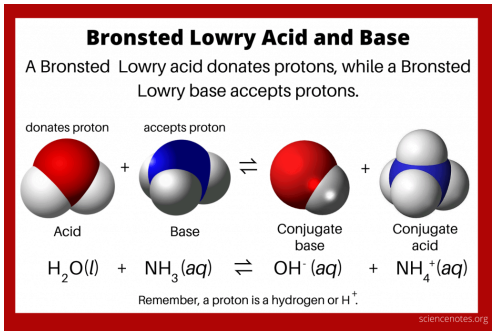
Chemistry Study Guide
Chapters 16-18

1. What are the properties of acids and bases? Where do they fall on the pH scale? What's the difference between the Arrhenius Model of acids and bases, the Bronsted-Lowry Model, and the Lewis Model.

2. Be able to identify acid/base pairs according to the Bronsted-Lowry Model.



3. What makes an acid/base weak or strong? What does it mean when the acid/base ionization constant is high vs low?

Acid Ionization Constant

- **Acid Ionization Constant** (K_a): the equilibrium constant for the ionizatior reaction of an acid with water
  - $HA + H_2O \rightleftharpoons A^- + H_3O^+$

$$K_a = \frac{[H^+][A^-]}{[HA]}$$

- Large K_a = Strong acid
- Small K_a = Weak acid

Base Ionization Constant

- **Base Ionization Constant** (K_b): the equilibrium constant for the ionization reaction of a base with water
  - $B + H_2O \rightleftharpoons OH^- + BH^+$

$$K_b = \frac{[BH^+][OH^-]}{[B]}$$

- Large K_b = Strong base
- Small K_b = Weak base

4. How do you calculate pH or pOH if given the hydrogen or hydroxide concentration? How are pH and pOH related?
   -log $[H^+]$, -log $[OH^-]$, pH + pOH = 14
5. What are the reactants and products in a neutralization reaction?

6. Define what a titration is and what buffers are.

7. Define chemical equilibrium. K_{eq} is the ratio of product concentrations to that of reactants (raised to the power of their coefficients). What does it mean if K_{eq} is greater than 1? Less than 1?

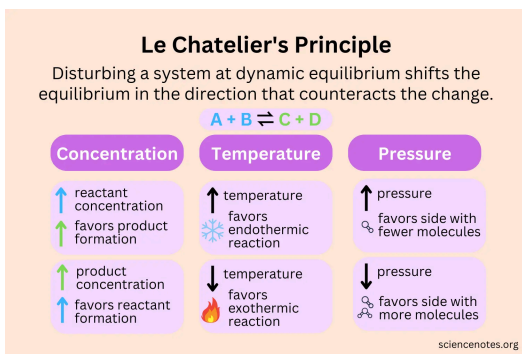
$$aA + bB \rightleftharpoons cC + bB$$

$$K_c = \frac{[C]_{eq}^{c}[D]_{eq}^{d}}{[A]_{eq}^{a}[B]_{eq}^{b}}$$

$K_c >> 1$: Mixture contains mostly products

$K_c << 1$: Mixture contains mostly reactants

8. Be able to name the three factors that affect equilibrium according to Le Chatelier's Principle.



9. What is the equation for calculating reaction rate?

$$\text{REACTION RATE} = \frac{\text{CHANGE IN MASS OF REACTANT OR PRODUCT}}{\text{TIME}}$$

10. What is collision theory and activation energy?

11. Be able to name 4 different factors that affect reaction rates.

Vocabulary

Acid
Base
Conjugate acid
Conjugate base
pH
pOH
Buffer
Titration
Chemical equilibrium
Le Chatelier’s Principle
Reaction Rate
Collision Theory
Activation Energy
Surface area
Concentration
Temperatures
Catalyst
Pressure
Neutralization
Bronsted Lowry Model
Arrhenius Model