Department of Teaching & Learning  
Parent/Student Course Information 

Advanced Placement Biology  
(SC 4340)  
One credit, One year  
Grades 11-12 

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department. 

COURSE DESCRIPTION  
Advanced Placement Biology is a college-level course that examines the principles of biology in detail. This course is designed in accord with the requirements of the College Board, and students are expected to take the Advanced Placement Biology Examination at the end of the course. 

COURSE GOALS  
• Develop knowledge of the facts, principles and processes of biology  
• Develop an understanding of the means by which biological information is collected, how it is interpreted, how hypotheses are formulated from available data and how further predictions are made  
• Develop an understanding that science is a human endeavor with social consequences 

PREREQUISITE  
Biology and Chemistry 

OPTIONS FOR NEXT COURSE  
Advanced Placement Environmental Science (Biology and Chemistry prerequisites)  
Advanced Placement Chemistry (Chemistry prerequisite)  
Advanced Placement Physics 1 (Algebra II/Trigonometry prerequisite)  
Advanced Placement Physics C: Mechanics (Algebra II/Trigonometry and Calculus prerequisite)  
Earth Science  
Oceanography (Earth Science prerequisite)  
Astronomy (Earth Science prerequisite)  
Physics (Algebra II prerequisite or co-requisite) 

REQUIRED TEXTBOOK  

MINIMUM REQUIREMENTS  
• Read and outline assigned chapters in the textbook and/or answer the questions in the study guide  
• Participate in the laboratory activities, prepare written laboratory reports and adhere to all safety procedures  
• Read science journals, magazines and books to expand the ideas and topics presented in class  
• Participate in simulated computer laboratory experiences  
• Attend the extended class or laboratory sessions scheduled each week  
• Demonstrate knowledge and understanding of all core objectives through laboratory investigations, projects, oral and/or written tests, quizzes and reports
• Conduct the required laboratory experiments identified by the Advanced Placement Biology Development Committee

The Knowledge, Skills and Attitudes that Comprise the Advanced Placement Biology Course are Summarized as Follows From the Prescribed Curriculum:

**BIG IDEAS AND KNOWLEDGE**

**Big Idea 1: Evolution**
- Natural Selection
- Biological Evolution
- Evidence for evolution
- Phylogenetic classification
- Evolutionary patterns
- Speciation and extinction

**Big Idea 2: Cellular Processes; Energy and Communication**
- Free energy changes
- Dynamic homeostasis
- Homeostatic mechanisms
- Cellular energetics

**Big Idea 3: Genetics and Information Transfer**
- Heritable information
- Mendelian genetics
- Molecular genetics
- Gene regulation
- Gene expression
- Cell communication

**Big Idea 4: Interactions**
- Population dynamics
- Subcellular organization
- Cooperative interactions
- Distributions of local and global ecosystems
- Environmental factors

**LABORATORY EXPERIENCES**

- Descriptive and experimental laboratory exercises are a required component of the Advanced Placement Biology course. A minimum of twenty-five percent (25%) of a student’s time should be spent in laboratory investigations.

- The Advanced Placement Biology Development Committee has identified standard laboratories that are a required component of all AP Biology courses in the country. The required standard laboratories are listed below.

**Big Idea 1: Evolution**
Lab 1: Artificial Selection
Lab 2: Mathematical Modeling: Hardy-Weinberg
Lab 3: Comparing DNA Sequences to Understand Evolutionary Relationships with BLAST

**Big Idea 2: Cellular Processes: Energy and Communication**
Lab 4: Diffusion and Osmosis
Lab 5: Photosynthesis
Lab 6: Cellular Respiration

**Big Idea 3: Genetics and Information Transfer**
Lab 7: Cell Division: Mitosis and Meiosis
Lab 8: Biotechnology: Bacterial Transformation
Lab 9: Biotechnology: Restriction Enzyme Analysis of DNA

**Big Idea 4: Interactions**
Lab 10: Energy Dynamics
Lab 11: Transpiration
Lab 12: Fruit Fly Behavior
Lab 13: Enzyme Activity

- In addition to the standard labs, students are required to participate in other laboratory investigations which reinforce and expand those facts, principles and concepts of general biology covered in lecture, reading and discussion. Computer simulated labs such as Bird Breed, Enzken and Flygen are included in these additional investigations.
NOTE: Students should keep records of their laboratory work in such a fashion that the reports can be readily reviewed. Some institutions want to see a record of the laboratory work done by an advanced placement student before making a decision about granting credit and/or placement in the biology program.

Dr. Aaron C. Spence, Superintendent
Virginia Beach City Public Schools
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(Revised August 2017)