



**Online Courses for High School Students**  
1-888-972-6237

**Advanced Placement® Biology**

**COURSE DESCRIPTION:**

This course guides students to a deeper understanding of biological concepts including the diversity and unity of life, energy and the processes of life, homeostasis, and genetics. Students learn about regulation, communication, and signaling in living organisms, as well as interactions of biological systems. Students carry out a number of learning activities, including readings, interactive exercises, extension activities, hands-on and virtual laboratory experiments, and practice assessments. These activities are designed to help students gain an understanding of the science process and critical-thinking skills necessary to answer questions on the AP Biology Exam. The content aligns to the sequence of topics recommended by the College Board.

**PREREQUISITES:**

Success in Biology, Chemistry, Algebra I, and teacher/school counselor recommendation required; success in Algebra II highly recommended

**COURSE LENGTH:** Two Semesters

**REQUIRED TEXT:** No required textbook for this course

**LABS:** Home school is responsible for all labs

**COURSE OUTLINE:**

**Unit 1: Evolution: The Diversity and Unity of Life**

- Course Introduction
- Natural Selection
- Phenotypic Variation in Populations
- Types of Natural Selection
- Laboratory: Natural Selection
- Application of Mathematics: Graphing
- Genetic Basis of Evolution
- Application of Mathematics: Hardy-Weinberg Equilibrium
- Vertical and Lateral Gene Transfer
- Laboratory: Population Genetics
- Origin of Life on Earth
- Evidence for Evolution
- Test-Taking Strategies

- Shared Ancestry: Conserved Traits
- Phylogeny and the Interrelatedness of Life
- Speciation and Extinction

## **Unit 2: Energy and the Processes of Life**

- Energy and Life
- Energy Strategies of Living Things
- Photosynthesis
- Laboratory: Photosynthesis
- Glycolysis and Fermentation
- Test-Taking Strategies
- Cellular Respiration
- Laboratory: Cellular Respiration
- ATP
- Water and Macronutrients
- Cell Death

## **Unit 3: Homeostasis**

- Homeostasis
- Cell Membranes and Walls
- Passive and Active Transport
- Laboratory: Diffusion and Osmosis
- Exocytosis and Endocytosis
- Membranes and Organelles
- Application of Mathematics: Data Tables
- Positive and Negative Feedback Mechanisms
- Behavioral Responses to the Environment
- Biotic and Abiotic Factors
- Laboratory: Transpiration
- Obtaining and Eliminating Nutrients
- Regulating Respiration and Circulation
- Laboratory: Circulation
- Regulating Temperature
- Defense and the Immune Response
- Timing and Coordination of Life Processes

## **Unit 4: Genetics**

- History of the Gene
- DNA and RNA
- Protein Synthesis
- Test-Taking Strategies
- Genetic Code and Unity of Life
- Genetic Engineering
- Mitosis and Meiosis
- Laboratory: Mitosis and Meiosis
- Sexual Reproduction

- Asexual Reproduction
- Mendelian Inheritance
- Laboratory: Genetics
- Application of Mathematics: Probability
- Human Genetic Disorders
- Ethical Issues in Genetics

### **Unit 5: Semester 1 Review and Test**

- Students review the semester content and take an exam.
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### **Unit 6: Regulation, Communication, and Signaling**

- Course Introduction
- Gene Regulation in Prokaryotes
- Gene Regulation in Eukaryotes
- Gene Regulation Signals
- Application of Mathematics: Bioinformatics
- Laboratory: Gene Regulation
- Mutation and Genetic Variation
- Viruses and Genetic Variation
- Test-taking Strategies
- Cell Communication
- Signal Transduction Pathways
- Information Exchange
- Laboratory: Behavior
- Processing Signals: Nervous System Structure
- Processing Signals: Nervous System Function
- Communication Between Individuals

### **Unit 7: Interaction of Biological Systems**

- Nucleic Acids and Proteins
- Lipids and Carbohydrates
- Laboratory: Molecular Biology
- Test-taking Strategies
- Intercellular Structure and Function
- Laboratory: Dissolved Oxygen
- Interactions between Cells, Organs, and Systems
- Test-taking Strategies
- Interactions within Communities
- Energy Flow in Ecosystems
- Laboratory: Energy Flow in Ecosystems
- Application of Mathematics: Visualizing Mathematical Relationships
- Interactions of Molecules, Enzymes, and Cells
- Laboratory: Enzyme Catalysis
- Interactions between Individuals and Populations
- Changes in Ecosystems
- Molecular Variation

- Biodiversity

### **Unit 8: Semester 2 Review and Test**

- Students review the semester content and take an exam.

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### **Unit 9: Comprehensive Review**

- Students do a comprehensive review of the entire course and complete a practice AP exam.

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### **Unit 10: Independent Study**

- During the Independent Study portion of the course, teachers assign a project or reading to the students. Each teacher will choose an area of study in biology that allows students to explore, in depth, some aspect of biology that extends the course work.