

#424/434 AP BIOLOGY/AP BIOLOGY EXAM PREP

GRADES 11 & 12

LEVEL: AP

CREDITS: 5/5

PREREQUISITES: COLLEGE BIOLOGY AND CHEMISTRY

BASIC TEXT: Biology, Campbell and Reese, Sixth Edition

RESOURCES: video projector, biotechnology equipment, field trips to see biotechnology companies, field trips to Museum of Science to use their laboratory.

MISSION RELATED GOALS: Foster communication, foster problem solving, enhance academic curiosity, respect the rights of others, be a successful, contributing member of society that exhibits self-confidence.

STUDENT EXPECTATIONS ADDRESSED: Inquiry based learning promotes intellectual curiosity. Lab experiments and lab design foster problem solving. Cooperative learning in lab settings develops effective communication. Emphasis is placed on written and oral communication and maintaining a high level of academic excellence.

STATE STANDARDS:

The focus of this course is not on state standards, but standards established by the College Board to help students successfully pass the AP Biology exam. The course is taught thematically.

COLLEGE BOARD THEMES:

- I. Science as a Process
- II. Evolution
- III. Energy Transfer
- IV. Continuity and Change
- V. Relationship of Structure to Function
- VI. Regulation
- VII. Interdependence in Nature
- VIII. Science, Technology, and Society

COURSE DESCRIPTION:

The AP Biology course 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.

The two main goals of AP Biology are to help students develop a conceptual framework for modern biology and to help students gain an appreciation of science as a process. Primary emphasis in an AP Biology course is on developing an understanding of concepts rather than on memorizing terms and technical details. 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; recognition of unifying themes that integrate the major topics of biology; and application of biological knowledge, and critical thinking to environmental and social concerns.

GENERAL PERFORMANCE OBJECTIVES:

Students are encouraged to focus on understanding important relationships, processes, mechanisms, and potential extensions and applications of concepts. Less emphasized, but still very important, is the memorization of terms and technical details. Lab skills test a student's ability to explain, analyze, and interpret biological processes and phenomenon. Other process skills include the ability to use a wide range of laboratory equipment to accurately measure mass and volume.

COURSE OUTLINE:

1. Molecules and Cells (25%)
 - A. Chemistry of Life
 - i. Water
 - ii. Organic molecules in organisms
 - iii. Free energy changes
 - iv. Enzymes
 - B. Cells
 - i. Prokaryotic and eukaryotic Cells
 - ii. Membranes
 - iii. Subcellular organization
 - iv. Cell cycle and its regulation
 - C. Cellular Organization
 - i. Coupled Reactions
 - ii. Fermentation and cellular respiration
 - iii. Photosynthesis

2. Heredity and Evolution (25%)
 - A. Heredity
 - i. Meiosis
 - ii. Eukaryotic chromosomes
 - iii. Inheritance patterns
 - B. Molecular Genetics
 - i. RNA and DNA structure and function
 - ii. Gene regulation
 - iii. Mutation
 - iv. Viral structure
 - v. Nucleic acid technology
 - C. Evolutionary Biology
 - i. Evolution of life
 - ii. Evidence of evolution
 - iii. Mechanisms of evolution
3. Organisms and Populations (50%)
 - A. Diversity of Organisms
 - i. Evolutionary patterns
 - ii. Survey of the diversity of life
 - iii. Phylogenetic classification
 - iv. Evolutionary relationships
 - B. Structure and Function of Plants and Animals
 - i. Reproduction, growth, and development
 - ii. Structural, physiological, and behavioral adaptations
 - iii. Response to the environment
 - C. Ecology
 - i. Population dynamics
 - ii. Communities and ecosystems
 - iii. Global issues

USE OF TECHNOLOGY:

Video programs, power point presentation, interactive web activities, microscopes, gel electrophoresis, titration, micropipetting, gene splicing, culturing cells, asexual propagation, chlorophyll extraction, and use of photospectrometer.

ASSESSMENT:

Students are given multiple ways to show mastery including; tests, quizzes, lab reports, analysis, class reports, research, and participation. Multiple choice tests and school wide rubrics are employed.