

Science

Typical Science Sequence for Students in the Class of 2020, 2021 and 2022			
Grade 9	Grade 10	Grade 11	Grade 12
Honors Physics Physics Class of 2020 & 2021 Biomedical Students: Honors Biology Biology	Honors Chemistry Chemistry <u>Science Elective Course Options:</u> AP Physics 1 Environmental Science Forensics	Honors Biology Biology Class of 2020 & 2021 Biomedical Students: AP Physics 1 Honors Physics (Grades 9/11) Physics (Grades 11/12) <u>Science Elective Course Options:</u> Students can take any additional science course in which the course prerequisite has been met.	AP Biology AP Chemistry AP Physics 1 AP Environmental Science Honors Anatomy & Physiology Environmental Science Forensics Sports Medicine
Typical Science Sequence for Students in the Class of 2019			
Grade 9	Grade 10	Grade 11	Grade 12
Classical Science	Honors Biology Biology	Honors Chemistry Chemistry Environmental Science Physics <u>Science Elective Course Options:</u> Students can take any additional science course in which the course prerequisite has been met.	AP Biology AP Chemistry AP Environmental Science AP Physics 1 Honors Anatomy & Physiology Environmental Science Forensics Physics Sports Medicine
Honors Biology	Chemistry Honors Chemistry	AP Biology AP Chemistry AP Physics 1 Honors Anatomy & Physiology Environmental Science Forensics Physics Sports Medicine	AP Biology AP Chemistry AP Physics 1 AP Environmental Science Honors Anatomy & Physiology Environmental Science Forensics Physics Sports Medicine

Notes:

1. Physics, Chemistry, and Biology must be taken in sequential order for all students entering 9th grade as of September 2018.
2. Students may double up in elective science classes based on teacher recommendation and academic performance.
3. Students electing to double up in two AP lab sciences must take a study hall to accommodate lab periods.

BIOLOGY**Grade 11****5 Credits**

This laboratory course is designed to help students gain an understanding of how the study of living things has developed through the use of investigation and observation. Students are encouraged to inquire, experience, and integrate the biological principles they have learned into their own lifestyles. This course incorporates hands-on laboratory activities in the areas of Cellular Biology, Biochemistry, Genetics, Biotechnology, Evolution, Ecology, and Human Impact.

Prerequisite: *Chemistry & Physics for Class of 2020 & 2021, Classical Science for Class of 2019*

HONORS BIOLOGY**Grade 11****5 Credits**

This laboratory course is designed to introduce and subsequently immerse students into the process of learning about the biochemistry of cells, cellular biology, genetics, biotechnology, ecology and human impact issues. The topics are developed around the five themes of biology: Organization and Development, Matter and Energy Transformations, Interactions and Interdependence, Heredity and Reproduction, and Evolution and Diversity. All topic material can be related to these themes. Lab investigations relating to the current subject material will be performed weekly and will introduce the student to the use of equipment and traditional lab skills which can be expanded upon in college. Students will be encouraged to develop study skills, test taking skills and lab skills as well as gain information on career opportunities and current research in the various fields of biology, it is aligned with Advanced Placement Biology in order to ensure greater success for those students who decide to take Advanced Placement Biology as an upper classman.

Prerequisite: *Teacher recommendation and/or a 90 or above in Chemistry*

ADVANCED PLACEMENT BIOLOGY**Grades 12****6 Credits**

AP Biology meets an additional period once in a four day rotation. The first goal of the Advanced Placement Biology course is to assist the student in his/her goal of scoring the maximum on the AP Biology Examination. Students will experience a beginning level college biology course with all of its goals and objectives. The course consists of four "Big Ideas" set forth by the College Board for the new AP Biology Course. The Big Ideas are as follows:

Big Idea 1: The process of evolution drives the diversity and unity of life.

Big Idea 2: Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.

Big Idea 3: Living systems store, retrieve, transmit, and respond to information essential to life processes.

Big Idea 4: Biological systems interact, and these systems and their interactions possess complex properties.

Students enrolled in the course will conduct the 13 required labs mandated by the College Board.

Students are expected to take the Advanced Placement Biology Exam in May.

Prerequisite: *Biology and Chemistry or Honors Biology and Honors Chemistry. Entrance into this course requires teacher recommendation and/or a 90 in a current college preparatory science course or an 80 in a current honors science course.*

CHEMISTRY**Grades 10-12****5 Credits**

This laboratory course is designed to introduce and subsequently immerse the student into the process of learning about the building blocks of matter and their interactions. This course highly stresses mathematical computation and problem solving skills. It introduces the student to the traditional fundamental skills and use of equipment that can be expanded on in the future at the college level.

Prerequisite: *Physics for Class of 2020, 2021 and 2022 and Biology for Class of 2019.*

HONORS CHEMISTRY**Grades 10****5 Credits**

This laboratory courses is designed to introduce and subsequently immerse the student into the process of learning about the building blocks of matter and their interactions. This course stresses quantitative reasoning and problem solving skills. It introduces the student to the fundamental skills and use of equipment found in a college level lab program, experimental design, data analysis and interpretation.

Prerequisite: *Physics or Honors Physics for Class of 2020, 2021, and 2022. Biology or Honors Biology, and Geometry/Honors Geometry for Class of 2019. Entrance into this course requires teacher recommendation and/or a 90 in a current college preparatory science course.*

ADVANCED PLACEMENT CHEMISTRY

Grades 11-12 6 Credits

AP Chemistry meets an additional period once in a four day rotation. AP Chemistry is equivalent to two semesters of a college level inorganic chemistry course. This course stresses quantitative reasoning and problem solving skills in each of the five content areas as described by the College Board in the “Advanced Placement Course Description”, as a lab program that introduces the student to the fundamental skills and use of equipment found in a college level lab program, experimental design, data analysis and interpretation. The course consists of six “Big Ideas” set forth by the College Board the Big Ideas are as follows:

Big Idea 1: The chemical elements are the building blocks of matter, which can be understood in terms of the arrangements of atoms.

Big Idea 2: Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them.

Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

Big Idea 4: Rates of chemical reactions are determined by details of the molecular collisions.

Big Idea 5: The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.

Big Idea 6: Bonds or attractions that can be formed can be broken. These two processes are in constant competition, sensitive to initial conditions and external forces or changes.

Students are expected to take the Advanced Placement Chemistry Exam in May.

Prerequisite: *Chemistry or Honors Chemistry. Entrance into this course requires teacher recommendation and/or a 90 in a current college preparatory science course or an 80 in a current honors science course.*

ENVIRONMENTAL SCIENCE

Grades 10-12 5 Credits

This laboratory course-allows students to study concepts from physical science, biology, chemistry and earth science with an environmental focus. The course is designed to develop knowledge of scientific principles and to improve laboratory skills. Students will explore scientific habits of mind through guided scientific inquiry. Scientific processes, enhancement of mathematical skills and content area reading will be stressed.

ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE

Grades 11-12 6 Credits

AP Environmental Science meets an additional period once in a four day rotation. Students taking Advanced Placement Environmental Science will learn to define and provide examples of the basic concepts of ecology and physical geography. Students will learn how the growth of the world’s population and economic growth has altered the environment, including ecological and abiotic systems. Students will understand how changes in the earth’s systems are likely due to human populations. Students will be able to explain how humans can try to mitigate the effects of growing populations and expanding economies through changes in technology, policy, governmental regulations, agreements and incentives. **Students are expected to take the Advanced Placement Environmental Science Exam in May.**

Prerequisite: *Chemistry or Honors Chemistry* **Corequisite:** *Biology or Honors Biology. Entrance into this course requires teacher recommendation and/or a 90 in a current college preparatory science course or an 80 in a current honors science course.*

FORENSICS

Grades 10-12 5 Credits

This course studies how forensic scientists assist in solving crimes. Topics include history of forensic science, the crime scene, physical and biological evidence collection and analysis, microscopic investigations, hair and fiber analysis, determination of the time of death, and insect study. DNA evidence is also covered along with computer, document, and voice recognition as evidence. Disclaimer: Some of the course content may be graphic.

HONORS HUMAN ANATOMY & PHYSIOLOGY**Grades 11-12 5 Credits**

This laboratory course is designed to introduce students pursuing a career in the allied health field to the structure and function of the human body. In addition, medical terminology, diagnostic tools, current research and clinical advances will be covered. In the laboratory portion, students will learn proper laboratory techniques, how to prepare biological drawings and write formal lab reports through hands-on and virtual activities.

Prerequisite: *Chemistry* **Corequisite:** *Biology* Entrance into this course requires teacher recommendation and/or a 90 in a current college preparatory science course.

PHYSICS (Class of 2022)**Grade 9 5 Credits**

The course introduces students to the study of physics conceptually by studying physical phenomena, and by requiring them to describe those phenomena computationally and graphically, both in the classroom and the laboratory. The major topics include kinematics, mechanics, impulse, momentum, energy, thermodynamics, waves, light, optics, sound, electricity, and magnetism.

HONORS PHYSICS (Class of 2022 & 2020 Biomed Magnet Students) Grade 9 5 Credits

The course introduces students to the study of physics conceptually by studying physical phenomena, and by requiring them to describe rigorously those phenomena computationally and graphically, both in the classroom and the laboratory. The major topics include kinematics, mechanics, impulse, momentum, energy, thermodynamics, waves, light optics, sound, electricity and magnetism.

Prerequisite: *Acceptance into this course for 9th graders will be based on multiple measures including a review of science and math grades and teacher recommendations.*

PHYSICS (Class of 2019 & 2020 Biomed Magnet Students)**Grades 11-12 5 Credits**

This laboratory course is designed to be the equivalent of an introductory level physics course. This course provides a systematic introduction to the main principles of physics and emphasizes the development of critical thinking skills and problem solving techniques. It calls upon most mathematical techniques through Algebra II and Trigonometry.

*Physics is the required eleventh grade science course for students enrolled in the Biomedical Magnet program.

Prerequisite: *Biology* **Corequisite:** *Algebra II*

ADVANCED PLACEMENT PHYSICS I**Grades 10-12 6 Credits**

AP Physics 1 meets an additional period once in a four day rotation. Students explore principles of Newtonian mechanics (including rotational motion); work, energy, and power; mechanical waves and sound; and introductory, simple circuits. The course is based on six Big Ideas, which encompass core scientific principles, theories, and processes that cut across traditional boundaries and provide a broad way of thinking about the physical world. The following are Big Ideas:

Big Idea 1: Objects and systems have properties such as mass and charge. Systems may have internal structure.

Big Idea 2: Fields existing in space can be used to explain interactions.

Big Idea 3: The interactions of an object with other objects can be described by forces.

Big Idea 4: Interactions between systems can result in changes in those systems.

Big Idea 5: Changes that occur as a result of interactions are constrained by conservation laws.

Big Idea 6: Waves can transfer energy and momentum from one location to another without the permanent transfer of mass and serve as a mathematical model for the description of other phenomena

Students are expected to take the Advanced Placement Physics I Exam in May.

Corequisite: *Algebra II/Trigonometry* Entrance into this course requires teacher recommendation and/or a 90 in a current college preparatory science course or an 80 or above in a current honors science course.