

# 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. In high school, students follow a traditional three-year cycle starting with Biology first, followed by Chemistry and Physics. In addition, all students 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 grades, 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.

## Biology 9 (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.

## Marine and Oceanographic Sciences (Grades 9 and 10) Honors Option for Oceanography

Marine and Oceanographic Sciences is a two-year program that all students take in grades nine and ten that provides one year of credit. Students cover Marine Biology during ninth grade and learn field science underwater as well as microscopy techniques. Marine Biology is a semester science elective. During sophomore year, students study physical oceanography then assist in research projects at the Wrigley Centers' labs and field locations. The course includes study, building, and use of real remote operated vehicles and taking ethograms in the field. Oceanography is a one-semester, honors-level laboratory science elective.

## Health (Grade 10)

Health is a scientifically accurate, age-appropriate course in skills and knowledge that promotes physical, emotional, mental and social health. This is a one-semester elective spread over the course of the academic year. The course covers health literacy as a consumer, risk assessment, stress management and coping with loss, healthy relationships, conflict resolution, nutrition and physical activity; as well as personal care and body systems, growth and development, drugs and alcohol, diseases and disorders, and safety and environmental health. The course will include the Habits of Mind and cover the Health Connected Sex Education curriculum.

## Chemistry 10 with Honors Option

This course begins with subatomic particles and ends with cells, going from small to large arrangements of matter. Students 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.

## Physics (Grade 11) with Honors Option

This class covers the curriculum of a traditional Algebra-based high school Physics class, but adds engineering with studies of the engineering design cycle in technology and fabrication projects. Traditional labs in linear motion, thermodynamics, electronics, energy transfer, and magnetism are offered; the difference between how these are

presented in this course is that the students must fabricate, engineer, and code their own laboratory equipment and measuring devices. In addition, the curriculum includes environmental topics associated with Physics and Engineering. Each unit requires that the students produce multiple measurable, deliverable results as they work with a new and diverse collaborative group.

### **Science with Humanity (Grade 12) Honors**

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.

### **AP 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 must have taken or be currently taking Calculus. Students in this class are eligible to take the AP Physics exam in the spring.