

AP Biology Course Syllabus

Introduction and Course Overview

The Advanced Placement Biology Course at Glen A. Wilson High School is a one year in depth and challenging course developed to be equivalent to a college introductory course taken by biology majors. In that respect we try to help students develop independent, self-learning strategies, which include time management and independent lab and literature research. We want to prepare them for the demands of a college career. We also align the course with AP topics and the 8 major themes of AP Biology. The course was developed with the assistance of previous AP instructors at Wilson High School and in consultation with instructors from other schools in Los Angeles and San Diego Counties.

The topics covered are those recommended by the AP Development Committee, which include – I. Molecules and Cells (Chemistry of Life, Cells, Cellular Energetics); II. Heredity and Evolution (Heredity, Molecular Genetics, Evolutionary Biology); III. Organisms and Populations (Diversity of Organisms, Structure and Function of Plants and Animals, Ecology. Despite the tremendous amount of factual material, we want the students to appreciate and understand the delicate balances and interactions that allow life to exist. We emphasize the “process” of science and change. This understanding ties the facts together in a meaningful manner. The eight major themes are very helpful in exploring these relationships: Science as a Process, Evolution, Energy Transfer, Continuity and Change, Relationship of structure to function, Regulation, Interdependence in nature, Science, Technology, and society.

This year we are fortunate to have replaced the 4th edition of Neil Campbell and Jane B. Reece’s Biology with the 7th edition. This book is designated the “AP Edition” and has been extremely helpful. We are very impressed with the authors’ dedication to provide the “facts” in a thematic framework. For that reason we have decided to teach the topics for the most part according to the sequence of the text with the help of the “AP Topic Correlation” and the “AP Biology Thematic Study Grid”. However, we do not follow the sequence exactly, altering it or skipping chapters at times. Reading this text is an important component of a student’s success in the course.

A variety of activities are employed to engage the students. These activities include lectures, discussions, collaborative group activities, power point and oral presentations, laboratory investigations, internet research, independent research, essay writing assignments (released AP essays), unit questions, interactive computer activities, and practice AP exams. Students design experiments in which they have to explore and extend the topics in the class. The 12 AP labs are covered with the use of the Ward’s Natural Science kits. In addition, we have the corresponding interactive CDs for each lab. At least 25% of class time is spent on lab activities. AP classes are blocked before and after lunch, allowing the necessary time to conduct the labs. Saturdays are also scheduled when necessary. Labs and activities are also included from other sources.

There are 18 computers in the AP Biology room. These computers are used by the students with simulations, interactive CDs from the texts and other sources, and labs.

For example, microscope slides and dissection images have been digitized. Physiology labs such as cardiovascular and respiration are conducted with the use of computer probes and interfaces from Pasco Scientific. Additional biology labs have been brought in from variety resources, including the internet.

Not all resource, labs, lectures, and activities listed below are completed each year.

Course Resources:

Primary text:

- Campbell, Neil A., J. Reece. *Biology*, 7th edition (2005)

Supplementary Texts and Manuals:

- Campbell, Neil A., J. Reece. *Practicing Biology – A Student Workbook*, 7th edition (2005)
- Tortora, Gerard J., Derrickson, Bryan. *Principles of Anatomy and Physiology*, 11th edition (2006)
- Martini, Frederic H. *Fundamentals of Anatomy and Physiology*, 4th edition (1989)
- Donnelly, Patricia J., Wistreich, George A., *Laboratory Manual for Anatomy and Physiology*, 3rd edition (1990)

Computer Software and Hardware:

- CyberEd: Biology
- CyberEd: Chemistry
- Campbell BIOLOGY 7th edition - CD-ROM
- Interactive Physiology 7 – system Suite – Benjamin Cummings (adam.com) – CD-Rom
- Fundamentals of Anatomy and Physiology - CD-ROM
- Pasco Scientific interfaces and probes
- Course website: www.gunthersclass.com

Video Resources:

- GPN Biology Series
- Pacific Media: Biology Series
- Video Companion to Fundamentals of Anatomy and Physiology
- Various additional resources – see course outline

Course Outline:

Unit 1: Introduction and Chemistry – Chapters 1, 3, 4, 5

AP Topics: Chemistry of Life - Water, Organic Molecules in organisms

Text and Topics:

Chapter 1 – Exploring Life: Exploring Life

Chapter Questions and Quiz

Chapter 3 – Water and the Fitness of the Environment

Read

Chapter 4 - Carbon and the Molecular Diversity of Life

Chapter Questions and Quiz

Chapter 5 – The Structure and Function of macromolecules

Chapter Questions and Quiz

Unit 1 Exam

Lectures:

- Intro to AP Biology and course overview
- Review of scientific method (a historical perspective)
- Experimental design: Research question, hypothesis, independent and dependent variables, data, analysis, conclusion, accuracy, precision.
- Review of Chemistry – Inorganic
- Water – hydrogen bonds, acids and bases
- Review of Chemistry – Organic: carbohydrates, lipids, proteins, enzymes, nucleic acids.

Labs and Activities:

- Video: DNA - Geometry of Life
- Computer interactive: Atomic Structure
- Computer interactive: Acids and Bases
- Computer Interactive: AP Lab #2
- Computer Interactive: Biochemistry
- Activity – Organic Compounds Worksheet & Activity
- Lab – A scientific experiment: review of measurement, scientific method. Data analysis, experimental design; hypothesis formation and testing, standard deviation. Accuracy, precision
- **AP Lab # 2 – Enzyme Catalysis**

Essays:

- Describe the seven properties of life.
- Explain the biological organization of structural levels.
- Describe the four macromolecules in detail. Discuss types, subunits, and provide an example for each category of macromolecule
- Describe the seven types of proteins; include functions and provide an example.

Unit 2: The Cell, Part 1 – Chapters 6, 7, 8

AP Topics: Chemistry of Life - Free energy changes, Enzymes; **Cells** - Prokaryotic and eukaryotic cells, Membranes, Subcellular organization; **Cellular**

Text and Topics:

Chapter 6 – A Tour of the Cell

Chapter Questions and Quiz

Chapter 7 – Membrane Structure and Function

Chapter Questions and Quiz

Chapter 8 – An Introduction to Metabolism

Chapter Questions and Quiz

Unit 2 Exam

Lectures: (note: student presentations may replace or supplement lectures)

- Intro into the cell
- Prokaryotic vs Eukaryotic cells
- Organelles: ER, Ribosomes, Golgi apparatus, Lysosomes, Endomembrane Sys
- Cell Membrane, osmosis, active and passive transport
- Enzymes and activation energy

Labs and Activities:

- Video – Cell
- Video – FAP: Cell Membrane and Protein Synthesis
- Computer interactive: Campbell – Chapters 6, 7,8
- Computer interactivities: The Cell, DNA, Enzymes, Photosynthesis, Plasma Membrane
- Biological Illustration – Animal and Plant Cell
- Crossword – Cell
- Student group presentations
- AP Computer interactive: AP Lab #1
- Lab: Comparison of prokaryotic, eukaryotic, plant and animal cells.
Include worksheet from Solomon, Berg, and Martini – page4-7
- **AP Lab #1: Diffusion and Osmosis**
- Lab: Assignment of 1st independent Lab

Essays: (note: 3 – 5 essays are selected from list each year)

- Discuss the functions of Smooth and Rough ER.
- Discuss relationships among the endomembrane system.
- Describe structure and function of mitochondria & chloroplasts.
- Discuss design, structure and functions of membranes.
- Compare and contrast passive transport, active transport, and facilitated diffusion (know examples).
- Describe how energy flows through an open system.
- Explain ways in which ATP drives cellular work (specific examples).
- Enzymes are biological catalysts.
 - a. Describe the catalytic cycle of an enzyme.
 - b. Explain three ways that a cell's chemical and physical environment affects enzyme activity.

Unit 3: The Cell, Part 2 – Chapters 9, 10

AP Topics: Cellular Energetics – Coupled reactions, Fermentation and cellular respiration, Photosynthesis

Text and Topics:

Chapter 9 – Cellular Respiration: Harvesting Chemical Energy

Chapter Questions and Quiz

Chapter 10 – Photosynthesis

Chapter Questions and Quiz

Unit 3 Exam

Lectures: (note: Student presentations may supplement or replace lectures)

- Glycolysis
- Citric acid cycle
- Krebs cycle
- Electron transport
- Photosynthesis
- Energy, ATP, endergonic and exergonic reactions, coupled reactions

Labs and Activities:

- Video: Great Pacific Media – Glycolysis and Cellular Respiration
- Video: Great Pacific Media – Photosynthesis
- Group presentations: Power Point, Posters, Oral Presentations.
- Computer Interactive – Ward's AP Lab #5
- **AP Lab # 5 Cell Respiration**
- Computer Interactive – Ward's AP Lab #6
- **AP Lab # 4 Plant Pigment and Photosynthesis**
- Computer Interactive – Campbell Chapters 9 & 10
- Computer Interactive - CyberEd - Photosynthesis

Essays:

- Provide an overview of cellular respiration, include 3 stages (discuss products and reactants at each stage)
- Compare and contrast Fermentation and Respiration.
- Provide an overview of photosynthesis; include light reactions and Calvin Cycle. Be able to describe products and reactants and their locations.
- Describe function of photosystems: both cyclic and noncyclic electron flow.

Unit 4 Cell Reproduction – Chapters 12, 13

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| AP Topics: Cells – Cell cycle and its regulation; Heredity – Meiosis and gametogenesis |
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Text and Topics:

Chapter 12 – The Cell Cycle

Chapter Questions and Quiz

Chapter 13 – Meiosis and the Gene Idea

Chapter Questions and Quiz

Unit 4 Exam

Lectures: (note: Student presentations may supplement or replace lectures)

- Mitosis
- Meiosis

- Discuss Independent planning lab

Labs and Activities:

- Video: Great Pacific Media – Cellular Reproduction: Mitosis, Cytokinesis, and the cell Cycle
- Video: Great Pacific Media – Meiosis, Sexual Reproduction and Genetic Variability
- Biological Illustration: Mitosis and Meiosis compared
- Computer Interactive: Mitosis
- Computer Interactive: Meiosis
- Computer Interactive: Campbell Chapters 12 & 13
- Lab: Mitosis on Line
- Lab: Mitosis and Meiosis - Microscope
- **AP Lab #3 Mitosis and Meiosis**

Essays:

- Describe human life cycle.
- Describe the cell cycle and phases of mitosis - include importance of process.
- Describe the phases of meiosis and importance of process.
- Compare and contrast mitosis and meiosis.
- Explain mechanisms for control of cell division.
- Compare and contrast sexual vs. asexual reproduction.
- Explain how sexual reproduction provides genetic variation.

Unit 5: Genetics and Heredity: Chapters 14, 15, 16

AP Topics: Heredity – Eukaryotic chromosomes, Inheritance patterns; **Molecular Genetics** – RNA and DNA structure and function, Mutation

Text and Topics:

Chapter 14 – Mendel and the Gene Idea (Inheritance patterns)

Chapter Questions and Quiz

Chapter 15 – The Chromosomal Basis of Inheritance (Eukaryotic chromosomes)

Chapter Questions and Quiz

Chapter 16 – The Molecular Basis of Inheritance

Unit 5 Exam

Lectures: (note: Student presentations may supplement or replace lectures)

- Mendel and the Law of Segregation
- Probability and Dihybrid Cross
- Pedigrees and Human inheritance
- Genetics problems
- Human genetic disorders
- Morgan and sex-linkage
- Recombination
- DNA Replication

Labs and Activities:

- Video: Great Pacific Media – Understanding Inheritance: Mendel, Method and Mapping

- Video: Great Pacific Media – The Human Genome: Traits, Disorders, and Treatment
- Internet reports: Genetic Disorders
- Genetics problems and worksheets
- Collaborative groups and problem solving
- Genetics Lab Activities 19, 20, 21, 23 – Worksheets
- Computer Interactive: Campbell 14, 15, 16
- Computer Interactive: Mendel's Principles
- Computer Interactive: Investigating Heredity
- Outline history of discovery of DNA - Scientists and their contributions to discovery of DNA
- Computer Interactive: Ward's Lab #7

- **AP Lab # 7 – Genetics of Organisms**

Essays: (note: 3 – 5 selected essays are assigned)

- Be able to determine and analyze genetic crosses using the rules of Mendelian Genetics. This will include any patterns of inheritance that differ. (i.e. Incomplete Dominance, Codominance, Multiple Alleles, Epistasis, Pleiotropy, etc.)
- Be able to determine and analyze human pedigrees, and to describe their use and significance.
- Describe the significance of Mendel's discovery and his subsequent laws.
- Outline Morgan's use of fruit flies and explain his experiments significance and procedure both in sex linkage, and in gene linkage. Be able to design a similar experiment.
- Discuss the relationship between genetic recombination and chromosome mapping.
- Be able to describe the different types of chromosomal alterations and related genetic disorders.
- Be able to describe the significance of both the Griffith Experiment and the Hershey-Chase Experiment and evaluate (asses implications and limitations).
- Describe DNA replication.

Unit 6 – Molecular Genetics: Chapters 17, 18, 19, 20

AP Topics: Molecular Genetics – RNA and DNA, Gene Regulation, Mutation, Viral Structure and Replication, Nucleic acid technology and applications

Text and Topics:

Chapter 17 – From Gene to Protein

Chapter Questions and Quiz

Chapter 18 – The Genetics of Viruses and Bacteria

Chapter Questions and Quiz

Chapter 19 – Eukaryotic Genomes

Chapter Questions and Quiz

Chapter 20 – DNA Technology and Genomics

Chapter Questions and Quiz

Unit 6 Exam

Lectures: (note: Student presentations may supplement or replace lectures)

- Transcription, translation, codons, amino acids
- Virus Structure
- Genetic Recombination
- Regulation of gene expression
- DNA Technology; cloning
- DNA Sequencing; gene therapy

Labs and Activities:

- Video: Great Pacific Media – DNA, RNA, and Protein Synthesis
- Video: Great Pacific Media – Biotechnology: Engineering Genomes
- Video: Genetic Engineering
- *Experimental Design: Independent Lab*
- Computer Interactive: Protein Synthesis; Bacteria and Viruses; DNA
- *Activity: DNA, RNA, and Protein Synthesis*
- Computer Interactive: Ward's Lab #6
- **AP Lab # 6: Bacterial Transformation; DNA Fingerprinting**

Essays: (note: 3 – 5 selected essays are assigned)

- Describe the steps involved in protein synthesis.
- Compare protein synthesis in prokaryotes and eukaryotes.
- Discuss the different types of point mutations and their affect on the function of a protein.
- Explain viral structures and their life cycle. (Know the differences between lytic and lysogenic cycles)
- Explain how genetic recombination generates diversity in bacterial populations. Provide methods. Be able to explain transformation lab.
- Explain the control of gene expression. Compare repressible and inducible enzymes; explain how each functions.
- Explain three key tools of DNA technology.
- Discuss different uses of DNA technology.

Unit 7 – Evolution: Chapters 22, 23, 24

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| AP Topics: Evolutionary Biology – Evidence for evolution, Mechanisms of evolution, |
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Text and Topics:

Chapter 22 - Descent with Modification: A Darwinian View of Life

Chapter Questions and Quiz

Chapter 23 – The Evolution of Populations

Chapter Questions and Quiz

Chapter 24 – The Origin of Species

Chapter Questions and Quiz

Unit 7 Exam

Lectures: (note: Student presentations may supplement or replace lectures)

- Evolution, Natural Selection, Adaptaion
- Evidence for Evolution
- Hardy Weinberg Principle

- Genetic Drift
- Speciation
- Geographic and reproductive isolation
- Patterns of Evolution
- Fossil Record

Labs and Activities:

- Activities on Human Evolution:
 - Biochemical Evidence For Evolution
 - Evolutionary Changes in Primates
 - Genetic Equilibrium
 - Human Variation
- Activity 22.1 : Campbell– Collaborative groups on concept maps. Individual work on activity
- Activity 24.1 : Campbell What Factors Affect Evolution?
- Computer Interactive: Ward's AP Lab #8
- **AP Lab #8 Population Genetics and Evolution**

Essays: (note: 3 – 5 selected essays are assigned)

- Compare and contrast Lamarck and Darwin according to their mechanisms of evolution.
- Explain Natural Selection and provide examples.
- Explain possible mechanisms that can cause evolution, in other words, explain situations which go against the Hardy-Weinberg Theorem.
- Analyze evidence which supports evolution.
- Describe reproductive barriers which separate species.
- Explain modes of speciation.
- Apply the Theory of Punctuated Equilibrium.

Unit 8 - Diversity of Organisms: Chapters 25, 26, 27, 28

AP Topics: Evolutionary Biology – Early evolution of life, Mechanisms of evolution; **Diversity of Organisms** – Survey of the diversity of life, Phylogenetic classification, Evolutionary relationships

Text and Topics:

Chapter 25 – Phylogeny and Systematics

Chapter Questions and Quiz

Chapter 26 – The Tree of Life: An introduction to Biological Diversity

Chapter Questions and Quiz

Chapter 27 - Prokaryotes

Chapter Questions and Quiz

Chapter 28 - Protists

Chapter Questions and Quiz

Unit 8 Exam

Lectures: (note: Student presentations may supplement or replace lectures)

- Taxonomy from Linnaeus – binomial nomenclature
- Whittaker and the 5-kingom system
- Woese and domains
- Classification and Evolution
- Phylogenetic trees, shared characters, clades

- Viruses
- Prokaryotes: Archaea and Eubacteria
- Eukaryotes

Labs and Activities:

- Activity: Classification and Dichotomous Keys
- Activity (Prentice Hall): Classification – Linnaeus, cladograms, DNA/RNA, Molecular Clocks
- Activity (Prentice Hall): Protists
- Video: Classification
- Computer activity: Campbell Chapters 25, 26, 27, 28
- Computer activities: Classification of Living Things, Protists, Viruses and Bacteria, Invertebrates, Vertebrates
- Campbell: Student Workbook – Activity 25.1 How are phylogenies constructed?
- Campbell: Student Workbook – Activity 26/27.1 What do we know about the origin of life on Earth?
- Campbell: Student Workbook – Activity 26/27.2 How has small size affected prokaryotic diversity?
- Group presentations: Viruses, bacteria, protists
- Lab: Bacteria – digitized slides
- Lab: Examination of Protists
- Lab: Prokaryotic and Eukaryotic cells: Elodea and Anabaena

Essays:

- Explain the snowball Earth Hypothesis.
- What do scientists think the primitive Earth was like? How could life possibly arise in such an inhospitable environment?
- Discuss early Earth and the origin of life and relate this to the Miller/Urey experiment.
- What is the rationale for separating the archaea, the bacteria, and all the eukaryotes into three domains?
- Compare and contrast the various classification systems, explain the reasoning behind the breakdown of each system.

Unit 9 - Plants and Fungi: Chapters 29, 31, 35, 36, 38, 39

AP Topics: Structure and Function of Plants – Reproduction, growth, and development (plants); Structural, physiological, and behavioral adaptations (plants); Response to the environment (plants).

Text and Topics:

Chapter 29 – Plant Diversity I: How Plants Colonized Land

Chapter Questions and Quiz

Chapter 31 - Fungi

Chapter Questions and Quiz

Chapter 35 – Plant Structure, Growth, and Development

Chapter 36 – Transport in Vascular Plants

Chapter 38 – Angiosperm Reproduction and Biotechnology

Chapter 39 – Plant Response to Internal and External Signals

Unit 9 Exam

Lectures: (From Instructor's Manual: Solomon, Berg, and Martin, *Biology*)

- Plant Structure, Growth, and Differentiation
- Leaf Structure and Function
- Stems and Plant Transport
- Roots and Mineral nutrition
- Reproduction in Flowering Plants
- Plant Growth and Development

Labs and Activities:

- Activity 36.1 Campbell – How are water and food transported in plants?
- Activity 38.1 – How can plant reproduction be modified using biotechnology?
- Computer Interactive: Campbell – Chapters 29, 31, 35, 36, 38, 39
- Computer Interactive: The Leaf, Roots and Stems, Nonflowering Plants, Flowering Plants
- Lab: Plant Key
- Lab: Plant leaf, stems, roots – microscope
- Lab: Flower dissection
- Lab: Reproduction in Fungi
- **Lab: AP #9 Transpiration**

Essays:

- Discuss the structure (morphology) and function of flowering plants.
- Provide an overview of transport in plants; discuss the movement of water and solutes on the cellular, organ, and whole plant levels.
- Design an experiment which determines the transpiration rate of a plant under various conditions.
- Describe pollination and fertilization in flowering plants; discuss mechanisms which help increase genetic variation.
- Discuss the different plant hormones and their effect on growth, development, and responses to environmental stimuli

Unit 10 - Animals: Chapters 32, 33, 34

AP Topics: Diversity of Organisms – Survey of the diversity of life;
Phylogenetic classification

Text and Topics:

Chapter 32 – An Introduction to Animal Diversity

Chapter Questions and Quiz

Chapter 33 - Invertebrates

Chapter Questions and Quiz

Chapter 34 - Vertebrates

Unit 10 Exam

Lectures:

- Animal nutrition and cell structure
- Symmetry, tissues, body cavities, protostome and deuterostome development
- Vertebrates

- Invertebrates

Labs and Activities:

- Computer Interactive: Campbell – Chapters 32, 33, 34
- Computer Interactive: Invertebrates
- Computer Interactive: Vertebrates
- Animal Classification Table
- Animal Classification Outline
- Lab: Animal Survey

Essays:

No Essays in this unit: Student reports on Vertebrates and Invertebrates.

Unit 11 - Animal Form and Function: Chapters 40 - 49

AP Topics: Structure and Function of Animals – Reproduction, growth, and development (animals); Structural, physiological, and behavioral adaptations (animals); Response to the environment (animals).

Text and Topics:

- Chapter 40** – Basic Principles of Animal Form and Function
- Chapter 41** – Animal Nutrition
- Chapter 42** – Circulation and Gas Exchange
- Chapter 43** – The immune System
- Chapter 44** – Osmoregulation and Excretion
- Chapter 45** – Hormones and the Endocrine System
- Chapter 46** – Animal Reproduction
- Chapter 47** – Animal Development
- Chapter 48** – Nervous System
- Chapter 49** – Sensory and Motor Mechanisms
- Unit 11 Exam**

Lectures:

- The digestive system
- The circulatory system
- The Respiratory System
- Homeostasis and the Immune System
- Excretion
- The Endocrine System
- The Reproductive System
- The Nervous System
- The Senses

Labs and Activities:

- Computer Interactives: Campbell 40 – 49
- Computer Interactives: Skeletal Muscle Contraction, Resting Potentials, Graded Potentials, Action Potentials, Vision, Hormones and Receptors, Anatomy of the Heart, Heartbeat, Cardiac Cycle, Gas Exchange, Enzymes in Digestion, Renal Filtration, Renal Absorption and Secretion.
- Figures: Draw figures on all systems with structure/function tables

- Activity: Eye and ear; optical illusions
- Crossword: Blood
- internet report: Blood disorders
- Lab Animal Histology: Microscope and Computer
- Lab Nervous System: Brain Dissection, Nueron – microscope and digital, Reflex arc
 - Lab Blood: Microscope and digital
 - Lab: Heart Dissection
 - **Lab: AP #10 – Physiology of the Circulatory System**
 - Lab: EKG – Pasco Scientific
 - Lab: Spirometer and Respiration – Pasco Scientific
 - Lab: Chemical Nature of Enzymes
 - Lab: Kidney dissection
 - Lab: Mink dissection
 - Videos: We have videos on all systems

Essays:

- Right Brain – Left Brain
- Summary of Immune response
- Summary of Time Magazene article “End of Antibiotics”
- Aids
- Essay – Menstrual Cycle
- Exchange of gases
- Structure and function of the mammalian kidney, water balance, and hormonal actions
- Describe structure and function of mammalian respiratory system.
- Discuss the sources and actions of the following hormones. Describe the feedback mechanisms: Insulin/glucagons; parathyroid/calcitonin; throtropin//throxine

Unit 12 - Ecology: 50, 53, 53, 54

AP Topics: Ecology: Population dynamics, Communities and ecosystems; Global issues

Text and Topics:

Chapter 50 – An Introduction to Ecology and the Biosphere

Chapter 52 – Poplulation Ecology

Chapter 53 – Community Ecology

Chapter 54– Ecosystems

Chapter 55 – Conservation Biology and Restoration Ecology

Unit 12 Exam

Lectures:

- Climate and abiotic factors
- Biomes
- Population Density and Dispersion
- Demography and Population Growth
- Succession

- Trophic Levels
- Energy Flow and Production

Labs and Activities:

- **Research report:** Determine a detrimental impact on the environment. This may be caused by man or nature. Establish a cause and effect relationship. Use your knowledge of biology to analyze the effects. Whether caused by man or not, examine the consequences to society and the prognosis for the future. Are there any steps we can take to minimize or counteract the negative impact to the environment or society?
- Activity 50.1 What factors determine climate?
- Activity 52.1 Qht methods can yo u use to determine opulation density and distribution?
- Activity 52.2 What models can you use to calculate how quickly a population can grow?
- Activity 53.1 What do you need to consider when analyzing communities of organisms?
- Activity 55.1 What factors can affect the survival of a species?
- **Lab: AP Lab #11 Animal Behavior**
- **Lab AP Lab #12 Primary Productivity**
- Vidoes – Great Pacific Media
 - Aquatic Biomes: Oceans, Rivers and Wetlands
 - Community Interactions: Competition, Predation, and Symbiosis
 - How Ecosystems Work: Energy Flow and Nutrient Cycles
 - Human Impact on the Biosphere
 - Populations: Biotic Potential, Environmental Resistance
 - Terrestrial Biomes: Deserts, Grasslands and Forests
- Computer Interactives: Campbell 50, 52, 53, 54, 55
- Computer Interactives: Food Chains and Webs, Population Ecology, Human impacts on the Environment, Biomes

Essays:

- Discuss the importance of abiotic factors and their affect on distribution of species.
- Discuss organism's responses to environmental change. Provide examples.
- Describe an organism's life history.
- Discuss how density-dependent and density-independent factors can affect population growth. Provide examples.
- See **Research Report**, above