SCIENCE

THE PHYSICAL SETTING/EARTH SCIENCE (Regents) (Grade 10, 11 or 12) (4010)

The Regents Earth Science program presents a course of study designed to encourage students to learn about their world by experiencing it first-hand. Earth Science is one of the most relevant disciplines students can undertake. It is through a study of Earth Science that students begin to understand the world around them and the forces responsible for the changes that they experience. It is also through the study of Earth Science that the delicate balance of nature on our planet can be understood and appreciated. Students should be led to view the Earth as a home with limited resources and limited ability to recover from abuse.

During our course of study, students will engage in activities that include: analysis, inquiry, design, information systems, mathematics, technology, and problem solving. As a result, students will experience an integration of scientific fact with the attitude formation necessary for the development of an informed, scientifically literate population.

Major areas to be covered:

The Earth Structure	Meteorology
Minerals and Rocks	The Water Cycle and Climate
The Dynamic Crust	Earth in Space
Weathering, Erosion, and Deposition	Oceanography/Coastal Processes
Earth History	Glacial Processes

The laboratory program is a **PREREQUISITE FOR ADMISSION TO THE FINAL EXAM.** The student must complete all lab activities assigned **AND** submit a satisfactory written report for the laboratory experiences.

The Laboratory Practical Test will be given in May or June prior to the written final exam.

Prerequisite:	**The successful completion of Living Environment/Biology Regents Exam**
Final Exam:	**Regents**
Credit:	**1 unit (40 weeks) Regents**

THE PHYSICAL SETTING/HONORS EARTH SCIENCE (4013) (Grades 9,10)

The honors section of Earth Science is a rigorous curriculum designed to allow highly motivated students to conduct an in-depth study of the Earth and Environmental Sciences. In Honors Earth Science, students are expected to work independently on a variety of assignments and accept greater responsibility for their learning. In order to develop a greater understanding of the processes that shape our everyday lives, the curriculum will integrate inquiry investigations and a variety of technologies with the study of earth as a system. The impacts of human activities on earth systems will also be a focus. The results of student investigations should be communicated through presentations and formal laboratory reports. Enrichment and integration with other disciplines is encouraged.

During our course of study, students will engage in activities that include: lectures, Google Slide presentations, labs, videos, computer simulations, projects, online use of Google Earth and other websites accessible with the Chromebook. Students will be evaluated by unit tests and quizzes, graded lab quizzes, written work, mid-year exam and the Regents final exam.

The laboratory program (20-30% of instruction) is a **PREREQUISITE FOR ADMISSION TO THE FINAL EXAM.** The student must complete all lab activities assigned **AND** submit a satisfactory written report for the laboratory experiences.

The laboratory Practical Test will be given in May or June prior to the written final exam.

Prerequisite:	**The successful completion of Living Environment/Biology Regents Exam**
Final Exam:	**Regents**
Credit:	**1 unit (40 weeks) Regents**

THE LIVING ENVIRONMENT/BIOLOGY (Grade 9) (4110)

Science relies on logic and creativity. It's a way of knowing; an intellectual and social process that applies human intelligence to the explanation of how the world works. Scientific explanations are developed using both observations (evidence) and what people already know about the world (scientific knowledge). All scientific explanations are tentative and subject to change. Understanding the scientific view of the natural world is an essential part of personal, societal, and ethical decision making.

The intent of this course is to provide students with an awareness of the natural world, basic scientific concepts, stimulation of inductive reasoning, and a basic understanding of biological processes and generalizations.
Students, upon completion of this course, will be able to hypothesize, interpret, evaluate, and apply their scientific knowledge and skills to real-world situations.

The basic core units are:

Unit I – Similarities and Differences Among Living Organisms – Characteristics of life, Cells, Single-celled vs. Multi-celled organisms

Unit II – Homeostasis in Organisms – Biochemical processes, Feedback and homeostasis, Disease

Unit III – Genetic Continuity –Heredity and genes, Genetic code, Genetic engineering

Unit IV – Reproduction and Development – Types of reproduction, Cell division, Human reproduction and development, Reproductive technology

Unit V – Evolution – Theory of evolution, Mechanics of evolution, Patterns of change

Unit VI – Ecology – Organisms and their environment, Population interactions, Energy flow in ecosystems, Diversity benefits life, Environmental changes

Unit VII – Human Impact on Ecosystems – Need for awareness, Our environment, People and the environment, Impact of technology, Individual and societal actions

Scientific Inquiry and Skills – What is science? Scientific inquiry, Further understandings

Laboratory Skills – Measurement tools, Microscopes, Observing organisms, Other lab techniques, Lab safety

Laboratory Requirement:
The successful completion of the laboratory program, which is a **prerequisite for admission to the final examination,** requires that the student:

1. Completes laboratory experiences representing all full–time lab periods.
2. Completes a satisfactory written report for each laboratory experience.
3. Demonstrates proficiency in those skills specified in the Living Environment Laboratory Skill Evaluation Form.

Final Exam: **Regents Exam**
Credit: **1 unit (40 weeks)**
Double period laboratory session

THE LIVING ENVIRONMENT/BIOLOGY (HONORS) (Grade 9) (4112)

The honors section of The Living Environment is an enriched level that can be taken as an option instead of the standard Living Environment course. The honors class covers all of the content covered in The Living Environment, with the addition of higher level vocabulary and a more thorough exploration into the life sciences.

The core units for the course include all of the units from The Living Environment, covered in greater detail. Additional core units include:

Human Anatomy and Physiology – An in-depth look at the workings of the human body
Plant Structure and Function – Differences between plants and animals will be explored in this botany unit
Classification of Diverse Life Forms – Making sense of the way that scientists organize life forms into groups for study
Scientific Research – Using the scientific method and modern lab techniques to give students a research lab experience

This course is intended for anyone who wishes to pursue a field of employment in the biological sciences, or is simply looking to learn more about the living world around them. This course is an excellent preparation for any student who plans to take Advanced Placement Biology as a Junior or Senior, and is highly recommended for those students.

Final Exam: **Regents Exam**
Credit: **1 unit (40 weeks)**
Double period laboratory session

ADVANCED PLACEMENT BIOLOGY (Grade 11 or 12) (4130)

This course is a one–year Advanced Placement course taught to Seniors and qualified Juniors. The overall academic record of the student must contain promise of success in college level work.

The aim of this course is to achieve the following:

1. Knowledge of the facts, principles and processes of biology;
2. Understanding of the means by which biological information is collected, how it is interpreted, and how one formulates a hypothesis from available data and makes further predictions;
3. Understanding that science is a human endeavor with social consequences;
4. Introduction of the students to college level work so that they may receive college credit;
5. Understanding of the most up–to–date information on various aspects of modern biology.

A college level textbook will be used, and laboratory experiences are included in this course. The four Big Ideas of the course are:

1. The process of evolution drives the diversity and unity of life.
2. Biological systems utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis.
3. Living systems store, retrieve, transmit and respond to information essential to life processes.
4. Biological systems interact, and these systems and their interactions possess complex properties.

Prerequisite:	**The successful completion of The Physical Setting/Chemistry and Physics Regents Exams**
Exam:	**AP exam required (fee approximately $96 - financial aid available to those that qualify)**
College Credit:	**3 units possible with score of 3, 4, or 5 on AP exam given in May (depending on policy of individual colleges).**
Credit:	**1 unit (40 weeks)**
	Double period laboratory session

GENERAL CHEMISTRY (Grade 11 or 12) (4206)

The General Chemistry course surveys topics such as: matter and energy, bonding, acids and bases, and the periodic table. It also pursues the connections between theoretical issues in chemistry and practical applications in the community such as; environmental pollution, chemical resources, water quality, criminal investigation, forensics and food chemistry.

Final Exam:	**Local**
Credit:	**1 unit (40 weeks)**
Prerequisite:	**The successful completion of Physical Setting/Earth Science and Living Environment/Biology.**

Laboratory requirement:

1. Laboratory experience in addition to class time is required.
2. Written lab reports will indicate if lab requirements have been met by the student.

THE PHYSICAL SETTING/CHEMISTRY (Regents) (Grade 11 or 12) (4210)

In Physical Setting/Chemistry, students will be able to understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Chemistry Core Topics:

1. Atomic Concepts
2. Periodic Table
3. Moles/Stoichiometry
4. Chemical Bonding
5. Physical Behavior of Matter
6. Kinetics/Equilibrium

7. Organic Chemistry
8. Oxidation-Reduction
9. Acids, Bases and Salts
10. Nuclear Chemistry

Laboratory requirement:

3. 1200 minutes of a passing laboratory experience in addition to class time is required for admission into the Regents Chemistry examination.
4. Written lab reports and teacher kept time logs will indicate if lab requirements have been met by the student.

Regents Exam:

1. Part A: Content based multiple choice questions.
2. Part B: Content and skills based questions, multiple choice or open ended questions, assessing the students' ability to apply, analyze, synthesize and evaluate material.
3. Part C: Content, skills and their application will be assessed with open ended items requiring students to apply their knowledge of content and skills in real-world situations.
4. Part D: Laboratory performance.

Credit: **1 unit (40 weeks)**
Prerequisite: **The successful completion of two Math credits, a passing grade on the Physical Setting/Earth Science and the Living Environment/Biology Regents exams.**

THE PHYSICAL SETTING/CHEMISTRY (HONORS)(Grade 10/11/or 12) (4216)

The honors section of The Physical Setting/Chemistry is an enriched level that can be taken as an option instead of the standard Chemistry course. The honors class covers all of the Regents Chemistry content, with the addition of higher level material geared as a suggested pre-requisite to the Advanced Placement Chemistry course.

Chemistry Core topics are the same as the Regents course but covered in more depth as this is considered to be a preparatory course for students interested in taking AP chemistry.

Laboratory requirement:

1. 1200 minutes of laboratory experience, in addition to the class time, is required for admission into the Regents Chemistry Examination. Laboratory will be more rigorous than non-honors chemistry, with written laboratory reports and time log requirements.

Credit: **1 unit (40 weeks)**
Prerequisite: **The successful completion of two Math credits (special attention for algebraic skills) and a mastery grade on both of the Physical Setting/Earth Science and the Living Environment/Biology Regents exams.**

ADVANCED PLACEMENT CHEMISTRY (4230)

The course is designed to prepare students to take the Advanced Placement chemistry exam. University level work is expected and the class sessions emphasize problem solving. A college level textbook and laboratory experiences are used in the course. Access to web-based program: www.myap.collegeboard.org will be mandatory for exam registration and material used in the classroom.

The course will cover the 6 Big Ideas (CR2):

1. Structure of matter (CR3a)
2. Properties of matter-characteristics, states and forces of attraction (CR3b)
3. Chemical reactions (CR3c)
4. Rates of chemical reactions (CR3d)
5. Thermodynamics (CR3e)
6. Equilibrium (CR3f)

Laboratory: 25% of instruction time (CR5a)

- Laboratory rubric is the grading system used to determine the mark for lab work.
- Lab topics (CR5b) including 6 inquiry-based lab topics (CR6) which are listed in the objectives.

Time Requirement: Students will spend at least one double period (80 minutes) a week in the lab to complete the suggested hands-on laboratory assignments.

Laboratory Reports: Each student is expected to keep a portfolio of the laboratory reports for each lab completed during the year. Each lab in the lab portfolio will be graded. It is important to note that many universities and colleges will request to see the lab portfolio when considering whether or not AP chemistry credit is granted.

Exam:	**AP Exam required (fee approximately $96 - financial aid available to those that qualify)**
Credit:	**1 unit (40 weeks)**
Prerequisite:	**The successful completion of The Physical Setting/Earth Science, Living Environment/Biology, Physical Setting/Chemistry Honors and Regents Physics or Honors Regents Physics are recommended; and the successful completion of two Math credits.**

ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE (Grade 11 or 12) (4330)

The goal of this course is to provide students with the scientific principles, concepts, and methodologies required to understand the relationships of the natural world, to identify and analyze environmental problems, and to examine alternative solutions for resolving and/or preventing them. In addition to studying issues of past, present and future, this class will also explore tools for effective environmental change and expose you to direct hands-on experience of science in the environment.

This course consists of 6 units. The 6 units are subdivided into chapters and topic lessons. Each unit contains lectures, multimedia presentations, readings, class assignments, lab activities, required homework and assessments. Field trips will be necessary to complete some of the lab activities.

Exam:	**AP Exam required (fee approximately $96 – financial aid available to those that qualify).**
Credit:	**1 unit (40 weeks)**
Prerequisite:	**The successful completion of The Physical Setting/Earth Science, Living Environment/Biology, Physical Setting/Chemistry and CC Algebra**

APPLIED PHYSICS (4405)

This course in physics is an elective for students in grades 11-12. The perspective is that of a non-scientist who wants to gain an appreciation for all that takes place in the physical world we live in. Prerequisites for this course include Physical Setting/Earth Science and Living Environment. The emphasis for this course will be hands-on learning, including interesting labs and projects (egg drop, roller coasters, electric motors/generators, etc.). We will also make use of the Internet to explore the concepts of physics and recent developments in the applications of physics. Unit topics for study include classical mechanics, electricity and magnetism, waves and optics, and modern physics. We will apply what we learn to interesting topics including roller coasters and amusement park rides, toys, the northern lights, stars and planets, movies, fiber optics, rainbows, collisions and explosions, black holes, and much more.

Prerequisite:	**The successful completion of Physical Setting/Earth Science and Living Environment/Biology**
Final Exam:	**Local**
Credit:	**1 unit (40 weeks)**

THE PHYSICAL SETTING/ PHYSICS (Regents) (Grade 11 or 12) (4410)

This course is geared to produce a genuine understanding of the physical laws fundamental to all sciences. An emphasis is placed on problem solving techniques that are applicable to any field of study.

Because the course is geared toward conceptual understanding, rather than mathematical skills, it is suitable for students with a wide range of abilities. The topics covered are Mechanics, Heat, Wave, Optics and Atomic and Nuclear Physics.

This course is essential to those considering a science-related field of study.

Final Exam:	**Regents exam**
Credit:	**1 unit (40 weeks)**
Prerequisite:	**Passing grade on Physical Setting/Earth Science, Living Environment/Biology, and Physical Setting/ Chemistry Regents exams; and the successful completion of two Math credits.**

THE PHYSICAL SETTING/PHYSICS (HONORS) (Grade 11or 12) (4416)

The honors section of The Physical Setting/Physics is an enriched level that can be taken as an option instead of the standard Physics course. The honors class covers all of the Regents Physics content, with the addition of higher level material.

Physics Core topics are the same as the Regents course but covered in more depth.

Laboratory requirement: 1200 minutes of laboratory experience, in addition to the class time, is required for admission into the Regents Exam. Laboratory will be more rigorous than non-honors chemistry, with laboratory notebook and time log requirement.

Credit: **1 unit (40 weeks)**
Prerequisite: **Scoring mastery on the Regent Chemistry Exam.**

ADVANCED PLACEMENT PHYSICS C: MECHANICS (4429)

Advanced Placement Physics C: Mechanics is a calculus-based physics course that covers kinematics, dynamics, energy, momentum, rotation, gravitation and oscillation. This course is the first of a two-course sequence that is equivalent to the introductory physics taken by science and engineering students at most colleges and universities.

Advanced Placement Physics C: Electricity and Magnetism builds on the C: Mechanics, with the addition of forces exerted on charged particles, electric and magnetic fields, electric circuits and their components, and the nature of electromagnetic radiation. This course is equivalent to the second semester of the introductory physics sequence typically offered at colleges and universities. This course applies both differential and integral calculus.

Examination: **AP Exam required (fee approximately $96 – financial aid available to those that qualify)**
Credit: **1 unit (40 weeks)**
Prerequisite: **Students must have completed Regents Physics and be concurrently registered in AP Calculus**

METEOROLOGY (4420)

This course in weather forecasting is an elective for students in Grades 11-12. Our perspective is that of the non-scientist who wants to gain an appreciation for all that takes place in the atmosphere around us.

The emphasis is on watching the sky, learning about basic atmospheric processes and understanding television weather casts. We operate our own weather station, as well as visit the ones at the National Weather Service and Channel 4. We use the Accu-Weather Interactive Database to get weather information both for labs and to learn how to forecast. Some of the topics covered are: the basic causes of weather, what causes the wind, storms, fronts, rain, snow, thunderstorms, tornadoes, hurricanes, sky watching and weather forecasting

Credit: **1 unit (40 weeks)**
Prerequisite: **The successful completion of The Physical Setting/Earth Science, Living Environment/Biology and Physical Setting/Chemistry**

ASTRONOMY (4423)

This course is an elective for students in Grades 11-12. Astronomy is the study of the universe above the Earth's atmosphere. In this course, students will study stars, motions of the sun, moon, and planets, and learn the constellations. Students will also learn the history of astronomy, rocketry and space travel. The birth, life and death of our solar system, our galaxy, the cosmos and current advancements in astronomy.

This course is intended for students who have demonstrated a high level of self-motivation. Much of the work is project and lab based. Night observations (at home) will be required.

Final Exam: **Local**
Credit: **1 unit (40 weeks)**
Prerequisite: **The successful completion of The Physical Setting/Earth Science and Living Environment/Biology, Physical Setting/Chemistry and Algebra.**