

# AP Biology Syllabus

## EXPECTATIONS

AP<sup>®</sup> Biology is both a hard and fun course. It provides students with an opportunity to develop a conceptual framework for modern biology emphasizing applications of biological knowledge and critical thinking to environmental and social concerns. This is a college-level course and you will be held to high expectations and mature responsibilities just like a college freshman taking Introduction to Biology.

## GOALS OF THE COURSE: Themes and Concepts

The AP<sup>®</sup> Biology Examination emphasizes the concepts and themes of biology. Less weight is placed upon specific facts than on the “big ideas” that tie them together. There are two major goals of AP<sup>®</sup> Biology: 1) to enable students to develop a real understanding of the principle concepts in biology, and 2) to experience science as a process of problem-solving and discovery.

AP<sup>®</sup> Biology at this school will be taught with emphasis on the themes below. Lessons are designed to highlight these themes. These topics are:

- Molecules and Cells
- Heredity and Evolution
- Organisms and Populations

For example, the theme of energy transfer will help us to connect topics as diverse as cellular respiration and ecosystem dynamics. In addition, the context for all concepts and lab work is the History and Philosophy of Science, also known as the Nature of Science (NOS).

The eight major themes as put forth by the College Board are:

1. Science as a Process (NOS)
2. Evolution
3. Energy Transfer
4. Continuity and Change
5. Relationship of Structure to Function
6. Regulation
7. Interdependence of Nature
8. Science, Technology, and Society (NOS)

Of these, evolution is the underlying foundation for all modern biological thought, and this is emphasized in every unit. While the NOS provides a conceptual framework for how science is done, evolution is the common thread that links everything together.

## THE MAJOR CONCEPTS (with approximate emphasis on the AP<sup>®</sup> Exam)

- **Studied in a different order than below, but the time spent on each concept is equivalent**
  - 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
    - C. Cellular Energetics – 8%  
Coupled reactions, Fermentation and cellular respiration, Photosynthesis
  - 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 – 8%

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 of Plants and Animals – 32%

Reproduction, growth and development, Structural, physiological, and behavior adaptations, Response to the environment

D. Ecology – 10%

Population dynamics, Communities and ecosystems, Global issues

**COURSE PLANNER**

- The table on the following page lists, on the left, the topics to be covered and the amount of days we will be spending on each unit. Also, in this section are required outside readings. It is important that you keep up with the readings.
- In the table, on the right, are the labs that we will be doing in each unit and the time we will be spending on the labs. Also, in this section are required outside readings. It is important that you keep up with the readings.
- Be mindful that I teach AP® Biology course in a semester, and not a year. The course planner is then accelerated and will require outside reading and work.

**Materials:** Students will need the following items:

1. 2 Composition Books
2. 3-ring binder with pockets (for notes and other materials)
3. Scientific calculator (Needed immediately)
4. No. 2 pencils, black ball-point pens, set of 6 color pencils
5. Current textbook (Campbell, N. Reece, J. Biology, 8<sup>th</sup> Edition)
6. Access to the Internet, either at home or at school, and a current email address

**The AP Test**

*Section I: Multiple-Choice Section*

**Part A** consists of 63 multiple-choice questions that represent the knowledge and science practices outlined in the *AP Biology Curriculum Framework* that students should understand and be able to apply.

**Part B** includes 6 grid-in questions that require the integration of science and mathematical skills. For the grid-in responses, students will need to calculate the correct answer for each question and enter it in a grid on that section of the answer sheet.

*Section II: Free-Response Section*

Students should use the mandatory reading period to read and review the questions and begin planning their responses. This section contains two types of free-response questions (short and long), and the student will

have a total of 80 minutes to complete all of the questions.

### AP Biology Exam Format

<b>Section 1</b>		
<i>Question Type</i>	Number of Questions	Time
Part A: Multiple Choice	63	90 min
Part B: Grid In	6	
<b>Section 2</b>		
<i>Question Type</i>	Number of Questions	Time
Long Free Response	2	80 min + 10 minute reading period
Short Free Response	6	

### AP Biology Tentative Course Guide

<b>Week (Approximate)</b>	<b>Topic</b>	<b>Reading</b>	<b>Instructional Activities</b>	<b>Labs</b>	<b>Assessment</b>
1 and 2	Biochemistry	Chapter 3 Chapter 4 (omit Section 3) Chapter 5	Construct macromolecules Toothpickase	Origin of Life (Inquiry Lab)	Test #1
3 and 4	Cells	Chapter 6 (omit Sections 1,6,7) Chapter 7	Inquiry Lab Jelly Marbles	AP Lab 1: Diffusion and Osmosis Lab	Test #2
5 and 6	Enzymes and Metabolism	Chapter 8 Chapter 9 (omit Section 6) Chapter 10 (omit section 4)	Enzyme Model	AP Lab 2: Catalysis Lab  AP Lab 4: Photosynthesis Lab  AP Lab 5: Cellular Respiration Lab	Test #3
7 and 8	Heredity	Chapter 11 Chapter 12 Chapter 13 Chapter 14 Chapter 15	Model Mitosis and Meiosis with Pop Beads	AP Lab 3: Mitosis and Meiosis  AP Lab 7: Genetics of Organisms	Test #4
9 and 10	Molecular Genetics	Chapter 16 (omit Section 3) Chapter 17 (omit Section 6) Chapter 18 (omit Section 5) Chapter 19 (omit Section 3) Chapter 20 (omit Sections 3 and 4)	Webquest	AP Lab 6: Molecular Biology DNA Electrophoresis and Green Gene Colony Transformation	Test #5

		Chapter 27 (omit Sections 3,4,5, and 6)			
11 and 12	Evolutionary Biology	Chapter 21 (omit sections 1,3,4, and 6) Chapter 22(omit Section 1) Chapter 23 Chapter 24 Chapter 25 (omit Section 6) Chapter 26 (omit Sections 4 and 5)	Bean Hunter using the Hardy Weinberg Equilibrium	AP Lab 8: Population Genetics and Evolution  Population of Genetics (Inquiry Lab)  Cell Communication (Inquiry Lab)	Test #6
13, 14, and 15	Structure and Function of Plants and Animals	Chapter 38 (omit Sections 2 and 3) Chapter 39 (omit Section 4) Chapter 40 Chapter 43 Chapter 45 Chapter 48 Chapter 49 (omit Sections 1, 3, 4, and 5)	Neuron Model	AP Lab 9: Transpiration  AP Lab 10: Physiology of the Circulatory System  AP Lab 11: Animal Behavior	Test #7
16 and 17	Ecology	Chapter 51 Chapter 52 (omit Sections 1, 3, and 4) Chapter 53 Chapter 54 Chapter 55 Chapter 56 (omit Sections 2, 3, and 5)	Create a concept map of biotic and abiotic concepts	AP Lab 12: Dissolved Oxygen and Aquatic Primary Productivity	Test #8
18	Final Exam	Cumulative			Final

**Grading scale:** Each student's grade will be based on the following allocation of points:

Graded Items	Percentage	
1. Major Tests/ Quizzes	45%	(Including the midterm and the final)
2. Laboratory Reports	35%	
3. Homework/ Class work/ Participation	10%	
4. IAN	10%	

## AP Biology Lab Report Write Up

All labs will be written in APA Format. Information about the format can be found online at <http://owl.english.purdue.edu/owl/resource/560/01/>.

Do not forget the header in the upper right corner with the title and the page number. Margins should be 1 inch for the text of the report and font should be 12 pt Arial. The report should be double spaced. Avoid contractions. Write in third person. Each section must be on a separate page.

Title Page (5 pts)	Centered on a Cover Sheet: Lab Number: Name of Experiment Name Partners' Names Course School Date Report Completed
Abstract (10 pts)	This is a brief summary of your report. Often limited to 1000 characters. Include a brief statement of the objective, a description of the experiment, hypothesis and the rationale behind it, the methods (not complete), and the concluding results.
Hypothesis and Underlying Principle (10 pts)	State the hypothesis. The hypothesis should include, or be followed by the underlying principles that support the predicted outcome. If there is more than one experiment or hypothesis, start this section with the underlying theory or principles and then list all of the hypotheses you will test.
Materials and Apparatus (5 points)	Briefly list the materials in the experiment and cite the lab manual for detailed explanations.
Procedure (5 pts)	Briefly describe how the experiment was performed.
Data/Results (15 pts)	Type all data tables and include graphs. Be sure to number and title all graphs. Do not include interpretation of the data here. Cite any errors.
Discussion (30 pts)	This is a section of great importance that should reflect your ability to analyze your data and tie the underlying principles to the experimental processes. Summarize the important procedures and results without including all of the detail of their respective sections. Explain significant sources of error and how they may have affected the results. Explain any deviations from expected results. Compare your results to the class average. Include comments on how the experimental design could be improved or discuss how additional studies could clarify the results of your experiment.
Conclusion (10 pts)	This is a short paragraph that restates the information you have presented previously. Begin this section by stating how the results of the experiment did or did not support the hypothesis that "_____". This should be the "short" version for people who want to read the main point of the experiment.
Works Cited (5 pts)	Center the words "Works Cited" on a new page. Write them in alphabetical order but do not number them. Double space each line and indent the second line of each reference 20 spaces. Use APA format to cite references. There are three sites to help format citations: <a href="http://citationmachine.net">http://citationmachine.net</a> or <a href="http://owl.english.purdue.edu/owl/resource/560/01/">http://owl.english.purdue.edu/owl/resource/560/01/</a> . The third is <a href="http://easybib.com">easybib.com</a>

Formatting/Grammar/Spelling (5 pts)

I expect to have few to no grammar/spelling mistakes

# Plagiarism Notice

The signatures below indicate that I understand that plagiarism is the un-credited use of another author's words or ideas. It is a form of stealing that should not be tolerated. Any assignment containing any plagiarized work will receive ZERO points. Plagiarized work includes any work copied from a published document, an internet site or any other individual. Not only will I receive a zero on the entire assignment that contains plagiarized work, I will also receive a discipline referral on my record.

In addition to plagiarism, cheating will NOT be tolerated. This includes copying work from another student or allowing someone else to copy your work.

(Student's signature) \_\_\_\_\_  
(Parent's/ Guardian's signature) \_\_\_\_\_

Parents,  
Sign below indicating that you have discussed all of this information with your student and understand the procedures of this class. I will communicate often via email, so please include an email address you check regularly. Also, please visit the RHS website for information about the course.

Parent/Guardian Signature \_\_\_\_\_ Date \_\_\_\_\_

Parent e-mail address: \_\_\_\_\_

Student's name (Print): \_\_\_\_\_

Student's Signature \_\_\_\_\_ Date \_\_\_\_\_

Student's e-mail address \_\_\_\_\_

**The AP Biology Test will be on Monday May 12<sup>th</sup> at 8:00 am. The place will be announced before the test date.**