



Physical Science
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.

2.0 Understands and applies scientific concepts, principles, and theories pertaining to Earth and the Universe.

- 2.1 Understands and applies knowledge of energy in the Earth system.
- 2.2 Knows the difference between internal and external sources of energy.
- 2.3 Understands plate tectonics.
- 2.4 Understands the energy transfer in the atmosphere and the ocean.
- 2.5 Understands and applies knowledge of geochemical cycles.

- 2.6 Understands that the elements and atoms move within earth's reservoirs.
- 2.7 Understands and applies knowledge of the origin and evolution of the Earth system.
- 2.8 Formations of the solar system.
- 2.9 Interactions among hydrosphere, lithosphere, atmosphere.
- 2.10 Understands and applies knowledge of the origin and evolution of the Earth system.
- 2.11 Knows the scientific evidence about the formation and age of the universe.
- 2.12 Understands the properties of galaxies and universes.
- 2.13 Knows the common characteristics of stars in the universe.

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 stability of the nucleus.
 - Lists the name and 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.
 - Evaluates whether a property is physical or chemical.
 - Understands how elements are arranged in the periodic table and how this arrangement shows repeating patterns among elements with similar properties.
 - Understands how an atoms electron configuration determines chemical behavior and whether it is electrically 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.
- 4.3 Understands and applies knowledge of chemical reactions.
 - Knows that chemical reactions involve a transfer of energy and that energy and matter are conserved.
 - Understands that a balanced chemical equation represents the conservation of matter.
 - Understands solutions are homogeneous mixtures of two or more substances.
 - Understands that compounds can be classified as acids or bases.
- 4.4 Understands and applies knowledge of motion and forces.

Describes the motion of an object using position, direction of motion, speed and velocity.

Constructs distance vs. time graphs which describe the motion of an object.

Uses formulas to calculate the motion of an object.

Understands and recognizes examples of Newton's Three Laws of Motion.

4.5 Understands and applies knowledge of types of energy and conservation of energy.

Identifies different types of energy.

Explains that energy is transferred by doing work on a system.

Describes, explains, and quantifies that energy appears in different forms and can be changed from one form to another according to conservation of energy.

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

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

Models the laws of conservation of mass and energy.

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.