

## AP Biology 2015-2016 Course Syllabus Pacific Academy, Encinitas



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### Course Description

This Advanced Placement course is equivalent to a two-semester introductory college biology course. Prerequisites include high school chemistry and biology.

### Course Overview

This course will cover four Big Ideas listed below, as outlined by the CollegeBoard for AP Biology:

1. **Evolution:** The process of evolution explains the diversity and unity of life
2. **Cellular Processes, Energy and Communication:** Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis.
3. **Genetics and Information Transfer:** Living systems store, retrieve, transmit, and respond to information essential to life processes.
4. **Interactions:** Biological systems interact, and these systems and their interactions possess complex properties.

It will be broken up into 8 units, according to the course textbook.

Unit 1: The Chemistry of Life (Chapters 2-6)

Unit 2: The Cell (Chapters 7-12)

Unit 3: Genetics (Chapters 13-21)

Unit 4: Mechanisms of Evolution (Chapters 22-25)

Unit 5: The Evolutionary History of Biological Diversity (Chapters 26-34)

Unit 6: Plant Form and Function (Chapters 35-39)

Unit 7: Animal Form and Function (Chapters 40-49)

Unit 8: Ecology (Chapters 50-55)

## Course Objectives

At the end of this course, students will be able to:

1. Use representations and models to communicate scientific phenomena and solve scientific problems
2. Use mathematics appropriately
3. Engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course
4. Plan and implement data collection strategies in relation to a particular scientific question
5. Perform data analysis and evaluation of evidence
6. Work with scientific explanations and theories
7. Connect and relate knowledge across various scales, concepts, and representations in and across domains

Since laboratories are an integral part of learning and practicing science, at least 25% of the course will be composed of laboratories. The AP curriculum will emphasize inquiry-based investigations throughout the lab work. Each lab will mirror the lecture topic covered in class. The labs will train students in

1. Keeping and maintaining an effective laboratory notebook by making observations and predictions
2. Safe laboratory practices
3. The use of various laboratory materials and equipment
4. Interpreting experimental results
5. Communicating scientific results by generating effective figures and graphs, preparing manuscripts and presenting data to scientific and general audiences
6. Experimental design

## Course Materials

**Textbook:** Campbell & Reece *Biology: 6<sup>th</sup> Edition* (provided)

**Laboratory Manual:** Morgan & Carter: *Investigating Biology Laboratory Manual (6<sup>th</sup> Ed)* (provided)

**Laboratory Notebook** by BookFactory (provided)

**Safety Glasses & Lab Coats.** Splash goggles will be provided in the lab, but for student preference and/or comfort, the student may want to purchase his or her own pair of safety glasses. Lab coats are encouraged, but not necessary.

## Course Expectations

**Lecture.** Students will be expected to attend lecture, review course material on a nightly basis and complete all weekly exams. Students are responsible for seeking help from me if they do not understand the material.

**Exams.** There will be weekly, cumulative 30-minute exams to test student progress and understanding of the material. **Exams may be given early as take-home problem sets.**

*Labs.* Since this course will be heavily lab focused, students will be expected to attend lab in proper lab attire and collect data for their lab notebooks. Every lab will last two weeks, unless specified otherwise. A laboratory notebook and manual will be provided.

Dress code for labs will be strictly enforced. All students must wear **closed-toe shoes** and **long pants**, or they will not be able to participate in the lab.

Students will be expected to prepare the Pre-Lab prior to lab according to the outline given at the end of this syllabus. At the end of each lab period, students will turn in their lab notebooks for grading. The notebooks will then be returned promptly to the students (typically by the following day) so students can prepare for the next lab period.

By the end of the second day of the lab, students will be expected to complete the Post-Lab results, discussion and conclusion in their lab notebooks, to be turned in at the end of the lab period. Results, discussion and conclusion should be typed up, printed out and taped into the lab notebook.

*Homework.* The homework will consist primarily of preparing the laboratory notebook for class. This task is time-consuming and requires a great deal of effort. There may be additional assigned problem sets or study guides as needed, which may or may not be graded.

### Grading

<b>13 Labs</b> 20 points each	260 points total (30%)	774 (90%) points A
<b>30 Exams</b> 10 points each	300 points total (34%)	688 (80%) points B
<b>2 Midterms</b> 50 points each	100 points total (12%)	602 (70%) points C
<b>Semester Exam</b> 50 points	50 points total (6%)	516 (60%) points D
<b>Paper</b> 50 points	50 points total (6%)	<516 (<60%) points F
<b>Final Project &amp; Paper</b> 100 points	100 points total (12%)	
	<b>860 points total</b>	

### Laboratory & Exam Schedule AP Bio

Week	M	T	W	R	F
1 (8/31-9/6) Chapters 1-3	1. Diffusion and Osmosis			Exam 1	
2 (9/7-9/13) Chapter 4-5				Exam 2	Half Day
3(9/14-9/20) Chapter 6 <b>Metabolism</b>	2. Enzymes				

4 (9/21-9/27) Chapter 7 <b>The Cell</b>	Exam 3			Exam 4	Half Day
5 (9/28-10/4) Chapter 8 <b>Membrane structure &amp; function</b>	3. Protists and Fungi			Exam 5	
6 (10/5-10/11) Chapter 9 <b>Cell Respiration</b>				Exam 6	
7 (10/12-10/18) Chapter 10 <b>Photosynthesis</b>	NO LAB	4. Cell Respiration		Exam 7	
8 (10/19-10/25) Chapter 11 <b>Cell communication</b>				Exam 8	
9 (10/26-11/1) Chapter 12-13 <b>Cell Cycle, Mitosis &amp; Meiosis</b>	5. Mitosis & Meiosis	Midterms	Midterms	Midterms	
10 (11/2-11/8) Chapter 14 <b>Mendel</b>				Exam 9	
11 (11/9-11/15) Chapter 15 <b>Inheritance</b>	6. Drosophila			Exam 10	
12 (11/16-11/22) Chapter 16 <b>Molecular basis of inheritance</b>	<b>Manuscript Prep (1-6)</b>			Exam 11	
13 (11/23-11/29) Chapter 17 <b>Gene to Protein</b>	7. Bacteriology		Exam 12	Thanks giving	
14 (11/30-12/6) Chapter 18 <b>Viruses and Bacteria</b>				Exam 13	

15 (12/7-12/13) <b>Chapter 19-20 Eukaryotic Genomes &amp; Genomics</b>	8. Molecular Bio		<b>Manuscript Exchange</b>	Exam 14	Half Day
16 (12/14- 12/20) <b>Chapter 21 Development</b>	<b>Manuscript Edits Due</b>		<b>Manuscript Due</b>	Exam 15	
17 (12/21- 12/27) <b>Chapter 22-23</b>	21-23 over break				
18 (12/28-1/3)					
19 (1/4-1/10) <b>Chapter 23 Intensive Review</b>	Exam 16 due 9. Plant Morphology			Exam 17 FP (4)	
20 (1/11-1/17) <b>Chapter 24-25 Phylogeny</b>				Exam 18	
21 (1/18-1/24) Review	10. Fast plants	Final	Final	Final FP (4)	Half Day
22 (1/25-1/31) <b>Chapter 26- Origin of Life</b>					
23 (2/1-2/7) <b>Chapter 27-28</b>	Exam 19 due Fast Plant Pollination (15)	FP (16)	FP (17)	Exam 20 FP (18)	
24 (2/8-2/14) <b>Chapter 29-30 Plant Evolution</b>	11. Brine Shrimp			Exam 21	
25 (2/15-2/21) <b>Chapter 31- Fungi</b>				Exam 22	
26 (2/22-2/28) <b>Chapter 32-34 animal diversity</b>	12. Animal Diversity (Dissections)			Exam 23 FP (39)	
27 (2/29-3/6) <b>Chapter 35-37</b>				Exam 24 FP (47)	
28 (3/7-3/13) <b>Chapter 38-39</b>				Exam 25	

29 (3/14-3/20) <b>Chapter 40-41</b>	Fast Plants Analysis (51)			Exam 26	
30 (3/21-3/27)	Midterms	Midterms	Midterms		
31(3/28-4/3) <b>Chapter 42-44</b>					
32 (4/4-4/10) <b>Chapter 45-47</b>	13. Terrestrial Ecology Field Studies			Exam 27	
33 (4/11-4/17) <b>Chapter 48-49</b>				Exam 28	
34 (4/18-4/24) <b>Chapter 50-55 Ecology</b>				Exam 29	
35 (4/25-5/1)	Review			Exam 30	
36 (5/2-5/8)	Review			Exam 31	
37 (5/9-5/15)	AP Bio Exam	Student Designed Experiment			
38 (5/16-5/22)					
39 (5/23-5/29)			<b>Science Fair?</b>		
40 (5/30-6/5)	Manuscript Due for Final Project (no final)	Finals	Finals	Finals	

## Laboratory Notebook Outline

### Pre Lab

- I. Name of Experiment
  - a. Date
  - b. Lab Partners
- II. Objective
- III. Background
  - a. Key vocabulary and equations
  - b. Important figures & diagrams
  - c. Experimental
    - i. Diagram of Set-up
    - ii. All reagents, quantities, and materials used
    - iii. Safety considerations (use MSDS)
  - d. Data Analysis

- i. What parameters are being measured?
  - ii. How will you analyze the data?
- IV. Hypothesis

## **Lab**

- V. Procedure
  - a. To be written as you are doing the lab
  - b. Third person, past passive tense
  - c. Write down everything, including all observations of reagents, colors, qualities, changes, smells, etc. The more observations you have, the better your data analysis will be.
  - d. Pictures/ Diagrams should always be included
- VI. Results
  - a. Graphs (with properly labeled axes, titles, captions)
  - b. Tables for repetitive data (with proper captions)
  - c. Figures (with properly labeled captions)

## **Post Lab**

- VII. Discussion
  - a. What did your results suggest?
  - b. Did your results support your hypothesis? Why or why not? If not, suggest another hypothesis and propose a new experiment.
  - c. Evaluate the error in your data. Does it support or devalue your conclusion?
- VIII. Conclusion
  - a. Were your methods accurate?
  - b. What is the importance of the results of your experiment? (Intellectually, socially, environmentally, etc.)

## **References**

For the laboratory notebook, references should be properly cited throughout the notebook as they are used. ALL references should be in ACS formatting. Everything you use should and can be cited, including: videos, lecture notes, PowerPoint slides, verbal communications, journals, textbooks, lab manuals, etc.