



D. SCIENCE

VUSD Graduation Requirement- 1 year of a life science & 1 year of a physical science

**A-G College Entrance Requirement- 2 years lab science (“d” requirement);
3 years recommended.**

For CSU, one year in the “biological science” area and the other year in the “physical science” area (one of which may be from the “g” elective area)

All science courses meet either the “D” entrance requirement unless otherwise noted.

S400 Introduction to Agriculture or S405 Introduction to Agriculture (SEI) (9-12)

- *Prerequisite: Min 2.00 GPA*
- *Meets UC/CSU “g” elective*

This is the first life science course in a two-year sequence which explores the agricultural sciences including animals, plants, crops, and leadership development through the Future Farmers of America (FFA). This course is designed to introduce students to the life sciences at a conceptual level utilizing a hands-on approach and emphasizing the scientific method. Core literature, research and formal writing assignments will be required. Participation in FFA (Future Farmers of America) activities and SAE.

S409 Chemistry & Agriscience (10-12)

- *Prerequisites: successful completion of one year of Ag Biology or Intro to Agriculture*
- *Minimum 2.00 GPA*
- *Completion of or concurrent enrollment in Int. Math 1.*
- *Meets UC/CSU “d” lab science*

This course explores the physical and chemical nature of soil as well as the relationships between soil, plants, animals and agricultural practices. Students will examine properties of soil and land and their connections to plant and animal production through project based learning. Using knowledge of scientific protocols as well as course content, students will develop an Agriscience research program. Participation in intracurricular FFA activities as well as the development and maintenance of an ongoing Supervised Agricultural Experience (SAE) program are required.

S450 Agricultural Biology (9-12)

- *Prerequisites: successful completion or concurrent enrollment in Int. Math 1 and min 2.00 GPA*
- *Students should not enroll in both Lab Biology and Ag Biology because same text and standards are used.*
- *Meets UC/CSU “d” lab science*

This life science course is a one-year lab science course for the college bound student with an interest in agriculture. The course emphasizes the principles, central concepts and inter-relationships in the scientific method, the molecular and cellular aspects of life, the chemical and structural basis of life, growth and reproduction of plants and animals, evolution of plants and domestic livestock species, and the growth and reproduction, genetics, taxonomy, nutrition, health and diseases of plant and domestic animals.

S413 Sustainable Agriculture (11-12)

- *Prerequisites: successful completion of one year of Ag Biology or Intro to Agriculture*
- *Minimum 2.00 GPA*

This project-based capstone integrated class combines an interdisciplinary approach to laboratory science and research with agricultural management principles. Using skills and principles learned in the course, students design systems and experiments to solve agricultural management issues currently facing the industry.

S415 Veterinary Science (10-12)

- *Prerequisites: successful completion of one year of Ag*
- *Min 2.00 GPA.*
- *Meets UC/CSU "g" elective*

This life sci. course focuses on a career exploration in the field of veterinary medicine, concentrating on anatomy and physiology, nutrition, breeding, health care, disease prevention and management systems of domestic animals and livestock. Veterinary health practices, office procedures, and record keeping will also be covered. Core literature, research and formal writing will be required. Participation in FFA (Future Farmers of America) activities and SAE (Supervised Agricultural Experience) projects are also required.

S420 Horticulture (9-12) Elective – not Science credit

- *Prerequisite: successful completion of one year of Agriculture*
- *Non-college prep.*

This elective course develops competencies in the propagation, culture, processing and marketing of ornamental plants including the design, use and maintenance of greenhouses and shade houses. Other topics to be covered include landscape and hardscape design and maintenance and the proper use, care and identification of equipment and supplies. Participation in FFA (Future Farmers of America) activities and SAE (Supervised Agricultural Experience) projects are also required.

S200/ Lab Biology 1 or S210 Lab Bio 1 SEI (9-12)

- *Prerequisites for current VHS students: Completion or concurrent enrollment in Int. Math 1*
- *Students should not enroll in both Lab Biology and Ag Lab Biology since the same standards met.*

Lab Biology 1 is a strong life science college preparatory course that covers major strands in Biology, including: structure and function, inheritance and variation of traits, matter and energy in organisms and ecosystems, and natural selection and evolution. Emphasis is on laboratories focusing on scientific investigation and experimentation, data analysis, technical writing, and critical thinking skills. Extensive writing and self-designed experimentation are required. Covers the same topics as Lab Biology 1 Honors.

S206 Lab Biology 1 Honors (9-12)

- *Prerequisites for current VHS students: Completion or concurrent enrollment in Int. Math 1*

Lab Biology 1 Honors requires students to meet higher standards of quality. All strands of Lab Bio 1 will be covered more in –depth with greater emphasis on laboratories focusing on scientific investigation and experimentation, data analysis, technical writing, and critical thinking skills. More extensive technical writing and self-designed and independent experimentation and application are required. *This course provides a foundation for AP Lab Bio and IB Lab Bio 3.*

S225 AP Biology (11-12)

- *Prerequisites: successful completion of Lab Biology 1 and Chemistry 1*

This is a rigorous college prep course. The first life science course in a 2-year series designed for students testing in the International Baccalaureate higher level and/or Advanced Placement. An in-depth approach to the study of living organisms is done. Topics include chemistry of life, genetics, genetic engineering, ecology, and how populations of organisms change through time. Extensive reading, essay writing, lab work and strong chemistry background are required.

S230 IB Lab Biology 3 HL2 (12)

- *Prerequisites: successful completion of AP Biology*

This is the second life science course in a two-year series for students testing in IB higher level and/or Advanced Placement. Topics include: cell biology, molecular biology, human anatomy & physiology, plant anatomy & physiology.

S170 Academic Earth Science or S175 Academic Earth Science SEI (9-12)

- *Meets UC/CSU "g" elective*

College preparatory physical science course in which the composition & dynamic changes of the Earth are examined by studying Earth history, rocks, geologic processes, Earth's atmosphere, astronomy & oceanography. This course may be taken by entering 9th graders who have been successful in middle school science but have not yet met requirements to take lab biology or for students who have completed lab biology/life science.

S605/S606 Life Science or Life Science SEI (10-12)

- *Meets UC/CSU "g" elective*

Life Science is a course for students who have completed Academic Earth Science, but not Lab Biology. This course exposes students to all components of Life Science with lab-based investigations. It covers many of the same CA State Std's as Lab Biology, but with a focus on practical applications of knowledge including exposures to various medical/science career pathways.

S260 Human Anatomy/Physiology (11-12)

- *Prerequisites: successful completion of Academic Earth Science & Life Science and/or completion of Lab Biology*

College prep life science course in the structure and function of the human body.

S300 Chemistry 1 (10-12)

- *Prerequisites: successful completion of Int. Math 1 & one year of Science*

This physical science college prep course emphasizes problem solving methods, lab techniques and investigations into the study of matter.

S311 Chemistry 1 Honors (10-12)

- *Prerequisite: successful completion of Int. Math 1 and Lab Biology or Honors Lab Biology*

This college prep *physical science* course emphasizes problem solving methods, lab techniques and investigations into the study of matter. Extensive writing and labs required.

S315 AP Chemistry (11-12)

- *Prerequisites: successful completion of Chemistry 1 or Honors Chemistry 1*
- *Successful Completion of Int. Math 2 and enrolled in a higher level math*

Chemistry is a rigorous *physical science* course designed to be the equivalent of a first year college level chemistry course. Because of its challenging nature and fast pace, regular attendance and hard work are essential to success in this class. The course reviews material from Chemistry I but examines it at a much deeper level. In addition, topics not addressed in a first year chemistry class will be covered. This course is lab-oriented with at least 1 full class period dedicated to lab work each week. The skills and content presented in this course will prepare students for the AP Chemistry exams and future success in college science courses.

S350 Physics 1 (10-12)

- *Prerequisites: successful completion of a college prep science course and Int. Math 1*

This *physical science* course is based upon the California State Physics Standards. As part of the traditional science sequence for college bound students, physics challenges students to learn about the physical world around them. Through a study of the natural laws that govern all interactions in the universe, students will learn the principles behind how "things work." Topics covered include motion, forces, energy, heat, light, magnetism and electricity. This course is designed for students that do not have a strong math background but are interested in hands-on science. Students will be required to use some math and to complete laboratory exercises on a regular basis.

S361 IB Physics 1 SL (11-12)

- *Prerequisites: successful completion of Physics 1*
- *Successful completion of Int. Math 2.*

This *physical science* course is designed after the International Baccalaureate curriculum for standard level Physics. The course will include a high level of math applications, the universal language of physics, and a much faster pace than Physics 1. Topics will include physical measurements, mechanics, thermal physics, oscillations and waves, electric current, fields and forces, atomic and nuclear physics, energy, power, and climate change along with three "optional" subjects. This is a hands on laboratory class and will require regular lab activities.

S357 IB Physics HL2 (12)

- *Successful completion of IB Physics SL*

This is the second year of an honors physical science course designed after the International Baccalaureate curriculum for standard level Physics. The course will include a high level of math applications, the universal language of physics, and a much faster pace than Physics 1. Students will be prepared for the IB Physics Higher Level Exam. Topics will include physical measurements, mechanics, thermal physics, oscillations and waves, electric current, fields and forces, atomic and nuclear physics, energy, power, and climate change along with three “optional” subjects. This is a hands on laboratory class and will require regular lab activities.

S362 AP Physics 1 (11-12)

- *Prerequisites: Successful completion of honors level college prep science and of Int. Math 2.*
- *Physics 1 is strongly recommended*

One year *physical science* course. AP Physics 1 (Algebra-based) is the equivalent to a first-semester college course in algebra-base physics. This course covers Newtonian mechanics (including rotational dynamics and angular momentum): work, energy, and power; and mechanical waves and sound. It will also include electric circuits. Prepares students to take the AP Physics 1 exam.

S363 AP Physics 2 (11-12)

- *Prerequisites: Successful completion of AP Physics 1*
- *Successful Completion of Int. Math 2*

One year *physical science* course. AP Physics 2 (Algebra-based) is the equivalent to a second-semester college course in algebra-base physics. This course covers fluid mechanics, thermodynamics, electricity and magnetism, optics, and atomic and nuclear physics. Prepares students to take the AP Physics 2 exam.

S144 IB Environmental Sys & Societies SL (11-12) (Interdisciplinary Science)

- *Prerequisite: successful completion of Lab Biology*
- *Meets VUSD High School Physical or Life Science requirement*

This trans-disciplinary course aims to provide students with the scientific knowledge, skills, and collaboration to appreciate the impacts that humans and technology have on abiotic and biotic environmental systems, to respond to the consequences associated with these global issues, and to reflect on these environmental elements in regards to socio-economic and political choices. This course also prepares those students who desire to take the IB ESS SL exam.

Refer to Science Flowchart on next page

Potential Science Pathways Available for 2019-20 School Year

