

# AP Biology Syllabus

**Teacher: Mr. Rivette**

**School phone: (847) 587-2561 ext 438**

**Email: [srivette@grantbulldogs.org](mailto:srivette@grantbulldogs.org)**

## Course Overview

The AP Biology course is constructed, in accordance to the standards instituted by the College Board for all AP courses, to offer high school students the equivalent of a college introductory biology course. It is designed to be taken after successful completion of the first year of biology and chemistry. It is taught to students by establishing conceptual understanding rather than factual technical detail, establishing analytical and critical thinking skills, and establishing a working knowledge of biology as a changing process of science. Also present in the curriculum is the existence of eight specified themes that pervade and unify all concepts throughout biology. Therefore, students are better equipped to handle a variety of different phenomena based upon conceptual understanding. Meanwhile, this is a laboratory course in which students are expected to use collected data to solve biological problems. The AP program is very demanding, and students should be expected to devote extra class time to laboratory and writing exercises in addition to normal classroom assignments.

### GOALS:

- 1) Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.
- 2) Understand the fundamental concepts, principles and interconnections of the life
- 3) Understand the relationships among science, technology and society in historical and contemporary contexts.

### Resources

#### Students' Text:

Campbell, N.A., et al. (2002). *Biology: Concepts and Connections*. (4<sup>th</sup> ed.)

#### Reference Text:

Campbell, N.A., & Reese, J.B. (2005). *Biology* (AP edition & 7<sup>th</sup> edition).

#### Lab Manuals:

AP Biology Lab Manual for Students

Ward's Science AP Biology Lab Manuals

Additional labs are teacher-generated or come from other sources.

## Course Outline

The major topics; Molecules and Cells, Heredity and Evolution, and Organisms & Populations are covered in detail in eight units.

UNIT ONE: *Ecology*, features stronger connections to evolution, including an update section on the evolution of life histories. The unit also reflects the urgent need for basic ecological research in an era when exploding human population and its technology are trading blindly and carelessly throughout the biosphere.

UNIT TWO: *The Chemistry of Life*, will aid students in developing the concepts of chemistry that are essential for success in biology stressing form and function of molecules.

UNIT THREE: *The Cell*, helps to build the study of cells around the theme of the correlation between structure and function.

UNIT FOUR: *Cellular Reproduction and Genetics*, traces the history of genetics, from Mendel to DNA technology, with “science as a process” as a theme.

UNIT FIVE: *Mechanisms of Evolution*, students will learn how life evolves and how biologists study evolution and test evolutionary hypotheses.

UNIT SIX: *The Evolutionary History of Biological Diversity*, will introduce students to the diversity of life in the context of key evolutionary junctions, such as the origin of prokaryotes, the evolution of eukaryotic cells, the genesis of multicellular life, and the adaptive radiation of plants, fungi, and animals.

UNIT SEVEN: *Animals: Form and Function*, deals with the interactions between organisms and their environment. The unit takes a comparative approach in exploring the diverse adaptations that have evolved in different groups. Humans fit into this comparative approach as an important mammalian example.

UNIT EIGHT: *Plants: Form and Function*, acquaints the student to plants in the evolutionary context of adaptation to terrestrial environments.

## **Laboratory Outline**

The laboratory component of this course consists of twelve mandatory labs that coincide with the three major topic areas of Molecules and Cells, Heredity and Evolution, and Organisms and Populations. Each lab will require formal lab write-ups that require students to demonstrate and express their understanding of the lab in scientific terms such as: interpreting and analyzing data, showing evidence of error, and proposing future studies. Along with a formal laboratory write-up, students are required to also answer lab manual questions for all labs and complete a flow chart of the design and procedure. Pre-lab quizzes are administered before lab to ensure student understanding before starting each lab. The labs are completed after the background concepts have been covered in class.

### **Labs**

1. Diffusion and Osmosis
2. Enzyme Catalysis
3. Mitosis and Meiosis
4. Plant Pigments and Photosynthesis
5. Cell Respiration
6. Molecular Biology
7. Genetics in Organisms
8. Population Genetics and Evolution
9. Transpiration
10. Physiology of the Circulatory System
11. Animal Behavior
12. Dissolved Oxygen and Aquatic Primary Productivity

# Lecture and Lab Schedule

## ADVANCED PLACEMENT BIOLOGY REVISED SEQUENCE OF UNITS

---

First Semester

---

### AP Bio Revised Order of Chapters and Units 2010

# Quarter 1

#### *Unit 1 – Ecology*

Ch. 34 The Biosphere: An Introduction to Earth's Diverse Environments  
Ch. 34 MC Test

Ch. 35 Population Dynamics  
Ch. 35 MC Test

Ch. 36 Communities and Ecosystems  
Ch. 36 MC Test

Ch.37 Behavior Adaptations to the Environment

**Formal Lab 11 Animal Behavior**

Ch. 37 MC Test

**Lab 11 Writing Assignment**

Ch. 38 Conservation Biology  
Ch. 38 MC Test

**Formal Lab 12 Dissolved Oxygen and Primary Productivity**

**Lab 12 Writing Assignment**

Review

**Unit MC Test**

**Unit Essay Test**

#### *Unit 2 – Biochemistry*

Ch. 2 The Chemical Basis of Life  
Ch. 2 MC Test

Ch. 3 The Molecules of Cells  
Ch. 2 MC Test

Review

**Unit MC Test**

**Unit Essay Test**

### *Unit 3 – The Cell*

Ch. 4 A Tour of the Cell

Ch. 4 MC Test

Ch. 5 The Working Cell

**Formal Lab 1 Osmosis and Diffusion**

**Formal Lab 2 Enzyme Catalysis**

Ch. 5 MC Test

Lab 1 Writing Assignment

Lab 2 Writing Assignment

## Quarter 2

Ch. 6 How Cells Harvest Chemical Energy

**Formal lab 5 Cellular Respiration**

Ch. 6 MC Test

Lab 5 Writing Assignment

Ch. 7 Photosynthesis: Using Light to Make Food

**Formal Lab 4 Photosynthesis**

Ch. 7 MC Test

Lab 4 Writing Assignment

Review

**Unit MC Test**

**Unit Essay Test**

### *Unit 4 – Cellular Reproduction and Genetics*

Ch. 8 The Cellular Basis of Reproduction and Inheritance

**Formal Lab 3 Mitosis and Meiosis**

Ch. 8 MC Test

Lab 3 Writing Assignment

Ch. 9 Patterns of Inheritance

**Formal Lab 7 Genetics of Drosophila**

Ch. 9 MC Test

Ch. 10 Molecular Biology of the Gene

Ch. 10 MC Test

Ch. 11 The Control of Gene Expression

Ch. 11 MC Test

Ch. 12 DNA Technology and the Human Genome

**Lab 6 Molecular Biology**

Ch. 12 MC Test

Lab 6 Writing Assignment

Lab 7 Writing Assignment

Review

Unit MC Test

Unit Essay Test

# Semester Exams

# Quarter 3

## *Unit 5 – Concepts of Evolution*

Ch. 13 How Populations Evolve

**Formal Lab 8 Population Genetics**

Ch. 13 MC Test

**Lab 8 Writing Assignment**

Ch. 14 The Origin of Species

Ch. 14 MC Test

Ch. 15 Tracing Evolutionary History

Ch. 15 MC Test

Review

**Unit MC Test**

**Unit Essay Test**

## *Unit 6 – The Evolution of Biological Diversity*

Ch. 16 The Origin and Evolution of Microbial Life: Prokaryotes and Protists

Ch. 16 MC Test

Ch. 17 Plants, Fungi, and the Colonization of Land

Ch. 17 MC Test

Ch. 18 The Evolution of Animal Diversity

Ch. 18 MC Test

Ch. 19 Human Evolution

Ch. 19 MC Test

Review

**Unit MC Test**

**Unit Essay Test**

## *Unit 7 – Animals: Form and Function*

Ch. 20 Unifying Concepts of Animal Structure and Function

Ch. 20 MC Test

Ch. 21 Nutrition and Digestion

Ch. 21 MC Test

Ch. 22 Respiration: The Exchange of Gases

Ch. 22 MC Test

Ch. 23 Circulation

**Formal Lab 10 Circulation**

Ch. 23 MC Test

**Lab 23 Writing Assignment**

# Quarter 4

Ch. 24 The Immune System

Ch. 24 MC Test

Ch. 25 Control of the Internal Environment

Ch. 25 MC Test

Ch. 26 Chemical Regulation

Ch. 26 MC Test

Review

**Unit MC Test**

**Unit Essay Test**

## *Unit 8 – Plants*

Ch. 31 Plant Structure, Reproduction, and Development

Ch. 31 MC Test

Ch. 32 Plant Nutrition and Transport

**Formal Lab 9 Transpiration**

Ch. 32 MC Test

**Lab 9 Writing Assignment**

Review

**Unit MC Test**

**Unit Essay Test**

## **AP EXAM REVIEW (5 DAYS)**

---

POST AP EXAM ACTIVITIES

# Semester Exams

## Teaching Strategies

The course is taught in a discussion format and problem based learning format. At the start of every day, a problem or question is posed. Students then hypothesize an explanation to the problem or question. The discussion or lecture then begins. The majority of these lectures are powerpoints with organized diagrams, pics, and movie clips or CD-Rom activities. Using prompting questioning techniques, I guide students to solutions to the problems or questions. Along with this problem – based approach, the eight themes, which were outlined above, are incorporated throughout all concepts, especially evolution. To reinforce these lectures, students are assigned various reading, vocabulary, and chapter review assignments. Following major units, writing assignments help students practice writing and connecting concepts. Meanwhile, activities and labs allow students to actively practice science surrounding the concepts at hand. They collect real data and analyze and form conclusions. Lastly, chapter tests are administered and unit free response essay tests close out units.

## Student Evaluation

Since the goals of the AP Biology course is to prepare students as if they were a college freshman in a year long biology course and to establish a strong foundation in science, the evaluation and/or assessment will mirror a college level distribution of grades in response to conceptual testing and free response scientific writings. Below is a breakdown of how students earn their grades.

<b>Assignment</b>	<b>Points</b>	<b>Percentage of Grade</b>
Chapter and Unit Exams	65	60%
Writing Assignments	50	10%
Labs	100	20%
Homework	10	10%
		100%

