



Chemistry High School

1.0 Understands and applies the skills of scientific inquiry.

- 1.1 Uses scientific inquiry to design, conduct, and analyze scientific investigations.
- 1.2 Identifies questions and concepts that guide scientific investigations.
- 1.3 Understands that different kinds of questions suggest different kinds of investigations.
- 1.4 Uses appropriate models when necessary.
- 1.5 Develops hypothesis.
- 1.6 Identifies controls and variables.
- 1.7 Designs and executes scientific investigations.
- 1.8 Selects and uses appropriate tools, technology and techniques to gather data.
- 1.9 Makes appropriate qualitative and quantitative observations.
- 1.10 Recognizes the importance of multiple trials with reproducible results.
- 1.11 Organizes data and observations efficiently, including creating appropriate tables and graphs.
- 1.12 Analyzes and evaluates the data and observations.
- 1.13 Integrates data and observations to draw appropriate conclusions.
- 1.14 Accounts for errors in investigations.
- 1.15 Uses evidence to infer possible applications or extensions for further inquiry.
- 1.16 Uses various methods to communicate experimental methods, observations, results, and interpretations.
- 1.17 Uses appropriate safety procedures when conducting investigations.
- 1.18 Recognizes that safety concerns change with different procedures.
- 1.19 Knows locations and appropriate uses of the safety equipment in the classroom.

4.0 Understands and applies concepts and theories pertaining to matter, its composition and the forces that govern it.

- 4.1 Understands and applies knowledge of the structure of atoms.
 - Understands the structure of an atom and relationship between the subatomic particles and applies knowledge from the periodic table.
 - Understands the relationship between neutrons and isotope and how they affect the mass and the stability of the nucleus.

Knows the name, symbol and common uses for common elements.

4.2 Understands and applies knowledge of the structure and properties of matter.

Classifies matter as elements, compounds and mixture.

Uses knowledge of chemical and physical properties to analyze and perform separations.

Evaluates whether a change is physical or chemical.

Understands how elements are arranged in the periodic table and how this arrangement show repeating patterns among elements with similar properties.

Applies knowledge of an atoms electron configuration to determine chemical behavior and predict whether it is electronically neutral or an ion.

Explains that atoms may be bonded together into molecules or ionic solids, and that compounds are formed from chemical bonds between two or more different kinds of atoms.

Uses dimensional analysis to solve stoichiometry problems.

Applies knowledge of solutions to calculate concentration.

Applies the kinetic molecular theory to describe the motion of atoms and molecules and explain the properties of gases.

Understands how the bonding characteristics of carbon allows the formation of many different organic molecules of varied sizes, shapes and chemical properties and provide the biochemical basis of life.

4.3 Understands and applies knowledge of chemical reactions.

Knows that most chemical reactions involve a transfer of energy and that energy and matter are conserved.

Understands that a balanced chemical equation represents the conversation of matter.

Understands the conservation of atoms in chemical reactions leads to calculate the mass of products and reactants.

Understands solutions are homogenous mix of two or more substances.

Analyzes compounds to determine if they are acids, bases, or salts.

Nuclear processes are those in which an atomic nucleus changes including radioactive decay of naturally occurring and human-made isotopes, nuclear fusion and nuclear fission.

4.4 Understands and applies knowledge of interactions of energy and matter.

Explains that all scientific ideas are tentative and subject to change and improvement.

Understands energy is exchanged or transformed in all chemical reactions and physical changes of matter.

5.0 Understands the nature of science.

- 5.1 Understands how science develops and changes over time.
- 5.2 Explains that all scientific ideas are tentative and subject to change and improvement with data to support this.
- 5.3 Explains that most core scientific theories have large quantities of experimental and observational evidence.
- 5.4 Understands that scientific innovators have had difficulty breaking through the accepted ideas of their time to reach new conclusions that are considered to be common knowledge.
- 5.5 Understands that people continue inventing new ways of doing things, solving problems, and getting work done.
- 5.6 Understands the dynamic relationship between science and society.
- 5.7 Knows that human behavior can affect earth processes and systems.