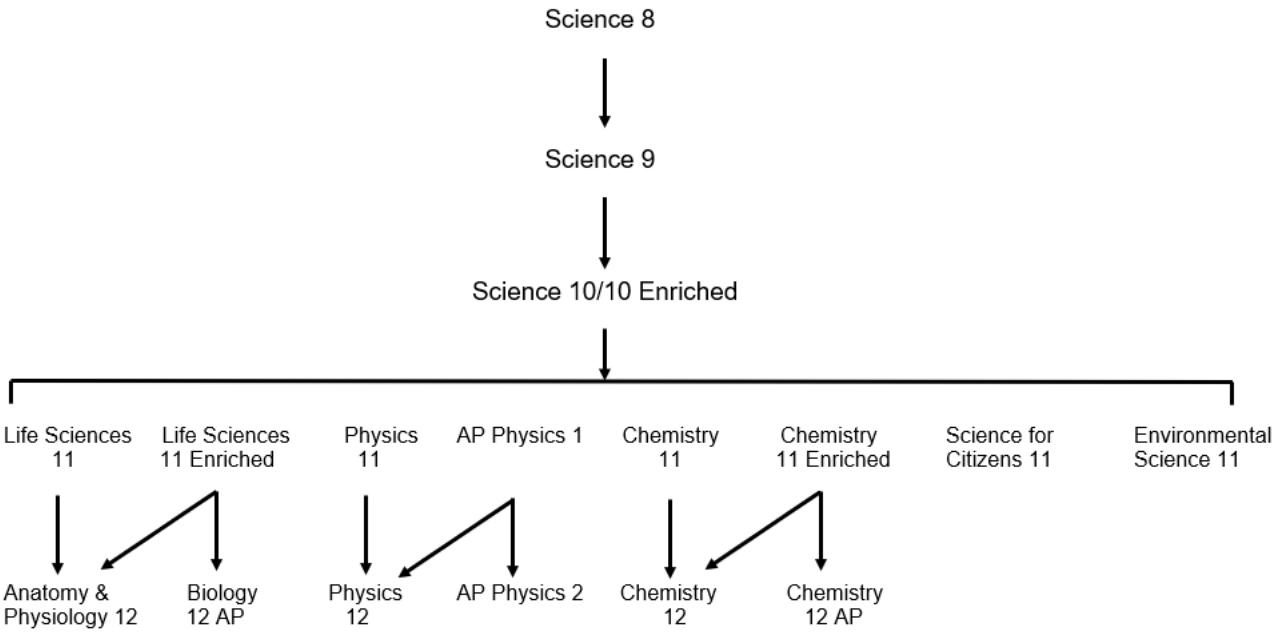
Burnaby Mountain Secondary School

Science Department Course Options 2023/2024



Burnaby Mountain Secondary Science department is proud to provide a broad range of courses. We are a dynamic, enthusiastic, and dedicated team of teachers. It is our hope that students will develop a lifelong interest in science.

We believe that students should collaborate, investigate, solve problems, communicate, innovate, discover, and increase their understanding of science through hands-on experience. Science and scientific literacy play a key role in educating citizens of today.

Grade 8: Students will investigate cells, atomic theory, light and plate tectonics. The big ideas from the science curriculum would include:

- Life processes are performed at the cellular level.
- The behaviour of matter can be explained by the kinetic molecular theory and atomic theory.
- Energy can be transferred as both a particle and a wave.
- The theory of plate tectonics is the unifying theory that explains Earth's geological processes.

Grade 9: Students will investigate cellular reproduction, the periodic table, electricity and ecosystems. The big ideas from the science curriculum would include:

- Cells are derived from cells.
- The electron arrangement of atoms impacts their chemical nature.
- Electric current is the flow of electric charge.
- The biosphere, geosphere, hydrosphere, and atmosphere are interconnected, as matter cycles and energy flows through them.

Grade 10: Students will investigate genetic diversity and patterns of inheritance, chemical processes, energy transformations and formation of the universe. The big ideas from the science curriculum would include:

- DNA is the basis for the diversity of living things.
- Energy change is required as atoms rearrange in chemical processes.
- Energy is conserved, and its transformation can affect living things and the environment.
- The formation of the universe can be explained by the big bang theory.

Science 10 Enriched

Students should be proficient /extending in the Science 9 curricular competencies that include questioning, planning and conducting, processing and analyzing, evaluating, applying and communicating. Students should also have their previous Science teacher's recommendation, and good work habits in all other courses.

Our enriched courses require students to work at a faster pace to accommodate extended breadth and depth of learning.

Life Sciences 11

Recommendation: 65% or higher in Science 10.

Students are expected to read and process information from a variety of texts that provide opportunities for students to question, predict, plan, conduct, process, and analyze data. This course provides the students with multiple opportunities to work with microscopes and engage in biological specimen dissections.

The key concepts covered in this course examine the interactions required for life at molecular and cellular levels, evolution, and the characteristics used to classify organisms. Students will examine trends in complexity among various life forms as well as the relationships between organisms using an ecological, evolutionary and Indigenous lens.

Life Sciences 11 Enriched/Pre-AP

Recommendation: Students should have 80% or higher in Science 10 or Science 10 Enriched, and their teacher's recommendation. Student's should also have good work habits in all other courses.

This is an in-depth, intensive course that moves at a faster paced than regular Life Sciences 11 and prepares students for AP Biology 12. This course is the first half of the AP Biology curriculum and is required to take AP Biology 12.

Topics in the Life Sciences 11, Anatomy & Physiology 12, as well as AP Biology 12 curriculum will be covered in this course with an emphasis on the developing the AP Science practices skills. Life Sciences 11 Enriched requires students to work at a fast pace to accommodate extended breadth and depth of learning.

The concepts covered in this course examine the interactions required for life at molecular and cellular levels, DNA, evolution, transport across a membrane, and the characteristics used to classify organisms. Students will examine trends in complexity among various life forms as well as the relationships between organisms using an ecological, evolutionary and Indigenous lens.

Chemistry 11

Recommendation: Students should have 65% or higher in Science 10 and Foundation and Pre-Calculus Math 10. Students are expected to have proficient math skills (unit conversion and algebra), know how to operate a scientific calculator (exponents, order of operations, scientific notation) and solve word problems systematically.

This course is a survey course introducing the branches of chemistry that include physical, inorganic, and organic concepts. Students will learn about what matter is composed of and the characteristics and behaviour of matter at the molecular and atomic level. A focus will be on students learning measurement and lab techniques and performing quantitative calculations.

Chemistry 11 Enriched /Pre-AP

Recommendations: Students should have 86% or higher in Science 10 and Pre-Calculus 10, as well as their teacher's recommendation. Student's should also have good work habits in all other courses.

This course is the first half of the AP Chemistry curriculum and is required to take AP Chemistry 12. It is an in-depth intensive course that moves at a faster pace than regular Chemistry 11 and prepares students for AP Chemistry 12. As Chemistry 11 Enriched covers topics with greater depth and at a faster pace than regular Chemistry 11 it is very important for students to commit to effective and regular study routines. The course also requires extra work be completed during the summer prior to the course and/or tutorials during some lunch hours throughout the year.

Physics 11

Recommendation: Students should have 65% or higher in Science 10 and Foundations and Pre-Calculus Math 10. Of all the senior science courses offered, Physics is the most reliant on strong mathematical skills.

Physics is a fundamental science that strives to describe the most basic elements of nature. Through inquiry and problem solving, students survey major themes of Physics such as kinematics (how things move), dynamics (why things move), energy (kinetic, potential, and thermal), circuits (building and analyzing), and waves (sound and light). Throughout this course there is a focus on data collection and analysis through lab work.

AP Physics 1

Recommendations: Students should have 80% or higher in Science 10 and Foundations and Pre-Calculus Math 10, plus their teacher's recommendation. Student's should also have good work habits in all other courses.

AP Physics 1 is the first half of the AP Physics curriculum and is required before taking AP Physics 2. It is an enriched course that, together with AP Physics 2, can provide students with the equivalent of a first-year university physics course. It is a valuable course for students who are strong academically and have a keen interest in the area of physics. Students will explore topics such as Newtonian mechanics (including rotational motion), dynamics, energy, mechanical waves and sound, and introductory simple circuits. Lab work is a key component of the course, and students will focus on experimental design, data collection, and analysis.

Environmental Science 11

Requirement: Passing mark in Science 10.

We live in a rare ecosystem on the West Coast that has a variety of unique plants and animals to explore. At the same time, climate change is one of the most important issues in science right now, and for the foreseeable future. Environmental Science 11 deals with the environment which we live in and our interaction with it. It is a new and upcoming field of Science, which can lead to various career in green energy development, engineering, urban planning, ecology and more…The course is designed for studentsthat are passionate about learning about their environment, how it works and what our relationship is with it – how we can sustainably play a role in both the preservation and restoration of that around us.

Science for Citizens 11

Requirement: Passing mark in Science 10.

Students will be exploring concepts within science that occurs in the everyday world and community. Examining topics of how technology, and changes in technology, affects the applications of science will be integrated throughout the course.

This course provides students with the pre-requisites required for graduation. It will not allow students entry into university. Some college programs may allow this course for admission, but this will vary from college to college and program to program.

Anatomy and Physiology 12

Recommendation: Students should have 65+ or higher in Life Sciences 11 and a proficient understanding of foundational Chemistry. Students must be able to read and process information from a variety of texts that provide opportunities for students to question, predict, plan, conduct, process, and analyze data.

This course examines how homeostasis (balance) is maintained through physiological processes, and the interaction between genes and the environment, as well as the interrelationships between organ systems. The course also focuses on understanding the chemistry that organizes atoms and molecules that make up biological systems.

AP Biology 12

Students should have an 80% or higher in Life Sciences 11 Enriched and the teacher's recommendation. It is highly recommended that students have completed Chemistry 11 or Chemistry 11 Enriched. Student's should also have good work habits in all other courses.
AP Biology 12 is an enriched course that can provide students with the equivalency of a first-year university biology course. It is a valuable course for students who are strong academically and have a keen interest in the area of biology. As AP Biology 12 covers topics with greater depth and at a faster pace than the regular Anatomy and Physiology 12 it is very important for students to commit to effective regular study routines.

The course covers the regular Anatomy and Physiology 12 topics as well as the AP Biology 12 curriculum which includes cellular energetics, cell communication and the cell cycle, and heredity. There is a strong emphasis on application and analysis of concepts as well as critical and creative thinking, making connections between topics and their prior experiences, rather than memorizing content.

Chemistry 12

Recommendation: 65% or higher in Chemistry 11 and Foundations 11 or Pre-Calculus 11.

Students are expected to have good math skills, completed Chemistry 11 at a highly competent level, apply significant figures, the mole concept and molarity in calculations, have good study habits and spend more time practicing problems, make connections between topics and apply their knowledge to new situations

This course is an in-depth study on equilibrium systems (reversible reactions). Students will learn about characteristics of equilibrium and the factors that affect reactions. They will also apply their understanding to reaction rates, solubility, acids and bases, and electrochemistry. This course involves a higher level of application and critical thinking than Chemistry 11.

AP Chemistry 12

Students should have an 80% or higher in Chemistry 11 Enriched and Pre- Calculus 11, plus the teacher's recommendation. Student's should also have good work habits in all other courses.

AP Chemistry 12 is an enriched course that can provide students with the equivalency of a first-year university chemistry course. It is a valuable course for students who are strong academically and have a keen interest in the area of chemistry.

As AP Chemistry 12 covers topics with greater depth and at a faster pace than regular Chemistry 12 it is very important for students to commit to effective regular study routines.

Physics 12

Recommendation: 65% or higher in Physics 11 and Pre-Calculus 11.

Physics 12 builds on the concepts and skills developed in Physics 11 with an emphasis on momentum, circular motion, non-contact forces, electrostatics, and electromagnetism. Capitalizing on the growing sophistication of students' experimental skills, lab work will focus on experimental design, data collection, and analysis.

Physics 12 is a challenging course meant to prepare students for post-secondary sciences.

AP Physics 2

Students should have 80% or higher in AP Physics 1 and Pre-Calculus 11, plus their teacher's recommendation. Student's should also have good work habits in all other courses.

AP Physics 2 is an enriched course that, along with AP Physics 1, can provide students with the equivalency of a first-year university physics course. It is a valuable course for students who are strong academically and have a keen interest in the area of physics.

Students will explore topics such as fluid statics and dynamics, thermodynamics with kinetic theory, fluids, electrostatics, electrical circuits with capacitors, electromagnetism, physical and geometric optics, and quantum, atomic and nuclear physics. Capitalizing on the growing sophistication of students' experimental skills, lab work will focus on experimental design, data collection, and analysis.