

# **SCIENCE**

The Monte Vista High School offers a wide variety of courses to meet student needs for future goals and avenues for the required credits for graduation. The Traditional Science path requires the following courses:

**9th grade - Biology**  
**10th grade - Chemistry**  
**11th grade - Physics**

## **ACCELERATED SCIENCE PATH**

Occasionally, students would like to accelerate their science education. The Monte Vista High School Science Department is in favor of this path if it meets the needs of the students concerned. Students wishing to pursue this path should consider the following:

1. Reason for the request. Example: I wish to pursue a career in science, engineering, medicine, etc.

2. THE PATH MUST BE BASED UPON TEACHER RECOMMENDATION PRIOR TO CLASS REGISTRATION

3. **The accelerated science path recommends the following courses to be taken:**

**9th grade - Honors Biology**  
**10th grade - Honors Chemistry**  
**11th grade & 12th grade -AP Physics, AP Chemistry, AP Biology, Anatomy & Physiology, Science Seminar and STEM classes (all or any combination of)**

## **BIOLOGY**

CREDIT: 1    LENGTH: One Year

LEVEL: Grade 9

This course is designed to be a comprehensive tour of several keystone concepts in biology and is required of all freshman. This course may be used as a prerequisite to additional STEM courses related to the life sciences. Topics of study will include the methodology of scientific inquiry, basics of biochemistry, cellular structure, metabolism, and function, body systems and homeostasis, the molecular and chromosomal basis of inheritance, and natural selection and evolution of populations and species through time. Labs and project-based learning will be used as often as possible to reinforce the material discussed in class, and students will have the opportunity to practice several skills, write detailed scientific reports, and present data to their peers.

## **HONORS BIOLOGY**

CREDIT: 1    LENGTH: One Year

LEVEL: Grades 9 – 12 (9<sup>th</sup> grade with departmental recommendation)

PREREQUISITE: Staff recommendation and/or student interest in career in the biological/medical fields

This course will include the same topics of study as general Biology, but will be taught as an AP Biology prep course with a stronger emphasis on mastery of specific vocabulary, nomenclature, processes, and concepts in the biological sciences. Topics of study will include the methodology of scientific inquiry, basics of biochemistry, cellular structure, metabolism, and function, body systems and homeostasis, the molecular and chromosomal basis of inheritance, and natural selection and evolution of populations and species through time. Labs and project-based learning will be used as often as possible to reinforce the material discussed in class, and students will have the opportunity to practice several skills, write detailed scientific reports, and present data to their peers.

## **AP BIOLOGY**

CREDIT: 1    LENGTH: One Year

LEVEL: Grade 10-12

PREREQUISITE: Biology or Honors Biology

AP Biology is a rigorous and demanding class, which serves as the equivalent of an introductory college biology course. Content will be covered in greater depth, with an emphasis on interpretation and analysis of information, linkage of complex ideas and concepts, as well as mastery of content-specific vocabulary and nomenclature. In addition, statistical analysis of data, self-directed scientific inquiry, and modeling of concepts will be expected. Students will be required to spend a significant amount of studying at home to allow time for discussion, labs, and inquiry during class time, and to ensure their success in this course. The AP Biology curriculum encompasses four 'big ideas', with Essential Knowledge and Process Skills that support each one. **Big Idea 1: Evolution** – the process of evolution drives the diversity and unity of life. **Big Idea 2: Cellular Processes (Energy and Communication)** – Biological systems utilize free energy and molecular building blocks to grow. **Big Idea 3: Genetics and Information Transfer** – living systems store, retrieve, transmit, and respond to information essential to life processes. **Big Idea 4: Interactions** – Biological systems interact and these systems and their interactions possess complex properties. At the end of the course, students will have the opportunity to take the AP Biology exam and earn college credit towards an introductory Biology course.

## CHEMISTRY

CREDIT: 1    LENGTH: One Year

LEVEL: Grade 10    PREREQUISITE: Algebra I

This course is primarily designed for those students that are not pursuing a scientific career, however if those students decide to pursue a science or medical career, the course is rigorous enough to prepare them to do so.. Topics included are structure of the atom, chemical formulas, chemical equations, the periodic table, acids and bases, oxidation, and reduction. Use of mathematical skills, problem solving, and laboratory skills are emphasized.

## HONORS CHEMISTRY

CREDIT: 1    LENGTH: One Year

LEVEL: Grades 10    PREREQUISITE: Algebra I + Teacher Recommendation

This course is a Pre-AP Chemistry course designed for the college-bound student planning to go on to any scientific field, engineering, home economics, or medical field. Due to the nature of the course, higher level math skills are recommended as the course will be very rigorous in terms of mathematical calculations. Topics included are structure of the atom, chemical formulas, chemical equations, the periodic table, acids and bases, oxidation, and reduction. Use of mathematical skills, problem solving, and laboratory skills are emphasized.

## AP CHEMISTRY

CREDIT: 1    LENGTH: One Year

LEVEL: Grades 11 -12

PREREQUISITE: Chemistry (+ Recommendation)

This is an advanced placement course designed to prepare the student for the AP Chemistry exam. The course covers the equivalent of one full year of college level General Chemistry, comparable to a first-year course at a college or university. The course is a rigorous math-based course, with a strong laboratory component. It is intended for students who have demonstrated a willingness to commit considerable time to studying and completing assignments outside of class, and who have successfully completed a prior course in chemistry during high school. The course will develop the students' ability to incorporate mathematical skills in the solution of chemistry problems, through both the use of textbook problems and laboratory activities. Because passing the AP exam may qualify the student to earn college

credit and by-pass a first-year college chemistry course, AP chemistry should not be considered “college prep.” Rather this is a college class with college-level expectations for behavior, participation, and effort.

### **HUMAN ANATOMY AND PHYSIOLOGY**

CREDIT: 1    LENGTH: One Year

LEVEL: Grades 11 - 12

PREREQUISITE: Successful completion of Biology I

This course will provide students an opportunity to explore the sophisticated relationships between structure and function in the human body within the context of evolutionary changes that have led to the modern design of the human body-plan. Students will examine the inner workings of each major body system, and explore topics such as homeostasis, anatomical and physiological disorders, medical diagnosis and treatment, modern and past imaging techniques, biochemistry, cytology, and histology within the remarkable array of body systems that comprise the human body. Laboratory activities using mammalian specimens, plastic models, and online interactive media will reinforce concepts and principles presented in the course.

### **PHYSICS**

CREDIT: 1    LENGTH: One Year

LEVEL: Grades 11-12

PREREQUISITE: Successful completion of Geometry and Biology It is preferable to have taken or be taking Algebra II/Trig.

Physics is a science which uses mathematics and science laboratory activities to describe the relationships between matter and energy. The topics covered include mechanics, heat, wave motion, optics, electricity, and nuclear physics. Students planning to pursue education beyond high school are encouraged to enroll in physics. Physics is recommended by the ACT as a preparatory course for college and the ACT Assessment.

### **AP PHYSICS I**

CREDIT: 1    LENGTH: One Year

LEVEL: Grades 11-12

PREREQUISITE: Successful completion of Algebra II/Trig, Biology and Chemistry (+ Recommendation).

AP Physics I is an algebra and trigonometry-based course that covers Newtonian mechanics (including rotational dynamics and angular momentum), work, energy, power, mechanical waves, and sound. It will also introduce electricity and magnetism, electric circuits, and thermodynamics. Laboratory investigations will encourage students to develop investigative and analytical skills. The course employs mathematical relationships extensively. This course is recommended for students pursuing careers in science, engineering, and other related careers. Because passing the AP exam may qualify the student to earn college credit and by-pass a first-year general college physics course, AP Physics I should not be considered “college prep.” Rather this is a college class with college-level expectations for behavior, participation, and effort.