

CHEMISTRY I

CREDIT 1 **GRADE** 11, 12 **PREREQUISITE** ALGEBRA I

The study of chemistry explores the properties of substances and the changes that such substances undergo. Major concepts presented in this course include structure and function of the periodic table, atomic structure, chemical and physical properties of matter, energy interactions of matter, and properties of solutions.

NOTE: This course is required for graduation.

State Standards for Chemistry I may be found here:

<https://www.tn.gov/education/article/science-standards>

Embedded Standards

Embedded standards are skills and processes used in the real work of science and support and enhance classroom instruction.

- Select a description or scenario that reevaluates and/or extends a scientific finding.
- Analyze the components of a properly designed scientific investigation.
- Determine appropriate tools to gather precise and accurate data.
- Evaluate the accuracy and precision of data.
- Defend a conclusion based on scientific evidence.
- Determine why a conclusion is free of bias.
- Compare conclusions that offer different but acceptable explanations for the same set of experimental data.
- Distinguish among tools and procedures best suited to conduct a specified scientific inquiry.
- Evaluate a protocol to determine the degree to which an engineering design process was successfully applied.
- Evaluate the overall benefit to cost ratio of a new technology.
- Use design principles to determine if a new technology will improve the quality of life for an intended audience.

First Nine Weeks

- Compare and contrast the major models of the atom (i.e., Bohr, and the quantum mechanical model).
- Interpret the periodic table to describe an element's atomic makeup.
- Describe the trends found in the periodic table with respect to atomic size, ionization energy, or electronegativity.
- Determine the Lewis electron-dot structure or number of valence electrons for an atom on any main-group element from its atomic number or position in the periodic table.
- Represent an electron's location in the quantum mechanical model of an atom in terms of the shape of electron clouds (s and p orbitals in particular), relative energies of orbitals, and the number of electrons possible in the s, p, d, and f orbitals.
- Distinguish among elements, compounds, and mixtures.
- Identify properties of a solution: solute and solvent in a solid, liquid or gaseous solution; procedure to make or determine the concentration of a solution in units of ppm, ppb, molarity, percent composition, factors that affect the rate of solution.
- Classify a solution as saturated, unsaturated, or supersaturated based on its composition and temperature and a solubility graph.

- Identify properties of matter (e.g., physical: density, boiling point, melting point, or chemical: ability to rust or tarnish, be sour) or changes in matter (e.g., physical: phase change, shape, color, or chemical: formation of a gas or precipitate).
- Compare and contrast heat and temperature changes (endothermic/exothermic) in chemical (e.g., combustion) or physical (e.g., phase transformations) processes.
- Investigate similarities and differences among solids, liquids, and gases in terms of energy and particle spacing.
- Predict how changes in volume, temperature, and pressure affect the behavior of a gas.

***Common Formative Assessment #1**

***Common Formative Assessment #2**

***Common Formative Assessment #3**

Second Nine Weeks

- Analyze ionic and covalent compounds in terms of their formation (electron transfer versus sharing), names, chemical formulas (e.g., molecular: H_2O , CO_2 , NH_3 ; empirical: NaCl , CaBr_2 , $\text{Al}(\text{NO}_3)_3$), percent composition, and molar masses.
- Determine the reactants, products, and types of different chemical reactions: composition, decomposition, double replacement, single replacement, combustion.
- Predict the products of a chemical reaction (e.g., composition and decomposition of binary compounds).
- Balance a chemical equation to determine molar ratios.
- Convert among the following quantities of a substance: mass, number of moles, number of particles, molar volume at STP.
- Identify and solve stoichiometry problems that interconvert volume of gases at STP, moles, and mass.
- Classify substances as acids or bases based on their formulas and how they react with litmus and phenolphthalein.
- Describe radioactivity through a balanced nuclear equation and through an analysis of the half-life concept

***Common Formative Assessment #4**

***Common Formative Assessment #5**

For information regarding instructional objectives and materials, please contact the school principal.

* Common assessments are scheduled within the nine weeks. Each school may adjust the week and/or day of the week to meet the individual school's schedule.

*Common assessments may be rescheduled due to inclement weather.