



## SAVANNA HIGH SCHOOL CURRICULUM LETTER AP BIOLOGY

### Education at Savanna - A Continuous Commitment **Mission Statement**

The mission statement of Savanna High School is to develop productive members of society who actively pursue the fulfillment of their potential. Our students will demonstrate competence in academic, personal, occupational and citizenship skills. We will strive to prepare our students for lifelong learning, working, and contribution to our community, state, nation, and world.

### **Expected Schoolwide Learning Results**

#### **L**earn Importance of Technology

- Demonstrate competence in basic computer skills and applications
- Use computers and technology integrated throughout the curriculum to acquire academic, research, and career skills

#### **E**volve as Critical Thinker and Communicator

- Participate in group discussions, following guidelines and instructions
- Demonstrate logical and effective decision making skills
- Apply problem-solving strategies to a variety of situations

#### **A**chieve Academic Goals and Prepare for Career

- Learn and use reading strategies to comprehend content-area curricula
- Write in content areas for various purposes and audiences
- Improve oral communication through individual and group presentations
- Develop listening skills and work collaboratively with peers
- Use organizers, daily planners, portfolios, and notebooks to manage study time and complete assignments.

#### **D**evelop Mind and Body to Benefit Community

- Understand the value of a health conscious lifestyle and apply healthy living practices for both mind and body
- Interact with guest speakers, who bring outside perspective to student experience
- Become involved in community projects to understand the necessity of caring for and helping others
- Be accountable for academic success and accept responsibility for actions and decisions
- Become knowledgeable and aware of global and multicultural issues.

# Syllabus

**\*NOTE:** The entire syllabus has been aligned to the AP Biology Curricular Requirements and denoted as [C1 - C8] for further reference. The eight major themes have been highlighted/shaded, and listed, throughout the syllabus where applicable (mostly the *Course Topics*) and is often redundant, as WE are continually connecting the concepts to these underlying themes. Please refer to the **curricular requirements** and their correlated **concepts** listed in the SUMMATIVE CHART at the end of this document.

## *Philosophy*

The purpose of an advanced placement course is to expose motivated high school students to a rigorous, college-level curriculum. My job is to provide a learning environment to which students see past the overwhelming and confounding facts, and instead embrace and recognize the mosaic of interconnected ideas and themes. Students will come to view science as an ever-evolving process, where the only constant is change. Together we will marvel the history, diversity, and complexity of Life, and at the same time deconstruct every process to its most fundamental physical nature. [C1-C6, C6- Evolution; Continuity and Change; Relationship of Structure to Function; Regulation; Interdependence in Nature]

## *Course Overview*

### **Course Prerequisite**

A grade of “A” or “B” in Biology, “C” or higher in Chemistry, and/or instructor’s recommendation is required to take this course.

### **Brief Course Description**

The intent of AP Biology is to provide the equivalent of a first-year college-level biology course to motivated students in the high school environment. Students who successfully complete the course **will be expected to take the advanced placement examination**. For those students who pass the exam, this course enables them to undertake (as freshmen) second-year work in the biology sequence or fulfill the laboratory science requirement to free time for other classes at a participating university.

### **Savanna’s Gate Policy**

In order to maintain excellence in teaching and learning in Savanna’s program, all students must earn at least a “B” in GATE courses. Student progress will be reviewed at the end of each quarter in order to identify those having difficulty. Students who are not performing at expected levels will be placed on probation for the following quarter. If the teacher finds the student still working below expectations at the end of the probationary period, the student will be transferred to a college preparatory course.

### **Homework Policy**

Homework will be given on a regular basis. Assignments will be based on class discussions and collected on examination days. **Late assignments will only be accepted the day following their due date, at one-half the credit**. The primary purpose of homework is to prepare the student for examinations; however, it is also a strong indicator of the effort the student is applying.

### **Make-up Policy**

If the student has an excused absence, they will have one day for each day he/she is absent to make up the work for full credit. Make-up tests may be different and more challenging.

## Cheating Policy

Please refer to the Anaheim Union High School District's Academic Honesty Policy located at <http://www.auhsd.us>, as I strictly adhere to its consequences.

## Educational Materials

### PRIMARY TEXT

Campbell, Neil A., and Jane B. Reece. AP Edition Biology. Seventh. San Francisco: Pearson Education, 2005.

### SUPPLEMENTARY TEXT

Mader, Sylvia S.. Biology. Ninth. New York: McGraw-Hill, 2007.

### AUXILLIARY MATERIALS

AP Laboratory Manual for Teachers and Students

Bakker, Elna. An Island Called California. Berkeley: Regents of the university of California, 1984. pp.345-369

Eiseley, Loren. The Star Thrower. New York: Harvest/Harcourt Brace Jovanovich, 1978. pp. 66- 75

Hickman, James C.. The Jepson Manual- Higher Plants of California. Berkeley: University of California Press, 1993.

Pack, Phillip. CliffsAP Biology. 2nd. New York: Wiley Publishing, Inc., 2001.

PBS Evolution Series Special

Reputable Internet Sites

## Challenges

Due to the swift pace at which we traverse through material, students are expected to work more and study smart. We have limited time to cover all that is expected. We begin the second week of September and finish late April, and all of which occurring within 88-minute blocks, minimum days, late starts, emergency drills, field trips, assemblies, and all the other intermittent disruptions common in high school. To compensate for this loss of time, students have assignments during their breaks, perform presentations, and are given many writing assignments to further their understanding and hasten class discussions.

## Concept and Themes

**[C1-C7, C6- Science as a Process; Evolution; Energy Transfer; Continuity and Change; Relationship of Structure to Function; Regulation; Interdependence in Nature; Science, Technology, and Society]**

To get students to see past the seemingly unrelated facts requires the instructor to awaken students to the intertwining fabric of Life. Instead of solely focusing on the facts, we seek out the concepts and underlying themes. For example, *structure to function* is a common theme- from the molecule to the biosphere. Students are challenged to reflect on the following questions when approaching new material:

What is the purpose and the *concept* of the topic at hand?

How is what we are learning *related* to what we have discussed?

How does *structure* dictate *function*?

What presence does *evolution* have on what we are learning?

How does it benefit all Life to preserve *biodiversity*?

How has *science changed* and where is it going?

## Assignments

The typical, non-lab, instructional day includes an “opening activity” (or OA), a composition book assignment, and class discussion. The OA is a question, or prompt, for students to answer while attendance is taken, which is intended to review the previous day's material or serve as a springboard for the day's discussion.

Immediately following, students will peer-evaluate their composition books. Students answer an in-depth prompt each night in their composition books, similar to what is expected in an AP Free Response question. Not only do these written responses help the students with their exam scores and overall understanding, the composition book assignments also address much of what is to be covered that day. In effect, we cover more material than we otherwise could in a day without such an assignment. [C4]

Outside the classroom routine, students are concurrently working on prelabs, study guides, and presentations. Students read the AP Labs prior to the actual lab day and complete a prelab assignment to ensure they understand the purpose and procedures beforehand. The prelabs also make the student more efficient in an abbreviated class period. Students have unit study guides to further their comprehension of the material discussed in class. In efforts to remain on schedule, students present various topics to the class in a variety of ways. These presentations may be found throughout the “*Course Topics*” section below.

## Lab Component

Students do the twelve required labs from the AP Laboratory Manual for Teachers and Students and a few others discussed in the “*Course Topics*” section below. Students normally work in groups of two to four and complete the ENTIRE lab (i.e. graphical analysis, data analysis, and questions). Labs are all “hands-on” and make up approximately 25% of the instructional time. [C8]

## Student Evaluation

Each exam, quiz, lab, and assignment is worth a certain number of points. The student’s grade is based on the total number of points he/she has obtained during the given time period. Many assignments are curved, and for this reason **final grades will not be rounded** (e.g. 89.99% is a B+, not an A-). The *approximate* percentages of points for final evaluation are as follows:

Exams	45%
Homework	25%
Labs	20%
Journal/Projects	10%

A→A+	= 100.00%-93.00% ( <b>Excellent work-</b> exceeds expectations)
A-	= 92.99%-90.00% ( <b>Great work-</b> meets expectations)
B	= 89.99%-80.00% ( <b>Good work-</b> meets most expectations)
C→C+	= 79.99%-73.00% ( <b>Average work-</b> meets some expectations)
C-	= 72.99%-70.00% ( <b>Needs improvement-</b> mostly inconsistent)
D	= 69.99%-60.00% ( <b>Unsatisfactory-</b> does not meet expectations)
F	= 59.99%- 0.00% ( <b>Unmotivated-</b> no appreciable effort)

## Course Topics

**NOTE:** The **Boldfaced Units** and UNDERLINED topics represent the *three* “**Overarching Topics**” and *nine* important “CONCEPTS,” respectively.

### Unit 1- Molecules and Cells

THE CHEMISTRY OF LIFE (2 ½ weeks)

[C6- Energy Transfer; Structure to Function; Science, Technology, and Society]

#### The Chemical Context of Life (Ch. 2)

##### Discussion Topics-

- Matter consists of chemical elements in pure form and in combinations called compounds
- An element’s properties depend on the structure of its atoms
- The formation and function of molecules depend on chemical bonding between atoms
- Chemical reactions make and break chemical bonds

#### Water and the Fitness of the Environment (Ch. 3)

*Discussion Topics-*

- ❑ The polarity of water molecules results in hydrogen bonding
- ❑ Four emergent properties of water contribute to Earth's fitness for life
- ❑ Dissociation of water molecules leads to acidic and basic conditions that affect living organisms

**Exam-** Basic Chemistry (Chapters 2-3)

**Carbon and the Molecular Diversity of Life (Ch. 4)**

*Discussion Topics-*

- ❑ Organic chemistry is the study of carbon compounds
- ❑ Carbon atoms can form diverse molecules by bonding to four other atoms
- ❑ Functional groups are the parts of molecules involved in chemical reactions

**The Structure and Function of Macromolecules (Ch. 5)**

*Discussion Topics-*

- ❑ Most macromolecules are polymers, built from monomers
- ❑ Carbohydrates serve as fuel and building material
- ❑ Lipids are a diverse group of hydrophobic molecules
- ❑ Proteins have many structures, resulting in a wide range of functions
- ❑ Nucleic acids store and transmit hereditary information

*AP Lab 2 Prelab*

*AP Lab 2- Enzyme Catalysis (2 days)*

**Exam-** Macromolecules and Metabolism (Chapters 4, 5, and 8)

**CELLS (2 ½ weeks)**

**[C6- Science as a Process; Evolution; Energy Transfer; Continuity and Change; Relationship of Structure to Function; Regulation; Interdependence in Nature; Science, Technology, and Society]**

**A Tour of the Cell (Ch. 6)**

*(Project-* Students present a 1-2 page typed paper on one of the following topics:

**Magnification and resolving power; microscopy; cell fractionation; prokaryotic vs. eukaryotic; cell size; compartmentalization in eukaryotic cells; structure and function of nucleus; structure and function of the eukaryotic ribosome; structure and function of the components of the endomembrane system; impaired lysosomal function; function of vacuoles; structure and function of the Golgi apparatus; role of peroxisomes in eukaryotic cells; structure and function of the mitochondria; compare amyloplast, chromoplast, and chloroplast; endosymbiont theory; structure and function of chloroplast; function of the cytoskeleton; structure and function of microtubules, microfilaments and intermediate filaments; ultrastructure and function of cilia and flagella; structure and development of cell wall; structure and function of extracellular matrix in animal cells; structure and function of intercellular junctions in plant and animal cells)**

**Membrane Structure and Function (Ch. 7)**

*Discussion Topics-*

- ❑ Cellular membranes are fluid filled mosaics of lipids and proteins
- ❑ Membrane structure results in selective permeability
- ❑ Passive transport is diffusion of a substance across a membrane with no energy investment
- ❑ Active transport uses energy to move solutes against gradients
- ❑ Bulk transport across the plasma membrane occurs by exocytosis and endocytosis

*AP Lab 1 Prelab*

*AP Lab 1- Diffusion and Osmosis (2 days)*

**Exam-** Cell and Membrane Structure and Function (Chapters 6 and 7)

**The Cell Cycle (Ch. 12)**

*Discussion Topics-*

- ❑ Cell division results in genetically identical daughter cells
- ❑ The mitotic phase alternates with interphase in the cell cycle
- ❑ The cell cycle is regulated by a molecular control system

*AP Lab 3 Prelab*

*AP Lab 3A- Mitosis (1 day)*

**CELLULAR ENERGETICS (3 weeks)**

**[C6- Science as a Process; Evolution; Energy Transfer; Structure to Function; Regulation; Science, Technology, and Society]**

**An Introduction to Metabolism (Ch. 8)**

*Discussion Topics-*

- ❑ An organism's metabolism transforms matter and energy, subject to the laws of thermodynamics
- ❑ The free-energy change of a reaction tells us whether the reaction occurs spontaneously
- ❑ ATP powers cellular work by coupling exergonic reactions to endergonic reactions
- ❑ Enzymes speed up metabolic reactions by lowering energy barriers
- ❑ Regulation of enzyme activity helps control metabolism

**Cellular Respiration: Harvesting Chemical Energy (Ch. 9)**

*Discussion Topics-*

- ❑ Catabolic pathways yield energy by oxidizing organic fuels
- ❑ Glycolysis harvests chemical energy by oxidizing glucose to pyruvate
- ❑ The citric acid cycle completes the energy-yielding oxidation of organic molecules
- ❑ During oxidative phosphorylation, chemiosmosis couples electron transport to ATP synthesis
- ❑ Fermentation enables some cells to produce ATP without the use of oxygen
- ❑ Glycolysis and the citric acid cycle connect to many other metabolic pathways

*AP Lab 5 Prelab*

*AP Lab 5- Cellular Respiration (1 day)*

**Photosynthesis (Ch. 10)**

*Discussion Topics-*

- ❑ Photosynthesis converts light energy to the chemical energy of food
- ❑ The light reactions convert solar energy to the chemical energy of ATP and NADPH
- ❑ The Calvin cycle uses ATP and NADPH to convert CO<sub>2</sub> to Sugar
- ❑ Alternative mechanisms of carbon fixation have evolved in hot, arid climates

*AP Lab 4 Prelab*

*AP Lab 4- Plant Pigments and Photosynthesis (2 days)*

**Exam-** Cellular Respiration and Photosynthesis (Chapters 9 and 10)

**Unit 2- Heredity and Evolution**

**HEREDITY (4 ½ weeks)**

**[C6- Science as a Process; Evolution; Continuity and Change; Structure to Function; Regulation; Science, Technology, and Society]**

**Meiosis and Sexual Life Cycles (Ch.13)**

*Discussion Topics-*

- ❑ Offspring acquire genes from parents by inheriting chromosomes
- ❑ Fertilization and meiosis alternate in sexual life cycles
- ❑ Meiosis reduces the number of chromosome sets from diploid to haploid
- ❑ Genetic variation produced in sexual life cycles contributes to evolution

*AP Lab 3B- Meiosis (1 day)*

**Exam-** Cell Cycle and Meiosis (Chapters 12 and 13)

**Mendel and the Gene Idea (Ch. 14)**

*Discussion Topics-*

- ❑ Mendel used the scientific approach to identify two laws of inheritance
- ❑ The laws of probability govern Mendelian inheritance
- ❑ Inheritance patterns are often more complex than predicted by simple Mendelian genetics
- ❑ Many human traits follow Mendelian patterns of inheritance

*AP Lab 7 Prelab- X<sup>2</sup> Analysis*

*AP Lab 7 Alternate- Genetics of Plants (4-5 days over 1 month period)*

*AP Lab 7 Prelab- Genetic Problems*

*AP Lab 7- Drosophila (3 days over 2 ½ week period)*

**Chromosomal Basis of Inheritance (Ch. 15)**

*Discussion Topics-*

- ❑ Mendelian inheritance has its physical basis in the behavior of chromosomes
- ❑ Linked genes tend to be inherited together because they are located near each other on the same chromosome
- ❑ Sex-linked genes exhibit unique patterns of inheritance
- ❑ Alterations of chromosome number or structure cause some genetic disorders
- ❑ Some inheritance patterns are exceptions to the standard chromosome theory

**Exam-** Mendelian and Chromosomal Patterns of Inheritance (Chapters 14 and 15)

**MOLECULAR GENETICS (4 ½ weeks)**

**[C6- Science as a Process; Evolution; Energy Transfer; Continuity and Change; Relationship of Structure to Function; Regulation; Interdependence in Nature; Science, Technology, and Society]**

**The Molecular Basis of Inheritance (Ch. 16)**

*Discussion Topics-*

- ❑ DNA is the genetic material
- ❑ Many proteins work together in DNA replication and repair

*BBC Movie- DNA Helix*

**From Gene to Protein (Ch.17)**

*Discussion Topics-*

- ❑ Genes specify proteins via transcription and translation
- ❑ Transcription is the DNA-directed synthesis of RNA: *a closer look*
- ❑ Eukaryotic cells modify RNA after transcription
- ❑ Translation is the RNA-directed synthesis of a polypeptide: *a closer look*
- ❑ RNA plays multiple roles in the cell: *a review*
- ❑ Comparing gene expression in prokaryotes and eukaryotes reveal key differences
- ❑ Point mutations can affect protein structure and function

**Exam-** DNA and Protein Synthesis (Chapters 16 and 17)

**The Genetics of Viruses and Bacteria (Ch. 18)**

*Discussion Topics-*

- ❑ A virus has a genome but can reproduce only within a host cell
- ❑ Viruses, viroids, and prions are formidable pathogens in animals and plants
- ❑ Rapid reproduction, mutation, and genetic recombination contribute to the genetic diversity of bacteria
- ❑ Individual bacteria respond to environmental change by regulating their gene expression

**Eukaryotic Genomes: Organization, Regulation, and Evolution (Ch. 19)**

*Discussion Topics-*

- ❑ Chromatin structure is based on successive levels of DNA packing
- ❑ Gene expression can be regulated at any stage, but the key is transcription
- ❑ Cancer results from genetic changes that affect cell cycle control
- ❑ Eukaryotic genomes can have many noncoding DNA sequences in addition to genes
- ❑ Duplication, rearrangements, and mutations of DNA contribute to genome evolution

**DNA Technology and Genomics (Ch. 20)**

*Discussion Topics-*

- ❑ DNA cloning permits production of multiple copies of a specific gene or other DNA segment
- ❑ Restriction fragment analysis detects DNA differences that affect restriction sites
- ❑ Entire genomes can be mapped at the DNA level
- ❑ Genome sequences provide clues to important biological questions
- ❑ The practical applications of DNA technology affect our lives in many ways

*AP Lab 6A Prelab*

*AP Lab 6A- Transformation (2 days)*

*AP Lab 6B Prelab*

*AP Lab 6B- DNA Restriction Analysis (2 days)*

**Exam-** Genetics of Viruses and Bacteria, Gene Regulation, and Biotechnology (Chapters 18-20)

**EVOLUTIONARY BIOLOGY (3 ½ weeks)**

**[C6- Science as a Process; Evolution; Energy Transfer; Continuity and Change; Relationship of Structure to Function; Regulation; Interdependence in Nature; Science, Technology, and Society]**

**Descent with Modification: A Darwinian View of Life (Ch. 22)**

*Discussion Topics-*

- ❑ The Darwinian revolution challenged traditional views of a young Earth inhabited by unchanging species
- ❑ In *The Origin of Species*, Darwin proposed that species change through natural selection
- ❑ Darwin's theory explains a wide range of observations

*PBS Evolution Series Special- Darwin's Dangerous Ideas*

**The Evolution of Populations (Ch. 23)**

*Discussion Topics-*

- ❑ Population genetics provides a foundation for studying evolution
- ❑ Mutation and sexual recombination produce the variation that makes evolution possible
- ❑ Natural selection, genetic drift, and gene flow can alter a population's genetic composition
- ❑ Natural selection is the primary mechanism of adaptive evolution

*PBS Evolution Series Special- Great Transformations*

*PBS Evolution Series Special- The Evolutionary Arms Race*

*AP Lab 8 Prelab*

*AP Lab 8- Population Genetics (2 days)*

**The Origin of Species (Ch. 24)**

*Discussion Topics-*

- ❑ The biological species concept emphasizes reproductive isolation
- ❑ Speciation can take place with or without geographic separation
- ❑ Macroevolutionary changes can accumulate through many speciation events

**End of 1<sup>st</sup> Semester**

*Project-* Students are assigned a "review" project where they present a 2 page, typed outline on topics and labs covered during the first semester.

**Unit 3- Organisms and Populations**

**DIVERSITY OF ORGANISMS (2 weeks- most of which is covered during Winter Break)**

**[C6- Science as a Process; Evolution; Energy Transfer; Continuity and Change; Structure to Function; Interdependence in Nature; Science and Society]**

**Phylogeny and Systematics (Ch. 25)**

*Discussion Topics-*

- ❑ Phylogenetics are based on common ancestries inferred from fossil, morphological, and molecular evidence
- ❑ Phylogenetic systematics connects classification with evolutionary history
- ❑ Phylogenetic systematics informs the construction of phylogenetic trees based on shared characters
- ❑ Much of an organism's evolutionary history is documented in its genome

*Video-* The Domains of Life

**Exam-** Evolution and Classification (Chapters 22-25)

*(Independent Study-* Students complete a “Biological Diversity” study packet covering chapters 18, 26-34 during Winter Break.)

**The Evolutionary History of Biological Diversity** (Ch. 26)

**The Prokaryotes** (Ch. 28)

**Plant Diversity I: How Plants Colonized Land** (Ch. 29- *discussed immediately before **Structure and Function of Plants***)

*Discussion Topics-*

- ❑ Land plants evolved from green algae
- ❑ Land plants possess a set of derived terrestrial adaptations
- ❑ The life cycles of mosses and other bryophytes are dominated by the gametophyte stage
- ❑ Ferns and other seedless vascular plants formed the first forests

**Plant Diversity II: The Evolution of Seed Plants** (Ch. 30- *discussed immediately before **Structure and Function of Plants***)

*Discussion Topics-*

- ❑ The reduced gametophyte of seed plants are protected in ovules and pollen grains
- ❑ Gymnosperms bear “naked” seeds, typically on cones
- ❑ The reproductive adaptations of angiosperms include flowers and fruit
- ❑ Human welfare depends greatly on seed plants

*Supplementary Reading-* “How Flowers Changed the World” from The Star Thrower pp. 65-75

**Fungi** (Ch. 31)

**An Introduction to Animal Diversity** (Ch. 32)

**Invertebrates** (Ch. 33)

**Vertebrates** (Ch. 34)

**Exam-** Evolutionary Relationships and Survey of the Diversity of Life (Chapters 26-34)

**STRUCTURE AND FUNCTION OF PLANTS AND ANIMALS** (5 ½ weeks- *one-half of which is covered in student projects/presentations*)

**[C6- Science as a Process; Evolution; Energy Transfer; Continuity and Change; Relationship of Structure to Function; Regulation; Interdependence in Nature; Science, Technology, and Society]**

*(Independent Study/Project-* Students must read chapters 29, 30, and 35-39 to answer nightly objective questions. In addition, ALL students are assigned a plant biology seminar topic where they research a PAST free response question relevant to the day's discussion and present a typed outline and rubric to the class.)

**Plant Structure, Growth, and Development** (Chapter 35)

*Discussion Topics-*

- ❑ The plant body has a hierarchy of organs, tissues, and cells
- ❑ Meristems generate cells for new organs
- ❑ Primary growth lengthens roots and shoots
- ❑ Secondary growth adds girth to stems and roots in woody plants
- ❑ Growth, morphogenesis, and differentiation produce the plant body

*Lab-* Viewing Plants (1 day)

**Goal:** to inspect plants around campus and identify the floral parts, leaf shape, and leaf arrangement to enable the student to use a dichotomous key in a subsequent lab

### **Transport in Vascular Plants** (Chapter 36)

#### *Discussion Topics-*

- Physical forces drive the transport of materials in plants over a range of distances
- Roots absorb water and minerals from the soil
- Water and minerals ascend from roots to shoots through the xylem
- Stomata help regulate the rate of transpiration
- Organic nutrients are translocated through the phloem

#### *AP Lab 9 Prelab*

*AP Lab 9-* Transpiration (3 days)

**Exam-** Plant Evolution and Structure and Function (Chapters 29, 30, 35 and 36)

### **Plant Nutrition** (Chapter 37)

#### *Discussion Topics-*

- Plants require certain chemical elements to complete their life cycle
- Soil quality is a major determinant of plant distribution and growth
- Nitrogen is often the mineral that has the greatest effect on plant growth
- Plant nutritional adaptations often involve relationships with other organisms

### **Angiosperm Reproduction and Biotechnology** (Chapter 38)

#### *Discussion Topics-*

- Pollination enables gametes to come together within the flower
- After fertilization, ovules develop into seeds and ovaries into fruits
- Many flowering plants clone themselves by asexual reproduction
- Plant biotechnology is transforming agriculture

### **Plant Responses to Internal and External Signals** (Chapter 39)

#### *Discussion Topics-*

- Signal transduction pathways link signal reception to response
- Plant hormones help coordinate growth, development, and responses to stimuli
- Responses to light are critical for plant success
- Plants respond to a wide variety of stimuli other than light
- Plants defend themselves against herbivores and pathogens

**Exam-** Plant Nutrition, Hormones, and Reproduction (Chapters 37-39)

*(Project-* Students work in groups of two and research the following vertebrate systems (chapters 40-49) to teach the class via a PowerPoint presentation. They must also create a typed, two-page outline, a multiple choice/free response quiz with rubric, and bibliography. Students are quizzed daily on the previous day's presentation.)

### **Basic Principles of Animal Form and Function** (Chapter 40)

### **Animal Nutrition** (Chapter 41)

### **Circulation and Gas Exchange** (Chapter 42)

*AP Lab 10-* Physiology of the Circulatory System (3 days)

### **The Immune System** (Chapter 43)

### **Osmoregulation and Excretion** (Chapter 44)

### **Hormones and the Endocrine System** (Chapter 45)

### **Animal Reproduction** (Chapter 46)

### **Animal Development** (Chapter 47)

### **Nervous Systems** (Chapter 48)

### **Sensory and Motor Mechanisms** (Chapter 49)

### **Behavioral Ecology** (Chapter 51)

#### *AP Lab 11 Prelab*

*AP Lab 11-* Animal Behavior (2 days)

**Exam-** Animal Structure and Function (Chapters 40-49)

**ECOLOGY** (2 ½ weeks- *much of which is covered in Spring Break study packet*)

**[C6- Science as a Process; Evolution; Energy Transfer; Continuity and Change; Relationship of Structure to Function; Regulation; Interdependence in Nature; Science, Technology, and Society]**

*(Independent Study-* Students complete a study packet covering chapters 50-55 during Spring Break.)

**An Introduction to Ecology and the Biosphere** (Chapter 50)

**Population Ecology** (Chapter 52)

**Community Ecology** (Chapter 53)

Highlight Symbiotic Relationships (and *coevolution*)

**Ecosystems** (Chapter 54)

*AP Lab 12 Prelab*

*AP Lab 12-* Dissolved Oxygen and Aquatic Primary Productivity (2 days)

**Conservation Biology and Restoration** (Chapter 55)

*Discussion Topics-*

- Human activities threaten Earth's biodiversity
- Population conservation focuses on population size, genetic diversity, and critical habitat
- Landscape and regional conservation aim to sustain entire biotas
- Restoration ecology attempts to restore degraded ecosystems to a more natural state
- Sustainable development seeks to improve the human condition while conserving biodiversity

*Lab-* Local Plant Community Survey and Biodiversity (3 hour outdoor lab)

**Goals-** to identify native plant species of southern California, as well as become familiar with their names, habitats, and adaptations to these habitats; to experience quantitative sampling of vegetation; to observe animals living within the different communities

*Lab-* Keying California Native Plants using the Jepson Manual (1 day)

**Goal-** to identify an unfamiliar native southern California plant species using a dichotomous key

*Supplementary Reading-* "Hollywood's Real Natives" from An Island Called California pp. 345-369

**Exam-** Ecology and Conservation (Chapters 50-55)

**AP Exam Review** (2-3 weeks) [C1-C7]

We will review all topics and labs, and end with a mock AP Exam (which serves as their final exam). During this time, we will peruse through CliffsAP Biology.

**Conservation Project** (weeks following the AP Exam)

**[C2-C7, C6- Evolution; Energy Transfer; Relationship of Structure to Function; Regulation; Interdependence in Nature; Science, Technology, and Society]**

Students do in-depth research on a local ecological community (e.g. intertidal, coastal strand, coastal salt marsh, freshwater marsh, coastal sage scrub, riparian woodland, Southern oak woodland, vernal pool, grassland, chaparral, or mixed-evergreen forest) to be reported to the class via a PowerPoint presentation. Their research must include the following:

1. Climate, past and present distribution, predominant species, soil composition, topography, the average age of the community, dependent environmental factors, floral and fauna adaptations, endemic species, and plants used in horticulture;
2. Human impact on the community's distribution, species composition, landscape, and climate;
3. Governmental or nonprofit wildlife preservation agency for overseeing protected lands;
4. Case study on a threatened or endangered species;
5. Impact of invasive exotic species;
6. Case study on a local preservation/restoration project;
7. Critique on a recent article regarding the community;

8. Ways in which the average citizen can help preserve local communities;
9. Experience/documentation of visit to a local national preserve, national forest, national/state park, wildlife sanctuary, or NATIVE botanical garden;
10. Experience/documentation of visit to a local university to find two published works

### **Student and Parent Resources**

- 1) A Homework Club has been recently established where students have the opportunity to be tutored by both teachers and students. These tutoring sessions are held Monday through Thursday from 2:40 to 3:40 pm.
- 2) Due to the swift pace at which we traverse through material, it is highly recommended students spend a minimum of five hours per week doing homework and studying for AP Biology.
- 3) You may access various assignments from either <http://www.savanna-hs.org/> OR [http://www.classreptilia.com/savanna\\_ap\\_biology.htm](http://www.classreptilia.com/savanna_ap_biology.htm) to see what your child is doing in class.
- 4) Parents often times want suggestions as to what they should have their student do to improve their grades. The best of students follow many of the “ideal” study habits listed below:
  - a) Read for understanding of material:
    - Take notes to clarify ideas;
    - Challenge or question the text;
    - Stop occasionally to evaluate if the text is understood;
    - Reread to revise understanding;
    - Predict what will come next (Armbruster et al. 1983; Collins 1994; Flavell 1981; Garner 1987; Tei and Stewart 1985).
    - Look up words in a dictionary **when** contextual clues do not help
  - b) Ask questions in class to eliminate confusion
  - c) Create a network of study-mates
  - d) Review material before coming to class
  - e) Review material discussed in class when they get home
  - f) Rewrite notes
  - g) Use flashcards
  - h) Have reliable people read their work
  - i) Do not leave all studying for the night before the test
  - j) Actively listen in class
  - k) Give 100% effort while doing assignments

### **My Commitment**

I, Mr. Michelotti, am committed to my students’ success by ...

- 1) being available for **extra help**...
  - a. before school at 7:30 am and after school until 3:00 pm.
  - b. at **micheelotti\_r@auhsd.us** for those most urgent questions in the evening and/or on the weekends.
- 2) providing a curriculum adherent to the **Science Content Standards** for California Public Schools.
- 3) practicing the California **Standards for the Teaching Profession**:
  - a. Engaging and supporting all students in learning,
  - b. Creating and maintaining effective environments for student learning,
  - c. Understanding and organizing subject matter for student learning,
  - d. Planning instruction and designing learning experiences for all students,
  - e. Assessing student learning, and
  - f. Developing as a professional educator.
- 4) being **dedicated to teaching and learning**. I maintain high expectations to set my students up for success later in life. I believe in empowering students and holding them accountable for their actions. The times are changing, problems are becoming more complex, and because of this I am determined to pass students who are able to think critically and problem solve.

**I ask you to remain current with your child’s progress and support their good study habits. I have attached a rubric developed by Jamin Lynch and Susan Barba named “I EARN the Grade I Get Because...” Please work through it with your child, so you both are aware of what is expected of an “A” and “B” student. This rubric is to be returned to your child to serve as a reminder to what behaviors will make him/her successful. Remember, the success of students depends on us working together.**

If you have any questions or comments, please feel free to contact me at **micheelotti\_r@auhsd.us** or through the main office at 220-4262 ext. 157. It is usually easier to respond to your questions via E-mail, however I will return your call within 24 hours.

Mr. Ron Michelotti, M.S.,

AP Biology/Chemistry Teacher

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 I HAVE READ AND DISCUSSED **THE ENTIRE CURRICULUM PAPER** WITH MY CHILD. IF YOU NEED TO CONSULT ME REGARDING MY CHILD, PLEASE CALL \_\_\_\_\_ DAYTIME AND \_\_\_\_\_ EVENINGS OR E-MAIL ME AT \_\_\_\_\_.

PARENT/ GUARDIAN SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

STUDENT SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

STUDENT NAME (please print) \_\_\_\_\_ PERIOD \_\_\_\_\_

*\*AP Biology Course Requirements*

CONCEPTS	C1- The course emphasizes the biological concepts as specified in the three overarching topics listed in the Topic Outline in the Course Description: <b>Molecules and Cells</b>	C2- The course emphasizes the biological concepts as specified in the three overarching topics listed in the Topic Outline in the Course Description: <b>Heredity and Evolution</b>	C3- The course emphasizes the biological concepts as specified in the three overarching topics listed in the Topic Outline in the Course Description: <b>Organisms and Populations</b>	C4- The course provides students with an opportunity to develop a conceptual framework for modern biology emphasizing: <b>an understanding of science as a process rather than an accumulation of facts</b>	C5- The course provides students with an opportunity to develop a conceptual framework for modern biology emphasizing: <b>recognition of evolution as the foundation of modern biological models and thought</b>	C6- The course provides students with an opportunity to develop a conceptual framework for modern biology emphasizing the integration of the general topics of biology through the eight major themes as specified in the Course Description: <b>Science as a Process; Evolution; Energy Transfer; Continuity and Change; Relationship of Structure to Function; Regulation; Interdependence in Nature; Science, Technology, and Society</b>	C7- The course provides students with an opportunity to develop a conceptual framework for modern biology emphasizing: <b>applications of biological knowledge and critical thinking to environmental and social concerns</b>	C8- The course includes a laboratory component that fulfills all of the objectives of the recommended AP Biology labs as listed in the Course Description. Students must spend a minimum of 25% of instructional time engaged in hands-on laboratory work.
The Chemistry of Life	●					● Energy Transfer; Structure to Function; Science, Technology, and Society	●	<i>See Lab Component</i>
Cells	●	●		●	●	● ALL	●	“ ”
Cellular Energetics	●	●		●	●	● Science as a Process; Evolution; Energy Transfer; Structure to Function; Regulation; Science, Technology, and Society	●	“ ”
Heredity	●	●		●	●	● Science as a Process; Evolution; Continuity and Change; Structure to Function; Regulation; Science, Technology, and Society	●	“ ”
Molecular Genetics	●	●		●	●	● ALL	●	“ ”
Evolutionary Biology		●	●	●	●	● ALL	●	“ ”
Diversity of Organisms		●	●	●	●	● Science as a Process; Evolution; Energy Transfer; Continuity and Change; Structure to Function; Interdependence in Nature; Science and Society		“ ”
Structure and Function of Plants and Animals	●	●	●	●	●	● ALL	●	“ ”
Ecology		●	●	●	●	● ALL	●	“ ”