Acids & Bases

Acids & Bases

Acids

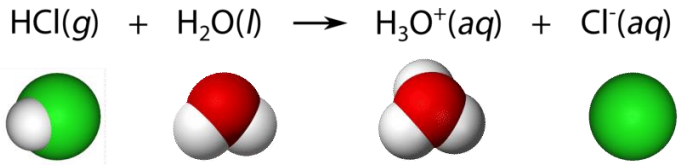
- Produce hydrogen ions
- Form hydronium ion in water, H_3O^+
- Sour taste
- Conduct electricity
- Cause burns
- React with metals
- React with indicators
- Turn blue litmus paper red

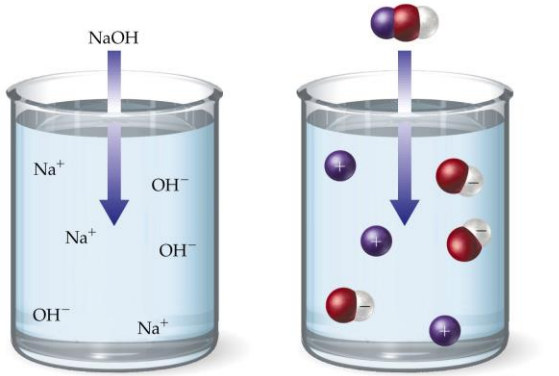
Base

- Produce hydroxide ion
- Solid crystals
- Corrosive
- Slippery
- Bitter taste
- Conduct electricity
- React with indicators
- Turn red litmus paper blue

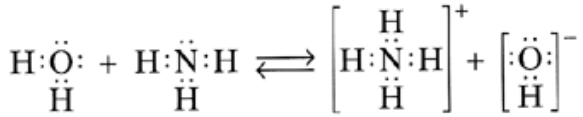
Acids & Bases

- Ionization of Acids
  - Water surrounds the molecule
  - Pulls apart the hydrogen
  - Forms hydronium ions and anions
- Dissociation of Bases
  - Ions break apart
  - Forms hydroxide ions and cations
  - Water does not bond
- Ionization of Ammonia
  - Water loses a hydrogen to ammonia
  - Creates ammonium ions and hydroxide ions





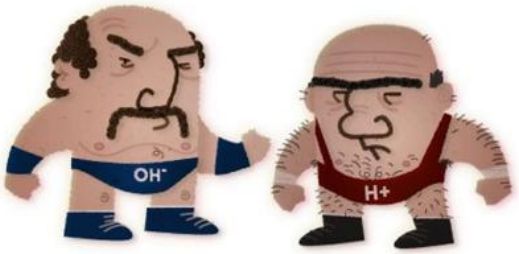
$$H_2O(l) + NH_3(g) \rightleftharpoons NH_4^+(aq) + OH^-(aq)$$



Mrs. Coulter Says

- Do page 270 – Skip "Skim"
- Do page 271 – All
- Do page 272 – Skip "Create"

Strength of Acids & Bases



Acids

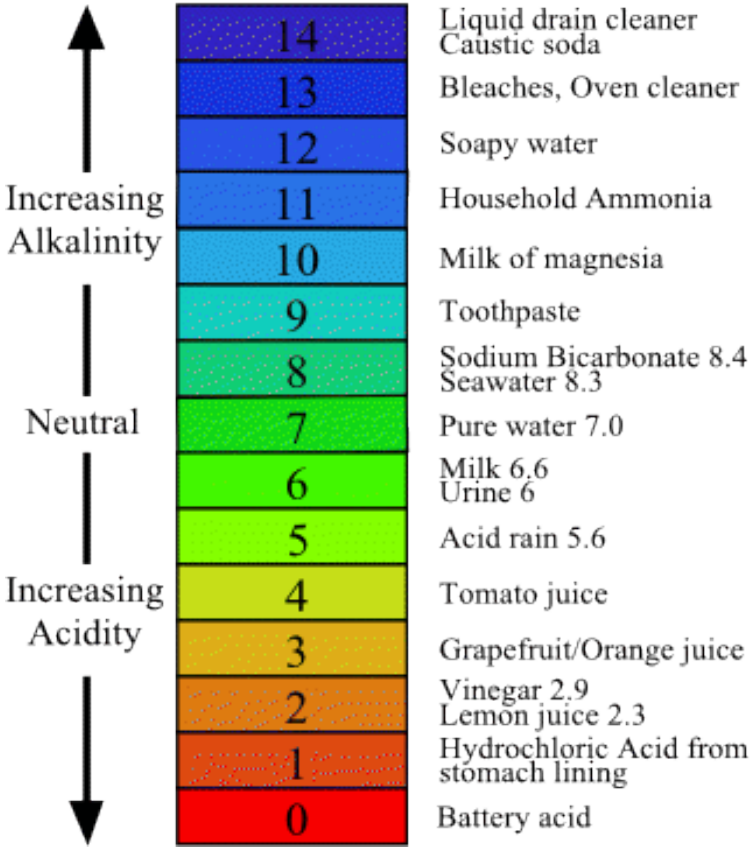
- Strong
  - Ionize completely
  - Strong electrolyte
  - HCl, HNO_3, H_2SO_4
  - $HCl + H_2O \rightarrow H_3O^+ + Cl^-$
- Weak
  - Partially ionize
  - Weak electrolyte
  - $HC_2H_3O_2$, H_2CO_3
  - $HC_2H_3O_2 + H_2O \rightleftharpoons H_3O^+ + C_2H_3O_2^-$

Bases

- Strong
  - Dissociate completely
  - Strong electrolyte
  - $NaOH$, $Ca(OH)_2$
  - $NaOH \rightarrow Na^+ + OH^-$
- Weak
  - Partially dissociate
  - Weak electrolyte
  - NH_3
  - $NH_3 + H_2O \rightleftharpoons NH_4^+ + OH^-$

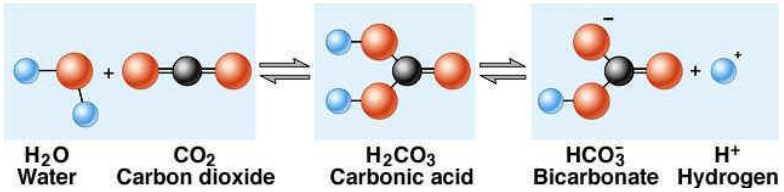
Strength of Acids & Bases

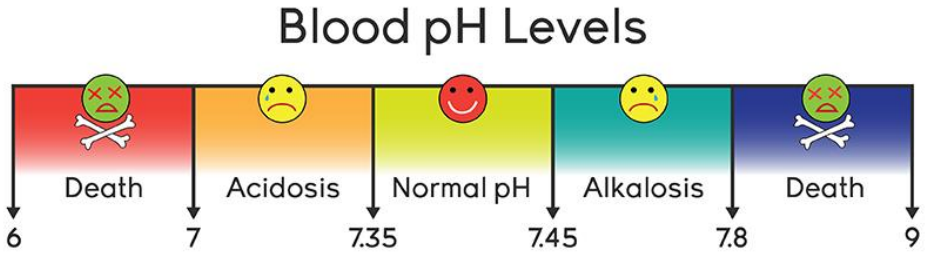
- Strength and Concentration
  - Strong does not mean concentrated
- pH of a Solution
  - Measure of the hydronium ion in solution
  - pH = -log[H_3O^+]
  - 0-14
  - Neutral is 7
  - Below 7 is acid
  - Above 7 is base



Strength of Acids & Bases

- Buffers
  - Solution that prevents a large in change in pH
  - Made by reacting a salt with its weak base or acid
- Blood pH
  - pH is 7.4
  - Buffer of carbonic acid and hydrogen carbonate ion
  - Acidosis
    - Blood pH too low
    - Causes fainting
    - Use smelling salts to raise pH
  - Alkalosis
    - Blood pH too high
    - Causes hyperventilation
    - Breathe into sack to lower pH

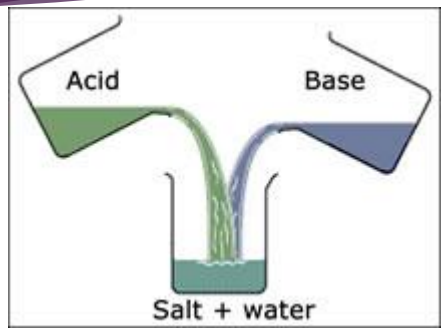




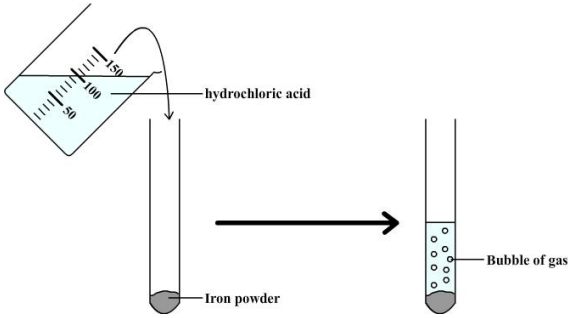
Mrs. Coulter Says

- Do page 273 – Skip “Predict”
- Do page 274 – All
- Do page 275 – Skip “Connect It”

Salts

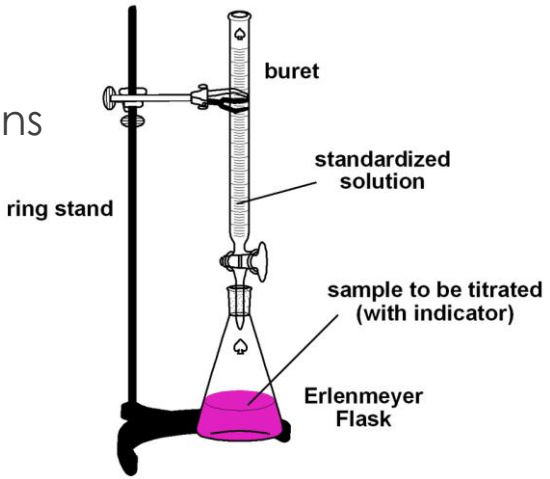


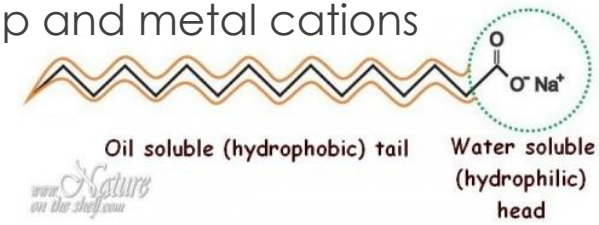
- Neutralization
  - Acids and bases react to form water and salt
  - Salt – any ionic compound
  - $HCl + NaOH \rightarrow NaCl + H_2O$
- Acid with metal
  - Always produce hydrogen gas and salt
  - $2HNO_3 + Zn \rightarrow H_2 + Zn(NO_3)_2$
- Acid with carbonate ion
  - Always produce water, carbon dioxide, and salt
  - $H_2SO_4 + Na_2CO_3 \rightarrow H_2O + CO_2 + Na_2SO_4$



Salts

- Titration
  - Reaction to determine the pH of a solution
  - Must know concentration of one of the solutions
  - Indicator used to find endpoint
- Soaps and Detergents
  - Created with fatty acid and strong base
  - Nonpolar tail attracted to oil
  - Polar tail attracted to water
  - Soap scum is a precipitate formed from soap and metal cations
  - Detergents do not form soap scum





Mrs. Coulter Says

- Do page 276 – Skip "Scan"
- Do page 277 – Skip "Sequence"
- Do page 278 – Skip "Synthesize It"