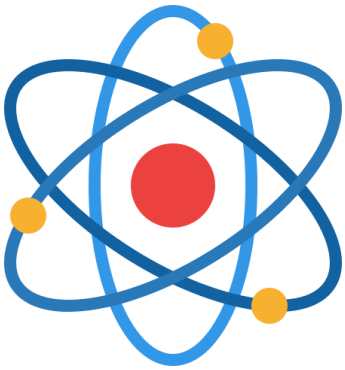
2024-2025
SCIENCE COURSE GUIDE



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Science - Course Descriptions

Living Environment

4310 Grades 9,10 *1 credit – Life Science*

This course is an introductory study of the living world. Topics covered include classification of living things, life activities, cell structure and function, biochemistry, genetics, plants, animals, ecology and evolution. Laboratory work, including written lab reports, is required. This course has double periods that alternate with a single period class. The final assessment for this course is the New York State Regents exam

Earth Science – Physical Setting

4309 Grades 9,10 *1 credit – Physical Science*

★ ***Recommended: Course credit for Living Environment***

This course includes the study of three general areas: Astronomy, the study of the sun, moon and planets; Meteorology, the mechanics, description and prediction of weather and climates; and Geology, the study of Earth materials, their formation, movements, and history. Written lab reports are required. This course has double periods that alternate with a single period class. The final assessment for this course is the New York State Regents exam.

Honors Earth Science – Physical Setting

4409 Grade 9 *1 credit – Physical Science*

★ ***Recommended: Course average of at least 85 in Living Environment and score of at least 85 on Regents exam in Living Environment.***

This rigorous course is designed for highly motivated, science-oriented students with both the interest and potential to major in science in college. In addition to meeting all requirements for the Physical Setting – Earth Science course, this fast-paced course will provide a broader and more in-depth study of Astronomy, Meteorology, and Geology. This course has double periods that alternate with a single period class. The final assessment for this course is the New York State Regents exam.

Chemistry – Physical Setting

4311 Grades 10,11,12 *1 credit – Physical Science*

★ ***Recommended: Grade of at least 70 on the Earth Science Regents Exam. Grade of at least 70 on the Integrated Algebra and Geometry Common Core Exams. Credit or concurrent enrollment in Algebra 2 or Applied Algebra 2.***

This course deals with both the theoretical foundations of chemistry and its many applications to everyday life. Topics include matter and energy, phases of matter, atomic structure, nuclear chemistry, the periodic table, bonding, kinetics and equilibrium, acids and bases, electrochemistry, and organic chemistry. Students must have a working knowledge of ratios, proportions and algebra along with the ability to express themselves in writing. Skills to be developed during the course include making connections between concepts and everyday life, problem solving, characterizing concepts and ideas in written form, and carrying out laboratory procedures. Students will be actively participating in inquiry based labs and completing written lab reports. Double periods alternate with single period classes. The final assessment for this course is the New York State Regents exam.

Honors Chemistry – Physical Setting

4411 Grades 10,11,12 *1 credit – Physical Science*

★ ***Recommended: Grade of at least 85 on Earth Science Regents Exam AND grade of at least 85 in Geometry AND credit for or concurrent enrollment in Algebra 2.***

This course is intended as a college and AP preparatory class. This course includes all requirements for the Physical Setting: Chemistry course plus additional topics, advanced problem solving, and higher level mathematical skills. Students must have a good working knowledge of ratios, algebra, unit conversions, scientific notation, and logarithms. In addition, students must have the ability to communicate scientific concepts in written form. Students will be required to design and perform laboratory experiments and complete written lab reports. Double periods alternate with single period classes. The final assessment for this course is the New York State Regents Exam.

Physics – Physical Setting

4312 Grades 10,11,12 *1 credit – Physical Science*

★ ***Recommended: Regents credit for Living Environment and a grade of at least 70 on both of the Regents Earth Science and Chemistry exams. Credit in Algebra 2 or Applied Algebra 2***.

This course is designed for students with an interest in physics and engineering and a very good understanding of math. This course focuses on mathematical applications and problem solving of physics phenomena. A solid foundation in algebra and trigonometry is critical for success in this class. Physics is for students with a strong work ethic and an interest in engineering and science. Topics covered include Mechanics, Energy, Electricity, Magnetism, Waves and Modern Physics including the Standard Model. Satisfactory completion of laboratory work and written reports are required. This course is highly recommended for students enrolled in Project Lead the Way looking to pursue a career in engineering. Double periods alternate with single period classes. The final assessment for this course is the New York State Regents exam.

Honors Physics – Physical Setting

4323 Grades 11,12 *1 credit – Physical Science*

★ ***Recommended: Regents credit for Living Environment and a grade of at least 80 on both the Regents Earth Science and Chemistry exams. Credit in Algebra 2 or Applied Algebra 2***

This course is intended to enrich a student's study of physics beyond the Regents syllabus. This course is designed for students with an interest in physics and engineering and a very good understanding of math. This course focuses on mathematical applications and problem solving of physics phenomena. A solid foundation in algebra and trigonometry is critical for success in this class. Physics is for students with a strong work ethic and an interest in engineering and science. Topics covered include Mechanics, Energy, Electricity, Magnetism, Waves and Modern Physics including the Standard Model. Satisfactory completion of laboratory work and written reports are required. This course is highly recommended for students enrolled in Project Lead the Way looking to pursue a career in engineering. Double periods alternate with single period classes. The final assessment for this course is the New York State Regents exam.

AP Biology

4410 Grades 11,12 *1 credit – Life Science*

★ ***Recommended: Regents credit for Living Environment and credit for Regents or Honors Chemistry.***

Advanced Placement Biology is a college level course designed for students with an interest in a college degree in biology or a biology related field. Topics that are covered are Cells, Heredity, Molecular Genetics, Evolution, Diversity of Organisms, Structure and Function of Plants and Animals and Ecology. Students will participate in college level labs exploring such areas as diffusion and osmosis, gel electrophoresis, genetics, animal behavior and photosynthesis. This course includes a summer reading assignment to review some basic concepts learned in Living Environment. Students are expected to take the AP exam in May. Double periods alternate with single period classes.

AP/ Advanced Studies Chemistry

4511 Grades 11,12 *1 credit – Physical Science*

★ ***Recommended: Final average of 85% or better in Honors Chemistry or 90% or better in Regents Chemistry.***

⇆ **DUAL ENROLLMENT OPTION AVAILABLE**

CH180/181 University Chemistry I w/Lab, CH182/183 University Chemistry II w/Lab (3 credits)

This course is designed for students with an interest and ability in chemistry, wether they are science majors wishing to gain a college-level experience, or non science majors hoping to fulfill their college science credit. Students can choose to earn AP Exam credit through the College Board or college transfer credit through SUNY Erie's Advanced Studies Program. Students will extend their knowledge and skills in various areas of chemistry explored in their previous chemistry course. The class consists of notes taken from video lectures at home, partener practice, daily classwork and extensive lab procedures performed in class. Tests include topics from two chapters and consist of AP -style multiple choice and free response questions. A project involving the topics of Electronic Structure and the Periodic Table will be assigned over the summer and tested on the second week of school. Double periods alternate with single period classes.

AP Computer Science A

3414 Grades 11, 12 *1 credit*

★ ***Suggested Preparation: Successful completion of AP Computer Science Principles (Technology Department)***

AP Computer Science A is designed to be an introductory college-level course in computer science. It emphasizes object-oriented programming methodology with an emphasis on problem solving and algorithm development. The coursework will include the following topics: Primitive Types, Using Objectives, Boolean Expressions and If Staements, Iteration, Writing Classes, Array (List, 2D) , Inheritance and Recursion. Current offerings of the AP Computer Science A Exam require the use of Java (those sections of the exam that require the reading or writing of actual programs), and therefore the AP Computer Science A course focuses on Java for coding. The course is based on numerous problem solving exercises, labs, and case studies, which require students to design and implement Java classes. The course requires 40-50 hours of hands-on work in a computer lab.

AP Environmental Science

4512 Grades 10,11,12 *1 credit – Physical Science*

★ ***Recommended: Regents credit for Living Environment, Earth Science, AND credit for OR concurrent enrollment in Regents or Honors Chemistry***

Advanced Placement Environmental Science is designed for students with an interest in gaining experience in a college-level science class during high school, or for students with a desire for in-depth study of our natural world, how humans impact our world, and ways we may reduce our impact on our planet. Topics covered in this course include local and unique ecosystem studies, human and animal population investigations, land and water use, energy and resource consumption, pollution in its various forms, and global climate change. The class format consists of lecture and discussion, and a robust field investigation component involving the collection and analysis of environmental data. In addition, extensive reading, writing, and practice is expected outside of class. Students are expected to take the AP Exam with the opportunity to earn college credit for the course. Double period labs alternate with single class periods.

AP Physics C

4333 Grades 11,12 *1 credit – Physical Science*

★ ***Recommended: Course credit in Honors Physics (Regents Physics by teacher recommendation)***

This course is designed for students who desire a college degree in engineering, mathematics, physics or related scientific field, or for those who plan to enter highly competitive college academic programs. Students enrolled in the Project Lead the Way program are highly encouraged to take this course. AP Physics C will engage students in studies of Newtonian Mechanics which correspond to a first year, calculus-based physics course designed for scientists and engineers. Along with knowledge of physics concepts, the main spirit of this course is the development and practice of mathematical application and problem-solving skills. Solid foundations in algebra and trigonometry are essential; the needed calculus tools will be explored as part of the curriculum. Topics covered in this course include vector and graphical analysis, kinematics, dynamics, work & energy, momentum, circular & rotational motion, oscillations, and gravitation. The laboratory section of this course is designed to engage students in the investigation of scientific phenomena so as to develop sophisticated models and understandings of the physical world. This course includes independent summer studies to review physics concepts which will be assessed during the first week of school. Students are expected to take the AP Exam and may be able to earn college credit for the course. Double period labs alternate with single class periods.

Honors – Principles of Biomedical Sciences (Project Lead the Way)

9160 Grades 10,11,12 *1 credit*

★ ***Recommended: Credit for Living Environment and Algebra***

In this course, students explore concepts of biology and medicine as they take on roles of different medical professionals to solve real-world problems. Over the course of the year, students are challenged in various scenarios including investigating a crime scene to solve a mystery, diagnosing, and proposing treatment to patients in a family medical practice, to tracking down and containing a medical outbreak at a local hospital, stabilizing a patient during an emergency, and collaborating with others to design solutions to local and global medical problems. Summer project to examine fundamental concepts which will be assessed at the beginning of the school year. Students are expected to take the AP Exam with the opportunity to earn college credit for the course. Double period labs alternate with single class periods.

Astronomy

4015 Grades 10,11,12 *1 credit – Physical Science*

★ Recommended: Regents exam credit for Physical Setting – Earth Science and course credit in two science courses (Regents level or higher).

This is a basic course studying one of the oldest sciences. History and the tools of astronomy will be studied. Extensive examination of the solar system, including information received from our most recent probes, orbiters, and landers. Evolution of stars, galaxies, and deep space will be covered. History and current status of the space program as well as the future of space will be thoroughly examined. Math concepts are not emphasized and will be developed as needed. It meets for one period every day. The final assessment for this course is written by the instructor.

General Anatomy and Physiology

4011 Grades 11,12 *1 credit – Life Science*

★ Recommended: Regents exam credit for Living Environment and course credit for Living Environment and Physical Setting – Earth Science

This course involves an in-depth study of the structure and function of the human body. Topics include integumentary, skeletal, muscular and nervous systems and current topics in medicine/Allied health. It meets for one period every day. The final assessment for this course is written by the instructor.

Meteorology

4025 Grades 10,11,12 *1 credit – Physical Science*

★ Recommended: Regents exam credit for Physical Setting – Earth Science and course credit in two science courses (Regents level or higher).

Do you want to learn more about the weather? Join us for a year-long adventure in the science of meteorology. Outdoor and indoor experiments supplement the topics studied in this course including: lake-effect snow, tornadoes, hurricanes, weather forecasting, severe weather and climate change. This class will meet for one period each day. The final assessment for this course is written by the instructor.

Oceanography

4577 Grades 10,11,12 *1 credit – Physical Science*

★ Recommended: Regents exam credit for one science course and credit for Living Environment and Physical Setting - Earth Science

This course is designed to develop an understanding of the fundamentals of Earth's Oceans. Oceans cover three quarters of Earth's surface. The impact of ocean environments on the atmosphere and land areas of Earth is tremendous. Topics in this course include but are not limited to the importance of coral reefs; marine animals and their habitats; causes and effects of ocean currents; exploration of oceans including remote sensing and personal exploration; the nature of the seafloor, and the effects human activities have on the oceans. Lab activities will be included. It meets for one period every day. The final assessment for this course is written by the instructor.

Science in the Media / Forensics

4578 Grades 10,11,12 *1 credit – Physical Science*

★ Recommended: Regents exam credit for one science course

This course covers both biology and principles of physics as well as an extensive Forensic Science unit. Several science fiction films will be viewed and critiqued as to the authenticity of the science portrayed. Students will have to complete several independent studies of commercials, films, or television shows, as well as individual scientific experiments. A research paper will also be required. The Forensic portion will include the study of crime scene investigation, evidence collection and analysis, case studies and crime processing techniques. Blood spatter, fingerprinting, and DNA analysis will be included in a laboratory setting. This class meets for one period every day. The final assessment for the course is written by the instructor.