

## AP Biology Course Syllabus

**COURSE DESCRIPTION:** AP Biology is taught at the same level as a first year college biology course. Students learn to think like scientists: making predictions based on observations, writing hypothesis, designing and completing experiments, and reaching conclusions based on the analysis of data derived from these experiments. Students apply the concepts of biology to their everyday experiences and current events and issues in science and society. The course provides opportunities for guided inquiry and student-centered learning to foster critical thinking skills. This course addresses the major themes: Science as a Process, Evolution, Energy Transfer, Continuity and Change, Relationship of Structure to Function, Regulation, Interdependence in Nature, and Science, Technology, and Society.

### COURSE OBJECTIVES:

- Read, understand, and interpret biological information and explain its relevance to environmental, medical, and social concerns
- Use the concept of evolution as the foundation of modern biological models and thinking
- Apply the concepts and procedures of scientific reasoning to understanding biological phenomenon
- Perform experiments, interpret the results of observations, and communicate results

**COURSE LENGTH:** Two Semesters

**REQUIRED TEXTS:** *Biology AP Edition, 7/E Campbell* | ©2004 | Pearson

The text book was selected in large part because it emphasizes evidence of an understanding of science as a process rather than an accumulation of facts. Course assignments and instruction are made with that concept firmly in place.

### COURSE OUTLINE:

1. Introduction and The Chemistry of Life (25% of first semester) Themes: Science as Process, Evolution
  1. Chemistry of Life including the Themes of Biology
  2. Water
  3. Organic Molecules in Organisms
  4. Free Energy Changes
  5. Enzymes
2. The Cell (25%) Themes: Science as Process, Relationship of Structure to Function Regulation, and Science, Technology and Society
  1. Prokaryotic and Eukaryotic Cells
  2. Subcellular Organization
  3. Membrane Structure and Function
  4. Cellular Energetics
    1. Coupled Reactions Thermodynamics, and ATP Cycling
    2. Fermentation and Cellular Respiration
  5. Photosynthesis
  6. Cell Cycle and its Regulation
3. Genetics (25%) Themes: Science as a Process, Evolution, Regulation, Continuity and Change and Interdependence in Nature
  1. Heredity

## AP Biology Course Syllabus

1. Meiosis and gametogenesis
2. Eukaryotic Chromosomes
3. Inheritance Patterns
2. Molecular Genetics
  1. RNA and DNA Structure and Function
  2. Gene Regulation
  3. Mutation
  4. Viral Structure and Replication
  5. Nucleic Acid Technology and Applications
4. The Mechanism of Evolution (25%) Themes: Evolution, and Continuity and Change
  1. Evidence for Evolution
  2. Mechanisms of Evolution

End of First Semester

5. The Evolutionary History of Biological Diversity (25% of second semester) Themes: Science as a Process, Evolution, and Interdependence of Nature
  1. Early Evolution of Life
  2. Diversity of Organisms
  3. Evolutionary Patterns
  4. Survey of the Diversity of Life
  5. Phylogenetic Classification
  6. Evolutionary Relationships
6. Plant Form and Function (25%) Themes: Evolution, Interdependence of Nature, and Relationship of Structure to Function
  1. Reproduction, Growth, and Development
  2. Structural, Physiological, and Behavioral Adaptations
  3. Response to Environment
7. Animal Form and Function (25%) Themes: Evolution, Interdependence of Nature, and Relationship of Structure to Function
  1. Reproduction, Growth, and Development
  2. Structural, Physiological, and Behavioral Adaptations
  3. Response to Environment
8. Ecology (25%) Themes: Evolution, Interdependence of Nature, and Science, Technology and Society
  1. Population Ecology
  2. Community Ecology
  3. Ecosystems
  4. Global Issues

**LABS:** The lab program requires students to apply biological knowledge and critical thinking skills in a hands-on investigation. To facilitate team work, students examine and discuss case studies in teamwork to identify collaborative skills as part of their pre-lab instruction. Students are required to produce lab reports that include an explanation of the problem, their hypothesis, the procedure, their data and observations, calculations, and analysis and conclusions including possible errors or limitations. Students are required to keep a lab notebook of all lab reports completed in the course.

Labs are sequenced into the flow of instruction integrating concepts and processes. The labs teach the scientific method and require students to think, observe, and make decisions about their learning rather than merely memorize facts.

## AP Biology Course Syllabus

All twelve required AP Biology labs are included in a hands-on format that requires 25% of the course time.

Unit 1:	AP Lab 2: Enzyme Catalysis
Unit 2:	AP Lab 1: Diffusion and Osmosis
	AP Lab 5: Cell Respiration
	AP Lab 4: Plant Pigments and Photosynthesis
	AP Lab 3a: Mitosis
Unit 3:	AP Lab 3b: Meiosis
	AP Lab 7: Genetics of Organisms
	AP Lab 6: Molecular Biology
Unit 4:	AP Lab 8: Population Genetics and Evolution
Unit 6:	AP Lab 9: Transpiration
Unit 7:	AP Lab 10: Circulatory Physiology
Unit 8:	AP Lab 11: Animal Behavior
	AP Lab 12: Dissolved Oxygen

### INSTRUCTIONAL STRATEGIES:

Each unit includes a concept review which integrates the topics of that unit with the 8 major themes identified by the College Board. Overall the course emphasizes evolution as the foundation of modern biology and the framework with which all modern biology is understood.

Students participate in discussions associated with labs to share potential sources of error and alternate hypothesis with their classmates and to synthesize their lab experiences and results. These discussions help students engage in real-world science as they practice finding and using patterns in collected data to solve scientific problems presented in the labs.

Topics such as global warming, stem cell research, effects of population growth, and other major societal and environmental concerns are also integrated in the appropriate units of the course.