

Course Descriptions

Burnaby Central

SCIENCE

Science 8

As students investigate cells, atomic theory, light, and plate tectonics they will increase their understanding of the Scientific Method and our natural world. Communication, critical and creative thinking, personal awareness, and social responsibility are skills that will be developed throughout the year. Students will also be provided with the opportunity to develop the processes, attitudes, and scientific habits of mind that allow them to pursue their own inquiries. The big ideas as developed by the Ministry of Education are as follows:

Life processes are performed at the cellular level.

The behavior of matter can be explained by the kinetic molecular theory and atomic theory.

Energy can be transferred both as a particle and a wave.

The theory of plate tectonics is the unifying theory that explains the Earth's geologic processes.

Science 9

As students investigate reproductive strategies, the periodic table, electricity, and ecosystems, they will increase their understanding of the Scientific Method and our natural world. Communication, critical and creative thinking, personal awareness, and social responsibility are skills that will be developed throughout the year. Students will also be provided with the opportunity to develop the processes, attitudes, and scientific habits of mind that allow them to pursue their own inquiries. The big ideas as developed by the Ministry of education are as follows:

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.

Science 10

Science 10 topics include genetic diversity and patterns of inheritance, chemical processes and energy transformations, as well as the formation of the universe. Using critical thinking, creative insight, and their current scientific knowledge, students will be provided with opportunities to collaborate, investigate, problem solve, communicate, innovate, discover and increase their understanding of science through hands-on experience. The big ideas as developed by the Ministry of education are as follows:

Genes are the foundation for the diversity of living things.

Chemical processes require energy change as atoms are rearranged.

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

The purpose of Science 10 Enriched is to provide enrichment for students who excel in Science. The intent of this course is to develop concepts at a deeper level than the Science 10 course. There is an expectation that students will be able to take on self-directed study in science areas that interest them. Proficiency in technology is required. Students are expected to be high achieving, highly motivated, and have a love for science. For admission to this course, student should select Science 10 Enriched during course selection and then speak to their Science 9 teacher for a recommendation. Admission is at the discretion of the Science Department.

Astronomy 11

Have you ever looked up and caught yourself staring off into the night sky? Have you wondered what else is out there beyond the horizon? Are you fascinated with the cosmos? This will be an introductory course on the history of astronomy and our solar system. Students will discuss a variety of topics from ancient astronomy up to modern day developments in the field. Detailed course topics include: ancient astronomy; formation and evolution of the solar system; the planets, stars, moons, sun and minor members of the solar system; working with telescopes and observing the night sky; and space exploration. *Some evening field trips to observe the night sky will be required. Please note that this course is a science elective. It does not satisfy the science graduation requirement.*

Life Sciences 11 (Biology 11)

Students are introduced to important biological themes of biodiversity, evolution, and classification. Interactions at the molecular and cellular levels are explored. Life Sciences 11 uses lab activities to study the increasing complexity of life forms of viruses and bacterium, fungi, and then on to higher plants and animals. Students investigate how different organisms change over time and fulfill their life functions, for example, exchanging materials, responding to the environment, and reproduction. This course teaches fundamental concepts, laboratory skills, and themes needed in future biology courses, in both the high school and post-secondary setting. Supplemental field trip to the Vancouver Aquarium wet-lab may occur at the discretion of the teacher.

Life Sciences 11 AP Transitions (Biology 11)

Part one (of three) of the AP Biology program is designed to cover the curriculum for Life Sciences 11 (see below) as well as infuse AP Biology curriculum throughout the year with a deeper focus on Heredity, Genetic Relationships, and Evolutionary Theory. A more lab focused and challenging course, recommendation from a Science 10 teacher is required.

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Chemistry 11

Chemistry 11 is a course designed to introduce the main ideas, principles and verifying concepts in chemistry, and provide a basis for Chemistry 12 and post-secondary entrance. Skills learned in Mathematics 10 are critical to success in Chemistry 11. Topics include: uncertainty in measurement, writing chemical formulae and balancing equations, the mole concept and Avogadro's Number, problems using balanced equations, solutions and ions, molarity, electron configurations, bonding, and organic chemistry.

Physics 11

This is an introductory course which covers the main ideas, principles, and unifying concepts in physics; to develop an understanding of the analytical and experimental methods of inquiry used in science; and to promote an understanding of how physics applies to everyday life. Physics 11 is recommended especially for students who plan to study pure sciences or engineering related technology but is also appropriate for humanities-oriented students. Topics include: kinematics, dynamics, energy (electrical, mechanical, and heat), and the transmission of energy (waves and photons). Students should take Math 11 prior to or concurrent with Physics 11. A minimum C+ average in Science 10 is strongly recommended.

Science for Citizens 11

This is a survey course that explores how scientific processes and knowledge inform our decisions and impact our daily lives. Scientific knowledge can be used to develop procedures, techniques, and technologies that have implications for **places of employment**. Scientific understanding enables humans to **respond and adapt to changes** locally and globally.

Anatomy and Physiology 12 (Biology 12)

Biochemistry and cellular mechanics form the basis of study for the first half of this academic course. Human physiology becomes the focus for the remainder of the year. An understanding of the organization of human systems and the integrated nature of the human body will be emphasized. Genomics and the importance of emerging DNA technologies may be explored. The effects of nutrition, lifestyle, and different medical conditions on homeostasis and health will be considered. Prior completion of Biology 11 and Chemistry 11 is strongly recommended.

Anatomy & Physiology 12 AP Transitions (Biology 12)

Part two (of three) of the AP Biology program studies how biochemistry and cellular mechanics form the basis of study. Genomics and the importance of emerging DNA technologies such as cloning and recombinant DNA will be explored. Human physiology becomes the focus for the remainder of the course. An understanding of the organization of human systems and the integrated nature of the human body will be emphasized. The effects of nutrition, lifestyle, and different medical conditions on homeostasis and health will be considered.

AP Biology 12

Part three (of three) of the program prepares students for the AP exam in May as well as covers topics that require more depth from both Life Sciences 11 as well as Anatomy & Physiology 12.

The AP Biology program prepares students for the Biology College Board Advanced Placement Exam. Successful completion of this program includes credit for Life Sciences 11, Anatomy and Physiology 12 as well as AP Biology. After showing themselves to be qualified on the AP Exam (graded on a 5-point scale), some students, in their first year of college, are permitted to take upper-level courses in biology or register for courses that have biology as a pre-requisite. This program requires a commitment of three semesters/quarters for successful completion.

Chemistry 12

This course further develops on concepts introduced in Chemistry 11 with an emphasis on reaction rates, reaction and solubility equilibrium, acid-base chemistry, and redox reactions. Math 12 should be taken concurrently or prior. A minimum C+ average in Chemistry 11 is strongly recommended. A good knowledge of stoichiometry and solution chemistry from Chemistry 11 is required for success.

Physics 12

This course further develops on the concepts learned in Physics 11 with emphasis on mechanics and electromagnetism. This course helps develop analytical, experimental and problem-solving skills. It also helps students appreciate the role and applications of physics in our technological and cultural development. A minimum C+ average in Physics 11 is strongly recommended. Math 12 should be taken concurrently or prior. Topics include vector mechanics in 2 dimensions, equilibrium, momentum, energy, circular motion, gravitation, and electromagnetism.