Unit 11: Rates of Reactions and Equilibrium

Learning Targets

1. Explain rates of chemical reactions in terms of the collisions of particles.
    - I can explain how the concentration of solutions affects the speed of a reaction.
    - I can explain how changes in temperature affect particle motion and therefore the speed of a reaction.
    - I can relate energy diagrams, activation energy, and catalysts to the speed or a reaction.
    - I can explain how surface area relates to reaction rates.

2. Relate the coefficients in a balanced chemical equation to the rate of disappearance or appearance of reactants and products.
    - I can calculate the rate of disappearance or appearance of a substance in a reaction when I am given time and concentration data.
    - I can use a balanced chemical equation to calculate the relative amounts of reactants and products after a given amount of time.

3. Using experimental data, determine the rate law for a reaction and calculate the rate constant.
    - I can calculate the order for a reactant when given appropriate data.
    - I can use the rate law and a table of data to calculate the rate constant.
    - I can determine the correct units for a rate constant for a given overall order of a reaction.

4. Use the concept of equilibrium to evaluate how completely reactants turn into products.
    - I can write the equilibrium constant expression when given a balanced chemical equation.
    - I can use the magnitude of the equilibrium constant to estimate the relative amounts of products and reactants in an equilibrium mixture.
    - I can calculate the equilibrium constant when given equilibrium concentrations.

5. Determine ways to maximize the production of products using LeChatelier's Principle.
    - I can explain how adding or removing a reactant or product shifts the equilibrium.
    - I can explain how lowering or raising the temperature affects the equilibrium.
    - I can explain how changes in pressure affect the equilibrium of gaseous reactions.