

Acids and Bases

Properties of Acids and Bases

- Acids
 - Taste sour
 - Corrode metal
- “Familiar” acids:
 - Fruit juice
 - Carbonated beverages
 - Some insects scare predators with acids
 - In car batteries
- Bases
 - Taste bitter
 - Feel slippery
- “Familiar” bases:
 - Most soaps, drain and window cleaners
 - Quinine
 - Lidocaine

Other Common Acids

- Hydrochloric Acid
 - HCl
- Sulfuric Acid
 - H_2SO_4
- Nitric Acid
 - HNO_3

Other Common Bases

- Sodium Hydroxide (Lye)
 - NaOH
- Calcium Hydroxide
 - Ca(OH)₂
- Ammonium Hydroxide
 - NH₄OH

Indicators

- Indicators allow us to determine whether a substance is an acid or a base.

Common Indicators

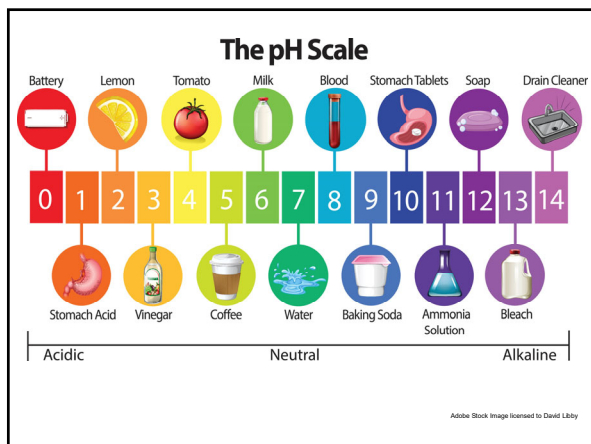
- Litmus
 - Acids turn blue litmus red
 - Bases turn red litmus blue
- Phenolphthalein
 - Clear in acid
 - Turns pink in a base
- Bromthymol Blue
 - Turns yellow in acid
 - Blue in a base

Universal Indicator

- A universal indicator is a solution of a number of different indicators.
- Can be used to tell how acidic or basic a substance is.

pH

- The pH scale measures how strong an acid or a base is.
- The scale goes from 0 – 14.
- Acids have a $\text{pH} < 7$
- Bases have a $\text{pH} > 7$
- A neutral substance (neither an acid nor base) has a pH of 7.

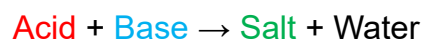


Neutralization Reactions

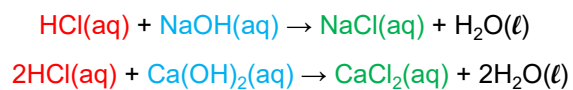
- The reaction between an acid and a base is a special kind of double displacement reaction called neutralization.
- An acid and base react together to form a salt and water.

What is a salt?

- An ionic solid consisting of a positive ion (other than hydrogen) and a negative ion (other than hydroxide).



Examples:



Applications

- Why do green apples taste sour?
 - They contain acid
- Why does orange juice taste salty if you drink it after brushing your teeth?
 - A neutralization reaction occurs between the toothpaste (base) and the orange juice (acid) to form a salt.

- Why does acid rain cause damage to marble statues?
 - Marble is calcium carbonate. It reacts with acid to form substances that dissolve in water.
- How does pouring baking soda on an acid spill make the area safe?
 - Baking soda is a base and neutralizes the acid.

- How do antacids work?
 - Excess hydrochloric acid in the stomach can cause “heartburn” or acid indigestion.
 - Antacids contain a base that neutralizes the acid.
