SCIENCE COURSE DESCRIPTIONS

The Science curriculum is designed so that students have the opportunity to develop a background in more than one science stream. All science courses are intended to allow individuals to understand the relationships that science, technology, and society share in our everyday world. Each subject uses laboratory, classroom, and technology activities to illustrate the nature of science and how scientific knowledge evolves.

Choosing the Right Course

- All incoming grade 10 students take a 5-credit Science 10 or Science 14 course.
- From Science 10, students may choose courses in Biology 20, Chemistry 20 and Physics 20.
- From the appropriate 20-level courses, students choose the courses in Biology 30, Chemistry 30 and Physics 30. The recommended mark is 60%.

SCIENCE 10 (5 credits)

Recommendation for Success: 60% in Grade 9 Science and Math 9
Science 10 is an introductory course designed to provide a means of showing the connections among science, technology, and society (STS). The four major units are:

- Unit 1: Energy and Matter in Chemical Change
- Unit 2: Energy Flow in Technological Systems
- Unit 3: Cycling of Matter in Living Systems
- Unit 4: Energy Flow in Global Systems

SCIENCE 14 (5 credits)

Prerequisite: Completion of Grade 9 Science
Science 14 is a general introductory course to biology, chemistry and physics. This course introduces students to relevant and practical applications of science to everyday life. It is designed to meet the needs and interests of students who want the basic requirements for a high school diploma.

- Unit 1: Investigating Properties of Matter
- Unit 2: Energy Transfers and Technologies
- Unit 3: Matter and Energy in Living Systems
- Unit 4: Matter and Energy in the Biosphere

Students who achieve a minimum standing of 80% may choose to register in Science 10

SCIENCE 24 (5 credits)

Prerequisite: Science 14 or Science 10
Science 24 continues the study of biology, chemistry, and physics. This course assists students in their understanding of principles behind the natural events that they experience and the technology they use in their lives.

Students who did not attain a 60% average in Science 10 may seek credit for Science 14 and 24 by taking and passing Science 24.

- Unit 1: Applications of Matter and Chemical Change
- Unit 2: Common Energy Conversion Systems
- Unit 3: Disease Defense and Human Health
- Unit 4: Motion, Change and Transportation Safety

Note: Science 24 is an “end of the line” course, in that there is not a Science 34 course. Please refer to the chart on our web page if you are interested in re-entering the academic Science route.

Biology 20 (5 credits)

Recommendation for Success: 60% in Science 10
Biology 20 students examine the interactions of living systems to better understand the constant flow of energy and the cycling of matter. Specifically, students explore the functioning of the human body and the mechanisms that work to maintain balance in organisms, in ecosystems and in the biosphere:

- Unit 1: Energy and Matter in the Biosphere
- Unit 2: Photosynthesis and Cellular Respiration
- Unit 3: Ecosystems, Taxonomy and Population Change
- Unit 4: Digestion and Human Health
- Unit 5: Circulation and Immunity
- Unit 6: Respiration and Muscles
- Unit 7: Excretory System

Biology 30 (5 credits)

Recommendation for Success: 60% in Biology 20
Biology 30 students conduct lab work and investigate how human systems sense and respond to the environment. They explore human reproduction and development at the cellular level and at the organism level. Students investigate the basic structure and role of DNA and investigate the inheritance of traits in individuals and populations. They analyze the changes in populations resulting from natural and human-induced changes in the environment and discover that living systems are dynamic:

- Unit 1: The Endocrine system
- Unit 2: The Nervous System and Senses
- Unit 3: Reproduction and Development
- Unit 4: Cellular reproduction
- Unit 5: Inheritance
- Unit 6: Molecular Genetics
- Unit 7: Populations and Community Dynamics

Chemistry 20 (5 credits)
Recommendation for Success: 60% in Science 10 and
60% in Math 10C

How do atoms combine to create matter? Students explore matter and how it changes in order to understand the natural world. They investigate the chemical properties of gases and solutions and apply their understanding of chemical bonds to explain the characteristics of ionic and molecular compounds. Students use mathematical processes to study the quantitative relationships in chemical reactions and develop laboratory skills required for scientific inquiry:

- Unit 1: Matter as Solutions, Acids, Bases and Gases
- Unit 2: Quantitative Relationships in Chemical Changes
- Unit 3: Chemical Bonding in Matter
- Unit 4: The Diversity of Matter

Chemistry 30 (5 credits)
Recommendation for Success: 60% in Chemistry 20 and 60% in Math 20-1
Chemistry 30 students will enhance their scientific literacy by developing an understanding of the nature of science and technology and the practical application of science in the real world.
The units of study include:

- Unit 1: Organic Chemistry
- Unit 2: Thermochemical Changes
- Unit 3: Equilibrium, Acids and Bases
- Unit 4: Electrochemical Changes

Physics 20 (5 credits)
Recommendation for Success: 60% in Science 10 and 60% in Math 10C
Physics 20 students investigate the motion of objects. They apply Newton's law of universal gravitation to astronomical observations. They also describe how energy is transmitted by mechanical waves and how waves relate to medical technologies, industry and musical instruments.

- Unit 1: Kinematics – In this unit, students investigate changes in the position and velocity of objects and systems in a study of kinematics.
- Unit 2: Dynamics – Students investigate causes of change in the position and velocity of objects and systems in a study of dynamic and gravitation. The concept of fields is introduced in the explanation of gravitational effects.
- Unit 3: Circular Motion, Work and Energy - Students extend their study of kinematics and dynamics to uniform circular motion and to mechanical energy, work and power.
- Unit 4: Oscillatory Motion and Mechanical Waves – An introduction to simple harmonic motion and mechanical waves.

Physics 30 (5 credits)
Recommendation for Success: 60% in Physics 20 and Math 20-1
Physics 30 students consider historical experiments and explore why the model of the atom has changed as a result of experiments and observations of natural phenomena. Students apply a quantitative approach to describe conservation of momentum in an isolated system, and they investigate applications and implications of electric and magnetic forces and fields. They also use the concept of wave-particle duality to understand both wave and photon behaviour of electromagnetic radiations.

- Unit 1: Momentum and Impulse – Elastic, inelastic, and two-dimensional collisions plus the Laws of Conservation of Momentum and Energy.
- Unit 2: Forces and Fields – The study of basic electric and magnetic fields, how they relate to each other, and their interaction with charged particles.

- Unit 3: Electromagnetic Radiation – An in-depth look at the properties of light, including reflection, refraction, and diffraction.
- Unit 4: Atomic Physics – This unit includes the study of radioactivity, quantum physics, and particle physics.