

SCIENCES

The senior high science programs will help all students attain the scientific awareness needed to function as effective members of society. Students will be able to pursue further studies and careers in science, and come to a better understanding of themselves and the world around them. The choice of program in Science should be based on achievement in Grade 9 science and mathematics courses.

Students in Grade 10 are required by Alberta Education to complete Science 10 before taking Biology, Chemistry, or Physics at the 20 and 30 levels. The level of difficulty increases with higher numbered science courses.

Students should carefully determine which science course(s) are needed for entrance to various post-secondary programs.

A grade 10 student may be enrolled in 20 level course in the second semester, however because of limited space and the greater academic demands of the course, the student must meet the following requirements before being considered

- The Student has displayed high academic ability, achievement and motivation in Science 10.
- Student has a strong recommendation from their Science 10 teacher. A grade 11 student may be enrolled in 30 level courses in the second semester, however because of limited space and the greater academic demands of the course, the student must meet the following requirements before being considered
- The Student has displayed high academic ability, achievement and motivation in a 20 level Science course. • Student has a strong recommendation from their 20 level science teacher.

SCIENCE 10 (5 credits)

Science 10 provides first year senior high school studies in Biology, Chemistry, Physics and climate change. The major themes of Science 10 are the interactions of matter and energy as reflected in the diversity, equilibrium, and change of various systems. Students with strong marks in Science 10 may qualify for the Biology 20/30 AP course, Science 10 consists of four units of study;

A - Energy and Matter in Chemical Change

B - Energy Flow in Technological Systems

C - Cycling of Matter in Living Systems

D - Energy Flow in Global Systems

SCIENCE 14 (5 credits)

This is a general science course designed for the student who has struggled with junior high school science and mathematics. The course includes such topics as properties of matter, human health, technology, and the environment. This course is designed to build science skills and show the applications of science to everyday life. There is an emphasis on laboratory activities and projects. Students in Science 14 who achieve an 80% or above may consider taking Science 10 with teacher recommendation. Science 14 consists of four units of study:

A - Investigating Properties of Matter

B - Understanding Energy Transfer Technologies

C - Investigating Matter and Energy in Living Systems

D - Investigating Matter and Energy in the Environment

SCIENCE 24 (5 credits)

Prerequisite: Science 14

This course builds on the knowledge and skills learned in Science 14. Such topics as chemical reactions, energy consumption, car safety, and biotechnology will be considered. This course is practical and lab oriented. Attention is given to the impact of science and technology on society. Completion of Science 24 is accepted for diploma graduation but not for Post-Secondary programs. Science 24 consists of four units of study:

A - Applications of Matter and Chemical Change

B - Understanding Common Energy Conversion Systems

C - Disease, Defence and Human Health

D - Motion, Change and Transportation Safety

SCIENCE 20 (5 credits)

Prerequisite: Science 10

Science 20 is an academic science course designed for students who do not wish to major in a pure science post-secondary program after high school. It is recommended for the student who achieved less than 60% in Science 10. Science 20 is a single course replacement for second year senior high school students in Biology, Chemistry, and Physics. Science 30 is accepted by most non-Science post-secondary programs. Please see the school website for the list of post-secondary institutions and their programs that accept Science 30. Science 20 consists of four units of study:

- A - Chemical Changes
- B - Changes in Motion
- C - The Changing Earth
- D - Changes in Living Systems

SCIENCE 30 (5 credits)

A grade 11 student may be enrolled in Science 30 in the second semester. However, because of limited space and the greater academic demands of the course, the student must meet the following requirements before being considered:

The student has displayed high academic ability, achievement and motivation in Science 20

The student has a strong recommendation from their Science 20 teacher. A grade 12 student who has passed any 20 level Science courses (Science 20 Chemistry 20 Biology 20 and Physics 20) may be enrolled in Science 30. Science 30 is designed for students who want to enhance their understanding of the scientific principles behind the natural events of their world and the technology that they use in their daily lives. Science 30 is an inquiry-based course requiring creativity and imagination. The course is designed to provide students with the scientific literacy required to function in a technological society and to prepare them for post-secondary studies. Science 30 has a final diploma exam at the end of the course. Science 30 consists of four units of study:

- A - Living Systems Respond to their Environment
- B - Chemistry and the Environment
- C - Electromagnetic Energy

D - Energy and the Environment

CHEMISTRY 20 (5 credits)

A grade 10 student may be enrolled in Chemistry 20 in the second semester. However, because of limited space and the greater academic demands of the course, the student must meet the following requirements before being considered:

The student has displayed high academic ability, achievement and motivation in Science 10

The student has a strong recommendation from their Science 10 teacher. This course deals with core topics such as bonding, solutions, gas laws and stoichiometry. Students are required to do lab work that supports the theoretical side of this course. Chemistry 20 consists of four units of study:

A - The Diversity of Matter and Chemical Bonding

B - Forms of Matter: Gases

C - Matter as Solutions, Acids and Bases

D - Quantitative Relationships in Chemical Changes

CHEMISTRY 30 (5 credits)

A grade 11 student may be enrolled in Chemistry 30 in the second semester. However, because of limited space and the greater academic demands of the course, the student must meet the following requirements before being considered:

- The student has displayed high academic ability, achievement and motivation in Chemistry 20
- The student has a strong recommendation from their Chemistry 20 teacher.

This course is more theoretical in nature than Chemistry 20, and enables students to be aware of chemistry in their lives and environment. Core topics include energy of reactions, chemical equilibrium, acid-base reactions, and oxidation-reduction reactions and organic chemistry. Students are required to do extensive lab work that supports the theoretical side of the course. Chemistry 30 is prerequisite for most science courses at post-secondary institutions. Students are required to write the Chemistry 30 diploma exam. Chemistry 30 consists of four units of study:

A - Thermochemical Changes

B - Electrochemical Changes

C - Chemical Changes of Organic Compounds

D - Chemical Equilibrium Focusing on Acid-Base Systems

CHEMISTRY 30/35 ADVANCED PLACEMENT (8 credits) (Fall and Winter Semester)

Prerequisite: Recommended 70% minimum in Chemistry 20 and Math 20 Pure

Chemistry 30 - 5 credits Chemistry 35 - 3 credits

This course is a sheltered and accelerated Chemistry 30 and advanced placement class for a student who really enjoys chemistry and/or has demonstrated a high proficiency in Chemistry 20. This course will cover the entire Chemistry 30 curriculum as well as some advanced placement topics in the fall semester. Advanced placement topics include Solubility Equilibrium, Free Energy and Entropy as well as further topics in Acid and Base Chemistry and Electrochemistry. A diploma exam from Alberta Education will be written during the January Exam session. The half semester Chemistry 35 course begins in January and ends in May after the AP exam. This course supplements the Alberta Chemistry 20/30 curriculum with topics from a first year university level inorganic chemistry course. This course requires students to build upon their knowledge of topics from Chemistry 20 and 30 for a deeper understanding of chemical processes and the structure of matter. Students will write an international exam in mid-May. Should they receive a score of 4 or 5, out of 5 they will be eligible to receive university credit at most universities in Canada and the USA. Students with heavy pre-existing extracurricular or academic loads are NOT recommended to take Chemistry AP.

PHYSICS 20 (5 credits)

A grade 10 student may be enrolled in Physics 20 in the second semester. However, because of limited space and the greater academic demands of the course, the student must meet the following requirements before being considered:

- The student has displayed high academic ability, achievement and motivation in Science 10
- The student has a strong recommendation from their Science 10 teacher and Math 10-C teacher
- It is recommended that a grade 11 student who registers for Physics 20 should have

Math 20-1 as either a prerequisite or co-requisite. The course includes the study of linear motion (kinematics) emphasizing vector quantities. This work leads to the study of forces (dynamics) including uniform circular motion and universal gravitation. The course includes the study of simple harmonic motion, energy, and concludes with the study of one and two dimensional waves. Physics 20 consists of four units of study:

A – Kinematics

B – Dynamics

C - Circular Motion, Work and Energy

D - Oscillatory Motion and Mechanical Waves

PHYSICS 30 (5 credits)

A grade 11 student may be enrolled in Physics 30 in the second semester. However, because of limited space and the greater academic demands of the course, the student must meet the following requirements before being considered:

- The student has displayed high academic ability, achievement and motivation in Physics 20
- The student has a strong recommendation from their Physics 20 teacher.

The course begins with the study of conservation laws including conservation of momentum and energy. The course then shifts to the study of electric fields/forces and then magnetic fields/forces and onto electromagnetic waves. Finally the course moves on to cover modern physics topics including the quantum nature of light, models of the atom and finally radioactivity. A suggested prerequisite or co requisite is Math 30 (Pure or Applied). Students are required to write the Physics 30 diploma exam. Physics 30 consists of four units of study:

A - Momentum and Impulse

B - Forces and Fields

C - Electromagnetic Radiation

D - Atomic Physics

PHYSICS 30/35 ADVANCED PLACEMENT (5 credits and 3 credits)

Prerequisite: Admission criteria apply. Strong self-motivated student See page 8

Students will take both Physics 30 and Physics AP in the first semester of Grade 12. Physics 30 AP is an intensive course that includes an in depth study of the regular Physics 30: Momentum, Forces & Fields, EMR & Light and Quantum/Atomic & Nuclear Physics. Students will write the Diploma in January.

BIOLOGY 20 (5 credits)

A grade 10 student may be enrolled in Biology 20 in the second semester. However, because of limited space and the greater academic demands of the course, the student must meet the following requirements before being considered:

- The student has displayed high academic ability, achievement and motivation in Science 10
- The student has a strong recommendation from their Science 10 teacher.

Biology 20 is a rigorous academic course designed for students with an interest in science in general and biology. Biology 20 consists of four units of study:

A - Energy and Matter Exchange in the Biosphere

B - Ecosystems and Population Change

C - Photosynthesis and Cellular Respiration

D - Human Systems

BIOLOGY 20/30 ADVANCED PLACEMENT (5 credits each)

Prerequisite: Strong self-motivated student Admission criteria apply.

The Biology Advanced Placement student will spend one whole year in Biology AP. During that time they will cover Bio 20, Bio 30, and Bio AP. Mostly students take this class in grade 11, even though they may take Biology AP in grade 12 as well. Students will need to attend class early once a week (8:15- 9:00am) to make this tight timeline possible. This keen group of students will experience an enriched Biology program. Lab work will make up approximately 25% of this course. Field trips, a university textbook and speakers will round out the course. At the end of semester 2 students will write the regular Biology 30 Diploma exam in June. Students who score a 4 or 5 out of 5 on their

AP exam in May will be able to receive university credit for this course. The specific regulations vary from university to university and the appropriate registration guide needs to be consulted.

BIOLOGY 30 (5 credits)

A grade 11 student may be enrolled in Biology 30 in the second semester. However, because of limited space and the greater academic demands of the course, the student must meet the following requirements before being considered:

- The student has displayed high academic ability, achievement and motivation in Biology 20
- The student has a strong recommendation from their Biology 20 teacher.

This course expands on some of the concepts from Biology 20 as well as introducing new concepts in human physiology. Systems that regulate change in humans will be a major unit. Reproduction, cell division and inheritance of traits will be studied in depth. Concepts introduced in ecology will be expanded focusing on population genetics. Students are required to write the Biology 30 diploma exam. Biology 30 consists of four units of study:

A - Nervous and Endocrine Systems

B - Reproduction and Development

C - Cell Division, Genetics and Molecular Biology

D - Population and Community Dynamics