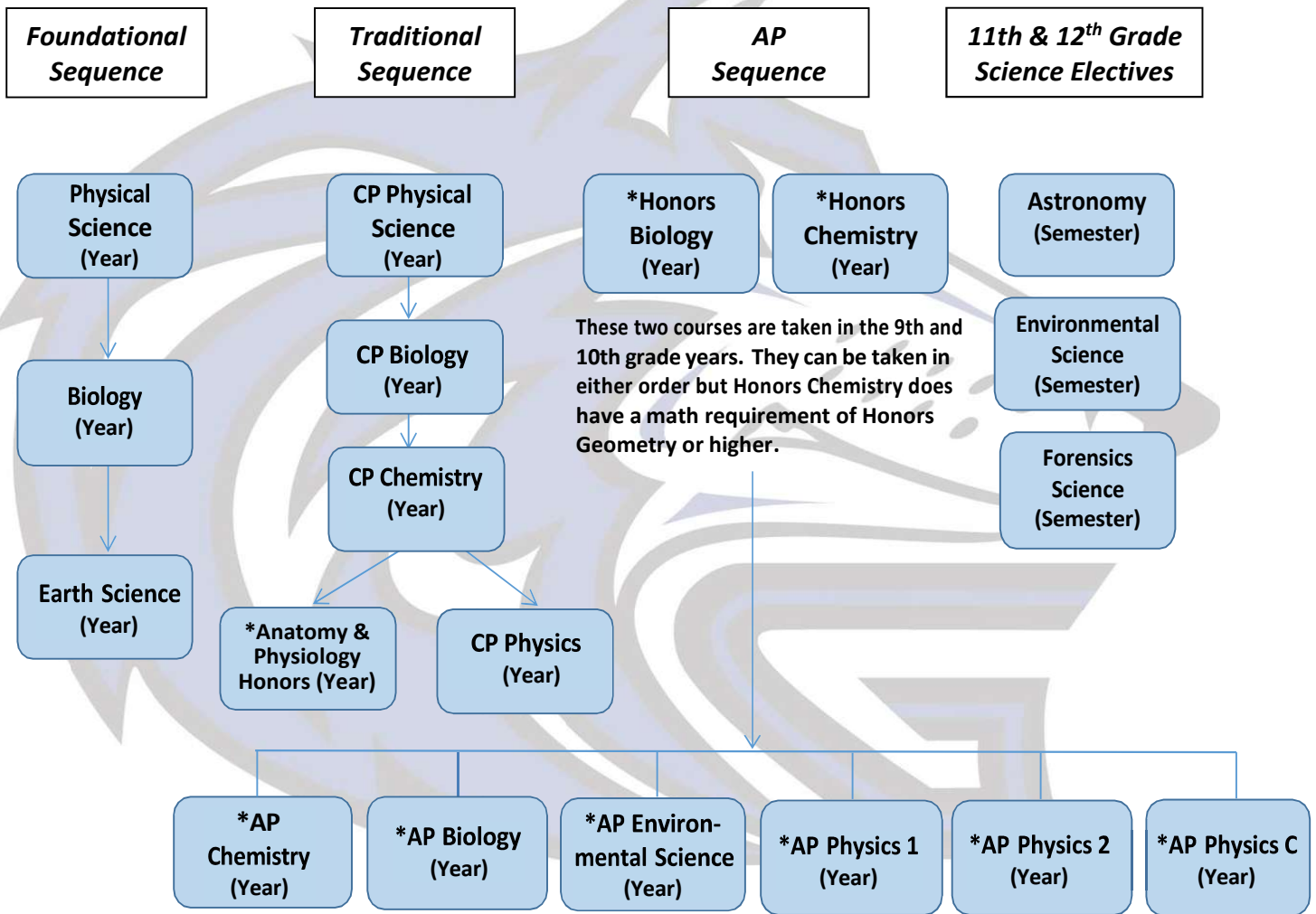


SCIENCE



* Designates a weighted course

SCIENCE COURSE DESCRIPTIONS

The science program at Grandview High School is designed to develop scientifically-literate students. Students are taught to gather and use scientific information to understand the world, expand thinking, and solve problems. They will learn to use the basic tools of scientific inquiry -- including scientific instruments -- mathematics, technology, references, and reasoning. Our science program helps students apply the process of scientific inquiry to understand and study the natural world.

The science program at Grandview is divided into three sequences, each differing in the level of rigor. All sequences address the Colorado Academic Content Standards within the first two years. Students interested in science as a career option should consider taking courses in the Advanced Placement sequence that allows them to take 2 or 3 AP science classes. Due to the importance of mathematics in describing and measuring scientific events, placement in mathematics courses is important when deciding appropriate science placement. The flow chart above is only an overview. Movement to a more rigorous sequence in future years is possible once the appropriate science and mathematical knowledge and skills have been obtained. Please refer to the "science course descriptions" to obtain more details regarding math requirements, specific timing of courses offered, and other pertinent guidelines.

Grandview students are required to successfully complete three years of science. However, we encourage all of our students to take four years of science to broaden their scientific knowledge to help them prepare for higher education experiences. In addition, many colleges expect students to complete four years of science in high school.

PHYSICAL SCIENCE

Grade Level: 9 – 10

Year: 1 Credit

Prerequisites: Instructor approval or concurrent enrollment in CP Algebra 1 and Math Lab

The laboratory experience is the foundation for this introductory physical science course. Students will explore physical science topics while developing the skills necessary to become proficient in science. This course will emphasize math and reading skills. The scientific method will be emphasized along with data analysis and critical thinking skills.

CP PHYSICAL SCIENCE



Grade Level: 9 – 10

Year: 1 Credit

Prerequisites: Concurrent enrollment in CP Algebra 1 or CP Geometry

CP Physical Science is a STEM-oriented course involving principles and concepts concerning the physical world. Content areas explored include Earth Science, Chemistry and Physics. This course emphasizes the study and proper use of fundamental science tools including the metric system, graphing techniques, and appropriate applied technologies.

BIOLOGY

Grade Level: 10 – 11

Year: 1 Credit

Prerequisites: Teacher approval

The laboratory experience is the foundation for this introductory life science course. Students will explore topics such as ecology, chemistry of life, cellular structure and function, genetics, evolution, classification, and human systems. The scientific method will be emphasized along with data analysis and critical thinking skills.

CP BIOLOGY



Grade Level: 10 – 12

Year: 1 Credit

Prerequisites: Successful completion of CP Physical Science

In this class, students will explore relationships between structure and function in organisms and the interaction of cells and organisms with each other and their environments. Units of study will include ecology, chemistry of life, cellular structure and function, genetics, evolution, classification, and human systems. Laboratory activities reinforce concepts and principles presented.

HONORS BIOLOGY****Grade Level: 9 – 12*Year: 1 Credit****Prerequisites: B or higher in previous math class and should have strong math skills**

In this class, students will explore relationships between structure and function in organisms and the interaction of cells and organisms with each other and their environments. Units of study will include ecology, chemistry of life, cellular structure and function, genetics, evolution, classification, and human systems. Laboratory activities reinforce concepts and principles presented. This course covers the same topics as the Biology and CP Biology programs, but in a greater depth and at an accelerated rate.

AP BIOLOGY****Grade Level: 10 – 12*Year: 1 Credit****Prerequisites: Honors Chemistry and Honors Biology or AP Chemistry or teacher approval****Fee: See AP Section for exam fee information**

AP Biology is designed to be the equivalent of a college introductory biology course. The curriculum for this class is the College Board Advanced Placement Biology curriculum. Units of study include: Inquiry, Biostatistics, Chemistry of Life, Cell Structure and Function, Cellular Energetics, Cell Cycle and Cell Communications, Inheritance, Gene Express and Regulation, Natural Selection and Evolution and Ecology. In addition to content, an emphasis is placed on scientific skills and learning to think like a Biologist. This course differs significantly from a high school course with respect to the quantity of type of laboratory work done and the time and effort of the student outside of class. The expectation is that students take the AP exam at the end of this course. Grades will be weighted to reflect the advanced nature and accelerated pace of the course.

CP CHEMISTRY**Grade Level: 10 – 12****Year: 1 Credit****Prerequisites: CP Physical Science, CP Biology, concurrent enrollment/completion of CP Algebra 2, and a C or higher in CP Geometry, or B or higher in Honors Biology and concurrent enrollment in CP Geometry**

This course provides the opportunity to develop knowledge and understanding about the relationships between the structure and properties of matter and the interaction of mass and energy. Units of study include matter and its changes, atomic structure, chemical composition, nomenclature, reactions, stoichiometry, gas laws, periodicity, bonding, molar geometry, and thermochemistry. Laboratory activities reinforce concepts and principles presented in this course.

HONORS CHEMISTRY****Grade Level: 9 – 12*Year: 1 Credit****Prerequisites: Previous science teacher recommendation and concurrent enrollment in/or completion of Honors Geometry**

This course is designed for students with high mathematical ability intending to pursue Advanced Placement biology, chemistry and physics classes in high school. Chemistry concepts will be covered at an accelerated pace with heavy emphasis on laboratory work, mathematical applications, and problem solving. In addition, students' skills in communicating information clearly through the written word, mathematical equations and graphs will be stressed. Students will develop skills in using both computers and calculators to aid in collecting and organizing data. Daily preparation is required outside of class.

AP CHEMISTRY****Grade Level: 10 – 12*Year: 1 Credit****Prerequisites: B or higher in Honors Chemistry; minimum enrollment in Honors Algebra 2 or higher math; teacher approval****Fee: See AP section in intro.**

AP Chemistry is designed to be the equivalent of a college introductory Chemistry course. The curriculum for this class is the College Board Advanced Placement Chemistry curriculum. Units of study will include atomic theory and atomic structure, chemical bonding, nuclear chemistry, gases, liquids and solids, solutions, reaction types, stoichiometry, equilibrium, kinetics, thermodynamics, and descriptive chemistry. This course differs significantly from a high school course with respect to the laboratory work done and the time and effort of the student outside of class. The expectation is that students take the AP exam at the end of this course. Due to the advanced nature of this class, grades will be weighted.

CP PHYSICS**Grade Level: 11 – 12****Year: 1 Credit****Prerequisites: Concurrent enrollment/completion of Pre-Calculus/College Algebra or teacher approval**

This course helps students understand the physical laws of our world. Units of study include: forces, motion, energy, light, waves, electricity, and magnetism. Laboratory work serves to promote understanding and to illustrate the experimental nature of physics.

AP PHYSICS 1****Grade Level: 11 – 12*Year: 1 Credit****Prerequisites: Successful completion of Biology and Chemistry, concurrent enrollment/completion of PreCalculus and teacher approval****Fee: See AP Section for exam fee information**

AP Physics 1 is designed to be the equivalent of a first semester college course in algebra-based physics. The curriculum for this class is the College Board Advanced Placement Physics 1 curriculum. Units of study will include Newtonian mechanics (including rotational dynamics and angular momentum); work, energy, and power; mechanical waves and sound; optics; and electrical circuits. This course differs significantly from a high school course with respect to the laboratory work done and the time and effort of the student outside of class. The expectation is that the student take the AP exam at the end of this course. Due to the advanced nature of this class, grades will be weighted.

AP PHYSICS 2****Grade Level: 11 – 12*Year: 1 Credit****Prerequisites: Successful completion of AP Physics 1****Fee: See AP Section for exam fee information**

AP Physics 2 is designed to be the equivalent of a second semester college course in algebra-based physics. The curriculum for this class is the College Board Advanced Placement Physics 2 curriculum. Units of study will include fluid mechanics; thermodynamics; electricity and magnetism; optics; atomic and nuclear physics. This course differs significantly from a high school course with respect to the laboratory work done and the time and effort of the student outside of class. The expectation is that the student take the AP exam at the end of this course. Due to the advanced nature of this class, grades will be weighted.

AP PHYSICS C****Grade Level: 12*Year: 1 Credit****Prerequisites: Physics or AP Physics 1 AND successful completion/concurrent enrollment in AP Calculus BC AND teacher approval****Fee: See AP Section for exam fee information**

AP Physics C is designed to be the equivalent of a college introductory physics course. The curriculum for this class is the College Board Advanced Placement Physics curriculum. Units of study will include kinematics, Newton's laws of motion, work, energy, power, systems of particles, linear momentum, circular motion and rotation, oscillations, and gravitation, electrostatics, conductors, capacitors and dielectrics, electric circuits, magnetic fields and electromagnetism. This course differs significantly from a high school course with respect to the laboratory work done and the time and effort of the student outside of class. The expectation is that students take the AP exam at the end of this course. Due to the advanced nature of this class, grades will be weighted.

ENVIRONMENTAL SCIENCE**Grade Level: 11 – 12****Semester: 0.5 Credit****Prerequisites: CP Biology or Biology**

Environmental Science is a lab-based course designed to provide students with an understanding of ecosystem concepts and the interactions that take place between humans and their environment. Topics include the ecosystem, populations, land use, water quality, pollution, renewable/nonrenewable energy and sustainability.

ASTRONOMY**Grade Level: 11 – 12****Semester: 0.5 Credit****Prerequisites: CP Biology or Biology**

This course focuses on the modern science of astronomy and cosmology. The process of scientific study provides the foundation of this course. Students will study the relationship of the Earth with our solar system, our galaxy, and the universe. Some topics include planets, stars, black holes, quasars, stellar evolution, and other solar phenomena.

EARTH SCIENCE**Grade Level: 11 – 12****Year: 1 Credit****Prerequisites: Below Algebra 2 or Chemistry completed or concurrently enrolled in Chemistry**

This course introduces the major principles of Earth Science. The course will include the study of astronomy, meteorology, geology, and oceanography. The content, reading, and pacing levels of this course are accessible to all students and encourage the development of scientific literacy.

FORENSIC SCIENCE**Grade Level: 11 – 12****Semester: 0.5 Credit****Prerequisites: Physical Science/Chemistry or Biology**

Forensic Science is the application of science to those criminal and civil laws that are tried by a court of law. It incorporates Biology, Chemistry, Entomology, Earth Science, Physics, Anatomy and Physiology, as well as other areas of science and technology. Observational skills, investigation, evidence collection, trace evidence (hair, fibers), fingerprinting, DNA analysis, blood pattern analysis, and document analysis (forgery, chromatography), odontology (teeth), glass, and forensic anthropology (bones) will be specific areas of study.

ANATOMY/PHYSIOLOGY HONORS****Grade Level: 11 – 12*Year: 1 Credit****Prerequisites: CP Biology, Chemistry, and teacher approval**

Anatomy and Physiology is designed for students with an interest in the human body and/or medical sciences. This course is a comprehensive, introductory exploration to the subjects of human anatomy, physiology and pathophysiology. The course begins with an overview of anatomical terminology, cells and tissues, as well as a review of the biochemistry necessary to understand how cells and parts of the human body function. Students will study multiple organ systems in great depth with an emphasis on the structure/function relationship among systems and regulation of physiological functions involved in maintaining a stable internal environment. Instruction in this class involves a mixture of lecture, microscopic study, physiological experiments, computer simulations and the dissection of preserved specimens.

AP ENVIRONMENTAL SCIENCE****Grade Level: 11 – 12*Year: 1 Credit****Prerequisites: CP or Honors Biology and concurrent enrollment in or completion of Chemistry or teacher approval****Fee: See AP Section for exam fee information**

AP Environmental Science is designed to be the equivalent of a college introductory Environmental Science course. The curriculum for this class is the College Board Advanced Placement Environmental Science curriculum. Units of study will include Earth Science concepts, the atmosphere, global water resources and use, soil and soil dynamics, ecosystem structure, energy flow, ecosystem diversity, natural ecosystem change and natural biogeochemical cycles. This course differs significantly from a high school course with respect to the laboratory work done and the time and effort of the student outside of class. The expectation is that students take the AP exam at the end of this course. Due to the advanced nature of this class, grades will be weighted.