



Power Standards for Science **Grade 11**

Biology

Cell Biology

*1.1 Understand that the fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.

Genetics

*1.1 Observe that a multi-cellular organism develops from a single zygote, and understand that its phenotype depends on its genotype, which is established at fertilization.

*1.2 Describe how genes influence traits by the instructions encoded in the DNA sequence that specify a sequence of amino acids in characteristic proteins.

*1.1 Model how the genetic composition of cells can be altered by incorporation of foreign DNA into the cells.

Ecology

*1.1 Illustrate how stability in an ecosystem is a balance between competing effects.

Evolution

*1.1 The frequency of an allele in a gene pool of a population depends on many factors and may be stable or unstable over time.

*1.2 Observe that evolution is the result of genetic changes that occur in constantly changing environments.

Physiology

*1.1 Understand that the human body's internal environment remains relatively stable (homeostatic) because of the coordinated structures and functions of organ systems despite the external environmental changes.

*1.2 Observe that organisms have a variety of mechanisms to combat disease.

Foundations of Physical Sciences-10

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.

Science Electives-Grades 12

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.