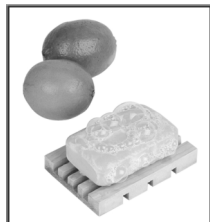


Intro to Acids & Bases



Properties of Acids & Bases

- **Acids**
 - Taste sour
 - Reacts with metals
 - Turns litmus red
 - Conducts electricity
- **Base**
 - Taste bitter
 - Slippery
 - Turns litmus blue
 - Conducts electricity

Ions in Solution

- _____ – contain more H^+ than OH^-
- _____ – contain more OH^- than H^+
- _____ – contain equal amounts of H^+ and OH^-

Autoionization of Water

- $H_2O + H_2O \leftrightarrow H_3O^+ + OH^-$
- Water is the usual solvent for acids and bases
- It produces equal numbers of H_3O^+ and OH^-

Arrhenius Model of Acids & Bases

- _____ - a substance that contains H and ionized to produce H^+ when dissolved in water.
- _____ - a substance that contains OH and ionizes to produce OH^- when dissolved in water

Arrhenius Model of Acids & Bases

- HCl
- NaOH

Arrhenius Model of Acids & Bases

- Although the Arrhenius model is useful in describing many acids and bases, it does not describe them all
- For example NH_3 contains no OH^- ions, but it is a base

Bronsted-Lowry Model

- _____ - proton donor
- _____ - proton acceptor

Bronsted-Lowry Model

- _____ – the species produced when a base accepts the H^+ ion from the acid
- _____ – the species produced when the acid gives up its H^+

Conjugate Acids & Conjugate Bases

- Identify the acid, base, conjugate acid, and conjugate base of the following reaction...
- $HX + H_2O \leftrightarrow H_3O^+ + X^-$

Conjugate Acids & Conjugate Bases

- Identify the acid, base, conjugate acid, and conjugate base of the following reaction...
- $NH_3 + H_2O \leftrightarrow NH_4^+ + OH^-$

Conjugate Acids & Conjugate Bases

- _____ – substance that can act as either an acid or a base

Conjugate Acids & Conjugate Bases

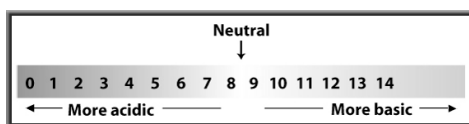
- Identify the acid, base, conjugate acid, and conjugate base of the following reactions...
- $\text{NH}_4^+ + \text{OH}^- \leftrightarrow \text{NH}_3 + \text{H}_2\text{O}$
- $\text{HBr} + \text{H}_2\text{O} \leftrightarrow \text{H}_3\text{O}^+ + \text{Br}^-$

The pH Scale

- $[\text{H}^+]$ is often expressed in very small numbers.
- _____ is a mathematical scale in which the concentration of hydronium ions in a solution is expressed as a number from 0 to 14.
- $\text{pH} = -\log[\text{H}^+]$ or $\text{pH} = -\log[\text{H}_3\text{O}^+]$

Interpreting the pH Scale

- pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic.



$$\text{pH} + \text{pOH} = 14$$

Acid Strength

- The _____ of an acid or a base tells you the degree of ionization
- Strong acids & bases break down into _____ ions
- Weak acids & bases break down into just a few ions

Neutralization Reactions

- _____ – acid + base → a salt + water
- Neutralization reactions are just a special type of double replacement reactions

Neutralization Reactions

- Write the equations for the following neutralization reactions
- Acetic acid and ammonium hydroxide
- Nitric acid and cesium hydroxide