

Advanced Placement *BIOLOGY* Course Syllabus

Course Description

Advanced Placement Biology is a second-year biology course, which has a prerequisite of one year of biology and one year of chemistry (although some students are permitted to enroll in the course as long as they are concurrently enrolled in chemistry). Students are placed into the AP Biology course based on personal desire and recommendation by their current science instructor. Additionally, prospective students are strongly encouraged to have a personal meeting with the current AP Biology instructor prior to their enrollment into the course. AP Biology students are primarily juniors or seniors. All students are expected to take the AP exam in May. The school district purchases the exam for every student and only requires reimbursement if an enrolled student fails to sit for the exam.

AP Biology meets five days a week with each class having duration of 59 minutes. Laboratory experiences are tailored into segments which accommodate the class schedule. Additional help is provided after school by the instructor upon a student's prior request. Currently, the utilized text is *Biology* by Campbell and Reese (6th ed., San Francisco, CA: Pearson Education, Inc., publishing as Benjamin Cummings, 2002). Additional assignments are taken from the text's accompanying student worktext, current scientific journals, and science programs on television, video, and the internet.

The course is primarily a lecture/discussion course with a strong emphasis on direct student involvement via the discussion component. Class activities are varied and are devised to emphasize the employment of the major themes that recur throughout the course, hands-on activities, writing, varied instructional techniques, student guided instruction, integration of the sciences, and incorporation of other disciplines into instruction.

Course Goals

This AP Biology course has four basic goals:

1. The student will learn and master the facts, principles, and theories of college level biology.
2. The student will comprehend the biological concepts underlying these facts, principles, and theories.
3. The student will develop critical thinking and problem solving skills, not only to use in biology, but to apply to every day life.
4. The student will be prepared to successfully pass the AP Biology exam in May in order to receive potential college credit.

Major Themes

The AP Biology Development Committee has identified eight major themes that recur throughout the course. Students should be cognizant of the pervasiveness of these themes in order to assist themselves in organizing concepts and topics into a coherent conceptual framework. Students will apply the following themes across the entire AP Biology curriculum :

- 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

Topic Outline

The following topic outline breaks down the percentage of this course devoted to each area of study:

		<u>Percentage of Course</u>
I. Molecules and Cells		25%
A. Chemistry of Life	7%	
Water		
Organic molecules in organisms		
Free energy changes		
Enzymes		
B. Cells	10%	
Prokaryotic and eukaryotic cells		
Membranes		
Subcellular organization		
Cell cycle and its regulation		
C. Cellular Energetics	8%	
II. Heredity and Evolution		25%
A. Heredity	8%	
Meiosis and gametogenesis		
Eukaryotic chromosomes		
Inheritance patterns		
B. Molecular Genetics	9%	
RNA and DNA structure and function		
Gene regulation		
Mutation		
Viral structure and replication		
Nucleic acid technology and applications		
C. Evolutionary Biology		
Early evolution of life		
Evidence for evolution		
Mechanisms of evolution		
III. Organisms and Populations		50%
A. Diversity of Organisms	8%	
Evolutionary patterns		
Survey of the diversity of life		
Phylogenetic classification		
Evolutionary Relationships		
B. Structure and Function of Plants and Animals	32%	
Reproduction, growth, and development		
Structural, physiological and behavioral Adaptations		
Response to the environment		
C. Ecology	10%	
Population dynamics		
Communities and ecosystems		
Global issues		

Course Content

The content of this course will closely match the content of the textbook.

		<u>Text Chapter(s)</u>
Week 1	Introduction to Biology Inorganic Chemistry Review Chapter 1 Quiz	1 2, 3
Week 2	Organic Chemistry Biochemistry Chapter 2, 3 Quiz	4 5
Week 3	Biochemistry Lab – Enzyme Catalysis Chapter 4, 5 Quiz	5, 6
Week 4	Cell Structure and Function Membrane Structure and Function Chapter 6 Quiz	7 8
Week 5	Membrane Structure and Function Energy Transformation- Photosynthesis Lab- Diffusion and Osmosis Chapter 7, 8 Exam	8 10
Week 6	Energy Transformation- Photosynthesis Energy Transformation- Cellular Respiration Lab- Plant Pigments and Photosynthesis	10 9
Week 7	Energy Transformation- Cellular Respiration Lab- Cell Respiration Chapter 9,10 Exam	9
Week 8	Cell Communication Cell Reproduction – Mitosis and Meiosis Lab- Mitosis and Meiosis	11 12, 13
Week 9	Mendelian and Non-Mendelian Genetics Chapter 12, 13 Exam	14, 15
Week 10	Mendelian and Non-Mendelian Genetics Lab- Genetics of Organisms	14, 15
Week 11	Molecular Genetics Chapter 14, 15 Exam	16, 17
Week 12	Molecular Genetics	16, 17
Week 13	Genomic Regulation Chapter 16, 17 Exam	18, 19
Week 14	DNA Technology and Genomics Genetic Basis of Development Chapter 18, 19 Exam	20 21
Week 15	DNA Technology and Genomics Lab- Molecular Biology Chapter 20 Exam	20

		<u>Text Chapter(s)</u>
Week 16	Mechanisms of Evolution	22, 23, 24, 25
Week 17	Mechanisms of Evolution Lab- Population Genetics and Evolution Evolution Unit Exam	22, 23, 24, 25
Week 18	Midterm Exam Review Midterm Exam	
Week 19	Evolutionary History of Biological Diversity	26, 27, 28
Week 20	Evolutionary History of Biological Diversity Chapter 26, 28, 28 Exam	26, 27, 28
Week 21	Fungi Plant Evolution and Diversity Chapter 31 Quiz	31 29, 30
Week 22	Animal Evolution and Diversity Chapter 29, 30 Exam	32, 33, 34
Week 23	Animal Evolution and Diversity Chapter 32, 33, 34 Exam	32, 33, 34
Week 24	Plant Form and Function	35, 36, 37, 38, 39
Week 25	Plant Form and Function Lab- Transpiration Plant Unit Exam	35, 36, 37, 38, 39
Week 26	Animal Form and Function	40,41,42,43,44,45,46,47, 48,49
Week 27	Animal Form and Function Lab- Physiology of the Circulatory System	40,41,42,43,44,45,46,47, 48,49
Week 28	Animal Form and Function Lab- Animal Behavior Animal Unit Exam	40,41,42,43,44,45,46,47, 48,49
Week 29	Ecology	50,51,52,53,54,55
Week 30	Ecology Lab-Dissolved Oxygen and Primary Aquatic Productivity Ecology Unit Exam	50,51,52,53,54,55
Week 31	AP Biology Exam Prep and Review	
Week 32	AP Biology Exam Prep and Review	
Week 33	AP Biology Exam Prep and Review	

Week 34	Creation of Student Power Point Presentations
Week 35	Creation of Student Power Point Presentations
Week 36	Student Power Point Presentations Final Exam Review Final Exam

Student Assessment

Student progress and mastery of material is assessed primarily by exams generated from the text book publisher's test bank. These exams are administered at the closure of each unit of material (refer to course content section of syllabus). Exams are exclusively composed of objective questions. Free response questions taken from past AP Biology exams are administered as separate assignments. The free response assignments are graded using rubrics reflective of those used by AP readers. Additional assignments are generated for each topic from the student worktext which accompanies the student text book. Previously released AP Biology Exams from 1990, 1994, 1998, and 2002 are utilized as diagnostic tools during the AP Biology Exam review portion of the course to check student progress and aid in steering subsequent review sessions. Post-AP exam assessment is based on student created power point presentations. Additional assessments are based on the 12 labs students complete during the course. Students are required to write up a lab report at the conclusion of each lab. The reports emphasize interpretation of collected data as well as presentation of data in effective charts and graphs.