

MVHS Science Elective Courses at a Glance

| Course Name | Grade Level | This class is for students who are interested in. . . | Some core concepts in this course | Some signature activities in this course include. . . | Expected work out of class | How are grades constructed and earned? | Recommended pre-requisites | Other info important for student consideration |
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| AP Biology | 11,12 | Life science or medicine. In addition, most colleges have a life science general education requirement for other majors which can be addressed via success on the AP Bio exam. | At a general level, the core concepts are the same as in freshman biology, however, the course goes much deeper in every respect. | Genetically engineering glowing bacteria, testing your own DNA and developing some of your own experiments. | Approximately 30-45 minutes week nights mostly reading. | Tests/quizzes and the final make up most of the grade. Labs are 20% and homework is a very small portion of the grade. | Biology and chemistry. | This course is the equivalent of a college level introductory biology class and, as such, uses college level vocabulary. |
| AP Chemistry | 11,12 | - pursuing science related majors in college - gaining skills that will help them succeed in college such as critical thinking, problem solving, self management and collaborative group work - experiencing the blended teaching/learning model used in many college courses | - first year college General Chemistry course includes topics such as Acids Bases, Equilibrium, Kinetics, Thermodynamics, Electrochemistry, Mass Spectroscopy and Photo Emission Spectroscopy | Blended Model of teaching and learning; Class uses multiple models of assessments; Engaging, relevant and challenging lab experiments; Personalization of learning through collaborative group work and quick teacher feedback; Multitiered support for students coming to AP Chemistry from different pathways; Full alignment with College Board redesign to ensure student success | Students spend from 45 minutes to an hour everyday for AP Chemistry (for a 5 day week). This time does not include preparing for exams and quizzes, which will take additional time. | AP Chemistry uses various types of assessments, using summative (tests, quizzes), formative (understanding checks, exit slips) and assessment as learning (PBAs). Our grading scale is weighted. Labs 25%, Assignment 15%, Test/Quiz 40%, Final 20% | B or better in Chemistry Honors or A in Chemistry B or better in Alg 2 and concurrent enrollment in Math Analysis or PreCalc Honors | There are relevant and engaging learning opportunities such as Year End, "Fact or Fiction" project. Some students get to present their project at conferences. There are fun activities such as Mole Day Activity and Halloween. |
| AP Environmental Science | 11,12 | Solving interesting and important real world problems; thinking about current events and applications of knowledge in your own lives. Students interested in marine biology, climate change, energy and innovation, water quality, sustainable food systems, economics, politics, and history. | Environmental Science is largely about your interface with your planet. The air, water, food, energy, and resources we use for shelter, work, and transportation all depend on cycles, and achieving sustainability in these practices is challenging. We do a lot of our work through case studies. | --building 3-level sustainable ecosystems --measuring toxic levels of common materials --cleaning up an oil spill --Def Dam Poetry Slam --measuring air, water, and soil pollution levels --extended unit on energy and climate science --Knowing how to prevent a zombie apocalypse | 45-60 minutes 3x week | 50% tests quizzes and FRQs; 25% projects and labs; 25% smaller activities and guided reading. About 3% extra credit opportunities and a 3% bonus for a 5 on the AP Exam. | Biology and either chemistry or physics | This course can be driven by current events and cases which vary in nature; this means the calendar can be unpredictable. Be prepared to think sideways as well as dive deep into important topics. |
| AP Physics 1 | 10,11,12 | ... learning physics, but aren't sure they want to be engineers or scientists. | Describing and explaining motion, waves, electricity, and magnetism. | ...cool labs, interesting computer simulations, the Egg Drop Vehicle Project, and Physics Day at Great America. | About an hour a day reading and watching instructional videos. Additional time as needed to master skills and complete assignments. | Grades are determined mainly by performance on tests (90% of total), with daily and weekly assignments also contributing to the overall grade. Retakes are offered when students perform at lower than a B level. | Geometry (at minimum), but the more math background the better. | The use of laptops or tablets is encouraged. A graphing calculator (like a TI-84 or TI-89) really helps on exams. |
| AP Physics C | 11,12 | ...majoring in engineering, computer science, or a physical science. | Using calculus to describe and explain motion, electricity, and magnetism. | Physics Day at Great America | About an hour a day reading and watching instructional videos. Additional time as needed to practice skills and prepare for exams. | Mostly based on exam performance (90%), but also dependent on daily and weekly assignments. | AP Physics 1 AP Calculus AB or BC (Students who take AP Calculus concurrently with AP Physics C are at a distinct disadvantage) | The use of laptops or tablets is encouraged. Advanced graphing calculators (like the TI-89 or NSpire) really help on exams. Historically, around 90% of students get a 5 on the AP Physics exams! |
| Chemistry | 10,11,12 | first year chemistry exposure; basic concepts of the atom, chemical compounds and chemical equations. | development of the atom; bonding of atoms to form compounds; writing and using chemical equations for stoichiometry concepts; general exposure to organic chem, nuclear chem, acids/bases, thermochemistry | lab activities, experiments, projects, and demos to show chemical concepts | take notes, do class work and homework, participate in labs, be responsible, be an active learner | grading done by categories: homework/classwork, labs/projects, tests/quizzes, final exam | the ability to write and solve simple algebraic equations | |
| Chemistry Honors | 10,11,12 | Chemistry is a central science. Chemistry is needed for all fields of science. | Bonding, Periodic Table, Writing Formulas, Writing Reactions, Atomic Structure, Stoichiometry, Gases, Thermochemistry, Acids and Bases. | make cookies, kool aid and ice cream. Lots of real world activities. | 20-30 minutes per class day as an average. | Categories are Weighted Homework, classwork, peer review, entrance/exit mini-quizzes:10%; Lab (written work, participation, conduct and assessment) & projects: 25% Tests and quizzes:45% Final exam :20% | B or better in Biology math intensive B or better in Geometry or higher course Concurrent enrollment in Algebra 2 or higher course | <ul style="list-style-type: none"> This is most student's first opportunity to take an honors level class. Chemistry honors is more rigorous than regular chemistry. Recommendation does not mean an A (or even a B). |

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| Physics | 10,11,12 | The physical sciences & engineering as well as those students with an interest in science and how the world & the universe "work". | Physics involves the study of matter and its motion through space and time, along with related concepts such as energy and force. Kinematics, Forces, Momentum, Energy, Rotational Motion, Sound, Planetary Mechanics, Astronomy, Wave Phenomena, Electricity & Magnetism, and Modern Physics. Emphasis is placed on analysis needed for an understanding of the world using Newtonian physics. This course primarily uses basic algebra, geometry and a small amount of right angle trigonometry. | Interesting hands-on labs and micro-labs, a number of them outside. We have a periodic STEM projects where you apply your knowledge of physics such as: Paper Bridge, Flight (Accuracy, Walk Along, Time Aloft), Egg Drop, Mouse Trap Powered Vehicle, Winter Hexagon (astronomy), Frisbee Flight and Great America Field Trip (May, all physics courses) | In Physics, you should expect about two hours of homework each week....reading, answering questions, solving problems, finishing lab reports, and doing projects. Students are encouraged to confer with peers on homework. That means get help if you need it but DO NOT COPY robotically. You learn physics by practice, thinking and discussion! | Grades are based on work in five weighted categories 17% Homework-Classwork 30% Lab-Projects 35% Tests & Quizzes 15% Final Exam 3% Class/Team Participation +journal | Passing grade in pervious MV science or math. This usually means Chemistry and Geometry plus Algebra I. Some students come directly from Biology but do that with a B or better to be successful. Sophomores are welcome (currently 20-30%) but find the course initially challenging without the preparation in labs, data treatment & calculations that come from Chemistry. | You will frequently use algebra, geometry, and basic trigonometry. You'll need a scientific calculator. This is "hands on" physics. You complete a number of projects outside of class with testing/judging in class. These are designed as STEM Design & Performance Competitions (usually with a small bonus for class "winners" depending on the nature of the project problem). |
| Physiology | 11,12 | Physical health and fitness, mental health, the human body, nutrition, medicine, human performance, etc. | <ol style="list-style-type: none"> How diet, exercise, sleep and stress impact health. How muscles and bones allow the body to perform activities. How the heart and blood allow the human body to function. How the immune system protects us from foreign invaders. How CPR/First Aid can save lives. How the human brain works and what happens when it doesn't. | <ol style="list-style-type: none"> Red Cross Training for CPR/First Aid Heart and Brain Dissection Friday Wellness activities are student lead presentations followed by the class doing an activity that is beneficial in some way to health. This occurs most Friday's throughout the entire year. Once a month we do a short mindfulness meditation with Mr. Prinz Cockroach demo to visualize and examine how neurons work. | There is the occasional homework assignments (not too much in comparison to other science classes). There is a semester long outside of class project called the OLE (outside learning experience). Overall expect there to be around 1-2 hours per week of homework. | Tests are 40% Homework/Labs are 15% OLE project is 15% Friday Wellness activity is 5% Final Exam is 20% Citizenship is 5% | Biology is really the only pre-requisite for this class. Chemistry might be helpful for some specific parts of the class, but overall is not necessary. | This is a great class if you are interested in learning more about physical and mental health or just want to know more about how the human body works and functions. It is a low stakes environment where the goal is to learn and find things the interest you as well as figure out the best way to increase your own happiness and health. |
| STEM independent study research | 9,10,11 | Doing science (as opposed to studying it). | Learning to read scientific papers and design your own experiment (s). Conducting your research, analyzing your data and presenting your results both in writing and orally. | Competing in the Synopsys science fair which is the local Intel ISEF affiliated science fair. This is the preliminary round of competition for many other opportunities. | Wide variation based on the specific project selected and on the time of year. Approximately 1-2 hours per week outside of class is required at the very beginning of the year and the beginning of second semester. Almost no time requirements at the end of either semester depending on the project selected and how successful it is at local competitions. | This course is graded pass/fail. Any 'grades' will be assigned by science fair competition judges. | Strong interest in science, high personal initiative and a schedule with sufficient time. | Students who overschedule themselves often struggle with this class because there are few deadlines. However when teacher recommendations regarding planning/timing is ignored it may become impossible for students to complete their project. |

Graduation Requirements:

UC/CSU/ University entrance:

For more information contact:

1 year life science, 1 year physical science

Minimum 3 years recommended

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