MISSION

The mission of the Office of Science PreK-12 is to work collaboratively with all stakeholder groups to define a vision for science education and to provide leadership for the development, implementation, and assessment of that vision for the Baltimore County Public Schools. These efforts are all directed toward one goal—enhancing achievement for all students in science. The staff truly believes that all students can learn and recognizes that learning is accomplished individually as well as by groups. To meet the needs of every student, the staff is committed to making science engaging, active, and relevant because they understand that the best way to learn is through personal discovery and scientific inquiry is the hallmark of science instruction in Baltimore County Public Schools. Because it is also the goal to create lifelong learners, everyone works toward helping students develop an appreciation for the body of knowledge known as science and an understanding of how to apply it to everyday life.

Standard, honors, and gifted and talented levels of biology, chemistry, and physics are offered as enrollments justify. In these classes, the instructional level and materials are modified according to the needs of the students. Course selections will vary according to the academic level and occupational goals of students. Course sequences are shown below.

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*Animals may be used for experimentation/dissection in this course; however, alternative activities may also be provided.

Anatomy and Physiology*
Course Number: 25.5020.4 (H)
Prerequisites: Successful completion of Biology is required. Successful completion of Chemistry is also recommended.
Credit: 1

Anatomy and Physiology provides a comprehensive overview of human body systems and stresses both the structure (microscopic and macroscopic) and functioning of those systems. Reading the text, original articles, and historical papers is required. A project or term paper may be required.

Animal Behavior*
Course Number: 25.1080.0
Prerequisites: Successful completion of Biology is required. Successful completion of Environmental Science or Chemistry is also recommended.
Credit: 1

Students in the animal behavior course will use knowledge of life cycles, parental behavior strategies, and environmental factors to analyze population dynamics.

Aquatic Science*
Course Number: 25.6010.0
Prerequisites: Successful completion of Biology is required. Successful completion of Environmental Science or Chemistry is recommended. (Successful completion suggests grade of “C” or better.)
Credit: 1

Students in aquatic science will use the scientific method and knowledge of ecological principles to investigate Maryland’s aquatic fresh water and tidal water environments and to demonstrate the interrelationships between the biotic and abiotic components.

Astronomy
Course Number: 25.7100.0
Magnet Course Number: 25.7150.5 (GT)
Prerequisites: Successful completion of Biology and Earth/Space Science or Chemistry is required. (Successful completion suggests grade of “C” or better.)
Credit: 1

Students will use their knowledge of astronomy to provide an explanation for the development of the modern model of the universe.

Biology*
Course Number: 25.1000.0
Prerequisite: Successful completion of Concepts of Physical Science and Algebra I is recommended.
Credit: 1

Biology provides students with an understanding of living things in their environment and how molecules and cells provide for the basis of life. This course provides a Service Learning component.

Contemporary Problems in Biology
Course Number: 25.1090.0
Prerequisites: None
Credit: ½

This elective is designed to review the concepts of HSA biology for students who need to retake the Biology HSA. Specific emphasis will also be placed on preparing students for the Biology HSA. Student projects and presentations are required.
Biology: Honors*
Course Number: 25.1000.4 (H)
Prerequisites: Successful completion of, or concurrent enrollment in, Algebra II or Geometry
Credit: 1

This course provides an in-depth study of living things and their environment.

Biology: Gifted and Talented*
Course Number: 25.1000.5 (GT)
Prerequisites: Successful completion of, or concurrent enrollment in: Algebra II, Geometry, or GT Mathematics 9 is required.
Credit: 1

This course provides a high-level introduction to biology using a college text. Reading the text, original articles, and historical papers is required. A project or term paper may be required. This course provides a Service Learning component.

Biotechnology*
Course Number: 25.4530.4 (H)
Prerequisites: Successful completion of Biology and Chemistry is required. Concurrent enrollment in Physics is also recommended.
Credit: 1

This course combines science research techniques and hands-on laboratory activities to study molecular biology, genetics, recombinant DNA, protein synthesis, aquaculture, hydroponics, biological pest management, electrophoresis, DNA fingerprinting, environmental and ecological management techniques, and bioethics. Development of protocols and other laboratory techniques will be taught for use in independent research projects. The course may be co-taught by science and technology teachers.

Chemistry
Course Number: 25.1100.0
Prerequisites: Successful completion of, or concurrent enrollment in, Algebra II
Credit: 1

The fundamentals of chemistry with relevant laboratory applications are investigated in this course. Topics such as atomic theory, atomic structure, chemical bonding, writing formulas and equations, chemical reactions, solutions, acids and bases, and environmental chemistry are included.

Chemistry in the Community (CHEMCOM)
Course Number: 25.1190.0
Prerequisites: Successful completion of or concurrent enrollment in Algebra II is required.
Credit: 1

This course is an alternative to the standard chemistry course. Developed nationally by the American Chemical Society, ChemCom is designed to enhance scientific literacy through the study of the impact of chemistry on society.

Chemistry: Honors
Course Number: 25.1100.4 (H)
Prerequisites: Successful completion of or concurrent enrollment in Algebra II or Gifted and Talented Mathematics 10 or equivalent GT level mathematics course is required.
Credit: 1

This course provides a quantitative and qualitative approach to the fundamentals of chemistry. Students do an in-depth study of the topics listed under Chemistry and also study acid-base equilibria, electrochemistry, thermodynamics, and redox reactions. Problem solving and lab skills are emphasized.

Chemistry: Gifted and Talented
Course Number: 25.1100.5 (GT)
Prerequisites: Successful completion of or concurrent enrollment in Honors Algebra II or GT Mathematics 10 or equivalent GT level mathematics course is required.
Credit: 1

This course covers quantitative, qualitative, and descriptive chemistry with an emphasis on computational/problem solving skills. The lab program stresses both qualitative and analytical chemistry. Organic and nuclear chemistry may be included.

Concepts of Physical Science as Applied to Biology (COPS)
Course Number: 25.0950.0
Prerequisites: Concurrent enrollment in Algebra I and Introduction to Technology and Engineering Concepts (IETC) is strongly recommended.
Credit: 1

COPS is designed to provide students with fundamental background knowledge in selected concepts of physics and chemistry necessary for a deeper, richer, and more comprehensive understanding of the biological topics they will encounter in Grade 10. The course is problem-based and requires the use of simple mathematics through Algebra I. Individual student projects and presentations are required.

Earth/Space Science
Course Number: 25.6510.0
Prerequisite: None
Credit: 1

Earth science involves students in instructional activities dealing with geology, erosive forces, seismic activity, volcanology, oceanography, astronomy, meteorology, and geologic time.

Ecology of Maryland and the Chesapeake Bay*
Course Number: 25.6100.0
Prerequisites: Successful completion of Biology is required. Successful completion of Earth/Space Science, Environmental Science, or Chemistry is recommended.
Credit: 1

This course covers the ecology, geology, and geography of the state of Maryland and examines the entire Chesapeake Bay watershed, its tributaries, and the Chesapeake Bay. Students will be asked to design and defend a plan for an aquatic or wetland restoration proposal.
This course emphasizes a laboratory approach to the study of both the biotic and abiotic components of the environment. An initial unit on the principles of ecology will extend upon topics learned in biology. Students are encouraged to apply their knowledge of these environmental issues and to participate in the Maryland Envirothon. This course provides a Service Learning component.

Field and Wildlife Biology*
Course Number: 25.3100.0
Prerequisites: Successful completion of Biology and Earth/Space Science or Chemistry is required. Concurrent enrollment in Chemistry is required for magnet students.
Credit: 1

This course involves students in a study of plants and animals in the context of ecology.

Forensic Science
Course Number: 25.4810.0
Credit: ½
Course Number: 25.4800.4 (H)
Credit: 1
Prerequisites: Successful completion of Biology and Chemistry is required.

This course emphasizes the integration of science in the legal process. Students learn the role of the forensic scientist and crime laboratory in a criminal investigation, as well as crime scene procedures including the simulation of a crime scene investigation and proper collection and analysis of evidence. Students learn about toxicology and anthropology and appropriate scientific analysis of physical evidence. Problem solving and critical thinking are emphasized during extensive hands-on laboratory activities. Students also receive an introduction into the workings and application of microspectrophotometry, gas chromatography and, the polarizing microscope. Supplemental case readings may be required.

Forensic Science: Gifted and Talented
Course Number: 25.4810.5 (GT)
Credit: ½
Course Number: 25.4800.5 (GT)
Credit: 1
Prerequisites: Successful completion of Biology and Chemistry is required. Concurrent enrollment in Physics is also recommended.

The gifted and talented forensic science program includes all of the topics from Forensic Science but also takes an in-depth look at chromatography, polarizing microscopy, and analysis of drugs using spectrophotometry. Independent problem solving and additional supplemental case readings are also required.

Horticulture
Course Number: 25.2040.0
Prerequisites: Successful completion of Biology and Earth/Space Science or Chemistry is recommended.
Credit: 1

Horticulture is designed for students who are interested in learning how to plant and raise garden vegetables, flowering plants, shrubs, and trees or who are interested in the floral and/or landscaping industry.

Microbiology
Course Number: 25.1080.4 (H)
Prerequisites: Successful completion of Biology and Chemistry is required.
Credit: 1

In Microbiology, students will be introduced to microorganisms as biological entities.

Oceanography/Marine Science*
Course Number: 25.6000.0
Prerequisites: Successful completion of Biology and Earth/Space Science or Chemistry is required.
Credit: 1

In Oceanography/Marine Science, students will identify, locate, and describe the major bodies of water on the earth’s surface.

Paramedical Biology
Course Number: 25.5400.0
Prerequisites: Successful completion of Biology and Earth/Space Science or Chemistry is required.
Credit: 1

In Paramedical Biology, students use their knowledge of human anatomy and physiology to explain how body systems react to and are affected by injuries and medical emergencies. Included in this study are the legal aspects of patient care and the health care provider’s rights and responsibilities under the law. Students learn how to gather information at the scene of a medical emergency and basic life support techniques. Additionally, students will study human anatomy. The course includes hands-on laboratory work, outside readings, and investigation of allied health careers.

Physics
Course Number: 25.1200.0
Prerequisite: Successful completion of, or concurrent enrollment in, Trigonometry/Analytical Geometry is required.
Credit: 1
Note: This course is also offered online.

This course is designed for students who intend to specialize in any kind of technical or scientific work. The course includes laboratory investigations in the study of motion, force, energy, momentum, electricity, magnetism, light, and relativity.

Physics: Honors
Course Number: 25.1200.4 (H)
Prerequisite: Successful completion of Trigonometry/Analytical Geometry is required.
Credit: 1

This program includes all topics from standard physics as well as topics selected from friction, electromagnetic induction, and modern physics. Students use mathematics to solve vector
problems, prove and derive formulas, and perform error analysis in laboratory work. Independent problem solving and supplemental readings are included.

**Physics: Gifted and Talented**
Course Number: 25.1200.5 (GT)
Prerequisites: Successful completion of Trigonometry/Analytic Geometry is required. Concurrent enrollment in Calculus is also recommended.
Credit: 1

This course emphasizes mathematical treatment of the fundamental laws of physics. There is considerable emphasis on the development of computational and problem-solving skills along with quantitative laboratory skills. The course uses a college text, physics periodicals, seminars, and educational and industrial community resources for enrichment. Major areas of concentration include mechanics, electricity, magnetism, light, and modern physics.

**Projects**
Course Number: 25.1360.4 (H)
Prerequisite: Successful completion of Biology, Chemistry, and Physics is required.
Credit: 1

The Projects course is designed for students who want to further their science application skills through independent-style projects. Students use skills and knowledge from biology, chemistry, physics, and mathematics and apply them to self-selected experiments and projects. All students compete in at least one Museum of Industry competition. Every project/experiment must be accompanied by documentation of pre-project planning, experiment proposal, data from testing, analysis of results, and self-evaluation of the plan and project. Individual and/or group presentations are also required. Animals may be used for experimentation/dissection in this course; however, alternative activities may also be provided.

**Zoology**
Course Number: 25.4010.0
Credit: ½
Course Number: 25.4000.0
Credit: 1
Prerequisite: Successful completion of Biology is required.

In zoology, students survey the animal kingdom phylogenetically from simple invertebrate to complex vertebrate species.

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**ADVANCED PLACEMENT COURSES**

Advanced placement science courses are scheduled whenever they are justified by enrollment. Students enrolled in advanced placement courses are eligible for GT credit. Each advanced placement course includes a study of major scientific concepts, principles, and unifying themes, and includes laboratory work that supports the development of research skills.

**Biology: Advanced Placement**
Course 25.1070.6
Credits: 2
Note: This course is also offered online.

**Chemistry: Advanced Placement**
Course 25.1790.6
Credit: 1
Note: This course is also offered online.

**Environmental Science: Advanced Placement**
Course 25.3020.6
Credit: 1
Note: This course is also offered online.

**Physics: Advanced Placement**
Course 25.1290.6
Credits: 2
Note: This course is also offered online.

**Physics B: Advanced Placement**
Course 25.1890.6
Credit: 1
Note: This course is also offered online.

**Physics C - Mechanics: Advanced Placement**
Course 25.1900.6
Credit: 1
Note: This course is also offered online.

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**INTERNATIONAL BACCALAUREATE PROGRAM (IB)**

International Baccalaureate science courses contain a body of knowledge together with scientific methods and techniques which students are required to learn and apply. In their application of scientific methods, students develop an ability to analyze, evaluate, and synthesize scientific information. A compulsory project encourages students to appreciate the environmental, social, and ethical implications of science. The project is collaborative and interdisciplinary: students analyze a topic or problem which can be investigated in each of the science disciplines offered by the school. It is also an opportunity for students to explore scientific solutions to global questions.

**Biology 9: Pre-IB**
Course 25.1010.7
Credit: 1

**Biology IB, Standard Level**
Course 25.1020.7
Credit: 1
Biology 11 IB, Honors Level*
Course 25.1040.7
Credit: 1

Biology 12 IB, Honors Level*
Course 25.1050.7
Credit: 1

Chemistry 10: Pre-IB
Course 25.1110.7
Credit: 1

Chemistry IB, Standard Level
Course 25.1120.7
Credit: 1

Chemistry 11 IB, Honors Level
Course 25.1130.7
Credit: 1

Chemistry 12 IB, Honors Level
Course 25.1140.7
Credit: 1

Physics IB, Standard Level
Course 25.1220.7
Credit: 1

Physics 11 IB, Honors Level
Course 25.1230.7
Credit: 1

Physics 12 IB, Honors Level
Course 25.1240.7
Credit: 1

* Animals may be used for experimentation/dissection in these courses; however, alternative activities may also be provided.

Note: IB courses are available only to students who have been admitted to the International Baccalaureate (IB) program. Registration for these courses is prerequisite on satisfactory completion of the requirements outlined in the International Baccalaureate curriculum.

Magnet Course:
This course can only be offered at Sparrows Point High School.

Environmental Photography (SP)
Course Number: 25.9610.0
Prerequisites: Successful completion of Biology, Environmental Science, and Fundamentals of Art is required. Successful completion of Earth/Space Science or Chemistry is recommended.
Credit: 1