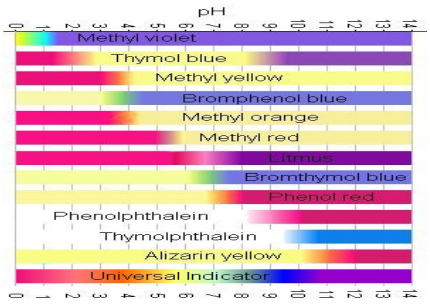
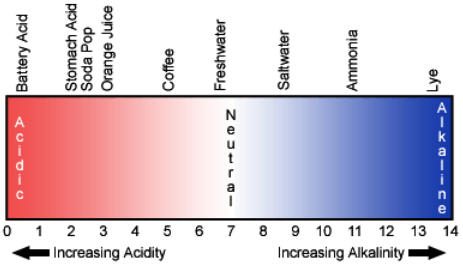
ACIDS/BASES/SALTS

Table's K,L,M

Acid + Base → Salt + Water

$M_AV_A = M_BV_B$





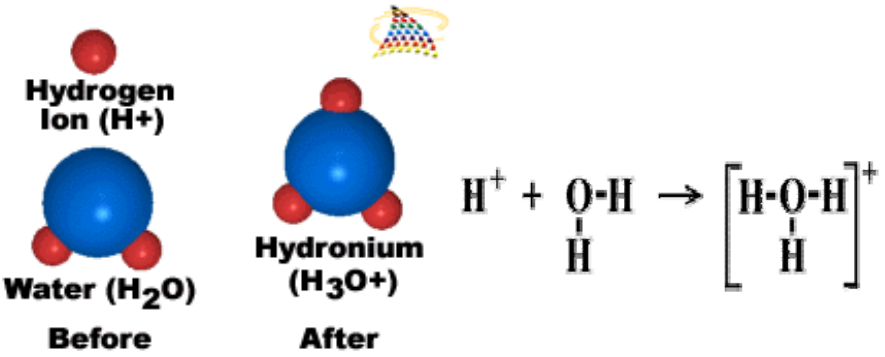
1

The Arrhenius Theory: ACIDS- Table K

- An acid is a substance whose water solution has a _____ (__$^+$) ion as its positive ion
  - Ex. ____→ __$^+$ + __$^-$
- __$^+$ is also known as a _____ (as a neutral Hydrogen atom will have 1 proton, 1 electron and ____ neutrons)
- The H^+ ion is then attracted to non-bonding electrons, or _____, of a water molecule to form a _____ion, _____$^+$

2

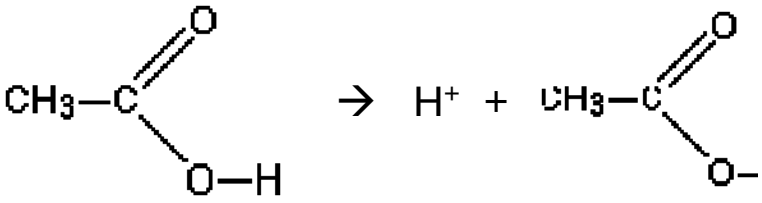
Hydronium



3

Organic Acids/Carboxylic Acids

- R-COOH → H^+ + $R-COO^-$



4

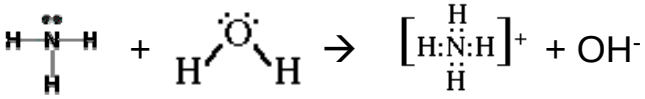
Properties of Acids

- _____ in solution (conductivity)
- _____ tasting: Citric acid in fruits, acetic acid in vinegar etc
- Can change the color of an _____ (TABLE M)
- Strong acids dissociate _____ and have many _____ in solution
- Weak acids dissociate _____ and have ____ ions in solution

5

The Arrhenius Theory:BASES (TABLE L)

- A base is a substance whose water solution has a _____ ion as its negative ion
- Ex. ____ + ____ → ____ + _____



- Amines are bases (CH_3NH_2) etc. as they will react with water to produce _____ ions
- Do not confuse alcohols with bases as both have OH endings to them (C-OH is alcohol, not base) (More on these 2 in Organic unit)

6

Properties of Bases

- _____ in solution (conductivity)
- _____ feel
- _____ taste
- Strong bases dissociate _____ and have _____ (____) ions in solution
- Weak bases dissociate _____ and have _____ (____) ions in solution

7

Neutralization

- _____ + _____ → _____ + _____
- Arrhenius stated that the H^+ (or H_3O^+) will bond with the OH^- to form _____
  - _____ions will combine to form a ____
- Most are _____ reactions (be sure to balance your equations)
  - Ex. ____ + _____ → _____ + _____
  - Write the balanced equation for the following neutralization reaction between nitric acid and calcium hydroxide
    - _____ + _____ → _____ + _____

8

Neutralization continued

- Write the balanced equation for the following neutralization reaction between magnesium hydroxide and sulfuric acid
  - _____ + _____ → _____ + _____

- **Salt formed is not always _____ on the pH scale
- Strong acid/weak base will result in an _____ salt
- Weak acid/strong base will result in a _____ salt
- If Acid = Base, a _____ salt will result

9

Titration

- adding a _____ volume and concentration of an acid or base with a burette to an _____volume or concentration of another acid or base until _____ is reached
- Unknown is determined with the following:
  - $M_AV_A = M_BV_B$
    - M_A = _____ of the _____
    - V_A = volume of the acid
    - M_B = _____ of the _____
    - V_B = volume of the base

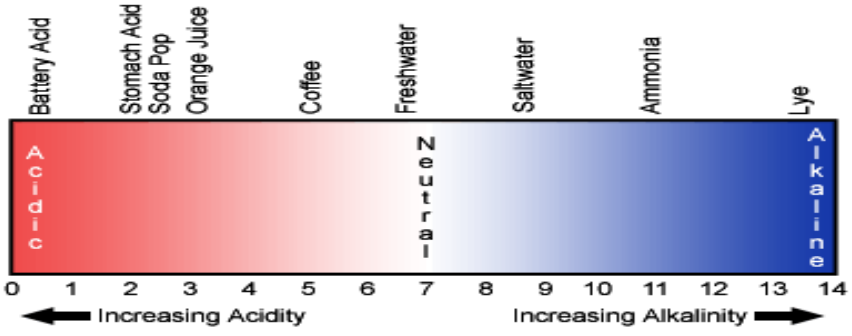
10

The pH scale

- Acidity(_____) and Alkalinity(_____)
- Dependent upon concentrations of H^+/OH^- ions
- When $[H^+] > [OH^-]$ = _____
- When $[H^+] < [OH^-]$ = _____
- Range of scale: 0-14

11

The pH scale continued



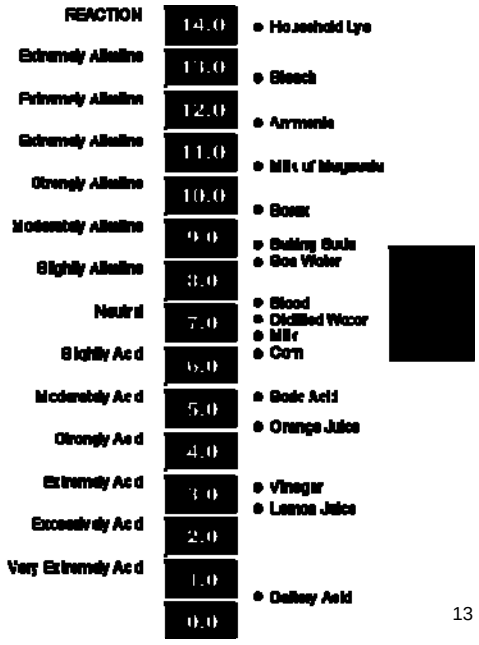
- (Weak Base) (Weak Acid)
- $[H^+] > [OH^-]$ $[H^+] = [OH^-]$ $[H^+] < [OH^-]$

12

pH scale
range 1 to 14

1+ most acidic
7 = neutral
14 = most alkaline

Water with a pH of below 6.5 or above 8.5 is generally unacceptable for drinking water.



13

The pH scale continued

- A decrease in pH means that it is becoming _____ _____ or _____
- An increase means _____ or _____
- Each ↓↑ in number is equal to a _____ change in strength
  - Ex. pH 2→3 becomes ____ times less acidic, not 1 time less
  - pH 2→4 is ____ times less acidic
  - pH 8→3 is _____ more acidic
- Strengths are dependent upon the level of _____ (how well the acid or base breaks into ions)

14

Bronsted-Lowry Acids and Bases

- another method to determine if a material is acidic or basic
- Acids are proton (____ ion) _____
- Bases are proton (___ ion) _____
  - Both rules allow for more substances being considered as acids and bases

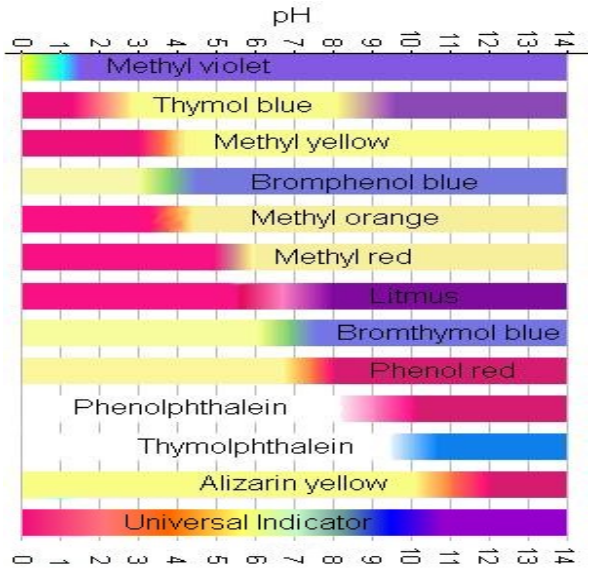
15

Indicators: (TABLE M)

- A substance that _____ when it gains or loses a _____
- Ex. phenolphthalein is colorless when H^+ ions are present.
  - As base is added to the solution, the acid is _____ (H^+ ions and OH^- ions are _____ and spectator ions are forming _____)
  - As more base is added and H^+ ions neutralized, the indicator will turn pink as it (the indicator) is now reacting with the excess base instead of the acid
  - The change in color is an '_____' that the titration/neutralization is _____

16

Indicators



17