BAKER COLLEGE
STUDENT LEARNING OUTCOMES
CHM1010 General Chemistry I
4 Credit Hours

Student Learning Outcomes & Enabling Objectives

1. Demonstrate proficiency in matter, measurement, and unit conversions.
    a. Describe the scientific approach to knowledge.
    b. Apply measurement techniques to accurately quantify chemical samples using SI, metric, and customary units.
    c. Classify matter based on its state and composition.
    d. Compare physical and chemical changes and properties.

2. Explain atomic structure, electronic configuration, quantum mechanics, and their implications for chemical behavior.
    a. Define atom, atomic number, atomic mass, and isotope.
    b. Describe the discovery and the properties of subatomic particles.
    c. Explain the Bohr model, atomic emission spectrum, and electromagnetic radiation.
    d. Describe atomic orbitals, electron configurations, and quantum numbers of subatomic particles.

3. Evaluate periodic trends and predict chemical properties.
    a. Identify main-group and transition elements on the periodic table.
    b. Distinguish between metals, nonmetals, and metalloids.
    c. Predict element behavior in the groups: noble gases, alkali metals, alkaline earth metals, and halogens using the periodic table
    d. Predict trends in electronegativity, ionization energy, and atomic radii.
    e. Predict electron configurations and valence electrons using the periodic table.

4. Evaluate chemical bonding and molecular structure.
    a. Distinguish between atomic and molecular elements, and ionic and molecular bonds.
    b. Infer chemical formulas for ionic and molecular compounds using principles of nomenclature.
    c. Apply VSEPR theory to predict molecular and electron geometry based on the five basic shapes and effects of lone pairs.
    d. Apply Valence bond theory to define common types of hybridization.

    e. Apply Lewis theory to demonstrate how atoms combine

5. Evaluate chemical reactions using principles of stoichiometry.
    a. Analyze balanced chemical equations.
    b. Calculate formula mass (molecular weight, molecular mass) for a compound
    c. Convert between moles, mass, and number of particles.
    d. Predict reactant consumption and product formation using stoichiometric relationships.

6. Evaluate the influence of intermolecular forces on the physical properties of matter.
    a. Infer that intermolecular forces contribute to the physical properties of matter.
    b. Explain the effect of intermolecular forces in processes like: Vaporization, Sublimation, Surface Tension, and Viscosity.
    c. Explain pressure in gas as a result of molecular collisions.
    d. Apply Kinetic molecular theory, Boyle's, Charles', Avogadro's, Ideal Gas Laws, and Dalton's law of partial pressure in problem-solving.

Big Ideas and Essential Questions

Big Ideas

- Properties of Matter
- Structure of the Atom
- Periodicity of properties
- Chemical Bonding and Molecular Structure
- Quantitative Chemical Relationships
- Intermolecular forces and states of matter

Essential Questions

1. How do we accurately measure and describe matter?
2. In what ways does atomic structure influence the chemical properties of elements?
3. What patterns in the periodic table help predict chemical behavior?
4. How do bonding and molecular geometry dictate the behavior of substances?
5. What role does stoichiometry play in quantifying chemical reactions
6. How do intermolecular forces determine the properties of different states of matter?