

## SCIENCE DEPARTMENT

**“Equipped with his five senses, man explores the universe around him and calls the adventure Science.”**  
EDWIN POWELL HUBBLE

### *Suggested Progressions*

Year	Track 1	Track 2	Track 3
9 <sup>th</sup> Grade	Biology	Earth Science	Honors Biology
10 <sup>th</sup> Grade	Chemistry Earth Science	Biology	Honors Chemistry
11 <sup>th</sup> Grade	Conceptual Physics Environmental Science Earth Science Chemistry	Chemistry	AP Biology AP Chemistry Honors Physics I Anatomy & Physiology
12 <sup>th</sup> Grade	Conceptual Physics Environmental Science Hon. Environmental Sci. Earth Science Chemistry	Conceptual Physics Environmental Science	AP Biology AP Chemistry Honors Physics I Honors Physics II Anatomy & Physiology

*\*All students are required to complete four science classes for graduation. These should include Biology, Chemistry, and Physics.*

### **BIOLOGY**

**SCI 400**                      **Full Year**                      **1 credit**                      **Q.P. 4**

This year course in biology is designed to provide a broad general understanding of the fundamental principles of living organisms. Topics to be covered include: characteristics of living organisms, scientific method, biochemistry, cell theory, cellular physiology, genetics, evolution, classification, and a phylogenic survey of the five kingdoms. Appropriate lab exercises are used to develop many of the biological concepts that are presented.

PREREQUISITE: None

### **HONORS BIOLOGY**

**SCI 402**                      **Full Year**                      **1 credit**                      **Q.P. 5**

This course in biology is designed to provide a broad general understanding of the fundamental principles of living organisms. Topics to be covered include: characteristics of life, scientific problem solving, biochemistry, cell theory, cellular physiology, genetics, evolution, classification, and a phylogenic survey of the kingdoms of life. An emphasis will be placed on the research that is the basis of our knowledge in biology and will necessitate critical evaluation of current research in professional publications. Appropriate labs will include DNA electrophoresis and individual or small group student generated experiments. Documented proficiency in writing and science is required.

PREREQUISITE: Departmental recommendation

### **CHEMISTRY**

**SCI 411**                      **Full Year**                      **1 credit**                      **Q.P. 4**

This is a math-based course in high school chemistry with emphasis on the experimental development of basic concepts through laboratory investigations and the mathematical expression of laboratory findings. The course is designed to develop an appreciation of chemistry as a creative pursuit of knowledge and to enhance scientific literacy.

PREREQUISITES: Biology and Algebra I

### **HONORS CHEMISTRY**

**SCI 412**                      **Full Year**                      **1 credit**                      **Q.P. 5**

This is an intensive course in high school chemistry with emphasis on the experimental development of basic concepts through laboratory investigations, and the mathematical expression of laboratory findings. The course is designed to develop an appreciation of chemistry as a creative pursuit of knowledge and to enhance scientific literacy. A strong emphasis is placed on higher-level lab work and independent study.

PREREQUISITES: Biology, Algebra I, and departmental recommendation

### **ADVANCED PLACEMENT<sup>®</sup> CHEMISTRY**

**SCI 445**                      **Full Year**                      **1 credit**                      **Q.P. 6**

Advanced Placement Chemistry is the equivalent of a first year college chemistry course. While many required topics were covered in Honors Chemistry, they will of necessity be reviewed and covered in more depth in this course. Additional topics include chemical equilibrium, acid-base theory, oxidation-reduction, thermochemistry, nuclear chemistry and electrochemistry. Laboratory work will be designed to complement what was completed in the first year course. Laboratory emphasis will be placed on those topics not already encountered.

PREREQUISITES: Chemistry and departmental recommendation

### **CONCEPTUAL PHYSICS**

**SCI 421**                      **Full Year**                      **1 credit**                      **Q.P. 4**

Conceptual Physics provides a conceptual framework for later quantitative course work. It applies the concepts of physics to explain phenomena that students have observed in the everyday world.

PREREQUISITES: Algebra and Geometry

### **HONORS PHYSICS I**

**SCI 422**                      **Full Year**                      **1 credit**                      **Q.P. 5**

This course is intended as a course for juniors so that the survey of classical physics can be completed in the senior year (Honors Physics II), Honors Physics I provides the student with a knowledge of kinematics in one and two dimensions, dynamics, circular motion, work and energy, linear momentum, vibrations and waves, sound, geometric optics, and the wave nature of light. Emphasis is placed on the understanding of concepts and their application to problem solving. Critical thinking skills are an important part of the course of study.

PREREQUISITES: Chemistry, Algebra II, and departmental recommendation

### **HONORS PHYSICS II**

**SCI 432**                                      **Full Year**                                      **1 credit**                                      **Q.P. 5**

This course is designed to complete the survey of classical physics begun in Honors Physics I. Honors Physics II provides the student with a knowledge of electric charge and electric field, electric potential and electric field, electric currents, circuits, magnetism, electromagnetic induction, electromagnetic waves, the theory of relativity, and early quantum theory. Emphasis is placed on the understanding of concepts and their application to problem solving. Critical thinking problems are an important part of the course of study.

PREREQUISITES: Honors Physics I and departmental recommendation

**ENVIRONMENTAL SCIENCE**

**SCI 431**                                      **Full Year**                                      **1 credit**                                      **Q.P. 4**

Environmental science probes the theory, history, and response of societies to environmental issues. This course examines sustainable development and public policy as societies shape the present and future. A global perspective is enhanced through many examples, case studies, and maps. Environmental science will heighten awareness of ethical issues, international and local environmental concerns and sociological perspectives.

PREREQUISITES: Biology and Chemistry

**HONORS ENVIRONMENTAL SCIENCE**

**SCI 442**                                      **Full Year**                                      **1 credit**                                      **Q.P. 5**

Honors Environmental Science will provide a fascinating insight into some of the more than two thousand plants and animals that make their home in the Chesapeake Bay. It will cover marine animals, along with selected birds, seaweeds, and wetland plants of the Chesapeake Bay and the mid-Atlantic area. You will acquire information on estuarine and estuarine-associated organisms. This course examines sustainable development and public policy as societies shape the present and future. A perspective is enhanced through many new examples, case studies, and maps. Environmental Science will heighten awareness of ethical issues, international and local environmental concerns, and sociological perspectives.

PREREQUISITE: Biology, Chemistry, and departmental recommendation

**HONORS ANATOMY AND PHYSIOLOGY**

**SCI 443**                                      **Full Year**                                      **1 credit**                                      **Q.P. 5**

This honors level course is designed to give a general overview of human anatomy and physiology. It stresses the relationship between structure and function. Topics to be covered include cell structures and their functions, tissues, glands and membranes, integumentary system, skeletal system, musculature system, nervous system, circulatory and respiratory systems, and digestive system. Although emphasis will be placed on the human body, other animals will be discussed for contrast and comparison. Laboratory activities, speakers, and field trips will help develop many of the concepts presented.

PREREQUISITES: Biology, Chemistry, and departmental recommendation

**EARTH SCIENCE**

SCI 446

Full Year

1 Credit

Q.P. 4

This course provides students an opportunity to examine the planet we live on and its surroundings. Topics to be investigated include the Earth's origin, structure and composition, the earth's environment and meteorology, as well as space and astronomy.

PREREQUISITE: None

**ADVANCED PLACEMENT<sup>®</sup> BIOLOGY**

SCI 447

Full Year

1 Credit

Q.P. 6

This course is designed to be the equivalent of a college introductory biology course usually taken by biology majors during their first year. The college course differs significantly from the usual first high school course in biology with respect to the kind of textbook used, the range and depth of topics covered, the kind of laboratory work done by students, and the time and effort required of students. AP Biology is designed to be taken by students after the successful completion of a first course in high school biology and one in high school chemistry. It aims to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology. Essential to this conceptual understanding are the following: a grasp of science as a process rather than as an accumulation of facts; personal experience in scientific inquiry; a recognition of unifying themes that integrate the major topics of biology; and application of biological knowledge and critical thinking to environmental and social concerns. Students will take the College Board's AP Biology Exam at the conclusion of the course.

PREREQUISITES: Biology, Chemistry, and departmental recommendation

**METEOROLOGY**

SCI 448

Semester

1/2 credit

Q.P. 4

This semester course will introduce students to the fundamental concepts in the atmospheric sciences. Students will learn about weather and forecasting using computer multimedia technology and dynamic information from the worldwide web.

PREREQUISITE: None