

AP Biology Course Outline

Course Description:

The purpose of Advanced Placement Biology is to provide a college level course in biology and to prepare the student to seek credit and/or appropriate placement in college biology courses. This course meets daily for a 50 minute period. Students are engaged in hands-on laboratory work, integrated throughout the course that accounts for more than 25% of the class time. Emphasis is placed on depth of understanding of a topic, rather than breadth of topics. Students will take several quizzes and exams that will test their overall knowledge and ability in this course.

STRUCTURE OF THE COURSE

AP Biology is built around six science practices, four big ideas and eight units.

SCIENCE PRACTICES

The AP Biology science practices describe what a student should be able to do while exploring course concepts. These are categorized into skills, which form the basis of the tasks on the AP Exam.

Science Practice 1: *Models and Representations* - Describe models and representations across scales.

Science Practice 2: *Question and Method* - Determine scientific questions and methods.

Science Practice 3: *Representing Data and Phenomena* - Create models of chemical phenomena.

Science Practice 4: *Model Analysis* - Analyze/Interpret models on a single or across multiple scales.

Science Practice 5: *Mathematical Routines* - Solve problems using mathematical relationships.

Science Practice 6: *Argumentation* - Develop an explanation or scientific argument.

BIG IDEAS

BIG IDEA 1: EVOLUTION (EVO) The process of evolution drives the diversity and unity of life. Evolution is a change in the genetic makeup of a population over time, with natural selection as its major driving mechanism. Darwin's theory, which is supported by evidence from many scientific disciplines, states that inheritable variations occur in individuals in a population. Due to competition for limited resources, individuals with more favorable genetic variations are more likely to survive and produce more offspring, thus passing traits to future generations. A diverse gene pool is vital for the survival of species because environmental conditions change. The process of evolution explains the diversity and unity of life, but an explanation about the origin of life is less clear. In addition to the process of natural selection, naturally occurring catastrophic and human-induced events as well as random environmental changes can result in alteration in the gene pools of populations. Scientific evidence supports that speciation and extinction have occurred throughout Earth's history and that life continues to evolve within a changing environment, thus explaining the diversity of life

BIG IDEA 2: ENERGETICS (ENE) Biological systems use energy and molecular building blocks to grow, reproduce, and maintain dynamic homeostasis. Cells and organisms must exchange matter with the environment. Organisms respond to changes in their environment at the molecular, cellular, physiological, and behavioral levels. Living systems require energy and matter to maintain order, grow, and reproduce. Organisms employ various strategies to capture, use, and store energy and other vital resources. Energy deficiencies are not only detrimental to individual organisms but they can cause

disruptions at the population and ecosystem levels. Homeostatic mechanisms that are conserved or divergent across related organisms reflect either continuity due to common ancestry or evolutionary change in response to distinct selective pressures.

BIG IDEA 3: INFORMATION STORAGE AND TRANSMISSION (IST) Living systems store, retrieve, transmit, and respond to information essential to life processes. Genetic information provides for continuity of life, and, in most cases, this information is passed from parent to offspring via DNA. Nonheritable information transmission influences behavior within and between cells, organisms, and populations. These behaviors are directed by underlying genetic information, and responses to information are vital to natural selection and evolution. Genetic information is a repository of instructions necessary for the survival, growth, and reproduction of the organism. Genetic variation can be advantageous for the long-term survival and evolution of a species.

BIG IDEA 4: SYSTEMS INTERACTIONS (SYI) Biological systems interact, and these systems and their interactions exhibit complex properties. All biological systems comprise parts that interact with one another. These interactions result in characteristics and emergent properties not found in the individual parts alone. All biological systems from the molecular level to the ecosystem level exhibit properties of biocomplexity and diversity. These two properties provide robustness to biological systems, enabling greater resiliency and flexibility to tolerate and respond to changes in the environment.

UNITS

The course content is organized into commonly taught units. The units have been arranged in a logical sequence frequently found in many college courses and textbooks. The eight units in AP Biology, and their weighting on the multiple-choice section of the AP Exam, are listed below.

Units	Exam Weighting
Unit 1: Chemistry of Life	8–11%
Unit 2: Cell Structure and Function	10–13%
Unit 3: Cellular Energetics	12–16%
Unit 4: Cell Communication and Cell Cycle	10–15%
Unit 5: Heredity	8–11%
Unit 6: Gene Expression and Regulation	12–16%
Unit 7: Natural Selection	13–20%
Unit 8: Ecology	10–15%

Classroom Requirements and Expectations

During the year, students will be required to **PAY ATTENTION** during class, carry out **CLASS ASSIGNMENTS**, do and bring in **HOMEWORK**, **STUDY** on a regular basis - 1-2 hours outside class time each day, and do **LABS** for this course.

THINGS TO BRING TO CLASS

At least two pens and a pencil must be brought to class daily. Three notebooks are required. One is used for chapter questions throughout the year, a second will be used for notes, and the third will be used 2nd semester for exam review. A folder or binder is recommended. Students will also need a scientific calculator.

Students will be given any reference sheets needed as they need them. Any homework assigned must be brought to school the day it is due. Labs, activities, and class work should be completed the day that they are due as well. ***Any missing assignments for a unit are due the day before an exam and will not be accepted after the Unit Exam.*** ***Lastly, plagiarism is unacceptable. Any student caught copying or allowing others to copy their HW or labs will be given zeros for that assignment.***

LIST OF DAILY REQUIREMENTS

- 1) Notebook (3)
- 2) Pens or pencils
- 3) Reference table
- 4) Textbook
- 5) HW and/or Labs for that day (when required)

Grading Policy

Formative assessments will be 20% of the grade

Homework:

Homework will be given on a regular basis. In this class, homework is used as a study aid. Homework will always be checked for completeness. Failure to do HW will result in loss of points towards the grade, and will lead to bad test grades.

Student Activities: In addition to your HW assignment, you will be doing student activities that are designed to help you understand the concepts of biology. Some of these activities will be finished in class, while others may need to be completed for HW. Some will be lone activities, while others will be done in groups.

Labs/Activities: Labs/Activities are done in every unit in AP Biology.

Summative assessments will be 80% of the grade

Tests: Tests are given when a unit is completed. Each unit will be completed at a different pace. There will be 6 unit tests by the end of Semester 1, with the Unit 6 test being the final - NO EXEMPTIONS 1st semester. Also 1st semester your lowest test grade is dropped.

