

SCIENCE

Earth Systems and Space Science

Grade: 9-12

Duration: Full Year

Credit Hours: 5

Prerequisite(s): none

Earth Systems and Space Science is designed to prepare students for Chemistry, Biology, and environmental science, as well as providing a background in physics as it relates to Earth and Space. Project and Problem Based Learning make up most of the course while infusing technology with real life scenarios that enable students to gain a better understanding of the relationship between the fundamental laws of nature and human's role in Earth systems and the potential for space exploration and colonization. The essential themes of the course include: chemistry, Earth systems, sustainability, physics, environmental studies, and space colonization. Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

Physics

Grade: 9-12

Duration: Full Year

Credit Hours: 5

Prerequisite(s): none

Physics provides a detailed study of matter, energy, space, time and the relationships between these areas of physical science. Connections are also developed between the analysis of motion and graphical analysis, collision problems and the solving of systems of equations. Students will be involved in problem-solving activities on an individual, small group and large group basis. Through this process the ability to read and understand problems, break them down into their component parts and then create and present solutions will be developed. Laboratory sessions provide an opportunity for the application and discovery of physics principles. Students use mathematics and technology extensively in developing their understanding of the topic. Topics include the study of motion and forces, gravitation, energy, momentum, waves, electricity, magnetism, and planetary motion. Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

Honors Physics

Grade 9-12

Duration: Full Year

Credit Hours: 5

Prerequisite(s): Teacher Recommendation, B or above average in previous science course, Algebra 1 or currently enrolled

This course addresses the same topics as the general Physics course but with more rigor and at an accelerated pace. Independent reading and projects may be assigned. Students in the Honors course are expected to write lab reports and design investigations to solve problems. Students recommended for this course are expected to be proficient in mathematics. This course is recommended for students considering pursuit of Advanced Placement courses in the sciences. Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

AP Physics 1**Grades: 10-12****Duration: Full Year****Credit Hours: 5****Prerequisite(s): Algebra I, Teacher Recommendation, and B or above average in a Physics course**

The AP Physics 1 course is comparable to an introductory physics college level course and prepares students for taking the national AP Physics 1 exam. The course includes topics in both classical and modern physics. Topics include: Newtonian mechanics, mechanical waves and sound, electrostatics, DC circuits, simple harmonic motion, impulse, momentum, work and energy. A thorough knowledge of algebra and basic trigonometry are necessary for success in this course. Laboratory sessions are comparable to those found in introductory physics college level laboratories. The AP exam is administered in late spring. Colleges and Universities may use AP test results to award college credit for an introductory physics course. *Course description is modified from the course description available at <http://apcentral.collegeboard.com>.* Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

Biology**Grade: 11-12****Duration: Full Year****Credit Hours: 5****Prerequisite(s): none**

Biology is a mandatory course for meeting current graduation requirements. Through the study of biology, students will acquire a clear understanding and competency of key biological concepts and ideas, develop an awareness of the relevance of biology as an integral part of their everyday lives, foster a growing appreciation of biology, and develop a proficiency in critical and creative thinking and problem-solving. Topics of study include the molecular and cellular basis of life, cell structures and processes, ecology, reproduction and development, genetics, evolution, human influence on the climate, and the diversity of living organisms. Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

Honors Biology**Grade: 11-12****Duration: Full Year****Credit Hours: 5****Prerequisite(s): Teacher Recommendation, B or above average in previous science course**

Biology is a mandatory course for meeting current graduation requirements. This course addresses the same topics as the general Biology course but with more rigor and at an accelerated pace. Independent reading and projects may be assigned. Students in the Honors course are expected to write lab reports and design investigations to solve problems. Additionally, bioethics will be discussed during the course to develop an appreciation for the relationship between science and society. This course is recommended for students considering pursuit of Advanced Placement courses in the sciences. Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

AP Biology

Grade 11-12

Credit Hours: 5

Duration: Full Year

Prerequisite(s): B or above average in a Biology course, and Teacher Recommendation

The AP Biology course is comparable to an introductory biology college level course and prepares students for taking the national AP Biology exam. The AP Biology course is divided into units incorporating 4 Big Ideas and 7 Science Practices. The Big Ideas include: evolution and diversity, use of energy, information processing, and interactions of systems. Under each Big Idea are units that provide further clarity and focus on information and experiences that are expected of the College Board. The AP exam is administered in late spring. Colleges and Universities may use AP test results to award college credit for an introductory biology course. *Course description is modified from the course description available at <http://apcentral.collegeboard.com>.* Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

Chemistry

Grades 10-12

Duration: Full Year

Credit Hours: 5

Prerequisite(s): Physics, Environmental Science, or Earth Systems and Space Science course

Chemistry provides a detailed study of matter, its properties, the changes it undergoes, and the principles which govern these changes. Topics of study include: structure and properties of matter, energy, bonding and reactions, nuclear chemistry, chemistry of living and non-living systems, and the chemistry of sustainability. Laboratory sessions reinforce the qualitative and quantitative aspects of chemistry, affording students opportunities to develop analytical skills, use critical thinking skills, and learn problem-solving techniques. Students will be able to explain the relationship between the chemical and physical properties of elements and their placement on the periodic table. Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

Honors Chemistry

Grade 10-12

Duration: Full Year

Credit Hours: 5

Prerequisite(s): Teacher Recommendation; Physics, Environmental Science, or Earth Systems and Space Science course; B or above average in previous science course

This course addresses the same topics as the general Chemistry course but with more rigor and at an accelerated pace. Independent reading and projects may be assigned. Students in the Honors course are expected to write lab reports and design investigations to solve problems. This course is recommended for students considering pursuit of Advanced Placement courses in the sciences. Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

AP Chemistry
Grades 11-12
Duration: Full Year
Credit Hours: 5

Prerequisite(s): teacher recommendation, B or above average in a Chemistry course

The AP Chemistry course is divided into units incorporating 6 Big Ideas. These Big Ideas include: atomic structure, structure – property relations, transformations, kinetics, thermodynamics, and equilibrium. Under each Big Idea are up to 4 units that provide further clarity and focus on information and experiences that are expected of the College Board. The course is designed to have students develop sound science practices that are enduring and adaptable to enable students to keep pace with the rapid expansion of scientific knowledge. A minimum of 16 laboratory investigations are conducted to provide students opportunity for the application, design, and analysis of the content covered and skills learned in the classroom. The AP exam is administered in late spring. Colleges and Universities may use AP test results to award college credit for an introductory chemistry course. *Course description is modified from the course description available at <http://apcentral.collegeboard.com>.* Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

Forensic Science
Grades 12
Duration: Full Year
Credit Hours: 5

Prerequisite(s): C or above average in Biology and Chemistry, and completed all science graduation requirements

This multidisciplinary course uses biology, chemistry and physics in understanding forensic science investigations. The course exposes students to the various laboratory skills, techniques and methods commonly used during forensic investigations of crime scenes. It is designed around students solving crime scene scenarios through the use of several skills including, but not limited to, trace evidence analysis, including hair, sand, soil, and fiber comparison, fingerprint analysis, insect evidence, footprint and dental impressions, ballistics, serology, and blood spatter analysis. Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.

AP Environmental Science
Grades 11-12
Duration: Full Year
Credit Hours: 5

Prerequisite(s): Teacher recommendation, B or above average in Biology and Chemistry

AP Environmental Science is interdisciplinary; it embraces a wide variety of topics from different areas of study. The goal of the AP Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships 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 or preventing them. The AP exam is administered in late spring. Colleges and Universities may use AP test results to award college credit for an introductory environmental science course. *Course description is modified from the course description available at <http://apcentral.collegeboard.com>.* Instructional strategies may be modified based on the students' Individual Education Plan (IEP) as per N.J.A.C.6A: 14-4.6.