods and beverages, and they also help preserve certain foods.
- **Cleaning with Bases:** Bases like baking soda and ammonia are found in many household cleaning products, making them effective against stains and odors.
- **Digestion:** Our stomach contains hydrochloric acid, which aids in breaking down the food we eat during digestion.
- **Balancing pH:** In swimming pools, chemicals are added to maintain the water's pH balance to ensure swimmers' safety and equipment longevity.

### Balancing Act

In some cases, it's crucial to balance the acidity or alkalinity of a solution. This is where the concept of neutralization comes into play. Neutralization occurs when an acid and a base react with each other, forming water and salt as products. This reaction helps neutralize the acidic or basic properties of the substances involved.

For instance, if you spill a strong acid like sulfuric acid on your skin, neutralization with a base like baking soda can quickly ease the burn and prevent further damage.

