**AP Biology Syllabus 2011-12**

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Office Hours/Tutoring: Mondays and Tues 3:10- 4:00. Room 403. And by appointment

**Course Overview**: Advanced Placement Biology (AP Bio) is designed to be the equivalent of a two semester first year college biology course with a laboratory. The course can serve as preparation for the AP Biology examination administered May 14th (2012). Successful completion of the course and a score of 3 or above on the exam, may qualify the student for credit for an introductory level biology course at the college or university level (varies from school to school).

The material for the course is designed around 8 major themes of Biology, as described in the AP Biology Course Description. These include: 1) science as a process, 2) evolution, 3) energy transfer, 4) continuity and change, 5) structure and function, 6) regulation, 7) interdependence and 8) science, technology and nature). These themes are the overarching framework that ties together the individual topics.

**Prerequisites**: Students entering the AP Biology course must have completed Biology or Biology Honors with at least “B” final grades for both semesters, they must score 350 or above (proficient or advanced) on their CA STAR science test, and have their current science teacher’s recommendation. It is recommended that chemistry be completed before taking AP Bio, but it may be taken concurrently. Because this is a high level course, strong reading and writing as well as algebra skills are necessary to do well.

**Instruction**: The main mode of instruction will be through lecture and discussion. It is vital that students participate in the discussions. You will learn much more when you participate by asking questions, extending the topic of discussion.

On the block days (Wednesday or Thursday) we will spend the entire 2 hour block period on laboratory explorations. This may involve virtual labs done in the computer lab

**Assessment**: The class will probably move through the material more rapidly than any other high school class you’ve taken. We will cover 54 college level chapters in approximately 33 weeks. This means our pace needs to exceed 1-2 chapters a week. You must stay on top of the reading! Periodic reading quizzes will see if you’re on pace with the reading.

There will be an exam approximately every 3-5 chapters or about every 2 weeks. These exams will cover the chapter material and any labs we completed during that time. These exams will be approximately one hour long and consist of 25-35 multiple choice questions (some taken from past AP exams), and 2-4 free response questions.

There will be one final exam per semester. The questions will be taken from past AP exams and consist of 100 multiple choice questions and 3-4 free response questions.

**Study Groups/Tutoring:** It is also required that each student attend 1.5 hours of study group or an after school tutoring group every two weeks (approximately once per test). Study groups must consist of 2- 6 current AP Bio students. These can meet at school or at someone’s home, but they must be focused and dedicated to the study of Biology. These groups can NOT meet over the internet or telephone.

**Materials**: You will need the following for this class:

* Lecture Notebook. It is preferable that you keep a spiral notebook for each semester so you don’t lose any of your notes by the end of the year.
* Computer access with internet is a huge plus. If you don’t have it at home, you must be familiar with the policies and hours of the school lab in order to get work done. Lab reports are to be typed. Announcements may be sent via email. My website will have material useful for studying.
* Recommended (optional) A good review book (I will recommend some at the end of the year).

**Text Books**: You will be provided the following textbooks. You are responsible for these books. Lost books will result in a fine equivalent to the replacement costs (over $100!).

* Campbell, N. and Reece, J. *Biology, 6th Edition.* Pearson, Benjamin-Cummings, 2002.
* The College Board *AP Biology Lab Manual for Students*. The College Board, 2001.

**The AP Biology Exam**: The course will culminate with the College Board’s AP Exam on Monday, May 9th 2009. The exam will be approximately a 3 hour test with a 80 minute (100 questions) multiple choice section, and a 100 minute (4 essay) free response section. The score on this test will determine whether or not college credit may be awarded. If a score of 3, 4, 5 is earned, some college credit will be given towards a college degree (the amount of credit varies from school to school). There will be an $86 dollar (as of 2010) test fee due at the time of application in early spring. Financial aid is available for those who qualify for free or reduced lunch.

**Student Expectations**: Because the depth and breadth of the material required for the class is quite rigorous, students will be required to manage their own learning and processing of information. Students will be expected to:

* Attend class regularly. \*See absence policy below
* Study and read outside of class. This included weekends and holidays. You need to be self disciplined in college!
* Complete all assignments \*See make up policy below
* Attend study group or after-school tutoring sessions regularly (see “Study Groups” above). I have noticed that studying with others is the most effective way to improve recall and long term retention of material.

**School wide student goals that will be emphasized in this class:**

* Students will understand course content deeply and master skills
* Students will demonstrate curiosity and enjoy learning
* Students will embrace challenges
* Students will develop successful learning habits

**Policies/Rules**: These policies are in addition to the school rules which are printed in your student handbook.

* Absences. Excused absences must be verified with a note (and a call home if on a test day). If a day is missed it is the responsibility of the student to find out what was missed. Excessive (more than 5 a semester) will require a conference with student and parent to determine if there is a problem with being able to complete the course.
* Make-up work for excused absences must be completed within two school days of the absence. Missed labs must be done at lunch and/or after school (at the instructor’s convenience).
* Late work loses -20% for every day late (must be in when collected, not at the end of the period). No excuses accepted that day (i.e. forgot at home, printer didn’t work…).
* Cheating. There is a difference between working “together” and copying. Please don’t copy other student’s work. Please don’t inform others as to what will be on an exam. The consequence for cheating will be severe, ranging from a zero on that assignment/test, to removal from the course, to an “F” on a report card.

**Course Scope and Sequence:**

The course will be a broad range comprehensive course in biology, covering topics in the following proportions:

Chemistry of Life (7%)

Cells (10%)

Cellular Energetics (8%)

Heredity (8%)

Molecular Genetics (9%)

Evolutionary Biology (8

Diversity of Organisms (8%)

Structure and Function of Plants and Animals (32%)

Ecology (10%)

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| **Unit** | **Topics** | **Assignments/Readings/Labs** | **Exams/Quizzes** | **Length** |
| 1 | The Chemistry of Life   * Chemistry * Water * Carbon * Macromolecules | Chapters 1-5   * Chemistry of Life Worksheet * Marshmallow Molecules * Water Demos * Testing for Carbs * Lab 2 – Enzyme Catalysis * Toothpickase Lab | Ch 2-5Test | 2 weeks |
| 2 | The Cell   * Cell Structure * Membranes * Photosynthesis * Respiration * Cell Cycle | Chapters 6-12   * Cell Models using Jello * Respiration & Photosynthesis Worksheet * Lab 1 – Osmosis & Diffusion * Lab 4 – Photosynthesis * Lab 5 – Respiration | Ch 6-8 Test  Ch 9-10 Test  Ch 11-12 Test | 6 weeks |
| 3 | Genetics   * Meiosis * Mendel * Chromosomes * DNA * Protein Synthesis * Viruses * Biotechnology | Chapters 13-21   * Lab 3 – Root tip observation * Lab 3 – Mitosis & Meiosis * Lab 6a – DNA Transformation * Lab 6b – Gel Electrophoresis * Lab 7 – Genetics of Organisms (virtual\*) – Chi2 * *Cracking the Code of Life* | Ch 13-15 Test  Ch 16-18 Test  Ch 19-21 Test | 6 weeks |
| 4 | Mechanisms of Evolution   * Phylogeny & Systematics * The Early Earth | Chapter 22-25   * Lab 8 – Population Genetics & Evolution (Hardy Weinberg) * *Planet of Life “The Birth of the Earth”* | Ch 22-25 | 2 weeks |
|  |  |  | Final Exam 1-25 |  |
| 5 | The Evolutionary History of Biological Diversity   * Prokaryotes * Eukaryote Diversity * Plants & Land * Animals * Vertebrates | Chapters 26-34   * Preserved Animal Observations * Homologous vs. Analogous structures * Plant Diversity walk in Fort Mason | Ch 26-28 Test  Ch 29-31 Test  Ch 32-34 Test | 6 Weeks |
| 6 | Plant Form & Function   * Structures * Reproduction * Adaptations | Chapters 35-39   * Fruit and Flower lab * Lab 9 – Transpiration * Lab 9 – Root and Stem dissection | Ch 35-39 Test | 2 Weeks |
| 7 | Animal Form & Function   * Structures * Animal Systems | Chapters 40-49   * Lab 10 – Physiology of the Circulatory System * Lab 10 - Daphnia * Lab 11 – Animal Behavior * Fetal Pig Dissection | Ch 40-42 Test  Ch 43-45 Test  Ch 46-49 Test | 5 Weeks |
| 8 | Ecology   * Ecosystems * Populations * Interactions * Environmental Concerns | Chapters 50-55   * Lab 12 – Dissolved Oxygen & Aquatic Primary Activity * *An Inconvenient Truth* * Silent Spring, Chapters 1 & 2 | Ch 50-55 Test | 2 Weeks |
|  |  | Review for AP Exam |  |  |
| 9 | Final Synthesis Project | Current Topics in Biology |  | 3 Weeks |

\* Virtual Fly Lab url < http://bioweb.wku.edu/courses/Biol114/Vfly1.asp>

**Laboratory Experiments:**  The AP Biology Course description includes 12 suggested laboratory experiments as a large part of the curriculum.  These labs will be done in small groups. They will be hand-on, so the utmost care must be taken for safety of yourself and others.

The data you collect must be analyzed and presented in 13 formal lab reports. These reports make up approximately 25% of your grade each term. You will be given lab report guidelines at a later time.

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| **#** | **Title of Lab** | **Description** |
| 1 | Osmosis and Diffusion | Measuring movement of water and substances through a semi-permeable membrane. |
| 2 | Enzyme Activity | Measuring the rate and effectiveness of catalase's digestion of hydrogen peroxide. |
| 3 | Mitosis and Meiosis | Modeling and observing the frequency and appearance of cell division. |
| 4 | Photosynthesis | Measuring the rate of reduction of DPIP by exciting electrons via the light dependent reactions of chlorophyll. |
| 5 | Cellular Respiration | Measuring Oxygen consumption of germination peas at various temperatures. |
| 6a | Bacterial Transformation | Inserting the gene for antibiotic resistance into E. coli |
| 6b | Gel Electrophoresis | Digesting and separating fragments of DNA using gel electrophoresis. |
| 7 | Genetics and Chi-Square Analysis: | Analyzing data from virtual fruit fly experiments using a Chi Squared test. <http://bioweb.wku.edu/courses/Biol114/Vfly1.asp> |
| 8 | Population Genetics and Hardy Weinberg | Simulating a population experiencing a shift in allele frequency, and analyzing populations using the Hardy Wienberg equation. |
| 9 | Transpiration | Measuring the amount of water transpired by tree branches under various conditions. |
| 10 | Circulatory System | Observing and Analyzing the various factors that affect circulation in invertebrates and humans. |
| 11 | Animal Behavior | Observing various factors that affect animal behavior. |
| 12 | Dissolved Oxygen and Primary Productivity: | Measuring the effect depth has on primary productivity by monitoring dissolved oxygen in an aquatic system. |