SCIENCE DEPARTMENT

Graduation Goals:
Upon completing three required years of science, students will be able to:

- Practice and employ the scientific method;
- Demonstrate skills in the laboratory to perform scientific investigations;
- Explain and manipulate the general laws of physics; core concepts of biology; and chemical elements, compounds, and reactions.
- Utilize and develop problem solving /critical thinking/analysis skills;
- Correlate real life situations to the concepts of physics, biology and chemistry;
- Effectively use scientific research tools, such as graphic calculators, the internet, and scientific literature.

Honors Conceptual Physics
515 Year 1.0 Freshman

Students who have demonstrated proficiency in analytical, mathematical and communication skills will examine in detail the concepts and principles of physics. Students will engage in laboratory work, develop concepts, and apply what they have learned.
Approval: Placement in Honors Conceptual Physics will be determined through standardized testing, grades in previous courses, and teacher recommendations.

Conceptual Physics
542 Year 1.0 Freshman

Students will, through hands-on activities, develop the concepts and understand the principles of physics. Mathematical problem-solving skills and critical thinking will be used and developed, particularly in lab work.

Honors Biology
520 Year 1.0 Sophomore

Biology is the science that deals with living organisms. This laboratory-oriented course will emphasize a systematic approach to molecular, cellular and developmental biology; genetics; evolution; physiology and ecology, with a special emphasis on humans as a representative species in the study of anatomy and physiology. The structure and function of the major plant and animal groups will be integrated with other aspects of the course material. The course will teach science as a method of inquiry.
Approval: Students will be placed in Honors Biology based on their performance and work habits in the ninth grade science course, based on the recommendation of the department.

Honors Biochemistry
525 Year 1.0 Sophomore

This one-year, two semester course is for students who are being considered for the International Baccalaureate Diploma Programme. Students will explore concepts of chemistry that directly impact biological functions, and they will be introduced to core concepts in biology.
Approval: Students will be placed in Honors Biochemistry based on their performance and work habits in the ninth grade science course, based on the recommendation of the department. Students are also required to be applicants to the International Baccalaureate Diploma Programme.

Biology
521 Year 1.0 Sophomore

This course will introduce the student to the major concepts of modern biology, the science of living organisms. This laboratory-oriented course will emphasize a systematic approach to molecular, cellular and developmental biology; genetics; evolution; physiology and ecology. The structure and function of the major plant and animal groups will be integrated with other aspects of the course material. The course will teach science as a method of inquiry.

Honors Chemistry
530 Year 1.0 Junior

This course is designed to provide the students with a basic understanding of the fundamental laws and theories of chemistry. Unifying principles such as kinetic theory, mole concept, atomic and molecular structure, periodic law, and oxidation-reduction will be studied. Laboratory work will provide the basis for the development of these principles.
Approval: Students will be placed in Honors Chemistry based on their performance and work habits in their tenth grade science course, as well as their performance in Algebra 1 and geometry.

Chemistry
531 Year 1.0 Junior

This course aims at providing the student with a solid background in the basic concepts and principles of chemistry. Topics under study include: atomic structure, periodic law, chemical equations and formulas, problem solving in mass relationships and energy changes, and the chemical bonding that produces molecular compounds. Laboratory work is designed to illustrate concepts and familiarize the student with techniques and equipment.

Honors Physics
540 Year 1.0 Senior

The topics of physics covered include mechanics, light, electricity, sound and relativity. In each area, more sophisticated applications and mathematical problem solving than that

used in conceptual physics will be stressed. The student will be prepared for an introductory college-level course. Laboratory experiments will include mechanics, light, electricity, sound and relativity.
Approval: This course requires the approval of the science department, based on the student's performance and work habits in chemistry or honors chemistry and in math; students must have completed a math course in Algebra 2 or higher.

Kinesiology and Sports Medicine
552 Year 1.0 Senior

In this course students will be introduced to the principles of anatomy, physiology, first aid, and kinesiology that are the basis of athletic training. Students will also be introduced to the specialties that operate under the umbrella of sports medicine.

Sports Medicine Practicum
553 Semester .5 Senior

Students taking this elective will apply the principles of anatomy, physiology, first aid and kinesiology in real-world athletic training situations under the supervision of a certified athletic trainer. **Note:** This practicum will involve extensive after-school work, so students must be available beyond the normal school day.

Approval: Students in this course must be taking Kinesiology or I.B. Biology and must receive the approval of the chair of the Science department or the Athletic Trainer.

Environmental Science 1
561 Semester 0.5 Senior

Students in this course will receive an up-to-date introduction to the study of the environment. Information is presented from interdisciplinary perspectives, including ecology, geology, climatology, and political science, an approach necessary for dealing with environmental problems. Students will gain a working knowledge of environmental functioning to analyze environmental issues from a number of perspectives.

Environmental Science 2
562 Semester 0.5 Senior

Students will learn the science involved in analyzing environmental problems through hands-on explorations and labs. Students will use the skills previously acquired in chemistry, biology and physics to collect, organize and analyze data taken directly from the environment as evidence for the issues discussed in Environmental Science 1. Required activities include water and soil testing, composting, Anacostia River clean-up projects, and interaction with miniature ecosystems.
Prerequisite: Environmental Science 1

Forensic Science

565 Semester 0.5 Senior

This multidisciplinary, applied science encompasses the sciences, technology, mathematics, social studies and language arts. Students will gain a basic understanding of how these disciplines are used in criminal cases. Assignments will incorporate published works, case examples and forensic science techniques. This course will broaden students' horizons regarding forensic science careers and will address how to pursue more advanced levels of study in this field.

I.B. Biology 11
580 Year 1 Junior

Upon completion of this course, taught at the I.B. Higher Level, students will have acquired an in-depth knowledge and understanding of the significance of local and global views of issues in science that impact a variety of other disciplines. They will also be able to seek answers actively to questions raised by advanced level biological concepts through guided and independent research. The skills of investigation and analysis students gain in this course will prepare them for advanced work in other scientific disciplines. The eleventh grade year of Biology will focus on chemistry as it impacts biology, cells, plant science, genetics and nucleic acids.
Approval/Prerequisites: This course is for students who have been accepted into the I.B. Diploma Programme.

I.B. Biology 12
582 Year 1 Senior

Students will continue to develop the research and analysis skills begun in I.B. Biology 11. This course will focus on human health and biology; neurobiology and behavior; ecology, evolution and conservation.
Approval/Prerequisites: Successful completion of I.B. Biology 11.