



Power Standards for Science Grade 10

Foundations of Physical Sciences

Energy Transformations – Examine and Illustrate Transfer of Energy From One Form to Another.

- *1.1 Explain how energy is transferred by conduction, convection and radiation.
- *1.2 Describe the availability, current uses and environmental issues related to the use of fossil and nuclear fuels to produce electricity.
- *1.3 Describe the availability, current uses and environmental issues related to the use of hydrogen fuel cells, wind and solar energy to produce electricity.

Chemical Structures and Properties – Identify and Apply Properties and Structures and Interactions of Matter.

- *2.1 Describe the general structure of the atom, and explain how the properties of the first 20 elements in the Periodic Table are related to their atomic structures.
- *2.2 Describe how atoms combine to form new substances by transferring electrons (ionic bonding) or sharing electrons (covalent bonding).
- *2.3 Explain how the structure of the carbon atom affects the type of bonds it forms in organic and inorganic molecules.
- *2.4 Explain the general formation and structure of carbon-based polymers, including. synthetic polymers, such as polyethylene, and biopolymers, such as carbohydrate..

Scientific Inquiry, Numeric and Literacy – Explore How Scientific Knowledge Is Created And Communicated.

- *3.1 Read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- *3.2 Use appropriate tools and techniques to make observations and gather data.
- *3.3 Assess the reliability of the data that was generated in the investigation.
- *3.4 Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- *3.5 Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

Foundations of Life Science-9

Global Interdependence - Summarize and illustrate how materials cycle through the Earth's systems.

- *1.1 Explain how chemical and physical processes cause carbon to cycle through the major earth reservoirs.
- *1.2 Explain how solar energy causes water to cycle through the major earth reservoirs.
- *1.3 Explain how the release of sulfur dioxide (SO₂) into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.
- *1.4 Explain how the accumulation of carbon dioxide (CO₂) in the atmosphere increases Earth's "greenhouse" effect and may cause climate changes.

Cell Chemistry and Biotechnology - Observe how organisms are structured to ensure efficiency and survival.

- *2.1 Describe significant similarities and differences in the basic structure of plant and animal cells.
- *2.2 Describe the general role of DNA and RNA in protein synthesis.
- *2.3 Describe how bacterial and viral infectious diseases are transmitted, and explain the roles of sanitation, vaccination and antibiotic medications in the prevention and treatment of infectious diseases.
- *2.4 Explain the risks and benefits of altering the genetic composition and cell products of existing organisms.

Genetics, Evolution and Biodiversity - Compare and summarize processes that are responsible for life's unity and diversity.

- *3.1 Explain how meiosis contributes to the genetic variability of organisms.
- *3.2 Use the Punnet Square technique to predict the distribution of traits in mono- and di-hybrid crossings.
- *3.3 Deduce the probable mode of inheritance of traits (e.g., recessive/dominant, sex-linked) from pedigree diagrams showing phenotypes.
- *3.4 Explain how the processes of genetic mutation and natural selection are related to the evolution of species.
- *3.5 Describe the factors that affect the carrying capacity of the environment.

Scientific Inquiry, Numeracy and Literacy - Explore how scientific knowledge is created and communicated.

- *4.1 Formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- *4.2 Design and conduct appropriate types of scientific investigations to answer different questions.
- *4.3 Identify independent and dependent variables, including those that are kept constant and those used as controls.
- *4.4 Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- *4.5 Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.

Science Electives-Grade 11

BIOLOGY

This course will focus on biological concepts. Topics include the scientific method of inquiry, as well as the following: basic biochemistry; the study of cell structure and function; cell physiology; cell reproduction and development; Mendelian genetics; population genetics; ecology; and the classification, structure and function of organisms. The application of scientific concepts to trade experiences reinforces the course curriculum. A variety of laboratories provide the student with opportunities to form hypotheses, design experiments, use technology, analyze data and draw conclusions.

CHEMISTRY

Building on knowledge developed in the previous integrated science courses, students will be introduced to chemistry topics such as: atomic structure, chemical bonding, energy changes, stoichiometry, periodicity, properties of gasses, solutions, acid-base theory, electrochemistry, and organic and biochemistry. Students will investigate the properties, composition and structure of matter and the laws that govern the combination of elements and reaction of substances. The application of scientific concepts to trade experiences reinforces the curriculum. Students will apply their knowledge of chemistry to various problem-solving activities with the use of science-specific technologies and standard laboratory tools.

PHYSICS

Using an applied approach, students will investigate Newton's laws, classical mechanics, universal gravitation, astronomy, electricity and electrical forces and the electromagnetic wave spectrum (EMS). The application of scientific concepts to trade experiences reinforces the curriculum. Through participation in laboratory experiences, students will develop an understanding of connections between physics and the workings of simple and complex technological devices.