**AP Biology Syllabus 2013-2014**

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Office Hours/Tutoring: By appointment. Room 403.

**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 Monday May 13th (2013). 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 4 Big Ideas, as described in the AP Biology Course Description. These include:

1) The process of evolution drives the diversity and unity of life.

2) Biological systems utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis.

3) Living systems store, retrieve, transmit and respond to information essential to life processes.

4) Biological systems interact, and these systems and their interactions possess complex properties.

In addition to the material described by the Big Ideas, students will be tested on Science Practices outlined in the Course Description. These practices include: experimental design and scientific modeling, the use of mathematics, data collection, analysis and interpretation, application of theories and explanations.

**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 1.67 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 ~45 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/Binder. 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.
* A Lab Notebook (composition book with or with out grid).
* 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 12th 2014. The exam will be approximately a 3 hour test with a 90 minute (63 questions) multiple choice section, and a 90 minute (2 essay, 4 short answers) 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 $89 dollar (as of 2013) 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.

**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 a quiz or exam. Other obvious examples of cheating are: using outside sources on exams (electronic or otherwise), lying about an illness to get out of testing, stealing test materials, etc. 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 quarter or semester report card.

**Grading Breakdown and Scale**

(percentages are approximate and vary)

70% = Quizzes, tests and final exam

5% = Homework

10% = Classwork

10% = Lab work

5% = Participation

Grading Scale: (for final grades)

89.5 – 100% = A

79.5 – 89.4% = B

69.5 – 79.4% = C

59.5 – 69.4% = D

59.4 & below = F

**Course Scope and Sequence:**

This AP Biology course is structured around the four Big Ideas and Enduring Understandings (EU’s). All Essential Knowledge (EK) will be taught and all Learning Objectives (LO’s) will be met through this curriculum (see the College Board AP Biology Curricular Framework for a complete list). The course will be based on inquiry based laboratory work and the use of the science practices in both lab and non-lab activities.

* Big Idea 1: The process of evolution drives the diversity and unity of life.
* Big Idea 2: Biological systems utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis.
* Big Idea 3: Living systems store, retrieve, transmit and respond to information essential to life processes.
* Big Idea 4: Biological systems interact, and these systems and their interactions possess complex properties.

**The Seven Science Practices:**

* SP 1: The student can use representations and models to communicate scientific phenomena and solve scientific problems.
* SP 2: The student can use mathematics appropriately.
* SP3: The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.
* SP4: The student can plan and implement data collection strategies appropriate to a particular scientific question.
* SP5: The student can perform data analysis and evaluation of evidence.
* SP6: The student can work with scientific explanations and theories.
* SP7: The student is able to connect and relate knowledge across various scales, concepts and representations in and across domains.

**Labs (and where they fit into the Big Ideas)**

**Big Idea 1: Evolution**

* **Artificial Selection:** Students will grow organisms such as Fast Plants and select for specific traits over several generations.
* **Mathematical Modeling: Hardy Weinberg:** Spreadsheet development to model factors affecting Hardy Weinberg Equilibrium.
* **Comparing DNA sequences using BLAST**: Students use NCBI to compare DNA and protein sequences for organisms to test student generated hypotheses on relatedness.

**Big Idea 2: Cellular Processes**

* **Diffusion/Osmosis:** Students investigate diffusion and osmosis in model systems and in plant tissue.
* **Photosynthesis:** Students investigate photosynthetic rate under a variety of student selected conditions.
* **Cellular Respiration**: Students investigate some aspect of cellular respiration in organisms.

**Big Idea 3: Genetics and Information Transfer**

* **Cell Division - Mitosis and Meiosis**: Students compare mitotic rate after exposure to lectin or other substances presumed to affect mitotic rate.
* **Biotechnology - Bacterial Transformation**: Students investigate bacterial transformation.
* **Biotechnology - Restriction Enzyme Analysis**: Students investigate restriction enzyme analysis.

**Big Idea 4: Ecology**

* **Energy Dynamics:** Students develop and analyze model systems which describe energy flow.
* **Transpiration**: Students investigate the movement of water through plants in a model system.
* **Fruit Fly Behavior:** Students investigate chemotaxis in fruit flies.
* **Enzyme Investigation**: In an open inquiry lab, students will investigate and quantify factors that affect enzyme action.