

SCIENCE

Course Offerings	Gr. 9	Gr. 10	Gr. 11	Gr. 12	Grading Level
Conceptual Physics	X				I
Advanced Physics	X		X	X	II
Honors Physics	X		X	X	III
AP Physics 1: Algebra-Based	X				III
AP Physics 2: Algebra-Based		X		X	III
AP Physics C: Mechanics			X	X	III
Biology			X	X	I
Adv. Biology		X	X	X	II
Honors Biology		X	X		III
AP Biology			X	X	III
Anatomy & Physiology I			X	X	II
Anatomy & Physiology II				X	II
Advanced Chemistry		X	X	X	II
Honors Chemistry		X	X	X	III
AP Chemistry			X	X	III
Earth Science		X	X	X	I
AP Environmental Science			X	X	III
<i>Please see course listings for required pre-requisites.</i>					

All courses are designed to meet the NJ Core Curriculum Content Standards for Science and applicable Common Core State Standards

Conceptual Physics

Length: Year
Grade Level: 9

Credits: 5

In this inquiry-based course students will learn the key concepts in physics by using the following science and engineering practices: asking questions and defining problems; developing and using models; planning and carrying out investigations; analyzing and interpreting data; using mathematics and computational thinking; constructing explanations and designing solutions; engaging in argument from evidence; obtaining, evaluating, and communicating information. Students will be provided with many opportunities to perform investigations while working with classmates to “uncover” meaning and content knowledge.

Advanced Physics

Length: Year
Grade Level: 9, 11, 12

Credits: 5

Co-requisite: Advanced Algebra I or Honors Algebra I

This lab-based/inquiry physics course is structured so that students actively engage in scientific and engineering practices and apply crosscutting concepts to deepen their understanding of core ideas. The learning experiences provided for students will engage them with fundamental questions about the world and with how scientists have investigated and found answers to those questions. Students will carry out scientific investigations and engineering design projects related to core ideas in physics and use basic algebraic skills. The course will focus on forces and motion; types of interaction; energy; electricity and magnetism; and waves and their application.

Honors Physics

Length: Year
Grade Level: 9, 11, 12

Credits: 6

Pre-requisite – Honors Algebra I

This is a laboratory science course that incorporates advanced mathematical applications, relying on multiple representations to describe the physical world and more extensive algebraic representations. The appropriate Next Generation Science Standards will be addressed to raise the level of student discourse and develop essential scientific reasoning skills. This physics course will initiate a theme of energy that will continue in chemistry, followed by biology. The course will address the topics in mechanics, electromagnetism, and waves using an increased level of mathematical complexity and reduction of in-class guided practice.

AP Physics 1: Algebra-Based

Length: Year
Grade Level: 9

Credits: 6

Pre-requisite – Honors Geometry

This algebra-based physics course covers the following topics: Newtonian mechanics (including rotational dynamics and angular momentum); work, energy, and power; mechanical waves and sound. It will also introduce electrical circuits. Students will demonstrate their understanding through discussions, homework, classwork, labs, and oral and written reports. Students are encouraged to take the AP exam.

AP Physics 2: Algebra-Based

Length: Year
Grade Level: 10, 12

Credits: 6

Pre-requisite – AP Physics 1: Algebra-Based or AP Physics C: Mechanics

In this algebra-based course students will develop scientific critical thinking and reasoning skills through inquiry-based learning while exploring topics such as fluid statics and dynamics; thermodynamics with kinetic theory; PV diagrams and probability; electrostatics; electrical circuits with capacitors; magnetic fields; electromagnetism; physical and geometric optics; and quantum, atomic, and nuclear physics.

Biology

Length: Year
Grade Level: 11, 12

Credits: 5

Pre-requisite: Environmental Science

This laboratory-oriented course is divided into several units, including: various life forms, body systems, reproduction and development, relationships in the environment, and more. Throughout the course, emphasis will be placed on the importance of biology as it relates to everyday experiences. This course will fulfill the state graduation requirement for a biology lab science.

Advanced Biology

Length: Year
Grade Level: 10

Credits: 6

Pre-requisite: Advanced Physics

This course is a laboratory approach to the study of living things. Advanced Biology is recommended for students planning to further their education beyond high school. Aside from meeting the college requirement for a lab science, this double lab period course strengthens student's academic bases for those pursuing careers in science-related fields. Students enrolled in this course are expected to work independently and be self-motivated.

Honors Biology

Length: Year
Grade Level: 10, 11

Credits: 6

Pre-requisite: Honors Physics
Co-requisite – Honors Chemistry

Honors Biology is an inquiry-based laboratory course designed for 11th graders. This course will have students uncover content in the following units to develop conceptual understandings in Biology: Evolution, Cell Structure and Function, Mitosis/Meiosis, Mendelian genetics, Transcription and Translation, and Energy Flow in Ecosystems. Students will apply the energy representations learned in Honors Chemistry and Honors Physics to biological systems. The Modeling method of instruction is consistent with recommendations from the College Board, the National Science Foundation and major research studies.



AP Biology

Length: Year
Grade Level: 11, 12

Credits: 6

Pre-requisites: Honors Biology AND Honors Chemistry

The AP Biology course is designed to be the equivalent of an introductory college course usually taken by science majors during their first year. Students should have demonstrated several qualities, such as interest, aptitude, creativity, motivation, and maturity. The student who selects this course should understand that the course demands time and effort well beyond that of a typical high school biology course. Students are encouraged to take the AP exam.

Earth Science

Length: Year
Grade Level: 10, 11, 12

Credits: 5

Pre-requisite: Conceptual Physics

Earth Science is a lab based/ inquiry science course that actively engages students in scientific and engineering practices that deepen their understanding of several core ideas. The first core idea, Earth's Systems, focuses on the processes that drive Earth's conditions and its continual evolution. The second core idea, Earth and Human Activity, address society's interaction with the planet. Finally the third core idea, Earth's Place in the Universe, describes the universe as a whole and addresses its grand scale in both space and time.

Students will engage in activities that explore fundamental questions about the world and how scientists have investigated and found answers to these questions.

Advanced Chemistry

Length: Year
Grade Level: 11, 12

Credits: 6

Pre-requisites: Algebra I AND Advanced Physics

Advanced Chemistry is a student-centered, inquiry-based course. Students will acquire a strong understanding of the essential concepts in chemistry through experimentation and class discussions conducted through student white boarding. By acquiring evidence through historical experimentation, students will build a working model of the chemical world. Advanced Chemistry furthers the science course offerings taught through the Modeling approach, which focuses on students' development of conceptual understandings in the sciences. The Modeling method of instruction is consistent with recommendations from the College Board, the National Science Foundation, the American Chemical Society, and major research studies.

Honors Chemistry

Length: Year
Grade Level: 10, 11, 12

Credits: 6

Pre-requisite: Geometry, Algebra II and an honors level science course

**Algebra II may be taken concurrently*

The instruction in this course develops conceptual understanding in chemistry. Honors Chemistry incorporates advanced mathematical applications and discourse to describe the physical world, and develops essential scientific reasoning skills. The Modeling method of instruction is consistent with recommendations from the College Board, the National Science Foundation, the American Chemical Society, and major research studies.

Both the man of science and the man of action live always at the edge of mystery, surrounded by it

AP Chemistry

Length: Year
Grade Level: 11, 12

Credits: 6

Pre-requisites: Honors Chemistry, Algebra II, Pre-Calculus

**Pre-Calculus may be taken concurrently*

The AP Chemistry course is designed to be the equivalent of an introductory college course usually taken by science majors during their first year. The course will contribute to the development of the students' ability to express ideas with clarity and logic, both orally and in writing. Topics such as the structure of matter, kinetic theory of gases,

chemical equilibria, chemical kinetics, and the basic concepts of thermal dynamics will be presented in considerable depth. A great deal of time will be spent on chemical calculations, and mathematical formulations of principles of chemistry. The advanced work in chemistry should not displace any other part of the student's science curriculum. It is recommended that a student have a course in high school physics and a four- year college prep program in mathematics. Students are encouraged to take the AP exam. Summer work required.

AP Environmental Science

Length: Year

Credits: 6

Grade Level: 11, 12

The goal of this course is to provide students with the scientific principles, concepts, and methodologies required to understand the inter-relationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them. The course is interdisciplinary and embraces a wide variety of topics from different areas of study. There are several major unifying constructs, or themes, that cut across the many topics included in the study of environmental science. The following themes provide a foundation for the structure of the course: science is a process, energy conversions underlie all ecological processes, the Earth itself is one interconnected system, humans alter natural systems, environmental problems have a cultural and social context, and human survival depends on developing practices that will achieve sustainable systems. Students are encouraged to take the AP exam.

AP Physics C: Mechanics

Length: Year

Credits: 6

Grade Level: 11, 12

Pre-requisites: Honors Physics, or AP Physics 1, Calculus

**Calculus may be taken concurrently*

The student in AP Physics will be expected to work at a college level. Topics such as Newtonian mechanics, fluid mechanics and thermal physics, electricity and magnetism, waves and optics, and atomic and nuclear physics will be presented in considerable depth. Students will demonstrate their understanding through discussions, homework, classwork, labs, and oral and written reports. A calculus background is required. Students are encouraged to take the AP exam.

Anatomy & Physiology I

Length: Year

Credits: 5

Grade Levels: 11, 12

Pre-requisite or Co-requisite: Advanced Biology OR Honors Biology

This elective course will focus primarily on the human body and its systems. It will examine the structure and functions of the body and the mechanisms for maintaining homeostasis within it. Areas of study include, but are not limited to: cells, tissues; skeletal, muscular and nervous systems; endocrine, cardiovascular, respiratory, digestive and reproductive systems. Concepts to be covered include, but are not limited to: development, metabolism, and balance. The course will cover current events in the fields of science that relate to humans on a physiological level. Anatomy and Physiology will benefit students who are interested in pursuing an education in the science field.

Anatomy & Physiology II

Length: Year

Credits: 5

Grade Level: 12

Pre-requisite: Anatomy and Physiology I

The course will cover current events in the fields of science that relate to humans on a physiological level. It will focus primarily on the human body and its systems. It will examine the structure and functions of the body and the mechanism for maintaining homeostasis within it. Areas of study will include, but not be limited to: cells, tissues, and the following systems: respiratory, lymphatic endocrine, digestive, urinary, and reproductive. Fetal development and embryology will also be covered. The content will be centered on the key concepts of development, metabolism, and balance. Anatomy and Physiology II will benefit students who took an interest in Anatomy and Physiology I and want to pursue an education in this science field.



"In times of change, the learners will inherit the world, while the knowers remain well-prepared for a world that no longer exists."

Eric Hoffer