**AP Biology Course Syllabus**

**Course Overview and Objectives**

The AP Biology course is designed to be the equivalent of a two semester college introductory biology course. After showing themselves to be qualified on the AP Examination, some students, as college freshmen, are permitted to undertake upper-level courses in biology or register for courses for which biology is a prerequisite. 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.

The AP Biology course is designed around **four “big ideas”** and the enduring understandings that students should retain from their learning experiences in the course.

In addition to a deep and meaningful understanding of the four big ideas, students who complete an AP Biology course will develop their skills in scientific investigation and reasoning.

Students will engage in scientific inquiry and develop their skills in relation to science practices identified in the AP Biology curriculum as those that are necessary to scientific investigation. **They will spend at least 25% of class doing Laboratory exercises.**

This combination of content understanding and science practice skill will leave students prepared for more advanced science courses at the college level. And, I hope, an appreciation of the fascinating and complex organization of the world around us and its diverse inhabitants!

**Required Materials**

Textbook: Mader & Windelspecht, *Biology*, 11th Edition

3 Ring binder for organizing class notes and assignments

Looseleaf notebook paper

Pencil and Pens (more than 1 color)

**Grades:**

* Grades will be based on percentages as follows:
* Tests 50%
* Labs/Projects 20%
* Quizzes 15%
* Homework/Classwork 15%

**Assignments:**

* Typed or blue/black ink only (exception: graphs in pencil)
* **First & Last** name at top of each paper
* Due at **beginning** of class in the appropriate location unless otherwise stated
* ***No name papers will receive no credit, unless a major assignment (test, quiz, project, lab) in which there will be a 10% deduction. Your name should be the first thing you put on EVERY assignment!***
* ***Projects – the due date is the LAST day you may turn the project in …they may be turned in early. Therefore, if absent on due date – even if excused, project is STILL DUE!!!!***
* Lab days require that closed-toed shoes are worn in class. You will be given ample notice of when lab days will be. If you fail to wear closed toed shoes on a designated lab day, you will have the option of one of the following:
  + Wearing shoes from the collection of old shoes I have in my classroom AND taking a 10% grade deduction on the lab.
  + Not participating in the lab at all and taking a 0% grade on the lab.

**Late Work Policy**

* All assigned work is due **at the beginning of class**.
* Late work is accepted for 48 hours after the due date. The grade of the assignment will automatically **be reduced by 20%.** Late work is **NOT accepted after 48 hours** and you will receive a zero for the assignment. Please note that an assignment is considered late **if it is not turned in at the beginning of class**. For some projects I may NOT accept late work and I will announce this in advance.

**Attendance and Make-up Work:**

* It is **your responsibility** to obtain any work missed while you were absent immediately upon your return (blackboard, make-up folder); this includes scheduling to make-up any lab and/or test missed while out. I will NOT seek you out for make-up work!
* There will be NO make-ups for missed quizzes. If the absence is excused, then the missed quiz will be replaced with the average of all other quizzes you have taken for that quarter. If unexcused, then you will receive a zero.
* Students will have one day for each day of an excused absence to make up work missed (exception: tests and labs must be made up within 1 week.) Scenario: Student is absent on Tuesday and returns on Wednesday (absent 1 day). Work missed on Tuesday would then be due on Thursday.
* Any work missed due to an unexcused absence will receive no credit.
* Proof of excused absence must be shown to the teacher within the first 3 days back…otherwise the absence remains unexcused.
* **Any assignment assigned prior to your absence will be due immediately upon your return. *\*See last bullet under assignments regarding projects – Projects are due no later than due date regardless of absence.***
* If you return from an absence on a scheduled quiz/test day, you will be expected to take the quiz/test as long as no new material was covered while you were out…**Missing a review day does NOT exempt you from taking the quiz/test**
* ***Lab and Test make-up days will be after school in room 668 by appointment***. You must be ready to start by 1:50pm.
* Be advised…all test and lab make-ups may be given in an alternate form from the original.

**The Big Ideas and Enduring Understandings**

As previously stated, our course will develop your understanding of the four big ideas identified as unifying principles in the study of biology. Each big idea has “enduring understandings” which are the core concepts that you should retain and understand in order to develop a lasting understanding of the big ideas. In addition, each enduring understanding has supporting statements of “essential knowledge” that you must know to fully comprehend the enduring understanding.

The big ideas and their supporting enduring understandings are listed below. Each unit references these enduring understandings. You will notice that enduring understandings and big ideas overlap and are covered in more than one unit – this is because the big ideas are all connected to each other and developing an understanding of one will help you understand others! Statements of “essential knowledge” can be found in the introduction of your textbook.

**Big Idea 1: The process of evolution drives the diversity and unity of life.**

* Enduring Understanding 1A: Change in the genetic makeup of a population over time is evolution.
* Enduring Understanding 1B: Organisms are linked by lines of descent from common ancestry.
* Enduring Understanding 1C: Life continues to evolve within a changing environment.
* Enduring Understanding 1D: The origin of living systems is explained by natural processes.

**Big Idea 2: Biological systems utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis**.

* Enduring Understanding 2A: Growth, reproduction and maintenance of the organization of living systems require free energy and matter.
* Enduring Understanding 2B: Growth, reproduction and dynamic homeostasis require that cells create and maintain internal environments that are different from their external environments.
* Enduring Understanding 2C: Organisms use feedback mechanisms to regulate growth and reproduction, and to maintain dynamic homeostasis.
* Enduring Understanding 2D: Growth and dynamic homeostasis of a biological system are influenced by changes in the system’s environment.
* Enduring Understanding 2E: Many biological processes involved in growth, reproduction and dynamic homeostasis include temporal regulation and coordination.

**Big Idea 3: Living systems store, retrieve, transmit and respond to information essential to life processes.**

* Enduring Understanding 3A: Heritable information provides for continuity of life.
* Enduring Understanding 3B: Expression of genetic information involves cellular and molecular mechanisms.
* Enduring Understanding 3C: The processing of genetic information is imperfect and is a source of genetic variation.
* Enduring Understanding 3D: Cells communicate by generating, transmitting and receiving chemical signals.
* Enduring Understanding 3E: Transmission of information results in changes within and between biological systems.

**Big Idea 4: Biological systems interact, and these systems and their interactions possess complex properties.**

* Enduring Understanding 4A: Interactions within biological systems lead to complex properties.
* Enduring Understanding 4B: Competition and cooperation are important aspects of biological systems.
* Enduring Understanding 4C: Naturally occurring diversity among and between components within biological systems affects interactions with the environment.

**Science Practices**

In addition to developing your understanding of biology content, the goal of this course is also to help you develop the habits of mind that scientists use in their work. As such, the AP Biology course is also designed around seven science practices that the investigations and activities you participate in during class will help you develop. Each of the science practice statements has supporting information that will help you understand all aspects of the practice that you will develop. **You will spend at least 25% of this class doing lab activities to develop your understanding of these science practices**. Engaging in these practices will enable you to gather and analyze evidence and develop your own testable explanations for scientific problems. You will find evidence of activities that help you develop these practices in the schedule following this section.

* **Science Practice 1**: The student can use representations and models to communicate scientific phenomena and solve scientific problems.
* **Science Practice 2**: The student can use mathematics appropriately.
* **Science Practice 3**: The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.
* **Science Practice 4**: The student can plan and implement data collection strategies appropriate to a particular scientific question.
* **Science Practice 5**: The student can perform data analysis and evaluation of evidence.
* **Science Practice 6**: The student can work with scientific explanations and theories.
* **Science Practice 7**: The student is able to connect and relate knowledge across various scales, concepts and representations in and across domains.

**A.P. Biology Schedule 2013-2014**

(This schedule is tentative and is subject to change.)

**Unit 1: The Nature of Science and The Chemistry of Life (3 weeks)**

**Required Readings**: Chapters 1-3 & 6

**Enduring Understandings to be addressed:** 2A, 3A, 4A-B

**Labs and activities:**

* Catalase Enzyme Lab (SP1-7)
* Microscope Lab (SP 1-7)
* Concept mapping for organic molecules (SP1, SP3, SP4)

**Unit 2: Cells, the Basic Unit of Life (5 weeks)**

**Required Readings:** Chapters 4,5,7,and 8

**Enduring Understandings to be addressed:** 1B, 2A, 2B,3A, 3B, 3D

**Labs and Activities:**

* Osmosis and Diffusion potato lab (SP1-7)
* Mitosis and Meiosis lab (SP1-7)
* Cell concept mapping (SP1,3,4)
* Cell size lab surface area/volume ratio((SP1-7)

**Unit 3: Genetic Basis of Life (4 weeks)**

**Required Readings:** Chapters 9-14

**Enduring Understandings to be addressed:** 1A-C, 2C-E, 3A, 3C, 3D, 4A, 4C

**Labs and activities:**

* Chi-square practice (SP2, SP5)
* Drosophila computer simulation lab(SP1-7)
* Genetic recombination simulation

**Unit 4: Evolution (6 weeks)**

**Required Readings:** Chapters 15-23, 28-30

**Enduring Understandings to be addressed**: 1, 2A-B, 2D-E, 3A & 3C, 4B-C

**Labs and activities:**

* Hardy Weinberg Lab (SP1-7)
* Evolution Essay (SP3,6)
* Making a cladogram lab (SP1, 3-7)

**Unit 5: Ecology (3 weeks)**

**Required Readings:** Chapters 43-47

**Enduring Understandings to be addressed**: 1A, 2A & C-E, 3E, 4

**Labs and Activities:**

* Modeling and analyzing exponential growth (SP 1,4,5)
* Global Climate Change Essay (SP3.6)
* Energy Dynamic Lab (SP1-7)

**Unit 6: Human systems and Homeostasis (4 weeks)**

**Required Readings:** Chapters 31-42

**Enduring Understandings to be addressed:** 1B-C, 2A, 4

**Labs and Activities:**

* Body systems Posters
* Design cardiovascular experiment (SP1-7)
* Cow Eye Dissection (SP 1,3-7)

**Unit 7: Plant Biology (3 weeks)**

**Required Readings:** Chapters 24-27

**Enduring Understandings to be addressed:** 2A & E, 4A & C

**Labs and Activities:**

* Carbon cycle posters
* Plant hormone concept mapping (SP1,3,4)
* Flower dissection(SP1,7)

**After Unit 7: Review, AP Exam, Post AP Exam**

* After completing Unit 8, we will begin an intensive in class review of the material covered throughout the year in preparation for the AP Biology Exam. The specifics of this review will be determined by you and your classmates’ needs.
  + Don’t worry – you will take exams and work with practice questions that are modeled after the AP Exam all year!
* After the AP Exam, we will set our schedule based on your interests and on continuing to develop your science skills. Activities may include: creation of presentations on biology concepts to display in school, mammalian dissection and researched reports.