

Science

- Academy of Life Science



Students will explore various areas of interest concerning life, earth and physical sciences. Laboratory oriented courses will enable students to use reason, memory, imagination and the scientific method of inquiry. Students will learn the basic principles of each subject area and will be helped to apply these concepts to everyday life as well as to future studies. Course selections are designed to accommodate the capabilities and backgrounds of each student. Any student planning on attending a four year college should take four years of Regents/AP Science courses.

COURSE OFFERINGS

| <u>Course</u> | <u>Credit</u> | <u>Length</u> | <u>Type of Exam</u> |
|--|---------------|---------------|---------------------|
| Physical Setting/Earth & Space Science w/ Lab | 1 unit | 40 weeks | Regents |
| Biology with Lab | 1 unit | 40 weeks | Regents |
| Biology with Lab Honors | 1 unit | 40 weeks | Regents |
| Biology AP | 1 unit | 40 weeks | Regent/Local & AP |
| Physical Setting/Chemistry with Lab | 1 unit | 40 weeks | Regents |
| General Chemistry | 1 unit | 40 weeks | Local |
| Adv. Forensics (SUPA Syracuse Univ. Project Adv) | 1 unit | 40 weeks | SU |
| Forensic Science | 1 unit | 40 weeks | Local |
| Astronomy | ½ unit | 20 weeks | Local |
| Physical Setting/Physics with Lab | 1 unit | 40 weeks | Regents |
| Environmental Science | 1 unit | 40 weeks | Local |
| Chemistry AP | 1 unit | 40 weeks | Local & AP |

Physical Setting/Earth & Space Science w/Lab

Credit: 1 Unit Length: 40 Weeks

This course follows the curriculum outlined by the New York State Science Learning Standards, focusing equally on the Disciplinary Core Ideas, Cross Cutting Concepts and Science and Engineering Practices. Students will explore a range of phenomena throughout the course to build a foundation in the following concepts: Space Systems; History of the Earth; Earth's

Systems; Weather and Climate; and Human Sustainability. This is a course of study designed to engage students in investigating their world and integrating scientific principles and attitudes to gain a new understanding of the world around them, and the processes of change. An inquiry-oriented approach is used to study meteorology, climate, geology and astronomy. This course uses Earth and Space Science phenomena as a means for

learning how to interpret observations, reason from observation, build and interpret models from observations and apply the concepts learned. This course provides a strong foundation for Chemistry, Physics and upper level electives. This is a laboratory-based program that requires students to draw inferences, analyze data and interpret the environment. As a prerequisite for admission to the Regents exam, students must have successfully completed 1200 minutes of laboratory experience with satisfactory written reports for each laboratory investigation.

Physical Setting/Physics with Lab

Credit: 1 Unit Length: 40 Weeks

Prerequisite: Successful completion of Algebra and Geometry and Alg 2 or currently enrolled in Alg 2

The Regents Physics course presents a modern view of Physics with major emphasis placed on the topics of mechanics, waves, electricity, the standard model of the atom, and modern Physics. The course will culminate with a Regents exam in June. As a prerequisite for admission to the Regents exam, students must have successfully completed 1200 minutes of laboratory experience with satisfactory written reports for each laboratory investigation.

Physical Setting/Chemistry with Lab

Credit: 1 Unit Length: 40 Weeks

Prerequisite: Successful completion of Algebra and Geometry CC or currently enrolled in Geometry CC

The Regents Chemistry course focuses on the study of our physical world. An emphasis is placed on developing students' understanding of scientific concepts, relationships, processes, mechanisms and models that explain phenomena related to matter and energy. This course allows students to apply their developing understanding of the physical world in ways that challenge their critical thinking and

creative reasoning skills. The course will culminate with a Regents exam in June. As a prerequisite for admission to the Regents exam, students must have successfully completed 1200 minutes of laboratory experience with satisfactory written reports for each laboratory investigation.

Regents Life Science: Biology with Lab

Credit: 1 Unit Length: 40 Weeks

This course is designed for students to perform the science and engineering practices to develop an understanding of real world phenomena. Learning experiences revolve around understanding processes necessary to sustain life from the cellular level to the environmental level while also developing an understanding of the process of science. Cross cutting concepts are used to develop connections between various scientific topics.

The course will culminate with a Regents exam in June. As a prerequisite for admission to the Regents exam, students must have successfully completed 1200 minutes of laboratory experience including the three New York State required investigations with satisfactory written reports for each laboratory investigation.

Life Science: Biology with Lab - Honors

Credit: 1 Unit Length: 40 Weeks

Prerequisite: Earth Science and Teacher recommendation.

This course is designed for talented ninth grade students who, upon completion of this course, are expected to enroll in the AP Biology program designed for the academically talented students in science. While preparing students for the Regents Life Science: Biology examination, Honors Regents Life Science: Biology challenges students to develop an in-depth understanding of biology (cellular biology,

human physiology, genetics, evolution, and ecology) with the addition of basic chemical concepts, as well (atomic structure, bonding, periodic table). Students will also engage in the science and engineering practices and apply the cross cutting concepts to scientific topics. This curriculum provides students with opportunities to challenge themselves beyond the Regents Life Science: Biology program through scientific inquiry, laboratory investigations and out of class experiences. The course will culminate with a Regents exam in June. As a prerequisite for admission to the Regents exam, students must have successfully completed 1200 minutes of laboratory experience including the three New York State required investigations with satisfactory written reports for each laboratory investigation.

General Chemistry

Credit: 1 Unit

Length: 40 Weeks

General Chemistry focuses on the study of our physical world. An emphasis is placed on developing students' understanding of scientific concepts, relationships, processes, mechanisms and models that explain phenomena related to matter and energy. This course allows students to apply their developing understanding of the physical world in ways that challenge their critical thinking and creative reasoning skills. The course will culminate with a Local exam in June. There is no laboratory component to this course.

Environmental Science

Credit: 1 Unit

Length: 40 Weeks

Prerequisite: Counselor and teacher recommendation.

"Generation Green: Think Globally, Act Locally" Students will embark on a comprehensive journey through environmental science while investigating

the impact of an expanding human population on planet Earth. The course will provide a foundation in the ecology of land, freshwater and marine environments. Students will develop a deep understanding and appreciation for our local ecology and the Great Lakes. Students will explore environmental issues through case studies and project based research. At completion of the course, students will recognize the interdependence between human activities and the environment, preparing them to contribute to sustainable solutions for the future. Science for science credit. Environmental Science is a third-year science course to be taken after successful completion of Biology and Earth and Space Science.

Adv.Forensic Science - SUPA (Syracuse Univ Project Adv.)

Credit: 1 Unit

Length: 40 Weeks

Prerequisite: Teacher recommendation and successful completion of Regents Chemistry or Regents Physics.

Forensic Science is focused upon the application of scientific methods and techniques to crime and law. Recent advances in scientific methods and principles have had an enormous impact upon law enforcement and the entire criminal justice system. In this course, scientific methods specifically relevant to crime detection and analysis will be presented. Emphasis is placed upon understanding the science behind the techniques used in evaluating physical evidence. Topics included are blood analysis, organic and inorganic evidence analysis, microscopic investigations, hair analysis, DNA, drug chemistry and toxicology, fiber comparison, glass composition and fragmentation, fingerprints, soil comparisons, and forensic anthropology,

among others. This hands-on course is designed for seniors looking to further their studies in science.

A college level textbook is utilized throughout the course. There is a fee of \$115/credit payable to Syracuse University to register for this course (\$460). Students who successfully complete the course with a 73 or higher will receive 4 college credit hours, transferable to most institutions.

Forensic Science

Credit: 1 Unit

Length: 40 Weeks

Prerequisite: Regents Chemistry or Regents Physics or General Chemistry with teacher recommendation, or simultaneously enrolled in Regents Chemistry or Physics.

This course is based on the scientific methods used to solve crimes within the scope of the law. It is intended to provide an introduction to understanding the science behind crime detection. Emphasis is placed upon understanding the science behind the techniques used in evaluating physical evidence. Topics included are blood analysis, microscopic investigations, hair analysis, DNA, drug chemistry and toxicology, fiber comparisons, and fingerprints, among others. This hands-on course is designed for seniors looking to further their studies in science. It is taught at a college level intensity and closely mirrors the SUPA Forensics course and will be challenging. A high school level textbook is used in conjunction with this course.

Biology AP

Credit: 1 Unit

Length: 40 Weeks

Prerequisite: Teacher recommendation and student should be enrolled in or successfully completed Algebra. Recommended that students have an 85% or higher on the NYS Living Environment/Biology Regents exam

AP Biology is an introductory college-level biology course. Students cultivate their understanding of biology through inquiry-based investigations as they explore

the following topics: evolution, cellular processes, energy and communication, genetics, information transfer, ecology, and interactions. The AP Biology course is equivalent to a two-semester college introductory biology course for biology majors. Students should have successfully completed Biology and Chemistry or Biology with Honors. 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.

Astronomy

Credit: ½ Unit

Length: 20 Weeks

Prerequisite: [West](#) Grade 12 [East](#) Grades 11 & 12

Have you ever looked up at the night sky and wondered about space? Unlock and explore the mysteries of our universe in this one-semester high school Astronomy course. This course is broken up into five major units: Structure of Our Universe, Gravity and Motion, Light, Local/Backyard Astronomy, and Modern Astronomy. We will study topics such as the Big Bang, the scale of our universe, how astronauts “float” in space, orbits, the EM spectrum, how to locate and chart stars from Buffalo, NASA, space missions, and a culminating project on the potential of life on exoplanets in our solar system. We also attend a local planetarium show at the Whitworth Ferguson Planetarium at Buffalo State College. Can't wait for you to join this “out of this world” course!

Chemistry AP

Credit: 1 Unit

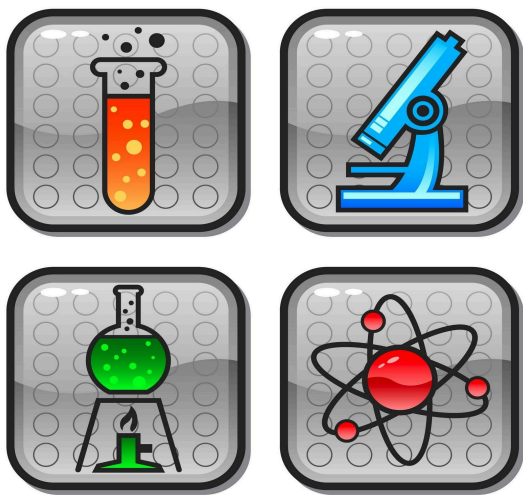
Length: 40 Weeks

Prerequisite: Teacher recommendation and successful completion of Regents Chemistry, Algebra, Geometry, and Alg 2 or currently enrolled in Alg 2. Recommended that students have an 85% or higher

on the NYS Living Environment/Biology and Earth Science Regents exams.

The AP Chemistry course provides students with a college-level foundation to support future advanced coursework in chemistry. Students culminate their understanding of chemistry through inquiry-based investigations, as they explore content such as: Atomic Structure and Properties, Compound Structure and Properties, Properties of Substances and Mixtures, Chemical Reactions, Kinetics, Thermochemistry, Equilibrium, Acids and Bases, Thermodynamics and

Electrochemistry. AP Chemistry is equivalent to a college-level general chemistry course. Students should have successfully completed an introductory high school chemistry course and Algebra II, or an equivalent course. This course requires that 25 percent of instructional time be spent in hands-on laboratory work, with an emphasis on inquiry-based investigations that provide students with opportunities to demonstrate the fundamental chemistry principles and apply the science practices.



Academy of Life Science

Admissions to this school-within-a-school program is competitive. Students supplement their Regents program with a combination of medical courses and biotechnology. This path requires extra science coursework beyond Regents requirements. A college course is required along with an internship in a field related to career interests. It is recommended that students have an 85 average in Math and science to be accepted and successful in the Academy of Life Science.

Academy Course Sequence

• Three Year Program •

| <u>Grade Level</u> | <u>Course</u> | <u>Credit</u> |
|---|--|----------------|
| Ninth Grade-Recruitment, application, and selection of students | Science | 1 unit |
| Tenth Grade | Medical Terminology | 1 unit |
| | Science | 1 unit |
| Eleventh Grade | Medical Ethics | ½ unit |
| | College Career Portfolio & Internship Skills | 1 unit |
| | Science | 1 unit |
| Twelfth Grade* (Complete remaining Science Requirements (2 additional science courses) | Science | 1 unit |
| | Science | 1 unit |
| | Local College Course | College Credit |
| | Internship | ½ - 1 unit |

~Students are required to take a minimum of 5 credits of Science from the following course list:

Choose 3 of the following Courses:

- Earth Science with Lab
- Earth Science with Lab Enriched
- Living Environment/Biology with Lab
- Living Environment/Biology with Lab Enriched
- Chemistry with Lab
- Adv Forensics (SUPA)

*Choose 2 of the following courses:

- Physics with Lab
- Biotechnology (West)
- Anatomy and Physiology
- AP Chemistry
- AP Biology

*Any Life Science Academy Student that earns a 3, 4 or 5 on an AP Science Exam in their Sophomore or Junior year can be waived from taking a college course.

*This academy program does not meet the requirements for a world language bypass for the Advanced Designation Diploma

The Academy is supported by an Advisory Board which currently includes the following companies, organizations and colleges:

West Seneca Central Schools • Greatbatch, Inc. • Canisius College Medical Laboratory • The Binding Site • IMMCO Diagnostics, Inc. • Trocaire College • Caplugs • David Clifford, M.C., ABFP • Computer Task Group • ZeptoMetrix Corp. • Niacet Corporation • SciBiz International • Tapecon • Mentholatum • TMP Technologies, Inc. • Kinex • Advantage Home Telehealth • Ivoclar Vivadent • Clinical Support Services, LLC. • Western New York Independent Living • Aerotek • Niagara University • ECC • University of Buffalo • HWI • Polymer Conversions, Inc. • Roswell Park Cancer Institute • AirSep Corp./Chart Industries • Surgical Repairs International • Evolution Dental • VWR • Value Centric, LLC • Honeywell • Superior Group • Sefar Filtration, Inc. • Kinex • Great Lakes Orthodontics, Ltd. • Reichart, Inc. • Buffalo BioBlower Technologies, Ltd. • Audobon Machinery, Company • Rheonix • AccuMed. • Precision Scientific Instruments • ParMed Pharmaceuticals, Inc. • QuadPharma • VIP/VAL Med Pharmaceuticals, Inc. • Praxair • Buffalo Filter • Life Technologies • AHRM, Inc. • Applied Medical Coating • Harker Bio • SR Instruments, Inc. • Frontier Science and Technology • NYS Center for Excellence. • Kinex • AndroBioSys, Inc. • Harmac Medical Products, Inc. • Accellent, Inc. • The Jacobs Institute • Plastic Weld Systems • TNT Moborg International, LTD • American Dental Partners, WNY • Safetec of America, Inc. • Fresenius-Kabi

Anatomy and Physiology

Credit: 1 Unit Length: 40 Weeks

Anatomy and Physiology is an advanced Life Science course designed primarily for students in the Life Science Academy.

Anatomy and Physiology is a well-established component of a comprehensive life science program and, as such, will focus on the structure and function of cells, tissues, organs and organisms. Students will be required to identify anatomical structures and demonstrate an understanding of their functions. This course is required for Life Science Academy students in the Laboratory Science strand and Regents Biology and Regents Chemistry are prerequisites.

Medical Law and Ethics

Credit: 1/2 Unit Length: 20 Weeks

Medical Law and Ethics provides an overview of the laws and ethics a student should know to help them provide competent, compassionate care to patients and complete life science related research that is within acceptable legal and ethical boundaries. The course will provide guidance to help resolve the many legal and ethical questions a student may reasonably expect to encounter. This is a required

course for students in the Life Science Academy and recommended for any student planning to pursue a career in Life or Health Sciences.

Biotechnology ([West Senior](#))

Credit: 1 Unit Length: 40 Weeks

Biotechnology is an advanced Academy of Life Science course designed primarily for students enrolled in the academy. The course encourages students to apply their knowledge of biology to investigate useful products and processes produced within the Life Sciences/Health Science industries. There is an emphasis on laboratory skills, analyzing data, and communicating results. Topics covered include Microbiology, DNA, Genetic Engineering, Polymerase Chain Reaction, Proteins, Immunology, and Research. Priority given to AOLS students. Regents Chemistry is a prerequisite.

Medical Terminology

Credit: 1 Unit Length: 40 Weeks

A course for students interested in health sciences professions designed to provide skill in understanding and using medical terms. This course introduces the fundamentals of word analysis, orientation

to the body as a whole and common prefixes and suffixes. Anatomic and physiologic terminology, pathological terminology, clinical procedures, laboratory tests, abbreviations and correct spelling and pronunciation of medical terms relating to the body systems are stressed. Many body systems are included, such as digestive, urinary, male and female reproductive, nervous and cardiovascular systems.

College Career Portfolio & Internship Skills

Credit: 1 Unit

Length: 40 Weeks

This hands-on course will introduce students to the application of multimedia technology in the workplace. The course will explore evolving technologies including electronic presentations, Internet exploration, and desktop publishing while highlighting the interpersonal skills vital to a successful career. The Business and Education Employability Portfolio, an electronic portfolio, will be compiled highlighting the student's exemplary work and extracurricular activities during high school. The student's career exploration, personal profile and academic records will also be included in the portfolio.

This portfolio can be used for college applications and interviews, for scholarship applications and for workforce interviews.

This course will also highlight internship expectations and soft skills needed in industry as students work towards post-graduation career readiness.

Science Honor Society

The Science Honor Society of the WSCSD is an exclusive organization that recognizes outstanding success in the sciences and promotes service to the school and local community.

The requirement(s) for Provisional Membership acceptance into the organization are:

- Students must successfully complete a minimum of two Regents* or two AP science courses or a combination thereof, at the high school. Student performance at the middle school is not considered because this is strictly a high school organization; and

The requirement(s) for maintenance for Permanent Membership are:

- Students are required to maintain a minimum 90% cumulative average in Regents Level Science courses, or minimum 85% in AP science courses, Adv Forensics, Life Science Academy courses and
- Students must achieve mastery level (85% or higher) on ALL NYS Science Regents exams that are taken while at the high school and
- Students must be enrolled in at least one science course each year school year during all four years of high school and
- Students must log a minimum of 20 service hours over a two school year period: 10 hours of which must be completed while volunteering at school events or assisting in the science department and

Successful completion of the above criteria earns "Honor Cords" to be kept and worn at High School Graduation and Permanent Membership status into the Science Honor Society.