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Acids and Bases

Acid: **a compound that contains the element hydrogen and when it is dissolved in water the hydrogen comes off the acid molecule and attaches to the water molecule. (H_3O^+ hydronium ions)**

- **Acids are called proton (H^+) donors.**

Properties of acids:

- sour taste
- turns blue litmus paper red
- react with certain metals to give of hydrogen gas
- electrolytes - solution can conduct electricity
- corrosive

Examples:

- HCl - hydrochloric acid (stomach acid)
- H_2SO_4 - sulfuric acid (batteries)
- $HC_2H_3O_2$ - acetic acid (vinegar)
- HNO_3 - nitric acid (explosives & fertilizer)
- H_3PO_4 - phosphoric acid (acidifies foods & sodas)
- $HC_6H_7O_7$ - citric acid (lemons, limes, oranges)

Base: **a compound that contains OH^- (hydroxide ions) and when it is dissolved in water the OH^- comes off the base molecule.**

Properties of Bases:

- Feels slippery
- bitter taste
- turn red litmus paper blue
- caustic - can burn or corrode other substances
- dissolves fats and oils

Examples:

- NaOH - sodium hydroxide (soap & Drano)
- $Ca(OH)_2$ - calcium hydroxide (medical & dental, & industrial uses)
- Baking Soda - $NaHCO_3$
- Toothpaste - $C_{12}H_7Cl_3FNaO_2$ (Colgate)

Indicators and pH Scale

Indicator:

a substance that changes color in the presence of an acid or a base

Examples:

- litmus paper
  - red → blue = base
  - blue → red = acid
- phenolphthalein (PHTH)
  - pink = base
  - colorless = acid
- methyl orange
  - red = acid
  - yellow = base

pH scale: a number scale used to describe the strength of an acid or base.

- Stronger the acid, the lower the pH
- Stronger the base, the higher the pH
- pH scale ranges from 1 - 14
- pH scale 1 – 6 indicates an acid
- pH scale 8 – 14 indicates a base
- pH of 7 is neutral