



Dude, mitosis starts in five minutes...
I can't believe you're not condensed yet.

**Advanced Placement Biology
2011-2012**

Contact Information:

E-mail: trenner@immaculateheart.org

Room:

SB5

Office Hours:

After school until 3:45 daily

Required Materials:

- Campbell, Neil A. et al. Biology. 8th Edition (AP Edition). Pearson Education, Inc., 2008. with Taylor, Martha R. Student Study Guide for Biology. 8th Edition. Pearson Education, Inc., 2008.
- Holtzclaw, Fred W. and Theresa Knapp Holtzclaw. AP Biology, Test Prep Series. Pearson Education, Inc. 2008.
- Three-ring binder
- AP Biology Lab Manual (This will be provided for you)
- Appropriate writing utensils (pen, pencil, highlighters, colored pencils)

Course Explanation:

Welcome to AP Biology! This AP Biology course is designed to be the equivalent of a college introductory biology course, usually taken by biology majors during their first year. After showing themselves to be qualified on the AP examination, some students, as college freshmen, are permitted to undertake upper-level biology courses or register in courses in which biology is a pre-requisite. Other students may have fulfilled a basic requirement for a laboratory-science course and will be able to undertake other courses to pursue their majors.

Throughout the year, we will be covering concepts that will help you build a conceptual framework for understanding modern biology, with an emphasis on:

- *an understanding of science as a process rather than an accumulation of facts*
- *recognition of evolution as the foundation of modern biological models and thought*
- *the integration of the general topics of biology through eight major themes*
- *applications of biological knowledge and critical thinking to environmental and social concerns*

This course will be challenging because of the fast pace and depth in which the material needs to be covered. If you need assistance or have any concerns please see me as soon as possible if your needs are not met in class.

Major Themes:

- I. Science as a process
- II. Evolution
- III. Energy transfer
- IV. Continuity and change
- V. Relationship of structure to function
- VI. Regulation
- VII. Interdependence in nature
- VIII. Science, technology and society

Curriculum Overview Mandated by AP College Board:

- I. *Molecules and Cells* (25%)
 - A. Chemistry of Life (7%)
 - Lab: Enzyme Catalysis
 - B. Cells (10%)
 - Lab: Diffusion and Osmosis
 - C. Cellular Energetics (8%)
 - Lab: Plant Pigment and Photosynthesis
 - Lab: Cell Respiration

- II. *Heredity and Evolution* (25%)
 - A. Heredity (8%)
 - Lab: Mitosis and Meiosis
 - B. Molecular Genetics (9%) Lab: Genetics of Organisms
 - C. Evolutionary Biology (8%)

- III. *Organisms and Populations* (50%)
 - A. Diversity of Organisms (8%)
 - Lab: Population Genetics and Evolution
 - B. Structure and Function of Plants and Animals (32%)
 - Lab: Transpiration
 - Lab: Dissolved Oxygen and Aquatic Primary Productivity
 - Lab: Physiology of the Circulatory System
 - C. Ecology (10%)
 - Lab: Animal Behavior

The laboratory investigations listed above for each section are the 12 labs recommended for AP Biology by the CollegeBoard. In addition to these labs, other lab activities may be done that pertain to the content (pGLO Genetic Transformation Lab, Animal Dissections, Cladistics Activities, etc.)

NOTE: About 25% of our time together will be devoted to laboratory investigations.

AP Biology Scope and Sequence for Immaculate Heart High School

Quarter 1 (9 weeks): 3 labs

- A. Introduction to themes
 - 1. Biology and Inquiry
 - i. Chapter 1: Introduction: Themes in the Study of Life
- AP Bio Lab 11: Animal Behavior Inquiry***
- B. Large Scale interactions
 - 1. Evolution: How has life changed over long periods of time?
 - i. Chapter 22: Descent with Modification
 - ii. Chapter 23 The Evolution of Populations
 - iii. Chapter 24: The Evolution of Species
 - iv. Chapter 25: The History of Life on Earth
- AP Bio LAB 8: Population Genetics and Evolution***
- 2. Classification/Diversity of life: How do we organize life into evolutionary-related groups?
 - i. Chapter 26: Phylogeny and the tree of life
 - ii. Chapter 27-34 “Parade through the Kingdoms”: These chapters provide a survey of life on Earth...We will read/discuss sections of these chapters but this will no longer be included in the new AP curriculum officially starting in 2012-1013...and has been down played on the recent AP Exams
 - 3. Ecology: How do individuals and groups of organisms interact?
 - i. Chapter 52: An introduction to Ecology and the Biosphere
 - ii. Chapter 53: Population Ecology
 - iii. Chapter 54: Community Ecology
 - iv. Chapter 55: Ecosystems
 - v. Chapter 56: Conservation Biology and Restoration
 - vi. Chapter 51: Animal Behavior

AP Bio LAB 12: Dissolved Oxygen and Aquatic Primary Productivity

Quarter 2 (10 weeks) 3 Labs

C. Cellular Processes: Cell Structure

1. Biochemistry: What molecules are living organisms built out of?
 - i. Chapter 2: The Chemical Context of Life
 - ii. Chapter 3: Water and the Fitness of the environment
 - iii. Chapter 4: Carbon and Molecular Diversity of Life
 - iv. Chapter 5: The structure and Function of Large Biological Molecules

AP Bio Lab 2: Enzyme Catalysis

2. Cell Structure: Cells are the basic units of life; what are their parts and what do these parts do?
 - i. Chapter 6: Tour of the Cell (You will do this chapter on your own)
 - ii. Chapter 7: Membrane Structure and Function
 - iii. Chapter 44: Osmoregulation and Excretion
 - iv. Chapter 11: Cell Communication
 - v. Chapter 48: Neurons Synapses and Signaling
 - vi. Chapter 49 and 50: Nervous System and sensory and Motor Mechanisms

AP Bio LAB 1: Diffusion and Osmosis

D. Cellular Processes: Making Energy

1. Respiration: How do cells harvest ATP energy from oxygen and organic fuels?
 - i. Chapter 8: An introduction into Metabolism.
 - ii. Chapter 9: Harvesting Chemical Energy

AP Bio LAB 5: Cellular Respiration

Quarter 3 (9 weeks) 4 labs

2. Animal Systems in support of Respiration: What systems in organisms have evolved to support cells making energy from respiration?
 - i. Chapter 40: Basic principles of Animal Form and Function
 - ii. Chapter 41: Animal Nutrition
 - iii. Chapter 42: Circulation and Gas Exchange
 - iv. Chapter 45: Hormones and the Endocrine System
 - v. Chapter 43: Immune System

AP Bio LAB 10: Physiology of the Circulatory System

3. Photosynthesis: How do cells harvest ATP energy and build carbohydrates from solar energy, carbon dioxide and water?
 - i. Chapter 10: Photosynthesis

AP Bio LAB 4: Plant Pigments and Photosynthesis

4. Plant Systems that support Photosynthesis: What systems in plants have evolved to support cells making energy from photosynthesis?
 - i. Chapter 35: Plant Structure Growth and Development
 - ii. Chapter 36: Resource Acquisition and transport
 - iii. Chapter 37: Soil and Plant nutrition
 - iv. Chapter 38: Angiosperm Reproduction and Biotechnology
 - v. Chapter 39: Plant responses to Internal and External Signals

AP Bio LAB 9: Transpiration

E. Making Cells and Making New Organisms

1. Mitosis: How do cells reproduce exact copies?
 - i. Chapter 12: The Cell Cycle
2. Meiosis: How do organisms produce haploid and diploid cells for sexual reproduction?
 - i. Chapter 13: Meiosis and the Sexual Life Cycles
 - ii. Chapter 46: Animal Reproduction
 - iii. Chapter 47: Animal Development

AP Bio LAB 3 : Mitosis and Meiosis

Quarter 4 (5 weeks) 2 labs

3. Genetics: How do organisms inherit genes?

- i. Chapter 14: Mendel and the Gene Idea
- ii. Chapter 15: The Chromosomal Basis of Inheritance

AP Bio LAB 7: Genetics of Organisms

F. Making Proteins

1. Protein Synthesis: How are proteins produced from our genetic code?
 - i. Chapter 16: The molecular Basis of Inheritance
 - ii. Chapter 17: From Gene to Protein
2. Gene Regulation: How are genes turned on or off at the correct times for proper organism development and function?
 - i. Chapter 18: Regulation of Gene Expression
 - ii. Chapter 19: Viruses
3. Biotechnology: Now that we can decode the DNA of any organism and move DNA from one organism to another, what new technologies can we implement?
 - i. Chapter 20: Biotechnology
 - ii. Chapter 21: Genomes and their evolution

AP Bio LAB 6 Molecular Biology

Requirements:

Class time: Our class begins each day at 7:50 during second period. Due to the plethora of material that we need to cover for the AP exam, we will need to meet for additional time. Therefore the A period, which will begin at 7:00 am will be utilized on an as needed basis to complete labs and more complex chapters. Please be here every class, because if you miss a class, you will be behind, and the more classes you miss the harder it is to catch up.

Homework: READ, READ, READ!!!! This will be assigned every night. In order to keep up with the material it is critical that you read the assigned parts of the chapters each night and do the problems/reading guides associated with the text. Doing the required assignments will allow you to be prepared for lecture and other activities associated with the content. Homework will be checked regularly and when it is, you will earn points for completing all of it. Also, other assignments will be given that are applicable to the content (i.e., worksheets, biological journals, news articles, magazine articles, etc).

Exams: There will be one at the end of every unit. Some units may have two exams if they are too long or complex. You must be present on the day of an exam. If you have an unexcused absence on the day of an exam, you will be automatically docked 10%. This class is supposed to prepare you for college, and a good number of classes at universities require students to be present for exams, and there are no opportunities for a makeup.

FRQ Quizzes: There will be many opportunities to practice Free Response AP questions throughout the year. These will be counted as quizzes and may be announced or POP quizzes...so be ready for anything.

Labs: We will have laboratory investigations associated with each unit. You will work in your groups for the entire year... so choose wisely! There are 12 labs recommended for AP Biology by the CollegeBoard, and we will do all of these laboratory investigations. It may be necessary to meet outside of class to complete some of the more complex and lengthy laboratory investigations. Missing a day of lab will be extremely detrimental! Please do your very best to be present on the days of laboratory investigations.

Each lab group will be assigned a specific task for each lab. It will be either to set up/ clean up lab, do a PowerPoint Presentation, Make a scientific 3 fold Poster or do an individual lab report. These duties will be rotated throughout the year and you will do each twice (more details on this later)

Lab safety is of the UTMOST importance. You are already familiar with the standard procedures and practices involved with lab work from your experiences in Biology and Chemistry. Safety precautions will include goggles, latex (or nitrile) gloves, and lab coats. Closed-toed shoes must be worn on days with labs. Also, under no circumstances will there be food or drinks in class on lab days.

Expectations:

Participation: Please participate! By asking questions (and answering them!), you will learn so much more. Your input is a valuable component to the success of this class as a whole. Students who do not ask/answer questions in AP Biology typically are not as well prepared in May. I will take into account participation when I calculate the final grade.

THINK: It is up to you as an AP biology student to apply what we are learning to the main themes of biology and the world we live in and of course yourselves!. This requires you to be a high order thinker and not just a good memorizer of facts. Facts are fun... but AP success comes from the **application** of facts to bigger themes. That is what AP is about.

Attendance: As I mentioned before, it is important that you show up for class every day. We have a lot of material to cover and if you miss any class time, it will show in your exam and lab grades. When you miss a class, please take the initiative to check with me about the material you missed.

Tardies: You must arrive to class on time...and I do not mean running through the door as class is starting! You should be in your seat and ready to begin class every day. Tardiness will significantly lower your participation grade!

GRADING:

Exams/FRQ Quizzes: 40%

Lab: 25%

Homework/ assignments: 10%

Final: 20%

Participation: 5%

Scale: The grading scale for AP Biology will be the same as the scale in the Student Handbook

I do not tolerate lying, plagiarism or cheating. Please refer to your student handbook for more information on the consequences of such behavior.

NOTE: I reserve the right to make any changes to this syllabus at any time

Parent/Student Acknowledgement:

We, _____ (student) and _____
(parent/guardian) have read and acknowledge the rules and guidelines set forth in the AP Biology syllabus.

Student signature: _____ Date: _____

Parent/guardian signature: _____ Date: _____

Parent phone number: _____

Parent e-mail: _____

Please return by the date I specify on the first day of classes.

Thank you so much and I look forward to an amazing year! Please feel free to contact me at anytime.

Tara Renner

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