

SCIENCE

The Science curriculum consists of courses that use science as a method of inquiry and learning. Emphasis is placed on the processes of science that allow students to discover and interpret scientific knowledge, develop positive attitudes toward science, encourage an interest in science as a vocation, and utilize problem solving/decision making techniques that relate to a technology-oriented society.

COURSE OFFERINGS

813 EARTH SCIENCE	880 AP CHEMISTRY
814 BIOLOGY/LIVING ENVIRONMENT	881 AP BIOLOGY
816 BIOLOGY/LIVING ENVIRONMENT HONORS	882 COLLEGE PHYSICS
883 AP ENVIRONMENTAL SCIENCE	884 AP PSYCHOLOGY
828 CONCEPTUAL CHEMISTRY	885 PSYCHOLOGY
830 CHEMISTRY	843 ANATOMY AND PHYSIOLOGY
836 CHEMISTRY HONORS	844 PHYSICAL GEOLOGY
838 CONCEPTUAL PHYSICS	851 ENVIRONMENTAL SCIENCE
840 PHYSICS	852 ETHICS IN SCIENCE
860 ADVANCED SCIENCE RESEARCH	853 ASTRONOMY
	887 FORENSIC SCIENCE
	805 SCIENCE WORKSHOP

813 Earth Science

Grade: 9

Unit of Credit: 1

Prerequisite: Science 8

Regents Earth Science is an overview of earth and solar system processes, including Earth Dimensions, Rocks, Minerals & Resources, Earthquakes and Earth's Interior, Surface Processes and Landscaping, Earth's History, Meteorology and Atmospheric Energy, Water Cycle & Climate, and Astronomy. Students are required to successfully complete a minimum of 30 hours of laboratory work and submit satisfactory reports in order to sit for the Regents exam. All students are required to take the Earth Science Regents exam in June.



814 Biology / Living Environment

Grades: 9-10

Unit of Credit: 1

Prerequisite: Earth Science

Regents Biology emphasizes the fundamental principles of biology including the study of organisms, human physiology, ecology, genetics and evolution. In addition to meeting daily, this course includes one laboratory period every other day. Students are required to successfully complete a minimum of 30 hours of laboratory work and submit satisfactory reports in order to sit for the Regents exam. All students are required to take the Living Environment Regents exam in June.

816 Biology/Living Environment Honors

Grade: 9

Unit of Credit: 1

Prerequisite: Final average of 90% in Earth Science

This course is designed to offer investigations in biology beyond the Regents level. Students will take the Living Environment Regents exam. This course is also a preparatory course for Advanced Placement Biology.

883 AP Environmental Science

Grade: 9-12

Unit of Credit: 1

Prerequisite: 9th grade students must have a final average of 90% in Earth Science, Algebra I, and English. 11th and 12th grade students should have successfully completed Regents Chemistry or Departmental Approval.

This course offers two sections, one for underclassmen and one for upperclassmen. It is an alternative to Biology Honors for 9th grade students and is also available to upperclassmen. It follows a combined curriculum outlined by New York State and the College Board. The course is designed to explore environmental topics in a depth equivalent to that of a first-year college course. Due to the fast pace and depth of material, extensive work outside the classroom will be required. Topics include: ecosystems, biodiversity, populations, Earth systems and resources, land and water use, energy resources and consumption, atmospheric pollution, aquatic and terrestrial pollution, and global change. All students are required to take the AP exam in May and 9th graders will take the Living Environment Regents exam in June. Freshmen are required to successfully complete a minimum of 30 hours of laboratory work and submit satisfactory reports in order to sit for the Regents exam.

828 Conceptual Chemistry

Grades: 11-12

Unit of Credit: 1

Prerequisite: Algebra I or Algebra 1A and 1B

Final grade of 75% or below in Biology

Conceptual Chemistry is an introductory course in foundations of chemistry. The emphasis is providing a basic understanding of chemical concepts and their applications in real world situations. Topics include: physical properties of matter, atomic structure, chemical bonding, the periodic table, chemical reactions, kinetics and acids/bases. The course is at the conceptual level with basic algebraic problem solving.

830 Chemistry

Grades: 10-11

Unit of Credit: 1

Prerequisite: 75% in Biology or Departmental Approval, and 75% in Algebra I.

Regents Chemistry is a comprehensive course in modern chemistry. Ten units are studied: physical properties of matter, atomic structure, chemical bonding, the periodic table, moles/stoichiometry,

kinetics and equilibrium, organic chemistry, oxidation and reduction, acids, bases and salts, and nuclear chemistry. Students are required to successfully complete a minimum of 30 hours of laboratory work and submit satisfactory reports in order to sit for the Regents exam. All students are required to take the Chemistry Regents exam in June.

836 Chemistry Honors

Grade: 10

Unit of Credit: 1

Prerequisite: Final average of 85% in Biology Honors/APES or 92% in Biology and 90% in Algebra I.

Chemistry Honors is designed to offer investigations in chemistry beyond the Regents level. All students are required to take the Chemistry Regents exam. This course is also a preparatory course for Advanced Placement Chemistry.

838 Conceptual Physics

Grades: 11-12

Unit of Credit: 1

Prerequisite: Algebra I or Algebra 1A and 1B

Final grade of 75% or below in Biology or Chemistry.

Conceptual Physics describes the workings of the world around us. It deals with everyday occurrences such as: Does a curve ball really curve; and can you not wear a seat belt and save yourself in a car accident by bracing yourself against the dashboard? The course is at the conceptual level, with basic algebraic problem solving. The course covers mechanics, including forces, motion, projectiles, and energy.

840 Physics

Grades: 11-12

Unit of Credit: 1

Prerequisite: Concurrent enrollment in Algebra II and 75% in Chemistry or Departmental Approval

Regents Physics is an introductory course with emphasis on the following topics: motion, forces, projectiles, collisions, energy, waves, electricity, magnetism, modern physics, and the standard model of the atom. Students are required to successfully complete a minimum of 30 hours of laboratory work and submit satisfactory reports in order to sit for the Regents exam. All students are required to take the Physics Regents exam in June.

860 Advanced Science Research

Grades: 10-12

Unit of Credit: 1 for each year

Prerequisite: Written essay due in the spring. Applicants will be chosen based on academic achievement, the written essay, and the student's desire to perform original research.

Advanced Science Research (ASR) is an independent study course for motivated students interested in conducting their own scientific research. Students are encouraged to study any scientific topic they find interesting. They will be trained as professional scientists in all necessary areas: scientific philosophy, literature review, experimental design/execution, data analysis, scientific communication (presentations and writing professionally). Students will design and conduct their own experiments at school. Students will also find professional/University-level scientists in their field of choice in order to conduct original research outside the classroom. Their results will be presented in high profile science competitions, including Regeneron Talent Search (formerly Intel). Tenth grade students are required to commit to 3 years of enrollment in order to complete the research required. This course receives Honors weighting.

880 AP Chemistry

Grades: 11-12

Unit of Credit: 1

Prerequisite: Final grade of 85% in Chemistry Honors or 92% in Regents Chemistry and 85% in Regents Physics. Concurrent enrollment in Regents Physics and AP Chemistry requires Departmental Approval.

This course is equivalent to the general chemistry course offered during freshman year of college. AP Chemistry differs from Regents Chemistry in the textbook used, the more advanced topics covered, the emphasis on chemical calculations, and the kind of experiments performed. All students are required to take the AP exam in May.

881 AP Biology

Grades: 11-12

Unit of Credit: 1

Prerequisite: Final grade of 85% in Biology, Chemistry, and Physics. Concurrent enrollment in Physics and AP Biology requires Departmental Approval.

This course is equivalent to an introductory biology course offered in college. There is a substantial focus on biology at the molecular level with its importance in the functioning of organisms, the functioning of biological communities and its application to evolution. Students will learn to describe and explain biological concepts and processes; use diagrams and models; develop questions and propose ways to test those questions; process, present and describe data; perform statistical tests to support claims, and make predictions that can be justified. All students are required to take the AP exam in May.

882 College Physics

Grade: 12

Unit of Credit: 1

Prerequisite: Final grade of 90% in Regents Physics and enrollment in Calculus.

This course is comprised of two, 4-credit college physics courses, identical in scope and sequence to AP Physics C Mechanics and AP Physics C Electricity & Magnetism. Topics included are kinematics, dynamics (Newton's Laws), work and energy, linear momentum and systems of particles, rotation, simple harmonic motion, gravity and orbits, electrostatics, conductors and capacitors, circuits, magnetic fields, and electromagnetism.

Deep comprehension of the fundamental principles of physics and their application to complex problem solving is stressed. Algebra and trigonometry are used extensively and require a high degree of comfort and speed. Calculus topics, including both differentiation and integration, are engaged throughout the course. Qualified students interested in pursuing engineering, math, physics, or other mathematical sciences are strongly encouraged to take this course.

This course receives AP weighting. Students taking the course are eligible to apply for 8 college credits through SUNY Westchester. Students are expected to take both AP Physics C exams in May.

884 AP Psychology

Grades: 10-12

Unit of Credit: 1

Prerequisite: None

This college level course focuses on the basic concepts in psychology through class discussions, experiments and outside reading. Major topics include the brain, development, consciousness, sensation, perception, learning, memory, thinking and language, motivation, emotion, theories of personality, psychopathology, therapy, statistics, intelligence and social psychology. All students are required to take the AP exam in May and will have additional assignments as a final June evaluation.

885 Psychology

Grades: 10-12

Unit of Credit: 1

Prerequisite: None

Psychology is the scientific study of behavior and mental processes. The course emphasizes analytical reasoning, conceptual understanding and critical thinking through class discussions, experiments and outside reading. Major topics include the brain, development, consciousness, perception, learning, memory, thinking, language, theories of personality, psychopathology, therapy, statistics, intelligence and social psychology.

843 Anatomy and Physiology

Grades: 11-12

Unit of Credit: 1 (4 College Credits)

Prerequisite: 80% combined average or higher in Regents-level Earth Science, Biology, and Chemistry or Departmental Approval.

Anatomy and Physiology will explore the layout and function of the human body. Included is a review of basic chemistry and cellular structures followed by the exploration of the different tissue types. A summary, as discussed by health care professionals, of the planes, directions, orientations and cavities will take place. Each body system will then be studied in detail. The systems will be divided into the following categories: exchange with the environment (digestive and respiratory systems); fluids and transport within the body (cardiovascular, lymphatic, immune and the urinary systems); structure, support, protection, and movement (integumentary, skeletal, and muscular systems); and control and regulation (nervous and endocrine systems). The reproductive system as well as well as diseases and homeostatic disruptions of each organ system will also be studied.

This course receives AP weighting. Students taking the course are eligible to apply for 4 college credits through SUNY Westchester. The fee for college credit is approximately \$276.

844 Physical Geology

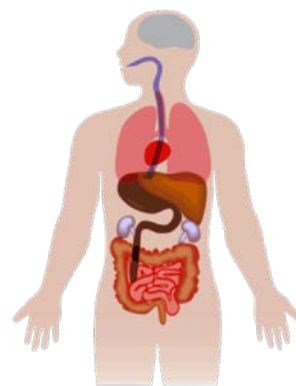
Grades: 11-12

Unit of Credit: 1 (4 college credits)

Prerequisite: 80% combined average or higher in Regents-level Earth Science, Biology, and Chemistry or Departmental Approval.

Physical Geology is a college level elective course designed for junior and senior students as a hands-on exploration of the Earth and the interactions between the lithosphere, atmosphere, hydrosphere, and biosphere. Topics covered will be similar to those typical of an introductory college geology course, including mineralogy and petrology, weathering and erosion systems, tectonics and structural geology, field geology, landform studies, geochemistry and environmental geology, and historical geology. Students will learn to use the tools of a modern geologist including Brunton Transit compasses, GPS receivers, rock saws and polarizing microscopes, the AS-1 seismograph, and modern computer software to examine the Earth. Students will be strongly encouraged to attend at least one local weekend field trip.

This course receives AP weighting. Students taking the course are eligible to apply for 4 college credits through SUNY Oneonta. College credit will require successful completion of this course and a long-term research project. The fee for college credit is approximately \$200.



887 Forensic Science

Grades: 11-12

Unit of Credit: 1

Prerequisite: Regents Chemistry

Forensic Science applies chemical, biological and physical principles to the investigation of physical evidence in criminal cases. The course emphasizes analytical reasoning, laboratory skills, hypothesis testing, and critical thinking. It incorporates technology applied to real world situations as well as the abstract complexities of the U.S. Constitution and the New York State Penal Code. Topics include: the crime scene, fingerprints, DNA and the law, counterfeiting, handwriting analysis, and hair and fiber analysis.

851 Environmental Science

Grades: 9-11

Unit of Credit: ½

Prerequisite: None

This course is a one semester elective that focuses on Environmental Science and how humans affect the Earth. Topics include but are not limited to: water sheds, human interaction with the environment, and the sustainability of the planet.

852 Ethics in Science

Grades: 10-12

Unit of Credit: ½

Prerequisite: None

Ethics can be defined as “well-founded standards of right and wrong that prescribe what humans ought to do.” This course has a dual focus that will allow students to (a) consider proper conduct for people in the field of research and to (b) look at a variety of controversial topics in science. Proper laboratory conduct will investigate how data is gathered and treated in laboratories by looking at actual cases where questionable methods have been employed. Controversial topics will include but not be limited to stem cell research, cloning, using animals for research, and performing clinical trials using human subjects.

853 Astronomy

Grades: 10-12

Unit of Credit: ½

Prerequisite: Algebra

This is a one semester elective Astronomy course. During the semester, all of the subtopics of Astronomy, namely, celestial spheres, seasons, time and motion will be addressed. The course is qualitative, with some basic quantitative analysis.

805 Science Workshop

Grades: 9-12

Unit of Credit: None

Students in need of assistance with science course work as well as those who need to prepare for the Earth Science, Biology, or Chemistry Regents exams will be assigned to a workshop class.

