AP BIOLOGY SYLLABUS

COURSE OVERVIEW

AP BIOLOGY will cover the same major biological concepts that are studied in an introductory college biology program. The class will be centered on the eight major themes from the AP Biology curricular requirements: Science as a process, Evolution, Energy transfer, Continuity and change, Relationship of Structure to Function, Regulation, Interdependence in Nature, and Science, Technology, and Society. AP Biology will meet on Monday, Thursday, and Friday for 2 class periods (about 95 minutes) and on Tuesday and Wednesday for a block period (about 80 minutes). This schedule will allow us more than enough time to complete the 12 labs in the *AP Biology Lab Manual for Students* as well as additional labs and activities. The textbook for this course is the seventh edition of Neil A. Campbell and Jane B. Reece's *Biology* published by Pearson Education Inc, in 2005. The additional labs come from the *Investigating Living Systems Laboratory Manual* by Raymond Oram and others.

STUDENT EXPECTATIONS

The main goal for students is to obtain a good understanding of the concepts in biology and to relate this information to their lives and society as a whole. Because this is a college level course, students will be expected to put a significant amount of time and effort into preparing for class each day and preparing for the AP Biology exam in May.

Students are expected to read the textbook chapters listed on the syllabus, and they will take an exam at the end of each unit. Other assessments will include daily homework assignments, quizzes, and various projects. Over the course of the year, students will complete several independent work/research projects. One of these projects shall include an oral presentation to the class. In addition, all students are required to complete a summer assignment that will be due on the first day of school. Students will be expected to take the AP Biology exam in May.

COURSE PLANNER

In order to successfully cover all of the material and incorporate all 12 AP laboratories, a tentative schedule has been developed. The following table summarizes the units to be studied along with the approximate time frame allotted. Following the table is a more detailed explanation of lecture topics, laboratories, activities, and assessments for each unit.

UNIT	TOPICS	READINGS	DATES
Pre-unit 1	Themes of biology and the scientific method	Chapter 1	2 days
1	Ecology	Chapters 50-55	2 weeks
2	Chemistry of Life	Chapters 2-5	2 weeks
3	Cell Structure and Function	Chapters 6, 7, and 11	2 weeks
4	Cell energy	Chapters 8 – 10	3 weeks
5	Cell reproduction and Genetics	Chapters 12-15	3 weeks
6	Molecular Genetics	Chapters 16-21	3 weeks
7	Evolution	Chapters 22-25	2 weeks
8	Introduction to Biological diversity	Chapters 26 – 28, and 31	2 weeks
9	Plant Diversity, Form, and Function	Chapters 29 – 30 and 35-39	5 weeks
10	Animal Diversity, Anatomy and Physiology	Chapters 32-34, and 40-49	5 weeks

Pre-unit 1

On the first two days of school, we will discuss the course syllabus and themes of biology. Students will conduct a brief activity using the scientific method. The lab activity is from the *Investigation Living Systems Lab Manual* and the objective is to solve a problem using the scientific method. The format for writing lab reports will also be discussed.

UNIT 1: Ecology

LECTURE TOPICS:

- Ecological interactions
- Behavioral ecology
- Population ecology
- Community ecology
- Ecosystems
- Humans impact on ecology

LABS/ACTIVITIES/PROJECTS:

- AP Lab #11: Animal Behavior
- AP Lab #12: Dissolved Oxygen and Aquatic Primary Productivity
- Biomes project: Students will create an informational/visual display of an assigned biome including the latitude, temperature range, rainfall, flora, fauna, and other unique characteristics.

ASSESSMENT:

- Homework assignments, Quizzes, Unit exam

UNIT 2: Chemistry of Life

LECTURE TOPICS:

- Atoms/Compounds/Bonding
- Properties of water
- Carbon compounds
- Macromolecules of Life: Carbohydrates, Proteins, Lipids, Nucleic Acids

UNIT 2: Chemistry of Life continued

LABS/ACTIVITIES/PROJECTS:

- AP Lab #2: Enzyme Catalysis
- Activity: Building molecular models of the macromolecules
- Lab: Proof of enzyme action

ASSESSMENT:

- Homework assignments, Quizzes, Unit exam

UNIT 3: Cell structure and function

LECTURE TOPICS:

- Structure and function of cell organelles
- Cell membrane structure and function
- Cell communication

LABS/ACTIVITIES/PROJECTS:

- AP Lab # 1: Diffusion and Osmosis
- Lab: Normal and Plasmolyzed Cells
- Lab: Techniques for Better Microscope Use

ASSESSMENT:

- Homework assignments, Quizzes, Unit exam

UNIT 4: Cell energy

LECTURE TOPICS:

- Metabolism
- Cellular respiration
- Photosynthesis

UNIT 4: Cell energy continued

LABS/ACTIVITIES/PROJECTS:

- AP Lab # 5: Cell Respiration
- AP Lab # 4: Plant Pigments and Photosynthesis
- Lab: Factors Affecting the rate of Yeast Respiration
- Lab: Influencing the Rate of Photosynthesis

ASSESSMENT:

- Homework assignments, quizzes, unit exam

UNIT 5: Cell reproduction and Genetics

LECTURE TOPICS:

- Cell cycle
- Meiosis
- Mendelian inheritance
- Chromosomal basis of inheritance

LABS/ACTIVITIES/PROJECTS:

- AP Lab # 3: Mitosis and Meiosis
- AP Lab # 7: Genetics of Organisms
- Lab: Heredity or Environment
- Inherited Disease Project: Research project on different inherited diseases. Each student will be assigned an inherited disease and they will create an informational pamphlet about the disease including: genetic cause, symptoms, diagnosis, and treatments.

ASSESSMENT:

- Homework assignments, quizzes, unit exam

UNIT 6: Molecular Genetics

LECTURE TOPICS:

- DNA structure, function, and replication
- Protein synthesis: transcription and translation
- Genetics of viruses and bacteria
- Eukaryotic genomes
- DNA technology

LABS/ACTIVITIES/PROJECTS:

- AP Lab # 6: Molecular Biology

ASSESSMENT:

- Homework assignments, quizzes, unit exam

UNIT 7 and 8: Evolution and biological diversity

LECTURE TOPICS:

- Darwin's explanation of evolution by descent with modification
- Evolution of populations
- Origin of species
- Phylogeny and systematics
- Prokaryotes, Protists and Fungus

LABS/ACTIVITIES/PROJECTS:

- AP Lab # 8: Population Genetics and Evolution
- Lab: Animal Adaptations
- Lab: Seed adaptations
- Lab: A Comparison of some Monerans and Protists

ASSESSMENT:

- Homework assignments, quizzes, unit exam

UNIT 9: Plant diversity, structure and function

LECTURE TOPICS:

- Plant diversity: How plants colonized land (bryophytes and ferns)
- Plant diversity: The evolution of seed plants (gymnosperms and angiosperms)
- Plant structure, growth and development
- Transport in Vascular plants and Plant Nutrition
- Angiosperm Reproduction

LABS/ACTIVITIES/PROJECTS:

- AP Lab # 9: Transpiration
- Lab: Flower anatomy

ASSESSMENT:

- Homework assignments, quizzes, unit exam

UNIT 10: Animal diversity, anatomy and physiology

LECTURE TOPICS:

- Characteristics of Animals
- Invertebrates (sponges → echinoderms) and Vertebrates
- Animal nutrition, circulation, gas exchange and excretion
- The immune system, hormones and the endocrine system
- Animal reproduction and development
- Nervous system, sensory and motor mechanisms

LABS/ACTIVITIES/PROJECTS:

- AP Lab #10: Physiology of the Circulatory System
- Lab: Survey of some Animal Phyla
- Lab: Arthropods

ASSESSMENT:

- Homework assignments, quizzes, unit exam

STUDENT EVALUATION

Unit tests count for about 50% of the students' final grade for the year. The projects completed during the year will also count as test grades. Laboratory work and lab write ups will count for 30% of the student's grade. Quizzes and homework will make up the remaining 20% of the students' final grade.

Tests are given upon the completion of each unit and 1-3 quizzes will be given during each unit to be sure the students' are studying the topics on a regular basis. Most homework assignments require the students to read and take notes on the textbook chapters. An outline of the chapter including definitions of all bold face terms will be collected and graded. Also, the summary questions at the end of each chapter will be completed and graded in preparation for unit tests. Practice AP tests that are given throughout the course of the year will also count as homework.

Working in pairs, at least one lab from the AP Lab Manual or other lab activity will be performed each week. The write ups for the lab vary based on the type of lab that was performed. For labs that come from the AP Lab Manual, students must complete the graphs and answer the questions in the manual. Other labs require a representation of data collected or diagrams drawn (as in the case of microscope labs) and a brief summary of their conclusions.