

Chemistry Standards Checklist

- SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.**
 - a. Follow correct procedures for use of scientific apparatus.
 - b. Demonstrate appropriate techniques in all laboratory situations.
 - c. Follow correct protocol for identifying and reporting safety problems and violations.
- SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.**
 - a. Trace the source on any large disparity between estimated and calculated answers to problems.
 - b. Consider possible effects of measurement errors on calculations.
 - c. Recognize the relationship between accuracy and precision.
 - d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.
 - e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.
- SC1 Students will analyze the nature of matter and its classifications.**
 - a. Relate the role of nuclear fusion in producing essentially all elements heavier than helium.
 - b. Identify substances based on chemical and physical properties.
 - c. Predict formulas for stable ionic compounds (binary and tertiary) based on balance of charges.
 - d. Use IUPAC nomenclature for both chemical names and formulas:
 - Ionic compounds (Binary and tertiary)
 - Covalent compounds (Binary and tertiary)
 - Acidic compounds (Binary and tertiary)
- SC2 Students will relate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.**
 - a. Identify and balance the following types of chemical equations:
 - Synthesis • Decomposition • Single Replacement
 - Double Replacement • Combustion
 - b. Experimentally determine indicators of a chemical reaction specifically precipitation, gas evolution, water production, and changes in energy to the system.
 - c. Apply concepts of the mole and Avogadro's number to conceptualize and calculate
 - Empirical/molecular formulas,
 - Mass, moles and molecules relationships,
 - Molar volumes of gases.
 - d. Identify and solve different types of stoichiometry problems, specifically relating mass to moles and mass to mass.
 - e. Demonstrate the conceptual principle of limiting reactants.
 - f. Explain the role of equilibrium in chemical reactions.

- SC3 Students will use the modern atomic theory to explain the characteristics of atoms.**
- a. Discriminate between the relative size, charge, and position of protons, neutrons, and electrons in the atom.
 - b. Use the orbital configuration of neutral atoms to explain its effect on the atom's chemical properties.
 - c. Explain the relationship of the proton number to the element's identity.
 - d. Explain the relationship of isotopes to the relative abundance of atoms of a particular element.
 - e. Compare and contrast types of chemical bonds (i.e. ionic, covalent).
 - f. Relate light emission and the movement of electrons to element identification.
- SC4. Students will use the organization of the Periodic Table to predict properties of elements.**
- a. Use the Periodic Table to predict periodic trends including atomic radii, ionic radii, ionization energy, and electronegativity of various elements.
 - b. Compare and contrast trends in the chemical and physical properties of elements and their placement on the Periodic Table.
- SC5. Students will understand that the rate at which a chemical reaction occurs can be affected by changing concentration, temperature, or pressure and the addition of a catalyst.**
- a. Demonstrate the effects of changing concentration, temperature, and pressure on chemical reactions.
 - b. Investigate the effects of a catalyst on chemical reactions and apply it to everyday examples.
 - c. Explain the role of activation energy and degree of randomness in chemical reactions.
- SC6. Students will understand the effects motion of atoms and molecules in chemical and physical processes.**
- a. Compare and contrast atomic/molecular motion in solids, liquids, gases, and plasmas.
 - b. Collect data and calculate the amount of heat given off or taken in by chemical or physical processes.
 - c. Analyzing (both conceptually and quantitatively) flow of energy during change of state (phase).
- SC7. Students will characterize the properties that describe solutions and the nature of acids and bases.**
- a. Explain the process of dissolving in terms of solute/solvent interactions:
 - Observe factors that effect the rate at which a solute dissolves in a specific solvent,
 - Express concentrations as molarities,
 - Prepare and properly label solutions of specified molar concentration,
 - Relate molality to colligative properties.
 - b. Compare, contrast, and evaluate the nature of acids and bases:
 - Arrhenius, Bronsted-Lowry Acid/Bases
 - Strong vs. weak acids/bases in terms of percent dissociation
 - Hydronium ion concentration • pH • Acid-Base neutralization