



Science  
Seventh Grade

**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 evaluate the data and observations.
- 1.13 Integrates data and observations to draw appropriate conclusions.
- 1.14 Accounts for errors in investigations.
- 1.15 Uses various methods to communicate experimental methods, observations, results, and interpretations.
- 1.16 Students use appropriate safety procedures when conducting investigations.
- 1.17 Recognizes that safety concerns change with different procedures.

**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 including internal and external sources of energy, plate tectonics, and energy transfer in the atmosphere and the ocean.

Explains the roles of plate movement on the Earth.

Labels the major plates in the Earth's crust.

Explains the rules of plate movement on earth.

2.2 Understand and apply knowledge of geochemical cycles including the elements and atoms within and moving between Earth's hydrosphere, lithosphere, and atmosphere.

Demonstrates that the Earth is comprised of layers.

Identifies the parts of the water, nitrogen, and carbon cycles.

Describes the factors of weathering, erosion, and deposition.

Differentiates between sedimentary, igneous, and metamorphic rocks.

Analyzes processes involved in the rock cycle.

2.3 Understands and applies knowledge of the origin and evolution of the Earth system including formation of the solar system, geologic time, interactions among hydrosphere, lithosphere, and atmosphere and origins and evolution of life.

Understands the processes that lead to fossil formation.

States the evidence for why early Earth is different from today's Earth.

### **3.0 Understands and applies concepts, principles and theories pertaining to life and its interactions.**

3.1 Understands the cycling of matter and the flow of energy through ecosystems.

Populations, ecosystems, communities, and biospheres.

Summarizes the nitrogen and carbon cycles.

Recognizes that matter and energy are conserved as they flow through and between organisms.

Organizes the energy transformation from producers through levels of consumers and decomposers.

3.2 Understands and applies knowledge of the interdependence of organism and their interactions with the environment.

Explains interrelationships and interdependency of biotic and abiotic factors leads to long-term stable systems.

Hypothesizes the impact of humans on ecosystems.

Identifies environmental factors and finite resources that influence ecosystem interactions.

### **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 the atom.

Knows the structure of an atom and relationship between the subatomic particles.

Understands the relationship between neutrons and isotope and how they affect the mass and stability of the nucleus.

Lists the names and symbols and common uses for common elements.

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

Knows that a large number of important reactions involve the transfer of sharing of electrons.

Classifies matter as elements, compounds and mixtures.

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

Understands how an atom's 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.

Knows that materials have different states and can be changed by heating and cooling.

Compares and contrasts solids, liquids and gases and their changes in state.

Compares and contrast the structures and properties of matter.

Lists examples of properties of matter through observation.

Determines whether a change is physical or chemical.

Describes similarities and differences between elements, compounds, and mixtures.

#### 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.

Identifies the different types of reactions.

#### 4.4 Understands and applies knowledge of types of energy and conservation of energy.

Knows that energy tends to move spontaneously from hotter to colder objects by conduction, convection, or radiation.

### **5.0 Understands the Nature of Science.**

#### 5.1 Understands how science develops and changes over time.

Explains that all scientific ideas are tentative and subject to change and improvement with data to support this.

Explains that most core scientific theories have large quantities of experimental and observational evidence.

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.

Understands that people continue inventing new ways of doing things, solving problems, and getting work done.

5.2 Understands the dynamic relationship between science and society.

Knows that human behavior can affect earth processes and systems.

Knows ways in which humans can modify ecosystems and cause irreversible effects.