

Science

The Santa Barbara Board of Education has established that the minimum graduation requirement is to include two years of science with two semesters to be taken from the physical sciences and two from the life sciences. Science courses are designed to provide laboratory experience in the methods of science and to develop an understanding of the biological and physical world. The student develops an understanding and appreciation of the influence of science on modern society. Through laboratory experience, skills in the use of scientific equipment are developed. Through investigation, data is collected to allow interpretation of natural phenomena.

Recommendation

Students planning a career in any area of science, medicine, or engineering should take a minimum of three years of science: biology, chemistry, and physics. The Academic Senates of the California Community Colleges, the California State University, and the University of California expect entering freshmen to have taken biology, chemistry and physics.

BIOLOGY, INTRODUCTION (P)

SM

Grades: 10-12

This course covers the State Content Standards for Biology. This course includes laboratory experience in using scientific methods and skills.

BIOLOGY 1, 2 (P)

DP, SB, SM

Grade: 9-12

Prerequisite: Algebra 1

This survey course includes a study of cells, cell physiology, genetics, evolution, microbiology, invertebrates, vertebrates, human body, plants and ecology. Students selecting this course should possess very good study skills and have very good study habits. Successful completion of this laboratory science course, which may include dissection of animals, satisfies college entrance requirements.

BIOLOGY 1, 2 (H)

SB

Grade: 11

This life science laboratory course includes the following topics: cell biology, genetics, ecology, evolution, and physiology of animals and plants. Laboratory investigations include the use of microscope, wet and dry labs, biotechnology, dissections, and the use of computers. All of the biology content standards in Biology are covered in this class. As an honors course, this moves at a faster pace and goes into more depth with those topics studied in Biology P.

BIOLOGY (AP)

DP, SB, SM

Grade: 11-12

Prerequisite: Biology 1, 2, Chemistry 1, 2, or instructor approval.

This is a college level course for students who have completed a basic study of biology and chemistry and are ready for a more intensive and conceptual approach to the phenomena of living systems. Emphasis is upon understanding concepts and application of scientific methodologies. Studies include the biology and chemistry of cells, genetics and evolution, vertebrates and invertebrates, human physiology and ecology, and plant studies. Numerous laboratory investigations are conducted.

CHEMISTRY 1, 2 (P)

DP, SB, SM

Grade: 10-12

Prerequisite: Algebra 1

Through laboratory investigations and problem solving techniques, the student studies some of the substances that make up our environment and the changes these substances undergo. Topics studied from the theoretical viewpoint and illustrated with practical applications when possible include: measurement, nomenclature, the mole concept, kinetic theory, atomic structure, chemical bonding, acid-base concepts, equilibrium, oxidation-reduction, molecular structure, nuclear chemistry and biochemical reactions.

CHEMISTRY (H)**SB, SM****Grades: 10-11***Prerequisite: "A" or "B" grade in Physics 1, 2*

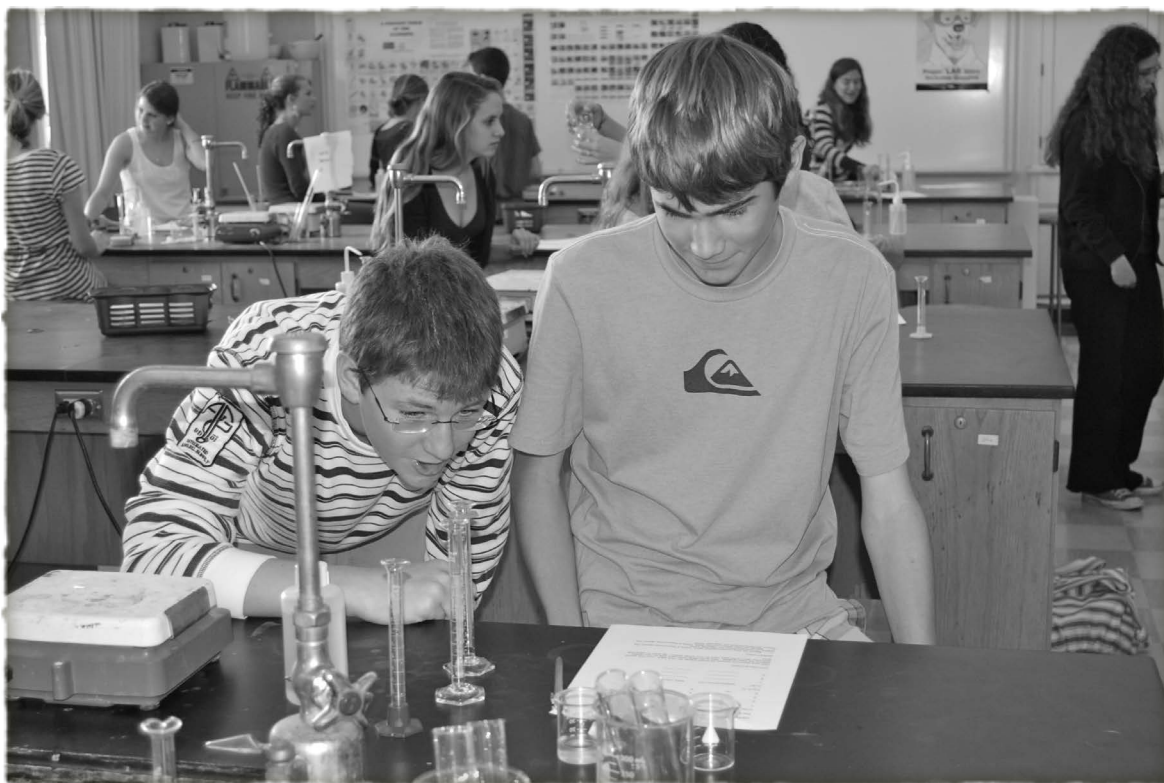
This is an honors laboratory course in college preparatory chemistry. The topics covered are the same as those written above in chemistry, but they are covered in more detail and at a deeper level. Additional assignments and a Science Project are required. This is the prerequisite chemistry course recommended for AP Chemistry.

CHEMISTRY (AP)**DP, SB, SM****Grade: 11-12***Prerequisite: Chemistry 1, 2*

This college-level, lab science course is for students who have completed Chemistry 1,2 and desire a more challenging, faster paced study of general chemistry. Areas of study include: atomic theory and structure; chemical bonding; nuclear chemistry; states of matter including colligate properties of solutions; reaction types, acid-base, precipitation, oxidation-reduction, electrochemistry; stoichiometry; equilibrium; kinetics; and thermodynamics.

COMPUTER SCIENCE I (P)**SB (Offered at DP through the Engineering Academy)****Grades: 10***Prerequisite: Concurrent enrollment in Algebra 3, 4 or higher.*

This course is designed for students who are interested in computer programming. This course introduces students to fundamental hardware components that make up a computer and includes scientific exploration into how these components function, both individually and at the system level. Students are introduced to software applications used in science and engineering to analyze and solve problems. Students learn elementary aspects of computer programming including topics such as digital and Boolean logic and flowcharting. Students use languages like BASIC to write programs.



CONCEPTUAL PHYSICS 1, 2 (P)

DP, SM

Grade: 9-12

Physics 1 presents mechanics, energy, and thermodynamics. Physics 2 continues with electricity, magnetism, and waves. Together, they meet the physics content standards of our district and the State of California. The course requires students to use computers, math, participate in group activities and hands-on laboratory projects. This is a conceptual course.

EARTH SCIENCE 1, 2 (P)

SB, SM

Grades: 9,10

Note: This course receives "g" (Elective) credit for UC and fulfills the graduation requirement for Physical Science.

This course follows the California State content standards for Earth Science. Topics covered include the Universe, dynamic earth processes, energy in the Earth system, biogeochemical changes, structure and composition of the atmosphere, California geology, and investigation and experimentation.

ENVIRONMENTAL HORTICULTURE 110

(SBCC Dual Enrollment)

SB, SM

Grades: 10-12

Explores the central concepts in environmental horticulture, while covering various horticultural practices and methods, with a focus on long-term sustainability and local ecological issues. Students build foundational knowledge through projects, lectures and discussions in management of a variety of horticultural projects and enterprises.

ENVIRONMENTAL SCIENCE (AP)

DP, SB, SM

Grade: 9-12

Prerequisite: Biology or instructor's approval

This is a college level course for students who have completed a basic study in biological sciences and at least one year of algebra. Students will investigate major environmental issues from scientific, social, and economic perspectives using quantitative analyses, laboratory and field investigations.

GREEN TECHNOLOGY 1 (P)

SB

Grade: 9

Open only to students concurrently enrolled in an aligned math course; this class provides students with a kinesthetic support for developing the algebra skills needed for success in rigorous college preparatory science classes. In addition, the course provides a foundation for enrollment in Green Technology Pathway courses.

GREEN TECHNOLOGY 2 (P)

SB

Grade: 9

Open to all freshmen, this second-semester course provides a baseline tool skill set for students interested in pursuing enrollment in Green Technology Pathway courses. Successful completion of this course will allow students to pursue course in the CTE Pathway Energy and Utilities Sector: Energy and Environmental Technology Concepts.

GREEN ENGINEERING (P)

SB

Grades: 11-12

The course is being created to give students an opportunity to learn about engineering through an environmental lens. Studies and projects include solar panels, windmill generators, computers and various probeware, fuel cell cars, hydro generators, peltier devices, liquid nitrogen, and solar constant. Green Engineering fulfills a course in the CTE pathway: Energy and Environmental Technology. This course is designed for students that have taken Green Tech 1/2 and Physics 1/2 (CP, H, or Industrial), and Algebra 2 (Concurrent enrollment in Algebra 2 accepted).

HUMAN GEOGRAPHY (AP)

SB

Grades: 9-12

The purpose of the AP course in Human Geography is to introduce students to the systematic study of patterns and processes that have shaped human understanding, use, and alteration of Earth's surface. Students employ spatial concepts and landscape analysis to examine human social organization and its environmental consequences. They also learn about the methods and tools geographers use in their science and practice.

LIFE SCIENCE 1, 2

DP, SB, SM

Grade: 9-12

FALL: Designed to provide the non-college preparatory student with a background in the biological sciences. Emphasis is upon development of scientific research and the significance of research methods to daily life, the use of the microscope, atomic and molecular structure, plants, animals, heredity, the human body, health and disease.

SPRING: Biology for the citizen, taught with emphasis on man's relationship to his surroundings. A study of plants, insects, animals and humans and how they relate to each other. Although the anatomy of each is studied, no dissection of animals is required.

Also offered as a "sheltered" course. Taught in English to students with limited English speaking capacity.

MARINE BIOLOGY 1, 2 (P)

SB

Grades: 11, 12

Prerequisite: Biology 1, 2 with "B" or better.

The focus of this class is the study of local marine plants and animals, their habitats, life histories and ecology. Other topics that are covered include oceanography and taxonomy. Marine Biology 1 begins with a unit on physical oceanography. The major marine phyla such as Porifera, Cnidaria, Mollusca, Arthropoda, Echinodermata and Chordata are covered in detail.

Marine Biology 2 begins with a unit on marine mammals. Next units on are marine algae and ecology. Finally, we look at human impact on the marine environment.

PHYSICS 1, 2 (P)

DP, SB, SM

Grade: 9-12

Prerequisite: Algebra 1

An introductory physics course, which thoroughly covers the fundamental topics in physics including kinematics, energy and momentum, rotational motion, heat and thermodynamics, waves, and electromagnetism. This class emphasizes problem solving using both a mathematical and conceptual approach and it is recommended that students have a strong foundation in mathematics and science. Laboratory experiences, projects, and in-class demonstrations are also utilized to help reinforce the students' understanding of the material.

PHYSICS 1, 2 (H)

SB, SM

Grades: 9-12

Prerequisite: Concurrent enrollment in Geometry H or higher required.

This is a laboratory-based course that elaborates on the concepts of physics by using mathematics to solve problems. Topics include motion, energy, heat and kinetic theory, electricity and magnetism, and waves. Class presentations and scientific writing will be incorporated into the lessons regularly.

PHYSICS B (AP)

DP, SB, SM

Grade: 11-12

Prerequisite: Trigonometry and Physics 1, 2, or instructor approval.

Recommendation: One year of chemistry

This is a college-level course, a systematic introduction of the main principles of physics emphasizing the development of problem-solving ability. Trigonometry is used immediately, algebra continually, and calculus not at all. The course specifically prepares highly motivated students to pass the AP Physics B Exam.