

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 requirement.

Physical Setting: Earth Science (9, 10, 11, 12) Full Yr., 1 Cr., Lab Alternate Days

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. Students should have a strong background in mathematical skills such as graphing and the use of formulas/equations. A strong emphasis is placed on interrelating the earth science concepts and utilizing them in problem solving situations. A laboratory performance test is part of the June Regents Examination.

Physical Setting: Earth Science Honors (9) Full Yr., 1 Cr., Lab Alternate Days

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. A stronger emphasis is placed on interrelating the earth science concepts and utilizing them in problem solving situations. Laboratory exercises reinforce the basic principles in each of the course topics. A laboratory performance test is part of the June Regents Examination. Projects and other alternative assessments will be an integral part of the students' evaluation.



Physical Setting: Earth Science Skills (9, 10, 11, 12) Full Yr., 1 Cr.

Placement must be determined by the Committee on Special Education. 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 principals of astronomy, geology, meteorology, and oceanography-related processes are reviewed in detail. These concepts are developed through appropriate laboratory exercises. A strong emphasis is placed on interrelating the earth science concept and utilizing them in problem solving situations. A laboratory performance test is part of the June Regents Examination

Living Environment Regents (9, 10, 11, 12) Full Yr., 1 Cr., Lab Alternate Days

Pre- or Co-requisite: Math A Regents, Integrated Algebra 1 or Integrated Algebra 1A. This course will provide a broad understanding of the fundamental principles of biology and will give treatment to the specific areas of biochemistry, human physiology, reproduction and development, modern genetics, modern evolution, and ecology. These concepts are developed through appropriate laboratory experiences which emphasize the disciplined approach of the scientist. This course terminates with a Regents Examination.

Living Environment Honors (9) Full Yr., 1 Cr., Lab Alternate Days

Pre-requisite or co-requisite: Integrated Algebra I Honors. This is an advanced level biology course designed for the more academically talented college-bound students. This course will help prepare students for future science courses in Physical Setting: Chemistry Honors, AP Biology, Anatomy, Physiology and Genetics. Projects and other alternative assessments will be an integral part of the student's evaluation. Students are required to take the New York State Regents Examination in June.

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

Placement must be determined by the Committee on Special Education. 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 co-requisite: Geometry or Geometry Honors.**

This course is designed for students in a college preparatory curriculum. It will provide the student with up-to-date chemistry concepts. Laboratory work is an integral part of the course.

Physical Setting: Chemistry Honors (10)**Full Yr., 1 Cr.****Lab Alternate Days****Pre-requisite or Co-requisite: Geometry or Geometry Honors and Teacher Recommendation.**

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. Topics tested on the SAT Subject Test in Chemistry will be covered in class. Those students who excel in this class may wish to take the SAT Subject Test in Chemistry in early June. 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. Students are required to perform a science project. Additional topics learned throughout the year are tested during the SAT Subject Test and the regular classroom examinations. This course terminates in a Regents Examination.

Physical Setting: Physics (11, 12) Full Yr., 1 Cr.**Lab Alternate Days****Pre-requisite: Geometry, Geometry Honors or Math B Honors.**

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 skill 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. This course culminates with a Regents Examination.

Advanced Placement Physics B (11, 12)**Full Yr., 1 Cr.****Lab Alternate Days****Pre-requisite or Co-requisite: Math B Honors, B2 or Alg. II/Trigonometry, Physical Setting: Chemistry.**

This course covers the material that would be covered in an introductory, one year, non-calculus college physics course. All of the topics in the NYS Regents Physics syllabus will be covered in much greater depth than in the standard Regents Physics class; along with many additional topics found in a College Physics course. The course will culminate with the students taking both APB Physics exam and the NYS Physics Regents. Although calculus is not required to take this course, the student must have strong mathematical skills. This course is a pre-requisite for the Advanced Placement "C" (with calculus) Physics class.

Advanced Placement Physics C (12 Only)**Full Yr., 1 Cr.****Lab Alternate Days****Pre-requisite: Physics A. P. B. Co-requisite: A. P. Calculus.**

This course covers the material that would be covered in a one year college physics course. Topics covered include mechanics, electricity, and magnetism. Calculus will be introduced and used where appropriate. Laboratory work will supplement the classroom presentation. This course is strongly recommended for college-bound students who intend to major in science, engineering or pre-medicine. Students who take the course should have maintained at least 85% average in APB Physics. Successful completion will prepare the student for the Advanced Placement examination, which may result in the acquisition of college credit.

Advanced Placement Chemistry (11, 12)**Full Yr., 1 Cr.****Lab Alternate Days****Pre-requisite: Physical Setting: Chemistry.**

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. Students taking this course should have demonstrated a strong interest in chemistry and should have maintained an 85% average in Regents Chemistry. Successful completion will prepare the student for the Advanced Placement examination, which can result in the acquisition of college credit.

Advanced Placement Biology (11, 12)**Full Yr., Double Period, 1 Cr.****Pre-requisite: Living Environment, Physical Setting: Chemistry.**

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. Successful completion will prepare the student for the Advanced Placement examination, which can result in the acquisition of college credit. It is recommended that students consider enrolling also in Genetics and Biotechnology.

Advanced Placement Environmental Science (11, 12)**Full Yr., 1 Cr.****Lab Alternate Days****Pre-requisite: Physical Setting: Chemistry.**

If you are passionate about the environment, then this is the course for you. Learn about how this planet works, and what humans have been doing to it. You will try to find solutions to climate change, species extinction, air and water pollution and waste disposal. This course is appropriate for any career that you are interested in. Remember, if you are not part of the solution, then you are part of the problem.

A. P. Statistics (10, 11, 12) Full Yr., 1 Cr.

This course is recommended for students enrolled in AP Psychology and/or Science Research.

Pre-requisite or co-requisite: Geometry, Geometry Honors, Math B2 or B Honors. This course is equivalent to a one semester introductory non calculus based college course. Students will be exposed to four broad conceptual themes:

1. Exploring data
2. Deciding what and how to measure
3. Producing models using probability and simulation
4. Statistical inference and hypothesis testing

Topics included in these themes are the normal distribution, bivariate data, simulating experiments, the study of randomness, binomial and geometric distributions, sampling distributions, z-test, t-test, chi-square test, and inference for two way tables. The use of a graphing calculator and statistical software is an integral part of this course. Students are encouraged to take the AP exam in May. A final project that incorporates the four conceptual themes is required. There will be a departmental final exam at the conclusion of this course.

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 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 Intel Science Talent Search. It is recommended that students in the Science Research Program enroll in AP Statistics as early as possible.

Science Research (9) One Semester, 1/2 Cr.

Full Yr., Alternate Days, 1/2 Cr.

Teacher Recommendation required. 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. A notebook/log book must be maintained as part of the student portfolio. Students will work individually or in teams developing and conducting independent research. Students will participate in Science Fair competitions and Field Trips. Students are graded on a Pass/Fail basis. The 1/2 credit cannot be used as part of a sequence toward graduation. As a concluding assessment the students will participate in the schools Science Symposium.

Science Research (10) One Semester, 1/2 Cr.

Full Yr., Alternate Days, 1/2 Cr.

Teacher Recommendation required. 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. A notebook/log book must be maintained as part of the student's portfolio. Students will work individually or in teams developing and conducting independent research. Students will participate in Science Fair competitions and Field Trips. Students are graded on a Pass/Fail basis. The 1/2 credit cannot be used as part of a sequence toward graduation. Students will participate in the schools Science Symposium as a concluding assessment. **Students may be eligible for college credit through the University of Albany.**

Science Research: Research Projects (11)

One Semester, 1/2 Cr.

Full Yr., Alternate Days, 1/2 Cr.

Class Meets By Appointment 9th Period

Research Teacher Recommendation required. Students should submit a request for participation to the research teacher. Students will develop and conduct a project which will provide them with the opportunity, in twelfth grade, to enter competitions such as: Intel Science Talent Search, Siemens-Westinghouse Science and Technology Competition, and the 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 the research at school. Students are graded on a Pass/Fail basis. The 1/2 credit cannot be used as part of a sequence for graduation. **Students may be eligible for college credit through the University of Albany.**

Science Research: Research Projects and Competitions(12)

One Semester, 1/2 Cr.

Full Yr., Alternate Days, 1/2 Cr.

Class Meets By Appointment 9th Period

Research Teacher Recommendation required. 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: Intel Science Talent Search, Siemens-Westinghouse Science and Technology Competition and the Science and Engineering Fair. Students will also participate in the school Science Symposium. Students are graded on a Pass/Fail basis. The 1/2 credit cannot be used as part of a sequence for graduation. **Students may be eligible for college credit through the University of Albany.**

Astronomy (10, 11, 12) One Semester, 1/2 Cr.
Pre-requisite: Physical Setting: Earth Science. **Co-requisite for Grade 10 students:** Regents or Honors Chemistry. Nature offers no greater splendor than the starry sky on a clear, dark night. Silent, jeweled with the constellations of ancient myth and legend, the night sky has inspired wonder throughout the ages; a wonder that leads our imaginations far from the confines of Earth and the pace of the present day and out into the distant reaches of space and cosmic time itself. Come explore such topics as space exploration, planets, stars, time travel, extra-terrestrial life, and asteroid impacts.

Ecology-Fall (11, 12) One Semester, 1/2 Cr.
Pre-requisite: Living Environment. 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

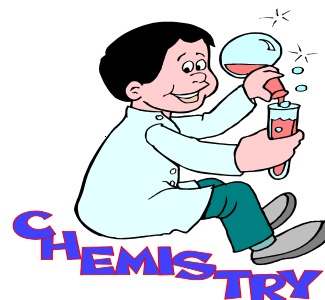
The course is designed to be hands on and encompasses notes, vocabulary, labs, and activities. Students will also be required to complete reading comprehension assignments and movie reviews. Both of these will follow topic areas of study. The class culminates with a comprehensive final exam.

Ecology Spring (11, 12) One Semester, 1/2 Cr.
Pre-requisite: Living Environment. 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

The course is designed to be hands on and encompasses notes, vocabulary, labs, and activities. Students will also be required to complete reading comprehension assignments and movie reviews. Both of these will follow topic areas of study. The class culminates with a comprehensive final exam.

Ecology Skills (11, 12) Full Yr., 1 Cr.
Placement must be determined by Committee on Special Education. 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 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. In the fall, the concentration will be on the dormancy of organisms in local ecosystems. The spring semester will focus on budding and regeneration of these ecosystems. This course will deal with the actual and potential factors which upset the balance so necessary to nature. The student will see that we ourselves generate the forces that are potentially dangerous to us and, realizing this, will become involved in the current problems of pollution and conservation. Much attention is also given to pollution of Long Island's ground water. This course is dynamic in that it deals with current events. Background materials constantly relate to everyday problems and their possible solutions.



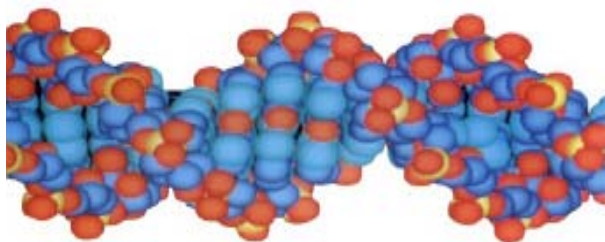
Forensic Science (11, 12) One Semester, 1/2 Cr.

Pre-requisite: Chemistry. 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. Students should have a strong background in all sciences, especially Chemistry and have a keen interest in this subject. Students will perform hands on activities while working cooperatively with their peers. Using methods of scientific inquiry, concepts, principles and theories will allow students to pose answers and develop solutions to legal situations. 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. This course will conclude with a Crime Scene Investigation where students will apply the techniques they've learned in class to solve a "real-life" crime.



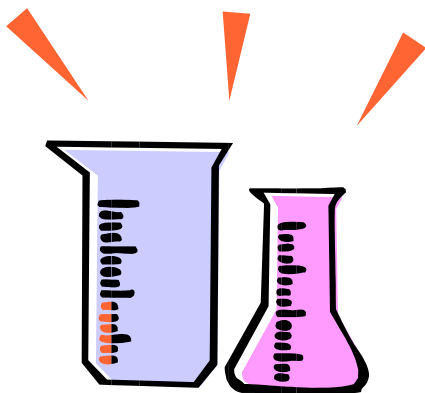
Genetics and Biotechnology (11, 12) One Semester, 1/2 Cr.

Pre-requisite: Living Environment. This course integrates key concepts in molecular biology and biotechnology into a lab-based learning experience. Students will learn the fundamental principles of what a gene is, how it is passed on and how it is expressed, as well as how genes can be manipulated in the field of biotechnology. As a result, each student will be exposed to techniques such as DNA isolation, bacterial transformation, DNA restriction analysis, gel electrophoresis, the Polymerase Chain Reaction (PCR), and other useful tools. Ultimately, students will be prepared to discuss important societal issues such as the human genome project, genetically modified organisms, genetic engineering, DNA sequencing/DNA databases, and other modern topics in genetics. This course will greatly assist those students who are planning to take the Advanced Placement Biology course.



Human Anatomy and Physiology (10, 11, 12) Full Yr., Alternate Days 1/2 Cr. One Semester, 1/2 Cr.

Pre-requisite: Living Environment. Co-requisite for Grade 10 students: Regents or Honors Chemistry. This course is designed for students who are interested in a detailed study of vertebrate anatomy. A thorough dissection of a representative amphibian and mammal are included in this course. **This dissection is an integral course requirement.** Classroom work will deal with the functions of human organs and systems.

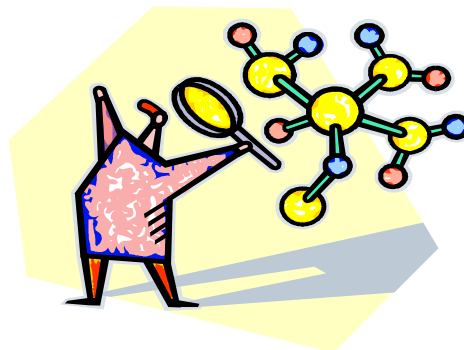


Marine Studies (11, 12) Full Yr., 1 Cr.

Pre-requisite: Living Environment and Physical Setting: Earth Science. 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.

- Physical Oceanography-the movement of the oceans through waves, tides and currents;
- Chemical Oceanography-the various elements and compounds dissolved in sea water, and;
- Geological Oceanography-a study of the geological features of the ocean floor and shoreline and the forces that have created them.

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. In addition, students will learn how human interaction 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. Finally, students will use appropriate technologies to research potential careers in marine biology and/or oceanography.



Marine Studies Skills (11, 12) Full Yr., 1 Cr.

Placement must be determined by the Committee on Special Education. 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.