

# Science

Mount Madonna School offers a comprehensive 6th-12th grade science program based on the recommendations of current research, the Next Generation Science Standards, and our experience with 21st Century Skills. Middle School students follow a hands-on process-based inquiry program that encompasses the recommendations in the NGSS, while using legacy projects developed in collaboration with Dr. Art Sussman of WestEd. In High School, students follow a traditional three-year cycle starting with Physics first followed by Chemistry and Biology. In addition, all student complete an in-depth Marine Science program and choose between AP Physics or Science with Humanity, an honors laboratory capstone course in life sciences and bioethics. All students graduate with five total years of High School Science.

## Middle School Science

In sixth and seventh grade, students learn Earth and Space Science, Life Science, and Physics by using the scientific process in hands-on experiments and projects. All students are required to complete a major inquiry-based science experiment and present their results. Students also study science from textbooks and in the field. In eighth grade, students study Chemistry and Physics through guided practice in the laboratory, and each student completes a major electrical engineering project.

## Green Up and Go

Green Up and Go offers students a real world opportunity to discover and understand principles of physics, engineering, design and green-clean technologies. From electric cars to wind farms our world is driven by innovations that come to life through the marriage of science and engineering. How do we prepare students to successfully navigate these two worlds? Students, working individually and in teams, participate in a series of handson experimental projects such as building wind generators and personal transportation devices to explore both alternative and traditional energy sources and transportation. The projects provide a foundation for data collection, analysis, reflection, presentations and technical writing skills. Through these experiences students hone critical thinking, communication, collaboration, creativity and Career Technical Education skills while learning key physics, engineering, and design concepts. Students will maintain an engineering journal throughout the year long course. It will contain lab write-ups, diagrams and all other assignments. This year long UC-approved D - lab science course combines elements of physics, engineering and green technology to prepare students for success in college science and engineering as well as careers that can contribute to a greener environment for us all.

## Chemistry 10 with Honors option

This course begins with subatomic particles and ends with cells, going from small to large arrangements of matter. Student study a traditional algebra-based course in Inorganic Chemistry for the first semester; topics include atomic structure, stoichiometry, reaction dynamics, solutions, and acid/base reactions. During second semester, students progress through Organic Chemistry, Biochemistry, and Genetics including hands-on electrophoresis and genetic transformations. Second semester labs comply with AP Biology labs.

## Biology 11 with Honors option

Students study environmental, organismic, and evolutionary Biology in depth. A grounding of concepts in evolution begins the year. Students complete a captive enrichment project that allows them to build on their knowledge of animal behavior.

Additional topics include botany, animal diversity, anatomical systems, development, and ecology. Students gain excellent microscopy skills and complete labs from the AP Biology series.

## Honors Science with Humanity (Grade 12)

This class is a survey of college-level topics in Life Science with an emphasis on bioethics. It is an honors laboratory course with Physics, Chemistry, and Biology as prerequisites. The central questions of the class are, "what can science tell us about being a human being," and "what are the ethics of using the tools we've developed in science?" Major units in the class are biomedical technology, physical anthropology, psychology, environmental science, and physiology of illegal drugs.

### **Advanced Placement Physics (Grade 12)**

Advanced Physics follows the current College Board recommendation on the topics and content for AP Physics. This course is calculus-based. Students in this class are eligible to take the AP Physics exam in the Spring.

### **Marine and Oceanographic Sciences**