

# AP BIOLOGY SYLLABUS

## COURSE OVERVIEW

This year we will begin the trimester schedule. Each trimester will consist of 12 weeks. The AP Biology course will run for all 36 weeks (3 trimesters) everyday for 70 minutes each day. In addition, students will receive materials and assignments for the first unit in the summer to be completed and ready for testing when the school year begins. All students will need to be available for labs on Saturdays which will be scheduled during the school year. Additional study sessions will be scheduled to assist students as necessary throughout the year. At the end of the year, students will be strongly encouraged to take the AP Biology Examination in May 2008.

This course will provide students an opportunity to study a first year college level biology course. It is designed to be a challenging course. Students are expected to study a minimum of 2 hours a night or more, especially at the beginning of the year until they have established successful study skills. Students will also be required to work on units over their vacations. It is strongly suggested that students set up study groups with other students to learn the material.

## COURSE GRADING

Students will write a contract at the beginning of each unit (except the first) that states what they will do in order to prepare for the unit test. The work will be due on the day of the test. If their performance on the test is not satisfactory, then I will assign specific work for the next unit contract.

Homework: Students will have assignments in addition to their contract work. These assignments will give the student an opportunity to demonstrate the following:

- Finding and using patterns in collected data to solve scientific problems
- Exhibit mastery of the major principles of biology
- Apply biological knowledge and critical thinking to environmental and social Concerns

Article evaluations: Students will be required to read and critique an article from a science journal for each unit.

Labs: The students will be performing all of the labs in the AP Biology Lab Manual and may do additional labs in biochemistry and dissections (after AP exam). The labs will be on Saturdays. The labs will last from 2-6 hrs. Students will be working in groups of 2 to 4 individuals. All labs require hands on work in the lab. Each student will be required to turn in a lab write up. Students are required to record in their lab book or lab handout what they have done, observed, and concluded as well as present the data, sample calculations, and conclusions in a well-organized

report. Students are also required to provide valid explanations of error and give specific ways to reduce laboratory error and increase accuracy.

Quiz / Tests: Tests will occur at the completion of each unit and will have a multiple choice component and an essay component.

Ecology Project: Students will be assigned a portion of an Ecology chapter to present to the rest of the class. They will need to provide students with outlines and other study materials. Their presentation must include visual aids.

## TEXTBOOK

The textbook for the course is the sixth edition of Neil A. Campbell and Jane B. Reece's *Biology*. The lab book will be the *AP Biology Lab Manual for Students*.

All the topics listed below will be integrated throughout the course using the eight major themes from the AP Biology Curriculum Requirements.

| UNIT | TOPICS AND LABS   | CHAPTER | WEEKS         |
|------|---|---------|---------------|
| 1    | <p>Introduction to Biology, Chemistry, Water and Organic Chemistry</p> <ul style="list-style-type: none"> <li>• Themes of Biology</li> <li>• Scientific Method</li> <li>• Atom Structure</li> <li>• Types of Chemical Bonding</li> <li>• Characteristics of Water</li> </ul> <p>Lab: Students will select a problem, develop a hypothesis, design and perform an experiment to test their hypothesis.</p> | 1-4     | Before school |
| 2    | <p>Biochemistry, Cell Structure, Cell Transport</p> <ul style="list-style-type: none"> <li>• Carbohydrates, proteins, lipids, nucleic acids</li> <li>• Cell structures</li> <li>• Prokaryotes vs. Eukaryotes</li> <li>• Plants vs. Animals</li> <li>• Membrane Structure</li> <li>• Passive and Active transport</li> </ul>   | 5,7,8   | 2 weeks       |

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|   | <ul style="list-style-type: none"> <li>•</li> </ul> <p>Lab: Identification of Organic molecules<br/> Lab: Animal and Plant Cells, Microscope techniques<br/> Lab: Diffusion and Osmosis (AP Lab 1)</p>   |        |         |
| 3 | <p>Chemical Reactions and Enzymes, Energy Transformations</p> <ul style="list-style-type: none"> <li>• Energy and Enzymes</li> <li>• Cellular Respiration</li> <li>• Photosynthesis</li> <li>• Alternative mechanisms of Carbon fixation</li> </ul> <p>Lab: Enzyme Catalysis (AP Lab 2)<br/> Lab: Plant Pigments and Photosynthesis (AP Lab 4)<br/> Lab: Cell Respiration (AP Lab 5)</p> | 6,9,10 | 3 weeks |
| 4 | <p>Cell Reproduction and Meiosis</p> <ul style="list-style-type: none"> <li>• Cell cycle</li> <li>• Regulation of Cell cycle</li> <li>• Meiosis and Genetic Variation</li> </ul> <p>Lab: Mitosis and Meiosis (AP Lab 3)</p>  | 12-13  | 2 weeks |
| 5 | <p>Modes of Inheritance and Genetic Crosses</p> <ul style="list-style-type: none"> <li>• Mendel and his Laws</li> <li>• Mendalian Inheritance in Humans</li> <li>• Chromosomal Basis Inheritance: Morgan, Mapping, Chromosomal errors</li> </ul> <p>Lab: Genetic of Organisms (AP Lab 7), using Plants</p>   | 14-15  | 2 weeks |
| 6 | <p>Molecular Genetics I</p> <ul style="list-style-type: none"> <li>• History and DNA</li> <li>• DNA structure and Replication</li> <li>• Protein synthesis: Genetic code, Transcription, Translation</li> <li>• Mutations and Proteins</li> </ul>  | 16-17  | 2 weeks |
| 7 | <p>Molecular Genetics II</p> <ul style="list-style-type: none"> <li>• Virus: structure and reproduction</li> <li>• Bacteria</li> </ul>   | 18,20  | 2 weeks |

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|    | <ul style="list-style-type: none"> <li>• Recombination of Bacteria: Transformation, Transduction, Conjugation and Plasmids</li> <li>• Operons</li> </ul> <p>Lab: Molecular Biology (AP Lab 6)</p>  |             |                             |
| 8  | <p>History of Life</p> <ul style="list-style-type: none"> <li>• Timescale on Origin of Life</li> <li>• Prokaryotes</li> <li>• Eukaryotes: Origin and survey of Kingdoms</li> </ul> <p>Lab: Survey of the Kingdoms</p> <p>Divided into two testing units: Chap 26-31 and Chap 32-34</p>   | 26-34       | 4 weeks (includes vacation) |
| 9  | <p>Introduction to Animal Physiology, Nervous System, Effectors and Receptors, Endocrine System</p> <ul style="list-style-type: none"> <li>• Overview of Animal Structure</li> <li>• Chemical signals: Invertebrates</li> <li>• Vertebrate Endocrine system</li> <li>• Nervous System: structure, physiology</li> <li>• Central Nervous system</li> <li>• Vision: invertebrates and vertebrates</li> <li>• Hearing and Equilibrium</li> <li>• Movement and Muscle function</li> </ul> <p>Divided into two test sections: Chap 40-45 and Chap 48-49</p> | 40,45,48,49 | 4 weeks                     |
| 10 | <p>Digestive System, Circulation, Gas Exchange</p> <ul style="list-style-type: none"> <li>• Animals: Nutritional requirements and Feeding mechanisms</li> <li>• Mammalian Digestive system</li> <li>• Invertebrate and other vertebrate digestive systems</li> <li>• Circulatory systems: invertebrates, Mammals and other vertebrates</li> <li>• Respiratory systems: invertebrates, Mammals and other vertebrates</li> <li>•</li> </ul>  | 41-42       | 2 weeks                     |

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|    | Lab: Physiology of the Circulatory System<br>(AP Lab 10)   |          |                     |
| 11 | <p>Immune System, Excretion and Water Balance</p> <ul style="list-style-type: none"> <li>• Nonspecific defense</li> <li>• Specific Defense: Humoral and Cell-mediated Immunity</li> <li>• Immune system and disease</li> <li>• Homeostasis: Thermoregulation and Osmoregulation</li> <li>• Excretory systems: invertebrates and vertebrates</li> </ul> | 43-44    | 2 weeks             |
| 12 | <p>Reproductive System and Development</p> <ul style="list-style-type: none"> <li>• Methods of Reproduction</li> <li>• Anatomy of Human Reproductive system</li> <li>• Humans: conception, fertilization, development and birth</li> <li>• Stages of Development</li> </ul>  | 19,46-47 | 1 week and vacation |
| 13 | <p>Plants</p> <ul style="list-style-type: none"> <li>• Plant Structure</li> <li>• Plant Growth and Development</li> <li>• Transport in Plants</li> <li>• Sexual Reproduction: structure, fertilization, seed formation, development</li> <li>• Plant Response: Hormones and other chemicals</li> </ul> <p>Lab: Transpiration (AP Lab 9)</p>            | 35-39    | 2 weeks             |
| 14 | <p>Evolution</p> <ul style="list-style-type: none"> <li>• Theories of Evolution</li> <li>• Charles Darwin and Natural Selection</li> <li>• Evidence of Evolution</li> <li>• Population Genetics</li> <li>• Origin of Species</li> <li>• Systematics</li> <li>•</li> </ul> <p>Lab: Population Genetics and Evolution<br/>(AP Lab 8)</p>                 | 22-25    | 2 weeks             |
| 15 | <p>Ecology</p> <ul style="list-style-type: none"> <li>• Biosphere and Biomes</li> <li>• Learning and Social Behaviors</li> <li>• Populations: Structure and Growth</li> </ul>  | 50-55    | 2 weeks             |

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|  | <ul style="list-style-type: none"><li>• Communities: Structure, Succession, and Biodiversity</li><li>• Ecosystem: Structure and Cycling</li><li>• Conservation</li></ul> <p>Lab: Animal Behavior (AP Lab 11)<br/>Lab: Dissolved Oxygen and Aquatic Primary Productivity (AP Lab 12)</p> |  |  |
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