Students have the opportunity to learn the extensive array of concepts, related facts, and laboratory skills of science through a program of 17 offerings. Laboratory experiences are strongly emphasized; therefore an additional period is required for Honors and Academic Earth Science, Biology, Chemistry, and Physics.

**REGENTS EXAMINATION ELIGIBILITY**
All Regents science courses require at least 1200 minutes of hands-on laboratory exercises accompanied by satisfactory written reports.

**ADVANCED PLACEMENT/COLLEGE CONCURRENT COURSE/HONORS LEVEL**
These programs are designed for students who are exceptionally skilled and desire an enriched program of study. Usually 10% of a particular class is enrolled in these programs. Note: For advanced placement, honors level classes, and college level courses it is suggested a final average of at least 90 in the previous grade and a teacher recommendation.

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<thead>
<tr>
<th>EARTH SCIENCE A</th>
<th>40 Weeks</th>
<th>1 Credit</th>
<th>Grade 9</th>
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<tbody>
<tr>
<td><em>Course Number: 4411</em></td>
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<td>Regents Earth Science students study geology, meteorology, climatology, and astronomy, with a focus on world environmental issues. Emphasis is placed on problem solving, observation, data collection and analysis. Includes 1200-minute lab eligibility requirement to sit for the Regents exam.</td>
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<table>
<thead>
<tr>
<th>EARTH SCIENCE H</th>
<th>40 Weeks</th>
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<tr>
<td><em>Course Number: 4410</em></td>
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<td>Honors level Earth Science students are expected to be self-motivated, independent learners who will master the Regents curriculum faster and with significantly less teacher directed support. Students will be expected to participate in regular class discussions. In addition to the expectation of the academic Earth Science curricula, students will learn to read scientific and current events literature and to write a scientific paper each quarter. Each student will write an article and present a research project as a poster and slideshow at the annual L.H.S. Earth Science Symposium.</td>
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<td>COURSE</td>
<td>COURSE NUMBER</td>
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<tr>
<td>BIOLOGY / LIVING ENVIRONMENT A</td>
<td>4421</td>
<td><strong>Course Number: 4421</strong>&lt;br&gt;Note: This course is mandatory for most diplomas&lt;br&gt;Students will understand and apply scientific concepts, principles, and theories pertaining to the living environment and recognize their real-life application. Instructional focus is on conceptual understanding plus application through lab experiences, reading science literature, and writing. Evolution, organization of biological systems at all scales, dynamic equilibrium, reproduction-growth-development, genetics-molecular biology, and interactions-interdependence are the main themes. Students also practice the scientific method. Includes 1200-minute lab eligibility requirement to sit for the Regents exam.</td>
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<tr>
<td>BIOLOGY / LIVING ENVIRONMENT H</td>
<td>4420</td>
<td><strong>Course Number: 4420</strong>&lt;br&gt;<strong>Prerequisite:</strong> Outstanding performance in previous Academic science program. It is recommended final averages of 85 in previous science honors courses and Algebra.&lt;br&gt;The course will contain everything in Biology 10A, and a selected college level concept will be presented in each of the four quarters. Students will seek a greater comprehension of biological concepts through projects, individual presentations, high-level writing assignments, and in-depth scientific inquiry experiences. Includes 1200-minute lab eligibility requirement to sit for the Regents exam.</td>
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<tr>
<td>CHEMISTRY A</td>
<td>4431</td>
<td><strong>Course Number: 4431</strong>&lt;br&gt;<strong>Prerequisites:</strong> Successful completion of previous academic level science courses and Algebra.&lt;br&gt;This course presents a modern view of the study of matter. Success in this course is well-correlated with a solid mathematics background. The units of study include: matter and energy, atomic structure, bonding, periodic table, mathematics of chemistry, kinetics and equilibrium, acids and bases, redox and electrochemistry, and organic chemistry. Includes 1200-minute lab eligibility requirement to sit for the Regents exam.</td>
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<tr>
<td>CHEMISTRY H</td>
<td>4430</td>
<td><strong>Course Number: 4430</strong>&lt;br&gt;<strong>Prerequisite:</strong> It is recommended final averages of 85 in previous science honors courses and Algebra.&lt;br&gt;Students will do in–depth advanced study of atomic structure and theory, chemical formulas and equations, thermochemical equations, behavior of gases, periodic table, electronic structure of atoms, ionic and covalent bonding, solution chemistry, organic chemistry, rate of reaction, chemical equilibrium, acids and bases, precipitation reactions, oxidation–reduction reactions, and electrochemistry. Students should possess a high degree of self-motivation and the ability to work independently. Includes 1200-minute lab eligibility requirement to sit for the Regents exam.</td>
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GENERAL CHEMISTRY (NON-REGENTS)  

Course Number: 4435  
Prerequisite: Successful completion of Algebra

This course is designed for the student who desires a basic knowledge of chemistry, related laboratory technique, and a greater awareness of the chemical environment for his/her own improvement or for some form of higher education. Topics include: matter and energy, atomic structure and bonding, chemical reactions, solution chemistry, properties of acids and bases, organic compounds, and nuclear chemistry. Laboratory work is an integral part of this course and written laboratory reports are required.

PHYSICS A

Course Number: 4441  
Prerequisites: Successful completion of Geometry, currently taking Algebra II Trigonometry or higher, and it is recommended an 85 final average in all previous science courses.

This course presents a modern view of physics. The major emphasis is placed on fundamental concepts of mechanics, energy, electricity and magnetism, wave phenomena, and modern physics. Problem solving skills using algebra, trigonometry and geometry will be applied through this course. Mathematics is a significant part of this course. Includes a 1200-minute lab eligibility requirement to sit for the Regents exam.

GENERAL PHYSICS (NON-REGENTS)

Course Number: 4439  
Prerequisites: It is recommended successful completion of Geometry, currently taking Algebra II Trigonometry or higher, and solid mathematical skills.

This course presents a modern view of physics. The major emphasis is placed on fundamental concepts of mechanics, energy, electricity and magnetism, wave phenomena, and modern physics. Applied physics is introduced as much a possible. Problem solving skills using algebra, trigonometry and geometry will be applied throughout this course. Laboratory work is an integral part of this course and written laboratory reports are required.

HUMAN ANATOMY AND PHYSIOLOGY

Course Number: 4450  
Prerequisite: For the senior or junior who has achieved a recommended final average of 80 or better in Biology and is currently enrolled in or successfully completed of Chemistry 11A.

This course is designed for students interested in any health career or other related fields. Providing an in-depth study of the human body, the program offers a general survey of the human organism, emphasizing the physiological functions of anatomical structures. Interrelationships among the body systems and a wide variety of disease states are stressed. Current literature in the
field is another major component of the class. Assessment includes numerous laboratory experiences, research papers, interviews, and assignments. Guest speakers will be included when they are available.

**BIOTECHNOLOGY**

- 40 Weeks
- 1 Credit
- Grades 11-12

*Course Number: 4454*

Biotechnology is a one-year course for 11th or 12th grade students. This is a course that values independent research, creativity, and a desire to learn about cutting edge science. Molecular biology (advanced genetics), bioinformatics, bioethics, hydroponics/aquaponics/environmental biotech, and biomedical engineering are the major areas covered in this survey course with exposure to many current topics along the way. Lessons engage students in design problems that can be accomplished in a high school setting. An 80 average or more in the sciences, plus taking or completing chemistry is strongly recommended.

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**ENVIRONMENTAL STUDIES**

- 40 Weeks
- 1 Credit
- Grades 11-12

*Course Number: 4461*

*Prerequisite: Successful completion of Biology*

This course is designed to give students a thorough overview of the issues and events that impact our planet and its ecosystems. Instructional strategies include lectures, discussions, activities, audiovisual presentations, and field activities. The course looks to the future and asks students to consider important environmental questions. How will human society deal with environmental challenges moving forward? Can the quality of human life be maintained and improved while still preserving and protecting the environment? We will cover many topics including ocean pollution, invasive and endangered species, water resources and water treatment, energy sources, farming, agriculture and the environment, plant and wildlife identification, and climate change. Each student will complete 2-3 projects per marking period on a current environmental science topic. These projects will include slideshows, posters, brochures, video clips and in-class presentations. A cumulative final exam is required of all students.

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**ENVIRONMENTAL SCIENCE (H)**

- 40 Weeks
- 1 Credit
- Grades 11-12

*Course Number: 4462*

*Prerequisite: Successful completion of Biology, successful completion of, or concurrent enrollment in, Honors or Regents Chemistry, and at least a 90% average in the sciences.*

Students will use fundamental scientific skills, which include critical thinking, active listening, reading comprehension, complex problem solving, speaking, judgment and decision-making, active learning, and writing. Students will focus on current ongoing environmental issues by reading scientific literature, identifying local environmental problems, conducting experiments and presenting their findings, formulating substantiated arguments to debate with their peers, and assessing case studies to determine appropriate decisions among competing alternatives. Topics will include Earth Systems and Resources, The Living World, Populations, Land and Water Use, Energy Resources and Consumption, Pollution, and Global Change. Although this is not a Regent course, laboratory activities will be completed during course.
**AN INTRODUCTION TO METEOROLOGY**

| Course Number: 4464 | Prerequisite: Successful completion of Biology |

This course is designed to introduce students to atmospheric processes important to understanding the weather. Students are expected to be self-motivated and independent learners who are capable of abstract thought. Meteorology has significant deep concepts. Special emphasis will be placed on local weather phenomena and weather forecasting. Topics that will be covered include winter storms and lake-effect snow, nor'easters, thunderstorms, hurricanes and tornadoes, weather modeling, reading and analyzing weather maps including surface maps and satellite and radar images, and the impact of climate change on our weather. The successful student will be: able to work independently and as part of a team, well-organized, curious, and proactive, and interested in learning more about the weather. An average of 80 or higher in the sciences is strongly recommended. A cumulative final exam is required of all students.

**ZOOLOGY**

| Course Number: 4465 | Prerequisite: Successful completion of Biology |

Zoology will focus on the detailed examination of the 10 major phyla within the Animal kingdom (Porifera, Cnidarians, Ctenophores, Rotifers, Platyhelminthes, Annelids, Molluscs, Arthropods, Echinoderms and Chordates). With hundreds of new species discovered every year and thousands waiting to be named, students will gain an understanding of how these organisms will be classified based on identifying characteristics including structural and behavioral adaptations, common anatomy, the various roles these groups play within a balanced ecosystem and their evolutionary history. This course will also strengthen student appreciation and understanding of the fragilities of our ecosystems, the roles animals play in keeping them balanced, and why it is important to protect them. Zoology will allow students to develop their scientific literacy skills through reading current journal articles, dissections, live observations and engaging in a Project Based Learning research projects (such as writing research papers, creating posters and brochures, PowerPoints & oral presentations, 3D modeling, etc.).

**AP BIOLOGY**

| Course Number: 4491 | Prerequisites: The course is open to junior or seniors with satisfactory completion of Chemistry 11 and it may not be audited. Recommended Biology Regents exam score of 80 or higher. |

The course is designed to prepare students for the AP Biology exam. The student is introduced to the fundamental characteristics of life from the molecular level to the ecological community. The method of instruction is primarily individualized with a comprehensive series of laboratory investigations. The course materials include a guidebook, textbook, and lectures on CD. The estimated fee for the required AP exam is $94. 

Note: Accelerated juniors taking AP biology must have achieved a minimum grade of 85 on the chemistry Regents to enter the course.
**SUPA CHEMISTRY**

**CHE106/107**  
40 Weeks  
1 LHS Credit  
8 College Credits  
Grade 12

**Course Number:** 4445  
**Prerequisite:** Algebra, Regents Chemistry. It is recommended an 85 average in science courses. Strong mathematical skills.

SUPA Chemistry is a cooperative effort between Syracuse University and Liverpool High School that provides qualified students the opportunity to enroll in SU courses taken directly from the SU course catalog. The curriculum and labs are completely aligned with Syracuse University, and upon successful completion of the course students will receive 8 hours of course credit from Syracuse University for a total cost of $920. Topics of study will include atomic structure, stoichiometry, electronic structure and chemical bonding, descriptive solution chemistry, gases, kinetics, thermodynamics and equilibrium.

**AP CHEMISTRY**

**Course Number:** 4494  
**Prerequisite:** Algebra, Regents Chemistry. It is recommended an 85 average in science courses. Strong mathematical skills.

The AP Chemistry course provides students with a college-level foundation to support future advanced coursework in chemistry. Students cultivate their understanding of chemistry through inquiry-based investigations, as they explore topics such as: atomic structure, intermolecular forces and bonding, chemical reactions, kinetics, thermodynamics, and equilibrium. The AP Chemistry course requires that 25 percent of the instructional time provides students with opportunities to engage in laboratory investigations. This includes a minimum of 16 hands-on labs, at least six of which are inquiry based. The estimated fee for the required AP exam is $94.

**AP PHYSICS 1**

**Course Number:** 4497  
**Prerequisite:** Algebra 2 Trigonometry. It is recommended an 85 average in science courses. Strong mathematical skills.

AP Physics 1 is an algebra-based, introductory college-level physics course. Students cultivate their understanding of Physics through inquiry-based investigations as they explore topics such as Newtonian mechanics (including rotational motion); work, energy, and power; mechanical waves and sound; and introductory, simple circuits. This course requires that 25 percent of the instructional time will be spent in hands-on laboratory work, with an emphasis on inquiry-based investigations that provide students with opportunities to apply the science practices. The estimated fee for the required AP exam is $94.

The New York State Regents exam in Physics is considered the final exam for high school credit. This course is recommended for students going into a science or engineering career field.