Science Program

Science Core Requirement: 3 Years

A. Local or Regents Diploma-Pass the Living Environment course, a Physical Setting course and one other approved* science course, and pass a science Regents examination.

B. Regents Diploma with Advanced Designation-Pass the courses and Regents examinations in two of the four Regents Science courses. One course and examination must be the Living Environment and one must be a Physical Setting course. An additional credit must be earned in an approved* science course.

*Science Research, Forensics, and Genetics may not be used to fulfill the three credit science requirements.

** Elective courses will be offered based on sufficient student enrollment.

SCIENCE			
GRADE 9	**GRADE 10**	**GRADE 11**	**GRADE 12**
Physical Setting: Earth Science	Science Regents Workshop - Living Environment	Science Regents Workshop - Living Environment	Science Regents Workshop - Living Environment
Physical Setting: Earth Science Honors	Science Regents Workshop - Physical Setting: Earth Science	Science Regents Workshop - Physical Setting: Earth Science	Science Regents Workshop - Physical Setting: Earth Science
Physical Setting: Earth Science Skills	Physical Setting: Earth Science	Physical Setting: Earth Science	Physical Setting: Earth Science
Living Environment Regents	Physical Setting: Earth Science Skills	Physical Setting: Earth Science Skills	Physical Setting: Earth Science Skills
Living Environment Honors	Living Environment Regents	Living Environment Regents	Living Environment Regents
Living Environment Skills	Living Environment Skills	Living Environment Skills	Living Environment Skills
Intro to Science Research Honors	Physical Setting: Chemistry	Physical Setting: Chemistry	Physical Setting: Chemistry
	Physical Setting: Chemistry Honors	Physical Setting: Physics	Physical Setting: Physics
	Astronomy	Advanced Placement Physics 1	Advanced Placement Physics 1
	Evolution	Advanced Placement Chemistry	Advanced Placement Physics C
	Natural Disasters	Advanced Placement Biology	Advanced Placement Chemistry
	Human Anatomy and Physiology	Advanced Placement Environmental Science	Advanced Placement Biology
	Advanced Science Research Honors	Astronomy	Advanced Placement Environmental Science
		Ecology-Fall	Astronomy
		Ecology-Spring	Ecology-Fall
		Ecology Skills	Ecology-Spring
		Evolution	Ecology Skills
		Natural Disasters	Evolution
		Human Anatomy and Physiology	Natural Disasters
		Forensic Science	Human Anatomy and Physiology
		Genetics and Biotechnology I	Forensic Science
		Genetics and Biotechnology II	Genetics and Biotechnology I
		Marine Studies	Genetics and Biotechnology II
		Marine Studies Skills	Marine Studies
		Science Research Honors: Research Projects	Marine Studies Skills
			Science Research Honors: Research Projects and Competitions

Science Regents Workshop - Living Environment(10,11,12) Full Yr., 1/2 Cr., Alternate Days
Prerequisite: Failure of Regents exam
Course Description: This workshop is for students who have passed the Living Environment course and have satisfied the laboratory requirement but have not scored a passing grade on the Living Environment Regents.

Science Regents Workshop - Physical Setting: Earth Science (10, 11,12) Full Yr., 1/2 Cr., Alternate Days **Prerequisite:** Failure of Regents exam
Course Description: This workshop is for students who have passed the Earth Science course and have satisfied the laboratory requirement but have not scored a passing grade on the Earth Science Regents.

Physical Setting: Earth Science (9, 10, 11, 12) Full Yr., 1 Cr., Lab Alternate Days
Prerequisite: None
Course Description: This course allows students to study the earth as a complex system involving interactions among rocks, minerals, water, air and living organisms. The basic principles of astronomy, geology, meteorology and oceanography-related processes are reviewed in detail. Laboratory exercises reinforce the basic principles in each of the course topics. A laboratory performance test is part of the June Regents.

Physical Setting: Earth Science Honors (9) Full Yr., 1 Cr., Lab Alternate Days
Prerequisite: None
Course Description: This course allows students to study the earth as a complex system involving interactions among rocks, minerals, water, air and living organisms. The basic principles of astronomy, geology, meteorology and oceanography are studied in detail. It is designed for high school students of above average ability and interest in science. Laboratory exercises reinforce the basic principles in each of the course topics. A laboratory performance test is part of the June Regents Examination.

Physical Setting: Earth Science Skills (9, 10, 11, 12) Full Yr., 1 Cr.
Placement must be determined by the Committee on Special Education.
Prerequisite: None
Course Description: This course allows classified students to study the Earth as a complex system involving interaction among rocks, minerals, water, air and living organisms. The basic principles of astronomy, geology, meteorology, and oceanography-related processes are reviewed in detail. These concepts are developed through appropriate laboratory exercises. A laboratory performance test is part of the June Regents.

Living Environment Regents (9, 10, 11, 12) Full Yr., 1 Cr., Lab Alternate Days
Pre- or corequisite: Algebra 1 or Algebra 1B
Course Description: This course will provide a broad understanding of the fundamental principles of Biology and will give treatment to the specific areas of experimental design, biochemistry, human physiology, reproduction and development, modern genetic, modern evolution and ecology.These concepts are developed through appropriate laboratory experiences which emphasize the disciplined approach of the scientist.

Living Environment Honors (9) Full Yr., 1 Cr., Lab Alternate Days
Pre- or corequisite: Algebra I Honors.
Course Description: This is an advanced level biology course designed for the more academically talented college-bound students. This course will not only provide a broad understanding of the fundamental principles of Biology, but also give expanded treatment to the specific areas of experimental design, biochemistry, human physiology, reproduction and development, modern genetics, biotechnology, modern evolution and ecology. These concepts are developed through appropriate laboratory experiences as well as cooperative learning experiences.

Living Environment Skills (9, 10, 11, 12) Full Yr., 1 Cr.

Placement must be determined by the Committee on Special Education.

Prerequisite: None

Course Description: This course will provide classified students with a broad understanding of the fundamental principles of Biology. It will address the areas of biochemistry, human physiology, reproduction and development, modern genetics, modern evolution and ecology. These concepts are developed through appropriate laboratory exercises. Students must take the Living Environment Regents Examination in June.

Physical Setting: Chemistry (10, 11, 12) Full Yr., 1 Cr., Lab Alternate Days

Pre- or corequisite: Geometry or Geometry Honors.

Course Description: This course is designed for students majoring in science, related fields of science, and other college preparatory students. It will provide the student with an important focus on up-to-date chemistry concepts including Atomic Structure, the Periodic Table, Moles/Stoichiometry, Chemical Bonding, Matter, Kinetics/Equilibrium, Organic Chemistry, Oxidation-Reduction Reactions, Acids, Bases and Salts, and Nuclear Chemistry. Laboratory work is an integral part of the course. A good background in mathematics is strongly recommended for success in this course.

Physical Setting: Chemistry Honors (10) Full Yr., 1 Cr., Lab Alternate Days

Prerequisite: Geometry or Geometry Honors

Course Description: Honors Chemistry is an advanced level course. The Honors student will go beyond Regents work by delving into more intricate scientific theories and applications. The course places emphasis on descriptive content. Investigative laboratory work is an integral part of the program. Some of the laboratory investigations will utilize computerized technology to assist students in the analysis, measuring, and/or reporting of laboratory activities.

Physical Setting: Physics (11, 12) Full Yr., 1 Cr., Lab Alternate Days

Prerequisite: Geometry, Geometry Honors

Course Descriptions: This course presents a modern view of physics based on conservation of matter, energy and momentum. The topics include mechanics, waves, electricity, magnetism, and modern physics. This is a lab-oriented program designed to produce skills in problem solving, critical thinking and cooperative learning. It requires students to learn by doing and is a transitional course into college level educational processes. A good background in mathematics is strongly recommended for success in the course.

Advanced Placement Physics 1 (11, 12) Full Yr., 1 Cr.,Lab Alternate Days

Pre- or Corequisite: Alg. II, Physical Setting: Chemistry.

Course Description: This course of study is a non-calculus treatment of topics in physics that are found in a one semester college introductory course. Laboratory and inquiry-based explorations are the basis for concept formation. Students have the option to take the College Board Advanced Placement B1 Physics Exam. The Regents Physics exam is taken by all eligible students. Strong math skills are recommended to take this course. This course is a Prerequisite for AP Physics C.

Advanced Placement Physics C (12 Only) Full Yr., 1 Cr., Lab Alternate Days

Prerequisite: AP Physics 1 **Co-requisite:** AP Calculus AB or AP Calculus BC

Course Description: In this course the student will study elements of Mechanics in the fall and Electricity and Magnetism in the spring. Topics will be treated with the calculus which is introduced as needed.. Problem solving skills will be practiced in this course. Students will have the option to take the College Board Advanced Placement Physics C Mechanics Exam or the College Board Advanced Placement Physics C Electricity and Magnetism exam, or both.

Advanced Placement Chemistry (11, 12) Full Yr., 1 Cr.,Lab Alternate Days

Prerequisite: Physical Setting: Chemistry.

Course Description: This course is designed to be the equivalent of the general chemistry course usually taken during the first year of college. Students should attain a depth of understanding of fundamentals and competence in dealing with chemical problems while developing the ability to think clearly and to express ideas, both orally and in writing, with clarity and logic. Major emphasis is placed on chemical calculations and the mathematical formulation of chemical principles.

Advanced Placement Biology (11, 12) Full Yr., Double Period, 1 Cr.

Prerequisite: Living Environment, Physical Setting: Chemistry.

Course Description: This course is designed to meet the objectives of a general biology course on the college level. Considerable time is spent in the laboratory collecting, analyzing and interpreting data in order to meet the lab standards mandated by the College Board. Students taking this course should have demonstrated a strong interest in biological science and must have done well in Living Environment and Chemistry.

Advanced Placement Environmental Science (11, 12) Full Yr., 1 Cr., Lab Alternate Days

Prerequisite: Chemistry, Living Environment and Earth Science.

Co-requisite: 10th Grade Honors Chemistry.

Course Description: Carbon footprints, ozone depletion, global warming, species extinction and much more! This course is designed to be the equivalent of an introductory college level course in environmental science. Learn about how the physical and biological world works and man's influence on it. This course provides background for many different college majors including environmental science, environmental law, environmental engineering or environmental design.

Astronomy (10, 11, 12) Semester, 1/2 Credit, Full Yr., Alternate Days, 1/2 Cr.

Prerequisite: Earth Science.

Co-requisite for Grade 10 students: Chemistry.

Course Description:. This course will broaden the student's knowledge of Astronomy and Astronomy's currently accepted scientific theories. Topics to be discussed and debated: Ancient astronomy/Archaeoastronomy; Constellations/Celestial; Navigation, Extraterrestrials/S.E.T.I.; Space exploration/Past and future space technology; Origins of the Universe/Cosmology; Origins of Life in the Universe/Astrobiology; Asteroid and comet impacts/Extinction Level Events (E.L.E.).

Ecology-Fall (11, 12)

Semester, 1/2 Cr.

Prerequisite: Living Environment, Earth Science.

Course Description: The fall semester of this course deals with general principles of ecology including: Ecosystem dynamics; Transfer of energy in an ecosystem; Relationships between organisms; Ecological cycles; Biomes. The course is designed to be hands on and encompasses notes, vocabulary, labs, and activities.

Ecology-Spring (11, 12)

Semester, 1/2 Cr.

Prerequisite: Living Environment, Earth Science.

Course Description: The spring semester of this course deals with man's impact on the environment (both positive and negative) including: pollution-water, air, and land; acid rain; global warming; endangered species; conservation of resources; energy sources; how to go "green". The course is designed to be hands on and encompasses notes, vocabulary, labs, and activities.

Ecology Skills (11, 12) Full Yr., 1 Cr.
Placement must be determined by a Committee on Special Education.
Prerequisite: Living Environment, Earth Science
Course Description: The main emphasis of this full year course is the terrestrial environment-to compare and contrast the flora and fauna of fields and secondary forests to define ecology in terms of these interrelationships. The course is designed to get the student directly involved in the discovery of common life forms in his/her local environment. Becoming knowledgeable in the ecology of these plants and animal forms, the student will see the significant roles that they play in the general ecology of the entire biosphere.

Evolution (10,11, 12)
Semester, 1/2 Cr.
Prerequisite: Living Environment
Course Description: Through a variety of laboratory activities, projects, and discussions, students will gain an enhanced knowledge of the most significant biological changes in species throughout time. Evolution: the fundamental concept underlying all science will be the focus of the activities in this course. Discussions of the history, ideas, evidence, controversy, and past and present research will be an integral part of the study of this subject.

Natural Disasters (10,11, 12)
Semester, 1/2 Cr.
Prerequisite: Living Environment, Earth Science, Regents Geometry or Algebra II Honors
Course Description: This course will provide a broad understanding of the fundamental principles of Physics, Chemistry, Biology and Earth Science in relation to the Human Impact on Earth as it relates to Natural Disasters. Students will construct models of and explore Tornadoes, Hurricanes, Typhoons, Droughts, Wildfires, Deforestation, Tsunamis, Blizzards, Earthquakes, Extra Terrestrial Events, Floods, Mass Wasting Events (Avalanches, Landslides, etc.), Pandemics, and Epidemics, and investigate their impact on Humans, our planet and beyond.

Human Anatomy and Physiology (10, 11, 12) Full Yr., Alternate Days 1/2 Cr., Semester, 1/2 Cr.
Prerequisite: Living Environment
Course Description: This course is designed for students who are interested in a detailed curriculum in Anatomy. Students are expected to participate and complete various dissections of animals. The dissections are an integral course requirement. Classroom work will deal with functions of the skeletal, muscular, and nervous systems and their relationship to how the human body functions.

Forensic Science (11, 12) One Semester, 1/2 Cr.
Prerequisite: Chemistry. This course may not be used to fulfill the three credit science requirements.
Course Description: This course will help students apply a broad spectrum of sciences in answering questions of interest to the legal system. Students will be able to develop skills used by forensic scientists as they try to investigate and solve crimes. Class topics will include possible careers in Forensic Science, Crime Scene Investigation field techniques, and the laws governing them, as well as evidence acquisition and processing. Laboratory techniques such as gel electrophoresis, PCR, DNA Fingerprinting, and fingerprint analysis will be employed.

Genetics and Biotechnology I (11, 12)
Semester, 1/2 Cr.
Prerequisite: Living Environment, Chemistry.This course may not be used to fulfill the three credit science requirements.
Course Description: This course introduces key concepts of molecular biology and biotechnology via a lab-based learning experience. Students will learn the fundamental principles of the many different fields of genetics including an in-depth study of DNA and Protein Synthesis, what genes are, how they are passed on through multiple generations, how they are expressed, as well as an introduction to how genes can be manipulated within the field of biotechnology. Each student will become proficient using tools and

techniques of the biotechnology lab including micropipetting, maintaining sterile technique, growing bacterial cultures, DNA restriction analysis, and gel electrophoresis.

Genetics and Biotechnology II (11, 12)
Semester, 1/2 Cr.
Prerequisite: Genetics I. This course may not be used to fulfill the three credit science requirements.
Course Description: This course is an advanced elective in which students will further develop the critical thinking and lab skills they learned in Genetics & Biotechnology I. The course will provide hands-on, lab-based learning experiences for students interested in continuing their working knowledge of bacterial transformation, and it will introduce DNA Fingerprinting through the use of the Polymerase Chain Reaction (PCR). Additionally, the extraction and sequencing of mitochondrial DNA as well as the testing of plants for genetic modification using Round-up Ready primers and PCR will be performed. Additional topics for discussion include DNA sequencing, the molecular biology of cancer, CRISPR/cas9 gene editing, as well as other current topics recently discovered in the fields of genetics.

Marine Studies (11, 12) Full Yr., 1 Cr.
Prerequisite: Living Environment and Physical Setting: Earth Science.
Course Description: Marine Studies is an introductory course designed to introduce students to the fields of Marine Biology & Oceanography. The first half of the year covers the history and subdivisions of Oceanography.
The second half of the year focuses on marine ecology and marine biology. Students will be introduced to ecological principles associated with various marine environments and aquatic organisms, a variety of marine ecosystems, as well as various groups of marine organisms, many of which are known to inhabit the waters surrounding Long Island.

Marine Studies Skills (11, 12) Full Yr., 1 Cr.
Placement must be determined by the Committee on Special Education.
Prerequisite: Living Environment, Earth Science
Course Description: Marine Studies is an introductory course designed to introduce students to the fields of Marine Biology and Oceanography. Students will be introduced to ecological principles associated with various marine environments and aquatic organisms, a variety of marine ecosystems, as well as various groups of marine organisms, many of which are known to inhabit the waters surrounding Long Island. In addition, students will learn how human interactions and pollution endanger the lives of many aquatic organisms and marine ecosystems, and will research conservation efforts as a method of preserving these delicate species and habitats.

Science Research Program

The Science Research Program provides students with the support and experience to do independent project work. Student project work can be in the area of the environmental, biological, chemical, physical, behavioral/social sciences or engineering. The area of project work is dependent upon the student's grade level. Older students might establish an arrangement with a mentor at a university. They will develop a senior project for submission to contests such as the Regeneron Science Talent Search. It is recommended that students in the Science Research Program enroll in AP Statistics as early as possible. These courses may not be used to fulfill the three credit science requirements.

Intro to Science Research Honors (9) Full Yr., Alternate Days, 1/2 Cr.
Prerequisite: None
Course Description: In this course, students will develop skills used in science research. Students will make use of computer based information retrieval systems, investigate some tools suitable for the observation and recording of data, work with some organisms and techniques suitable for certain projects and use some tools for data analysis. The scientific method will be reviewed so that each student can develop and report on a research project following the guidelines which include project proposal, bibliography, abstract, research paper, blackboard and oral presentation. . Students will participate in Science Fair competitions and field trips.

Advanced Science Research Honors (10) Full Yr., Alternate Days, 1/2 Cr.

Prerequisite: Intro to Science Research Honors (9)

Course Description: In this course, students will continue to develop skills used in science research. Students will make use of computer based information retrieval systems, investigate some tools suitable for the observation and recording of data, and continue to work with data analysis. Each student will develop and report on a research project following the guidelines of the Long Island Science Congress. These guidelines include a project proposal, bibliography, abstract, research paper, blackboard and oral presentation. Students will work individually or in teams developing and conducting independent research. Students will participate in Science Fair competitions and field trips.

Science Research Honors: Research Projects (11) Full Yr., Alternate Days, 1/2 Cr. **Prerequisite:** Advanced Science Research Honors (10)

Class Meets By Appointment 9th Period

Research Teacher Recommendation required. Students should submit a request for participation to the research teacher.

Course Description: Students will develop and conduct a project which will provide them with the opportunity in twelfth grade to enter competitions such as: Regeneron Science Talent Search, Long Island Science Congress, , and the Long Island Science and Engineering Fair. This project will involve a literature search, development of a hypothesis, hypothesis testing and analysis of the collected data. Possible areas for research are biological, physical, computer or behavioral/social sciences and engineering. Students will seek a mentor from local universities, hospitals, or laboratories for the research. In some cases, students can develop and conduct research at school. The 1/2 credit cannot be used as part of a sequence for graduation (Honors weighted course).

Science Research Honors: Research Projects and Competitions (12) Full Yr., Alternate Days, 1/2 Cr. **Prerequisite:** Science Research Honors: Research Projects (11)

Class Meets By Appointment 9th Period, Research Teacher Recommendation required.

Course Description: Students should submit a request for participation to the research teacher. Students will complete the research that was begun during eleventh grade (or under some circumstances, through a summer program). The research will be used to write a formal report. Students will complete applications for submission to the major applicable contests: Regeneron Science Talent Search, Long Island Science Congress and the Long Island Science and Engineering Fair. Students will also participate in the school Science Symposium. The 1/2 credit cannot be used as part of a sequence for graduation(Honors weighted course).