



School District of Horicon

Course Outline

Learning Targets

Chemistry

UNIT 1: Composition of Matter and Lab Safety

- Work in the laboratory safely
- Identify the names and functions of various pieces of lab equipment
- Distinguish between elements, compounds, mixtures, and solutions
- Give examples of physical and chemical properties
- Compare and contrast the phases of matter

UNIT 2: Measurement

- Express the accuracy and precision of measurements using percent error and significant figures
- Use scientific notation to represent numbers
- Convert between SI units using dimensional analysis
- Calculate density using math equations and graphs

UNIT 3: Atomic Structure and Periodic Table

- Describe the development of atomic theory based on experimental evidence
- Determine the atomic number, mass number, numbers of protons, neutrons, and electrons in an atom
- Compare and contrast the reactivity of elements based on position on the periodic table

UNIT 4: Chemical Formulas and Nomenclature

- Show how ionic and covalent compounds form using valence electrons
- Write the chemical names and chemical formulas for ionic compounds
- Write the chemical names and chemical formulas for binary covalent compounds
- Identify common properties of ionic compounds

UNIT 5: The Mole

- Calculate molar mass
- Convert between moles, grams, liters of gas at STP, and particle number
- Use percent composition
- Determine the empirical formula of a compound

UNIT 6: Chemical Reactions

- Balance chemical equations
- Distinguish between major types of chemical reactions such as synthesis, decomposition, single-replacement, double replacement, and combustion
- Predict the products of chemical reactions
- Follow the flow of energy in exothermic and endothermic reactions

UNIT 7: Stoichiometry

- Perform mole-mole, mole-mass, mass-mass, and mixed stoichiometry calculations
- Predict reactant and product amounts in reactions with a limiting reagent
- Predict reactant and product amounts in reactions with a percent yield

Unit 8: Solutions

- Describe the dissolving process and how solutions form
- Calculate the concentration of solutions using molarity
- Prepare solutions of a given molarity
- Use Beer's Law to determine the concentration of an unknown using standard solutions
- Determine the relative solubility of a solute in a given solvent using the solubility rules

Unit 9: Electron Configuration

- Write electron configurations for the elements using the Aufbau Principle, Hund's Rule, and the Pauli Exclusion Principle
- Calculate the wavelength, frequency, and energy of light using the wave and Planck's equations
- Explain the structure of the periodic table based on electron configurations

Unit 10: Chemical Bonding

- Use valence electrons to satisfy the octet or duet rule for atoms of an element
- Determine the molecular shapes of covalent compounds
- Predict the polarity of a molecular compound based on electronegativity and shape
- Describe how molecular shape and polarity determine trends in solubility, phase, and boiling point

Students will be able to meet the learning targets above as evidenced by formative and summative classroom assessments.