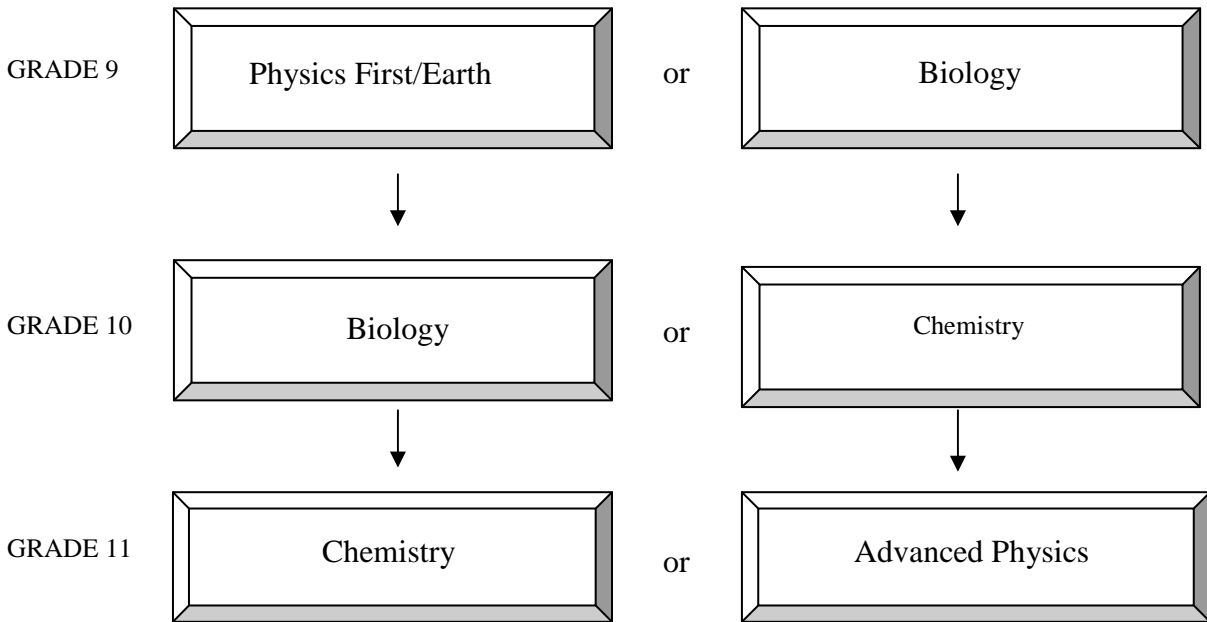
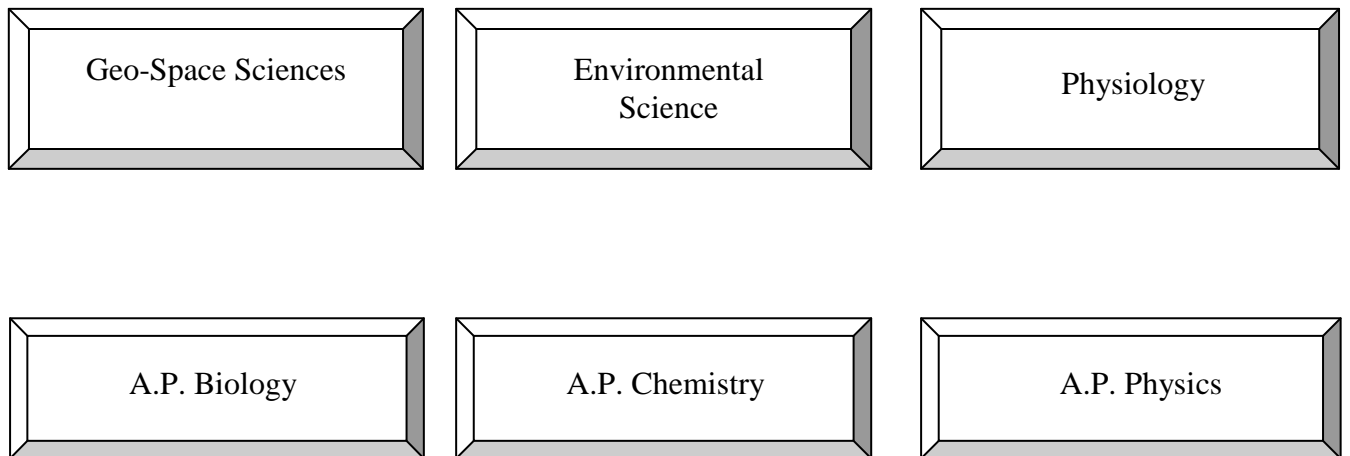


# Science



GRADES 10-12

## **Electives**



## Department of Science

### REQUIRED

#### **Physics First/Earth – full year – credits: 1**

This course is designed to explore many Physical Science and Earth Science concepts. The Physical Science concepts include forces, motion, gravity, weight, mass, free fall, Newton's laws, wave phenomena, EM waves vs. mechanical waves, electric charges and forces, and electromagnetism. These concepts will be covered using a laboratory/hands-on approach. The Earth Science concepts will include plate tectonics, changes in technology in studying crustal movement, heat and the rock cycle, conservation of matter and processes that affect the earth's crust. Astronomy topics will include the Big Bang Theory and how technological advances have changed astronomical theories. The planetarium will be used to support this class whenever possible.

#### **THIS COURSE TARGETS THE FOLLOWING STUDENT LEARNING EXPECTATION**

Primary:

Secondary: A1: Literacy Skills, A2: Acquire information – research and problem solving, A3: Technology Literacy, C1: Responsibilities of citizenship, S1: Demonstrate responsibility, S2: Demonstrate teamwork skills

#### **Biology – full year – credits: 1**

Biology addresses the structures that all organisms require for survival. Students will investigate structures necessary for life functions in unicellular and multi-cellular organisms. The presentation of cellular biology gives a background for the structure and function of nucleic acids and protein synthesis as well as genetics. Evidence that organisms change over time will be discussed and related to their survival. Also included are concepts dealing with ecosystems and energy cycling, and their relationship to global climate change as well as human biology and human impact on the environment.

Students will be involved in a great deal of laboratory work designed to investigate the topics presented as well as increase the skills of data interpretation, observation and predicting. Laboratory work is a required part of the course.

#### **THIS COURSE TARGETS THE FOLLOWING STUDENT LEARNING EXPECTATION**

Primary:

Secondary: A1: Literacy Skills, A2: Acquire information – research and problem solving, A4: Understanding of Aesthetics, S1: Demonstrate responsibility, S2: Demonstrate teamwork skills

#### **Chemistry - full year - credits: 1**

First year Chemistry is taught with the American Chemical Society's program "Chemistry in the Community." Chemical concepts and scientific habits of thinking are learned through inquiry in real-world scenarios. Basic concepts of chemistry are developed through a combination of lab work, individual guided reading and home study, and class discussion. Emphasis is on critical thinking, problem solving, and chemical concepts, rather than memorization.

Successful completion of this course will benefit students wishing to continue studying the sciences. It is recommended that all students complete this course successfully before signing up for advanced science classes at MHS.

Note: Satisfactory completion ("C" or better) of Algebra I and previous science classes are essential foundations for students signing up for this course.

**THIS COURSE TARGETS THE FOLLOWING STUDENT LEARNING EXPECTATION**

Primary: A2: Acquire information – research and problem solving, S2: Demonstrate teamwork skills

Secondary: A1: Literacy Skills, C2: Personal ethics, S1: Demonstrate responsibility

**Advanced Physics – full year – credits: 1**

Physics is the study of matter and energy. These two classifications include everything in the universe. This course explores how you are affected, day in and day out, by the continuous interaction of matter and energy. The goal is to use measurement and analysis to understand these ideas and how they relate to each other. Major concepts to be covered are motion, forces, momentum, energy, electricity, sound, and light. Student centered inquiry based labs are a major component of each concept.

These topics are presented using a laboratory approach where measurement and analysis are stressed. A high degree of mathematical and reasoning ability is necessary, as distinguished from the ability to memorize facts. The student is required to be able to apply a broad knowledge of topics to many varied situations.

**To receive an AP designation on their transcript, student must take the AP exam in May. A fee is required to take the AP exam. Students must commit to this by October 1.**

**THIS COURSE TARGETS THE FOLLOWING STUDENT LEARNING EXPECTATION**

Primary: A2: Acquire information – research and problem solving, S2: Demonstrate teamwork skills

Secondary: A1: Literacy Skills, A3: Technology Literacy, C2: Personal ethics, S2: Demonstrate teamwork skills

**ELECTIVES**

**Geo-Space Sciences – full year – credits: 1**

This full year course of study covers topics in astronomy, meteorology, geology and oceanography. Astronomy topics will include earth, sun, and moon relationships; star types and their lifecycle; the solar system; and model rocketry and space flight. The planetarium will be used on a regular basis to enhance the lessons. Meteorology topics will include reading and interpreting weather maps; identification of cloud types; global circulation of weather patterns and seasonal influences on the land and water; fronts and air masses; the structure of our atmosphere; severe weather and daily prediction of weather using a variety of weather charts and data. Geology topics will include rock and mineral identification; landforms; glaciers; the rock cycle and mineral formation; plate tectonics; earthquakes; and volcanoes. A study of Aquidneck Island will show a large variety of rock and mineral types and structures. Oceanography topics will include ocean formation and circulation patterns; waves; formation of beaches and oceanic

features; tides; and the study of native species of organisms and how to keep our oceans, bays, wetlands and beaches healthy.

**THIS COURSE TARGETS THE FOLLOWING STUDENT LEARNING EXPECTATION**

Primary:

Secondary: A1: Literacy Skills, A2: Acquire information – research and problem solving, A3: Technology Literacy, C1: Responsibilities of citizenship, S1: Demonstrate responsibility, S2: Demonstrate teamwork skills

**Environmental Science – full year – credits: 1**

Environmental Science will provide students with the scientific principles, concepts, and methodologies required to understand some of the interrelationships of the natural world; to identify and analyze environmental problems both natural and human-made; to evaluate the relative risks associated with these problems; and to examine alternative solutions for resolving and/or preventing them.

Environmental science is interdisciplinary; it embraces a wide variety of topics from different areas of study. There are several major unifying themes, including: science as a method of learning more about our world and how it changes our understanding; energy sources, their impact and the new technologies developing; our earth as one system that continually changes and reacts to disturbances; humans and our cultural, social and economic factors that continually impact the environment; and our ability to develop new and sustainable management practices to insure our survival.

Students will utilize the greenhouse for applied agricultural and horticultural practices. Local connections to our island environment and applied learning opportunities will be explored.

**THIS COURSE TARGETS THE FOLLOWING STUDENT LEARNING EXPECTATION**

Primary:

Secondary: A1: Literacy Skills, A2: Acquire information – research and problem solving, A3: Technology Literacy, C1: Responsibilities of citizenship, S1: Demonstrate responsibility, S2: Demonstrate teamwork skills

**Physiology – full year – credits: 1**

**NOTE:** We believe that satisfactory completion of Biology is an essential foundation for those electing this course.

The purpose of this course is to present the essentials of anatomy and present-day physiology logically, simply, and graphically. Anatomy and physiology will be presented simultaneously since structure and function are the main themes of the human body. This is a lab course with required detailed dissection. This must be considered as an in-depth course which may be used as a basis for further study of the human body in health and disease.

**THIS COURSE TARGETS THE FOLLOWING STUDENT LEARNING EXPECTATION**

Primary:

Secondary: A2: Acquire information – research and problem solving, A5: Physical, mental & emotional health

### **Advanced Placement Biology – full year – credits: 1**

**NOTE:** We believe that satisfactory completion (B or better) of Biology and Chemistry is an essential foundation for those electing this course. This challenging course is designed primarily as a “college level experience.”

An intense study of the entire biological world including botany, zoology, microbiology, and physiology, this course presupposes certain biological knowledge on the part of the student. The focus is on a laboratory approach designed for the student to gain new insights concerning biology and the work of biologists. The course depends on mastering the unifying principles and concepts applicable to all living forms. The College Board Advanced Placement Biology curriculum will be adhered to in this course. This class utilizes texts, documents and a rigorous pace that correlate to the standards and expectations established by the College Board for Advanced Placement study in this discipline. A direct goal of this course is to help ensure success on the Advanced Placement Exam given in May. This exam may lead to college credit.

**To receive an AP designation on their transcript, student must take the AP exam in May. A fee is required to take the AP exam. Students must commit to this by October 1.**

#### **THIS COURSE TARGETS THE FOLLOWING STUDENT LEARNING EXPECTATION**

Primary: Acquire information – research and problem solving, S2: Demonstrate teamwork skills

Secondary: A1: Literacy Skills, A2: Acquire information – research and problem solving, A4:

Understanding of Aesthetics, S1: Demonstrate responsibility, S2: Demonstrate teamwork skills

### **Advanced Placement Chemistry - full year - credits: 1**

Course Description Advanced Placement Chemistry is a second year course designed to meet the needs of the advanced science-oriented student. This course is roughly equivalent to college freshman general chemistry courses. This may enable the student to enroll in second semester courses as a college freshman, or take college courses that list chemistry as a pre-requisite. For other students, this may fulfill a college's lab science requirement and free some time for other courses. The College Board AP Exam must be taken in the spring. This class utilizes texts, documents and a rigorous pace that correlate to the standards and expectations established by the College Board for Advanced Placement study in this discipline. A direct goal of this course is to help ensure success on the Advanced Placement Exam given in May. This exam may lead to college credit.

Students are expected to be consistently self-directed in their study - it is expected that students will spend about six hours per week on home preparation. Many more labs are performed to illustrate good lab techniques, and apply and underscore chemical knowledge. Emphasis is on energy, molecular orbital theory, solution chemistry (including acid/base, equilibrium, and rate laws), and chemistry in the world around us. This course is mostly inorganic, but organic compounds are discussed and the basis of their bonding described.

Further information can be found at [www.collegeboard.com](http://www.collegeboard.com).

Note: It is recommended that students completion first year chemistry with a minimum grade of "B."

**To receive an AP designation on their transcript, student must take the AP exam in May. A fee is required to take the AP exam. Students must commit to this by October 1.**

**THIS COURSE TARGETS THE FOLLOWING STUDENT LEARNING EXPECTATION**

Primary: A2: Acquire information – research and problem solving, S2: Demonstrate teamwork skills

Secondary: A1: Literacy Skills, A3: Technology Literacy, C2: Personal ethics, S2: Demonstrate teamwork skills

**Advanced Placement Physics - full year - credits: 1**

Course Description Advanced Placement Physics is a second year course designed to meet the needs of the advanced science-oriented student. This course is roughly equivalent to college freshman general chemistry courses. This may enable the student to enroll in second semester courses as a college freshman, or take college courses that list Physics as a pre-requisite. For other students, this may fulfill a college's lab science requirement and free some time for other courses. The College Board AP Exam must be taken in the spring. This class utilizes texts, documents and a rigorous pace that correlate to the standards and expectations established by the College Board for Advanced Placement study in this discipline. A direct goal of this course is to help ensure success on the Advanced Placement Exam given in May. This exam may lead to college credit.

Note: It is recommended that students completion first year physics with a minimum grade of "B."

**To receive an AP designation on their transcript, student must take the AP exam in May. A fee is required to take the AP exam. Students must commit to this by October 1.**

**THIS COURSE TARGETS THE FOLLOWING STUDENT LEARNING EXPECTATION**

Primary: A2: Acquire information – research and problem solving, S2: Demonstrate teamwork skills

Secondary: A1: Literacy Skills, A3: Technology Literacy, C2: Personal ethics, S2: Demonstrate teamwork skills