

SCIENCE PROGRAM

<u>Grade</u>	<u>Courses Offered</u>	<u>Semesters</u>
9	<u>Physical Sciences</u> Physics/Chemistry	Two Semesters
10, 11, 12	Chemistry	Two Semesters
10, 11, 12	Physics	Two Semesters
11, 12	Advanced Placement Chemistry	Two Semesters
11, 12	Advanced Placement Physics	Two Semesters
 <u>Biological Sciences</u> 		
10, 11, 12	Biology	Two Semesters
11, 12	Environmental Biology	Two Semesters
11, 12	Advanced Placement Biology	Two Semesters
 <u>Earth and Spaces Sciences</u> 		
10, 11, 12	Astronomy	One Semester
10, 11, 12	Earth Science	Two Semesters
10, 11, 12	Geology	One Semester
<p>Note: Recommendations will be made each year by each student's science teacher as to the course and level students should take the following year. These recommendations are based on numerous factors and are designed to place students in the best possible position for them to be challenged and succeed.</p>		

PHYSICAL SCIENCES

The physical science courses include what is traditionally known as Chemistry and Physics. Chemistry courses emphasize the structure and behavior of matter from subatomic particles to macromolecules. Physics is the study of energy and energy's relationship with matter. Physics classes are structured around this theme. Topics include Newtonian mechanics, sound, light, electricity, and magnetism.

ADVANCED PLACEMENT CHEMISTRY (A)

Grades: 11, 12 Two Semesters

Prerequisite: Physics/Chemistry 1(A) and Chemistry 1 (A)

Recommended: Concurrent enrollment in Precalculus

This course is designed to be the equivalent of the general chemistry course usually taken during the first college year. For some students, this course enables them to undertake, as freshmen, second-year work in the chemistry sequence at their institution or to register for courses in other fields where general chemistry is a prerequisite. For other students, the AP Chemistry course fulfills the laboratory science requirement.

Students are expected to attain a depth of understanding of fundamentals and a reasonable competence in dealing with chemical problems. The course should contribute to the development of the students' abilities to think clearly and to express their ideas, orally and in writing, with clarity and logic. The college course in general chemistry differs qualitatively from the usual first secondary school course in chemistry with respect to the kind of textbook used, the topics covered, the emphasis on chemical calculations

and the mathematical formulation of principles, and the kind of laboratory work done by students. Quantitative differences appear in the number of topics treated, the time spent on the course by students, and the nature and the variety of experiments done in the laboratory.

ADVANCED PLACEMENT PHYSICS (A)

Grades: 11, 12 Two Semesters
This course qualifies for Technology or Science Credit.

Prerequisite: Physics/Chemistry (A), Physics 1 (A), Calculus or concurrent registration in Calculus

This course ordinarily forms the first part of the college sequence that serves as the foundation in physics for students majoring in the physical sciences or engineering. The sequence is parallel to or preceded by mathematics courses that include calculus. Methods of calculus are used wherever appropriate in formulating physical principles and in applying them to physical problems. Strong emphasis is placed on solving a variety of challenging problems, some requiring calculus. The subject matter is principally mechanics and electricity and magnetism.

CHEMISTRY (I)

Grades: 10, 11, 12 Two Semesters

Prerequisite: Algebra 1 and Physics/Chemistry (I)

Chemistry is a course that is designed for the college-bound student. It expands on the Chemistry material covered in the Physics/Chemistry I course. Students get an understanding of Chemistry and an awareness of the practical role of Chemistry in society in an issue-oriented approach. Students should be prepared for group projects, discussions, and laboratory work.

CHEMISTRY (A)

Grades: 10, 11, 12 Two Semesters

Prerequisite: Algebra 1 and Physics/Chemistry (A), Concurrent enrollment in Algebra 2 & Trigonometry

Chemistry, A level, builds upon the Physics/Chemistry A level curriculum. It is a rigorous and fast paced course that requires students to be self-directed, have motivationally strong study skills, and have strong reading comprehension skills. The course is designed to

give students an opportunity to study many traditional chemical topics at an advanced level with regard to lab work, class discussion, and homework.

PHYSICS (I)

Grades: 10, 11, 12 Two Semesters

**Prerequisite: Physics/Chemistry (I), Algebra 1
Recommended: Concurrent enrollment in Algebra 2 & Trigonometry**

Physics, I level, is designed to expand on topics covered in Physics/Chemistry I. The curriculum is designed for college-bound students. It gives students an understanding of major concepts of physics in a laboratory setting emphasizing conceptual models rather than mathematical ones. Topics include: forces, energy, motion, waves, light, and electricity.

PHYSICS (A)

Grades: 10, 11, 12 Two Semesters

**Prerequisite: Physics/Chemistry (A), Algebra 2 & Trigonometry
Recommended: Concurrent enrollment in Precalculus**

Designed to expand on topics covered in Physics/Chemistry A, the Physics A curriculum is designed for college-bound students. It provides a background in the physical laws that describe our universe. Areas of study include motion, forces, energy, light, electricity, and magnetism. This course relies heavily on laboratory experimentation and mathematical modeling.

PHYSICS/CHEMISTRY (R, I)

Grade: 9 Two Semesters

Physics/Chemistry is a laboratory course that has a quantitative and qualitative approach to Physics and Chemistry.

The Physics semester includes a study of the scientific way of knowing and the importance of empirical measurement in science. The following topics explore the interaction of matter and energy: motion, forces, energy, work, gravitational forces, projectile motion, and wave behavior in light and light properties. The Chemistry semester topics include properties of matter, atomic structure, nuclear chemistry, chemical bonding, the periodic table, types of reactions, and acids and bases.

PHYSICS/CHEMISTRY (A)

Grade: 9 Two Semesters

Prerequisite: Successful completion of Algebra 1 or concurrent registration in Geometry

Physics/Chemistry is a laboratory course that has a quantitative and qualitative approach to Physics and Chemistry. Basic Algebra skills are necessary for success in this level of Physics/Chemistry. Students should be prepared for daily assignments that are both conceptual and mathematical, significant reading with note taking, projects, and report writing.

The Physics semester includes a study of the scientific way of knowing and the importance of empirical measurement in science. Topics explore the interaction of matter and energy. Areas of study include motion, forces, energy, gravitational forces, and projectile motion. The Chemistry semester topics include properties of matter, atomic structure, nuclear chemistry, chemical bonding, the periodic table, types of reactions, and acids and bases.

BIOLOGICAL SCIENCES

The biological science courses emphasize the modern understanding of life on planet Earth. Curricular content includes the cellular basis of life, the structure and function of DNA, heredity, survey of living things, scientific theories of the origin and variation of life forms, and the role of populations and communities within ecosystems comprising the entire biosphere.

ADVANCED PLACEMENT BIOLOGY (A)

Grades: 11, 12 Two Semesters

Prerequisite: Physics/Chemistry (A), Biology 1 (A), Chemistry A

The AP Biology course is designed to be taken by students after the successful completion of a first course in high school biology and one in high school chemistry. It aims to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology.

This course is designed to be the equivalent of a college introductory biology course usually

taken by biology majors during their first year. Some AP students, as college freshmen, are permitted to undertake upper-level courses in biology or to register for courses for which biology is a prerequisite. AP Biology includes the topics regularly covered in a college biology course for majors.

BIOLOGY (R, I)

Grades: 10, 11, 12 Two Semesters

Prerequisite: Physics/Chemistry I or R level or teacher recommendation

First semester of Biology includes an in-depth study of the scientific way of knowing and the definition of "life" from a scientific vantage point. Topics include the chemical nature of life, the cellular composition of all-living things, genetics, and biotechnology. Second semester surveys scientific theories on the diversification of life, classification of organisms, human systems, and the interaction of humans and other biota within the biosphere. Students should be prepared for daily assignments including significant reading, projects, and writing.

BIOLOGY (A)

Grades: 10, 11, 12 Two Semesters

Prerequisite: Successful completion of Physics/Chemistry A level or teacher recommendation

Biology A level is a laboratory-based course designed for a motivated student who wishes to learn more about the biological sciences. Students should be prepared for a significant amount of reading outside the classroom setting as well as detailed laboratory write-ups.

First semester includes an in-depth study of the scientific way of knowing and the definition of "life" from a scientific vantage point. Topics include the interaction of humans and other biota within the biosphere, the chemical nature of life, the cellular composition of all-living things, genetics, and biotechnology. Second semester surveys scientific theories on the origin and diversification of life, classification of organisms, and human systems. Students should be prepared for accelerated, in-depth content learning in addition to extensive reading, individual and group projects, and writing.

ENVIRONMENTAL BIOLOGY (I)

Grades: 11, 12 Two Semesters

Prerequisite: Physics/Chemistry (I or A), Biology (I or A)

Recommended: Chemistry or concurrent enrollment in Chemistry

Environmental Biology is a rigorous course designed for motivated juniors and seniors who enjoy the outdoors and wish to investigate both local and global environment issues. This course combines traditional bookwork and assignments with weekly outdoor field projects. First semester students will adopt a study site and create a portfolio of the site's plants, animals, and water ecology. Proper field biology techniques and use of equipment and materials will be emphasized. Second semester will explore global issues like world population, pollution, and man's relation to his environment. Field experiences will include winter tracking, learning animal behavior and watching the spring bird migration. Students' success in this class will require a great deal of active participation, independent work, and responsibility.

EARTH AND SPACE SCIENCES

The earth science courses have as their focus the planet on which we live, along with its relationship to the solar system and the rest of the universe. The physical forces that have shaped the planet over time and on-going phenomenon, such as erosion, tidal forces, and weather, are also key topics. Space science courses have as their purview our solar system in relation to the Milky Way Galaxy and the enormity of the universe.

ASTRONOMY (I)

Grades: 10, 11, 12 One Semester

Prerequisite: One year of high school science and Algebra 1 or Geometry

The study of Astronomy enhances the students' appreciation of the universe through observational astronomy. Included in this course is the study of structure, position, motion, and origin of celestial bodies. The historical development of astronomy is also covered.

EARTH SCIENCE (R)

Grades: 10, 11, 12 Two Semesters

Earth Science is the study of the relationship of Earth within the solar system and universe as well as the physical nature of earth itself. Emphasis is placed on learning strategies, organizational skills, note taking, and laboratory skills. Topics are taught at a moderate pace and depth to match student needs.

GEOLOGY (I)

Grades: 10, 11, 12 One Semester

Prerequisite: One year of high school science and one year of high school math

Geology is a course that offers a basic knowledge of landforms and the forces that alter them. Areas of emphasis include earth materials, weather, fossils, and natural resource management.