

AP Biology – Syllabus

Course Overview:

Our AP Biology course is run on a block schedule. We meet 5 times every two weeks for 1 hour and 20 minute blocks. We also run an SRT (Student Resource Time) block, which is used for labs and review sessions. Lastly, an AP Biology Prep Course will be offered in the summer. Instructional time is split between lectures, discussions, tests, labs, and other hands-on activities. We run all twelve of the AP labs in the *AP Lab Manual for Students* as well as a few other labs (see Course Planner section below). The lab portion of the class is approximately 25% of the instructional time.

Textbook and Supplemental Readings:

We use the following textbook:

Purves, William K., et al. *Life: The Science of Biology*. Cranbury, NJ: Sinauer Associates, Inc.

Other supplemental readings are used throughout the year as well. These will come from peer reviewed science journals such as *Science* and *Nature*; as well as national magazines and newspapers.

Teaching Strategies:

The eight major themes (as presented in the *AP Biology Course Description*) are emphasized throughout the coursework. The class topics are all tied to the three overarching themes: Molecules and Cells, Heredity and Evolution, and Organisms and Populations.

Each student is expected to be at the center of his or her own learning. Students spend a great deal of time reading and taking notes* on their own, as well as writing various papers such as research papers, argumentative papers, topic review essays, etc. Students learn better in an environment where they are interacting and manipulating with the material, so I emphasize hands-on learning as much as possible. Along with the required twelve AP labs, we also perform a few outdoor labs, and multiple hands-on mini-labs and demonstrations.

In order for students to be successful on the AP test, they need to be exposed to sample test questions as often as possible. Practice problems from previously released AP materials as well as from various exam review books will be exposed to students within quizzes and tests.

(*Note taking tips: When taking notes on readings for homework focus on the bigger message that is being conveyed and for class lectures focus on the facts that are in bold face on the power points.)

****Summer AP Biology Prep Course-Unit 1: Molecules and Cells**

Session 1 – Biochemistry-2.5 hours

-Organic Chemistry/ Biochemistry (Ch. 3)

Session 2-Enzymes and Metaboism-2.5 hours

-Energy, Enzymes, and Metabolism (Ch. 6)

-*Enzyme Catalysis Lab (AP Lab 2)*

Session 3 – Cells and Cell Transport-2.5 hours

-Cell Structure and Function (Ch. 4)

-Cell Membranes (Ch. 5)

-*Diffusion and Osmosis Lab (AP Lab 1)*

Session 4 – Cell Respiration and Photosynthesis-2.5 hours

-Cellular Respiration (Ch. 7)

-Cellular Respiration Diagram

-Photosynthesis (Ch. 8)

-Photosynthesis Diagram

Session 5 – DNA & Protein Synthesis-2.5 hours

- Structure of DNA and Replication (Ch. 11)
 - DNA Model Activity*
- Protein Synthesis (Ch. 12)
 - Modeling Protein Synthesis Activity*

(*Students that do not participate in the summer prep course will be expected to recover this material and the two required labs in SRT. All students will be required to hand in two lab reports and take the Unit 1 Test on this material by the end of the 1st nine weeks of the school year in SRT or after school.)

Course Planner: (on average 6 days per unit for lecture, lab, quizzes and tests; 1day for mid-term exam, and 1 day for practice exam)

Unit 2 – Evolution-Summer -4 days spent as summer homework, plus 1 day for lab within the school year

- History of Life on Earth (Ch. 22)
 - Mapping the history of life in a timeline (Mini Lab)*
 - How do we study Earth's history? (Research Paper)*
- Mechanisms of Evolution (Ch. 23)
 - Population Genetics Lab (AP Lab 8)-2nd day of class*
- Species and their Formation (Ch. 24)

Summer Work Assignment:

Read History of Life on Earth (Ch. 22)

-Mapping the history of life in a timeline (Mini Lab at home-create timeline on sheets of 8x11 paper that connect to make a long time line that begins with Precambrian and ends with Present. Include the date, name of time period, and brief explanation of climate and species present)

-How do we study Earth's history? (Research Paper-One page, typed, double spaced, 12 font, times roman, use information from text)

Mechanisms of Evolution (Ch. 23) and Species and their Formation (Ch. 24)

-Notes and questions

Unit 3 – Classification -12 days

- Reconstructing and Using Phylogenies (Ch. 25)
 - Phylogenetic Classification Activity*
- Bacteria and Archaea (Ch. 27)
- Protists (Ch. 28)
- Fungi (Ch. 31)
- Seedless Plants (Ch. 29)
 - Observation of Bryophyta Lab*
- Seed Plants (Ch. 30)
 - Seed Plant Observation Lab*
- Animals and Evolution of Body Plans (Ch. 32)
- The Protostomes (Ch. 33)
- The Deuterostomes (Ch. 34)

Unit 4 – Plant Anatomy and Physiology-9 days-Cell Respiration Lab (AP Lab 5)-Plant Pigments & Photosynthesis (AP Lab 4)

- The Plant Body (Ch. 35)
- Transport in Plants (Ch. 36)
 - Transpiration Lab (AP Lab 9)*
- Plant Nutrition (Ch. 37)
 - Hydroponic Growth Lab*
- Regulation of Plant Growth (Ch. 38)
- Flowering Plant Reproduction (Ch. 39)
 - Flower Dissection Lab*
- Plant Responses to Environmental Challenges (Ch. 40)
 - Environmental Effects on Plant Growth Lab*

Unit 5 – Animal Anatomy and Physiology-7 days

- Physiology, Homeostasis, and Temperature Regulation (Ch. 41)
 - Daphnia Heart Rate and Temperature Lab (AP Lab 10C)*
- The Endocrine System and Animal Hormones (Ch. 42)
- Neurons and the Nervous System (Ch. 44)
- The Mammalian Nervous System (Ch. 46)
- Effectors (Muscle and Glands) (Ch. 47)

--MIDTERM EXAM--

Unit 6 – Animal Anatomy and Physiology-6 days

- Gas Exchange (Ch. 48)
 - Essay on Respiratory Strategies of Marine Mammals.
- Circulatory Systems (Ch. 49)
 - Physiology of the Circulatory System Lab (AP Lab 10)*
- Nutrition, Digestion, and Absorption (Ch. 50)
- Salt/Water Balance & Nitrogen Excretion (Ch. 51)

Unit 7 – Chromosomes and Viral/Bacterial Genetics-5 days

- Chromosomes, Cell Cycle, and Cell Division (Ch. 9)
 - Mitosis & Meiosis Lab (AP Lab 3)*
- Viral/Bacterial Genetics (Ch. 13)
- Eukaryotic Genome and its Expression (Ch. 14)

Unit 8 – Genetics and Biotechnology-7 days

- Genetics (Ch. 10)
 - Chi-Square Test Lab*
 - Fruit Fly Lab (AP Lab 7)*
- Recombinant DNA & Biotechnology (Ch. 16)
 - Molecular Biology Lab (AP Lab 6)*
- Molecular Biology and Medicine (Ch. 17)
 - Stem Cell Research Essay & Debate*

Unit 9 - Ecology and Behavior-9 days

- Animal Behavior & Behavioral Ecology (Ch 52-53)
 - Animal Behavior (AP Lab 11)*
- Population Ecology (Ch. 54)
 - Lynx/Hare population lab activity.*
- Community Ecology (Ch. 55)
 - Plant competition lab*
- Biogeography and Conservation Ecology (Ch. 56-57)
 - Life in pond water lab*
 - Environmental Issues Essay*
- Earth System Science (Nutrient Cycles) (Ch. 58)
 - Dissolved Oxygen and Primary Productivity (AP Lab 12)*

Recommended organization:

It is highly recommended that students have a three ring binder that is sectioned into a notes, labs, homework, and tests.

The notes section should consist of notes taken as homework from the required reading assignments and notes taken in class. The homework should consist of any worksheet or practice AP test material and the test section should include all quiz and test results taken throughout the course. The lab section must consist of a scientific lab notebook that the use to write pre-labs, collect and analyze data, and draw conclusions. Below is an explanation of how a lab report must be written:

Writing (and grading of) Lab Reports

Lab reports are the written result of a lab activity and will, along with what I observe during the lab, form the grade for the lab activity. Sections 1-4 and the data tables can and must be completed before class to save time for the lab activity and to prepare for the lab itself. The lab report must be typed. In your lab notebook use only ink and the front sides of the paper. Mistakes are not to be erased or covered with white-out, but have a single line drawn through them. The back sides are to be used for temporary notes and calculations that can be referred to you as you write the lab and by me as I grade them.

Important note : You must keep your lab notebook and typed reports. Some colleges require it to obtain credit for the lab portions of their biology courses.

The format of the lab report that I will expect you to follow includes :

- 1. Title - Should be descriptive indicating what was actually done in the lab. the titles given in the lab book can be easily improved upon. For example, the third experiment in the lab book is titled "Meiosis and Mitosis Lab." ("Experiment 3" as a title is not acceptable).**

2. **Background information**-This is a summary of the information acquired from the pre-lab information pertaining to the topic of the laboratory activity. This information can be obtained through the pre-lab assignments.
3. **Objectives** - State the purpose or goal of the lab - what you are trying to accomplish.
4. **Hypothesis**-These are statements that each student formulates based upon the proposed experiment and the background information that predict the outcomes of the lab. These statements will need to be reflected upon in the conclusion.
5. **Procedure** - Make as short description of how you will accomplish the goals. This should be able to be done in a few sentences for each section or part of the lab. I do not expect you to write all the individual steps of the procedure as listed in the lab text.
6. **Data** - This section will be a recording of the data collected as the lab is performed. The data tables should be copied from the lab manual to your lab report (or constructed from the information given) before you come to class.
7. **Data Analysis** - In this section you will answer the questions listed in the section of the lab manual and /or show all calculations and graphs.
8. **Results and Conclusions** - In this section you will summarize the findings of the lab activity (should be closely tied to the objectives). Try to relate the data to the theories behind the results. You must also evaluate the information you gathered. What is the error (or errors) in your data? Are there any anomalies (unexpected results) and if so why are they there? It is not wrong to make mistakes during a lab procedure. However, it is wrong to falsify or misrepresent results!

Lab Grading : For each lab students will be given a rubric to follow to produce their lab reports.

Grading Policy

-Students will earn points in the following areas:

Laboratory exercises.....10-25pts per lab*
 Homework.....1 or 0pts per assignment**

Quizzes.....5-15pts per quiz
 Tests.....approx. 40pts per test***
 Exams.....100pts

*If a student earns less than a B- on a lab report he or she may make improvements on the lab report and resubmit it for up to a B- for the lab report score.

**Homework is graded upon mastery of learning. If you achieve an 80% or better on your homework you will receive a "1" in the grade book, if less than 80% then you will receive a "0".

***If a student earns less than a C- on a test score he or she may retake a test that covers the same content. A student can only score as high as a B- on a retake. (This option does not include the midterm exam).

-Grading:

Your grade in this class broken down into four categories:

Tests and Quizzes	40%
Labs	35%
Homework	15%
<u>Exam</u>	<u>10%</u>
Total	100%

Grade configurations will be based upon the points and percentages earned in each category. For example, if a student earns 8 of 10 points possible in the homework category, then that means that the student accomplished 80% of the 15%. As a result, the student would earn a 12% in the homework category.

The grading scale we will use is:

93-100=A
 90-92=A-
 87-89=B+
 83-86=B
 80-82=B-
 77-79=C+
 73-76=C
 70-72=C-
 0-69=F

*Your **GPA** will be scored on a 5 point scale by the grading system, your course grade will be represented by a 4 point scale.

**You may lose percentages of your grade by the criteria determined in your student handbook.

I, _____, the student have read and understand the class syllabus for chemistry.

I, _____, the parent/guardian have read and understand the class syllabus for

the chemistry course of which my son/daughter is enrolled in.

If there are any questions please contact _____ (the Instructor) at
_____ or _____.

I can be reached during conference time from _____ to _____ and after school. I will check
voice mail and email throughout the day and will respond to such messages as soon as possible.