



Physics  
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 motion and forces.
  - Describes the motion of an object using position, direction of motion, speed and velocity.
  - Graphically describes the motion of an object using position, direction of motion, speed and velocity.

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

Evaluates the effect of forces using Newton's Three Laws of Motion.

Performs an experiment utilizing Newton's Three Laws of Motion.

Evaluates and analyzes uniform circular motion.

Applies the universal law of gravitation.

Analyzes and evaluate systems of particles and linear momentum.

Analyzes and investigate electric circuits.

4.2 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.

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

Understands properties and behaviors of waves.

Understands properties of electromagnetic waves.

Knows the range of the electromagnetic spectrum.

Understands the properties of sound waves.

Knows the laws governing the reflection and refraction of light.

## **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.