

AP Biology Syllabus

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Textbook: *Biology (Eighth Edition)* by Campbell, Reece

Course Description

One of the goals of the AP Biology course is to give you the students an understanding of biology as a process, rather than to accumulate discrete and unrelated facts to be memorized. To help achieve this goal, we will present to you eight major themes that will be used to guide us as we explore the living world around us. We will use these themes to provide you with the opportunity to connect the biological knowledge you gain to the major issues of social concern. This will help you become scientifically literate citizens.

These themes are as follows:

1. **Science as a Process** – Science is a way of knowing. It can involve a discovery process using inductive reasoning, or it can be a process of hypothesis testing.
2. **Evolution** – Evolution is the biological change of organisms that occurs over time and is driven by the process of natural selection. Evolution accounts for the diversity of life on earth.
3. **Energy Transfer** – Energy is the capacity to do work. All living organisms are active (living) because of their abilities to link energy reactions to the biochemical reactions that take place within their cells.
4. **Continuity and Change** - All species tend to maintain themselves from generation to generation using the same genetic code. However, there are genetic mechanisms that lead to change over time, or evolution.
5. **Relationship of Structure to Function** - The structural levels from molecules to organisms ensures successful functioning in all living organisms and living systems.
6. **Regulation** - Everything from cells to organisms to ecosystems is in a state of dynamic balance that must be controlled by positive or negative feedback mechanisms.
7. **Interdependence in Nature** - Living organisms rarely exist alone in nature.
8. **Science, Technology, and Society** - Scientific research often leads to technological advances that can have positive and/or negative impacts upon society as a whole.

A second goal of this course is set in nine concepts or guaranteed curriculum. These are listed below, and will be the used as a guide to reach an understanding of the eight themes listed above.

1. Students will recognize the chemistry behind the life processes.
2. Students will have a working knowledge of the prokaryotic and eukaryotic cell organelles, cell regulation, and cell growth.
3. Students will demonstrate an understanding of how energy is used in a cell.
4. Students will be able to explain the inheritance patterns in living organism at all levels.
5. Students will be able to explain genetics at a molecular level.
6. Students will have an understanding of evolutionary Biology and its underlying theme in Biological science.
7. Students will develop an appreciation of the diversity of organisms.
8. Students will understand the structure and function of plants and animals.
9. Students will recognize the relationship between living organisms and the ecosystem.

What you will learn:

With these nine standards listed above we would like to explore more specifically what you will learn this year. Each concept is restated and then broken down into very explicit ideas or concepts. This should help you focus your efforts in this class.

1. Students will recognize the chemistry behind the life processes by:
 - a. Understanding the properties of water as it relates to living organisms involving its:
 - i. Chemical make up
 - ii. Bonding patterns
 - iii. Establishment of Hydrogen bonding.
 - b. Becoming familiar with organic molecules in living organism by understanding:
 - i. Basic hydrocarbon structures
 - ii. Functional groups
 - iii. Bonding interaction
 - c. Being able to explain the following concerning enzymes:
 - i. Their purpose
 - ii. Basic structure
 - iii. Basic function
 - iv. Factors that affect their effectiveness.

2. Students will have a working knowledge of the prokaryotic and eukaryotic cell organelles, cell regulation and cell growth by:
 - a. Understanding the difference between prokaryotic and eukaryotic cells
 - b. Being able to identify the cell organelles in eukaryotic cells and explain their function
 - c. Being able to explain the process of cell division (mitosis)
 - d. Being able to identify the factors that limit and promote cell growth
 - e. Explaining the cell membrane model and show experimental evidence that supports this model.
 - f. Have a working knowledge of
 - i. Diffusion
 - ii. Osmosis
 - iii. Selectively permeable membranes

3. Students will demonstrate an understanding of how energy is used in a cell by:
 - a. Explaining what a coupled reaction is
 - b. Understanding the process of fermentation in all organisms
 - c. Knowing the steps of cellular respiration and photosynthesis and understanding their relationship to each other.

4. Students will be able to explain the inheritance patterns in living organisms at all levels by:
 - a. Knowing the steps of meiosis and understand its importance in sexual reproduction
 - b. Understanding the biological significance of gamete formation in living organisms
 - c. Explaining the chromosomal bases of inheritance and the disorders associated with them
 - d. Have a working knowledge of Medallion genetics and the inheritance patterns in living organisms.

5. Students will be able to explain genetics at a molecular level by:
 - a. Knowing the structure of DNA and RNA
 - b. Knowing the function of DNA and RNA
 - c. Understanding the process of protein synthesis and its relationship to RNA and DNA
 - d. Explaining the process of gene regulation on a molecular level
 - e. Being familiar with the life cycle of viruses and their relationship to DNA and RNA and other living organisms

- f. Being able to explain the use nucleic acid technology in humans and their short and long term implication.
6. Students will have an understanding of evolutionary Biology and its underlying theme in Biological science by:
- a. Developing an understanding of the early evolution of life and the different ideas that brought us to our current knowledge
 - b. Being able to list and explain the evidences of evolution
 - c. Being able to recognize the mechanism of evolution as they see them in different populations of organisms.
7. Students will develop an appreciation of the diversity of organisms by:
- a. Understanding the evolutionary patterns that exist between different and similar organisms.
 - b. Being able to recognize the diversity of life on our planet
 - c. Having a working knowledge of phylogenetic classification of organisms.
 - d. Being able to explain the evolutionary relationships that exist between different and similar organisms.
8. Students will understand the structure and function of plants and animals as they relates to the following areas:
- a. Reproduction
 - b. Growth
 - c. Development
 - d. Structure
 - e. Physiological
 - f. Behavioral adaptation
 - g. Response
9. Students will recognize the relationship between living organisms and the ecosystem by:
- a. Understanding population dynamics in the world they live in
 - b. Being able to identify the communities in the ecosystems that are around us
 - c. Understanding the impact of human population on the global issues we face as they relate to the ecosystem in which we live.

So, now that you understand what you are expected to learn we want you to understand how you will know that you have obtained this knowledge.

1. Students will recognize the chemistry behind the life processes by:
- a. Passing the written exam on this unit at 80% or higher
 - b. Completing AP lab number 2 Enzyme catalysis with the appropriate lab report completed
 - c. Developing a creative story or presentation using organic molecules, functional groups and bonding interactions
2. Students will have a working knowledge of the prokaryotic and eukaryotic cell organelles, cell regulation, and cell growth by:
- a. Passing the written exam on this unit at 80% or higher
 - b. Creating a model of an a typical plant and animal cell including all organelles that would be found in each
 - c. Completing AP lab number 1 on Diffusion and Osmosis with the appropriate lab report completed

- d. Designing a creative story or presentation that outlines the steps of cell division.
3. Students will demonstrate an understanding of how energy is used in a cell by:
 - a. Passing the written exam on this unit at 80% or higher
 - b. Completing AP lab number 5 cell respiration with the appropriate lab report completed
 - c. Completing the class lab on alcohol fermentation with the appropriate lab report being completed
 - d. Designing a creative story or presentation that shows the steps of photosynthesis and cellular respiration and their relationship to each other.
 4. Students will be able to explain the inheritance patterns in living organism at all levels by:
 - a. Passing the written exam on this unit at 80% or higher
 - b. Creating a model explaining the steps of meiosis
 - c. Completing AP lab number 3 Mitosis and Meiosis with the appropriate lab report being completed.
 - d. Completing AP lab number 7 Genetic of Organism with the appropriate lab report being completed.
 - e. Doing a presentation of a genetic disorder found in humans.
 5. Students will be able to explain genetics at a molecular level by:
 - a. Passing the written exam on this unit at 80% or higher
 - b. Completing AP lab number 6 Molecular Biology, with the appropriate lab report being completed
 - c. Creating a precise Model of DNA
 - d. Developing a creative narrative, which explains the process of gene regulation on a molecular level
 - e. Creating a poster of the life cycles of viruses and their relationship to DNA and RNA
 - f. Completing an annotative bibliography on nucleic acid technology as it relates to humans.
 6. Students will have an understanding evolutionary Biology and its underling theme in Biological science by:
 - a. Passing the written exam on this unit at 80% or higher
 - b. Completing AP lab 8 Population Genetic Equilibrium with the appropriate lab report being completed
 - c. Developing a presentation that gives the evidences of evolution and the mechanisms of evolution.
 7. Students will develop an appreciation of the diversity of organisms by:
 - a. Passing the written exam on this unit at 80% or higher
 - b. Reviewing or completing AP Lab 11 Animal Behavior (you completed in the summer before school started) with the appropriate lab report being completed.
 - c. Being able to use different phylogenetic keys to classify a variety of organisms.
 - d. Looking at populations in their community or in the world and explaining the evolutionary relationships that they see in a written paper.
 8. Students will understand the structure and function of plants and animals by:
 - a. Passing the written exam on this unit at 80% or higher.
 - b. Completing AP lab 8 Transpiration and AP lab 10 Physiology of Circulation with the appropriate lab report being completed.
 - c. Completing labs specific to each system with the appropriate lab report being completed
 - d. Describing in detail (written or picture format) the following systems in plants and animals:
 - i. Reproduction,
 - ii. Growth and development

- iii. Digestion
 - iv. Excretion
 - v. Muscular
 - vi. Nervous
 - vii. Respiratory
 - viii. Hormonal
 - ix. Immune
9. Students will recognize the relationship between living organism and the ecosystem by:
- a. Passing the written exam on this unit at 80% or higher
 - b. Completing AP lab 12 Dissolved Oxygen with the appropriate lab report being completed.
 - c. Identifying the ecosystems and communities that they live in
 - d. Creating a presentation about the impact humans have on global issues we face on our planet.

So, what will we do to help you if the above items are not completed?

1. If you do not pass the test at the 80% standard, you will be asked to review all the questions on the test and come to an understanding of what you did not grasp in that unit. After you have done this you will be given a similar test to see if you
2. You will not be able to take the exam the first time unless all assignments, labs, and activities have been completed in an acceptable manner.
3. As we identify areas in which your lack of understanding is apparent, you will be required to spend time studying during extended lunch with your instructor.
4. If, after these steps, you still are not able to grasp the key concepts in this class we request that adjustments be made in your schedule to so that you can be in the science study hall. This will allocate more time and individual to you by one of the science teachers.
5. You need to understand that at this school failure is not an option. We will do all we can to ensure your success in this school.

Materials

You will need the following materials for this course:

Textbook: Campbell, Reece *Biology 8th edition*
2006-07 Princeton Review for AP Biology
Laboratory notebook and AP lab book

Summer Assignment

Over the summer prior to taking AP Biology, you will be required to complete a selection of chapter readings to reinforce the material you should have mastered during General Biology. The first day you have this class there will be a quiz the material you have studied. Students scoring lower than 80% will need to remediate missing concepts and redo the work during the first two-weeks of the first quarter.

Home Work

You can expect to have homework every day that this class meets. This is a college level course. You are expected to maintain high standards of performance. Please make sure you have blocked out significant time in your otherwise busy lives to invest in this class.

Homework will generally consist of reading assignments, completions of the study guides for each chapter, and essay questions along with any the activities describe above.

Progress will be monitored by taking quizzes each day and periodic tests as outlined in this syllabus. Any test that you score lower than 80% must be retaken.

Laboratory Component:

There are 12 AP labs that will be completed during the year. Each lab has an extensive handout (found in the lab manual) that must be completed. In addition to this, you will be required to complete a lab report using a format that will be given to you in class. The importance of these lab experiences cannot be over stated in that at least 25% of this class is spent in working with these labs. Remember, much of what we will discuss in class will lead you to a better understanding of the labs. This process will help you in achieve the first goal given in this document. The 12 labs are as follows:

1. Lab 1 Diffusion and Osmosis
2. Lab 2 Enzyme Catalysis
3. Lab 3 Mitosis and Meiosis
4. Lab 4 Plant Pigments and Photosynthesis
5. Lab 5 Cell Respiration
6. Lab 6 Molecular Biology
7. Lab 7 Genetics of Organisms
8. Lab 8 Population Genetics and Evolution
9. Lab 9 Transpiration
10. Lab 10 Physiology of the Circulatory System
11. Lab 11 Animal Behavior
12. Lab 12 Dissolved Oxygen and Aquatic Primary Productivity

GRADING:

1. Exams will comprise the majority of the points possible. Four to five 100-point exams will be given each term as we come to a close of a unit. These test are to be informative to see what you have learn to this point. You will be required to score at least 80% on these tests. If you score below that you will be required to retake the exam within a timely fashion. The retakes will have an added degree of difficulty.
2. A mid term and term final will also be given each term they will be worth 200 points and are both formative and summative in nature. You will also be required to score at least 80 % in the midterm exam. Exams will be returned the following class.
3. Homework and assignments must be turned in on time for full credit. The work must be accurate and complete. A score of 7 or better on a 10-point assignment must be maintained or the work will be redone. The goal is best effort and good work all the time. All assignments will be tied to the guarantee curriculum given above and is to help ensure that you have learned what is required.
4. Labs will be completed with a lab partner. They will be due when the lab is complete and a discussion has been held in class concerning the outcomes of the lab. All labs should include the following: the lab sheets that may have been passed out to you or are found in the AP lab book. A lab write up that includes the following areas: Purpose, Procedure, Data and Conclusion Labs will usually be graded between 20- 40 points and again you must score 70% or above to be accepted.

- Quizzes will be given daily at the beginning of class. Each quiz will be worth 5 points. Missed quizzes due to absences or tardies will not be made-up. Students will be allowed to drop their lowest two scores if all quizzes are taken. Missed quizzes will be the ones that are dropped.
- Each quarter there will be a major assignment or project worth 100 points. Information on each assignment will be given at the beginning of each quarter.
- The final grade will be determined by dividing your total points by the number possible that term. See the grading breakdown below. Total points for each quarter will be approximately 800 to 1000.
- Progress reports will be given to students at mid-term and during the final week of the term. Also you may check your progress on the power school server.

ATTENDANCE:

- Students will be expected to be in class on time. The policy adopted by Orem High School will be followed.
- Class work miss due to truanancies may not be made up.

STUDENT RESPONSIBILITIES:

- Students will be expected to bring text, notebook, paper, and working materials (paper and pencil) each day to class.
- It will be expected that each student spend a minimum of 4 to 6 hours on homework each week.
- It is suggested that each student keep record of exam, assignment, and lab scores.

Discipline:

- Students will be expected to conduct themselves properly in class. Unreasonable disturbances or distraction to property will result in student/teacher counseling. Further problems will be referred to administrators and/or parents.
- Head phones Walkman's/Disc-mans, Cell-phones, pagers, games, etc. are not to be used in class please leave them in your locker, backpack (turned off) or home. Any of the above devise seen in class will be confiscated and your parents will need to come pick them up.
- This class is open to all students. Orem High School offers education to all students. Orem High School does not discriminate on the basis of race, color, religion, sex, disability, or national origin. Students who have a grievance with another student or any school employee should talk to the school administration or a counselor about their concerns.

GRADING BREAKDOWN

94-100 A	80-83 B-	67-69 D+
90-93 A-	77-79 C+	64-66 D
87-89 B+	74-76 C	60-63 D-
84-86 B	70-73 C-	00-59 F

Administrator Approval _____

Cut and return to teacher by date given below

I will occasionally have students in class correct the work of other students. This practice has an important educational purpose in that it allows the students to review, as well as consider problem solving and ideas that may be different than their own. If you have any questions please call or e-mail me at Orem High School.

I give permission for my child's work to be corrected by other students in his/her AP Biology class.

I do not give permission for my child's work to be corrected by other students in his/her chemistry class.

Student Signature _____ Date _____

Printed Name _____

Parents Signature _____

Printed Name _____

Please return this signed disclosure document by second day of class.

Course Structure

Major Topic	Molecules and Cells			Heredity and Evolution			Organisms and Population		
Sub Topics	Chemistry of Life	Cells	Cellular Energy	Heredity	Molecular Genetics	Evolutionary Biology	Diversity of Organisms	Structure and function of Plans and Animals	Ecology
Days Spent	6 Days	7 Days	7 Days	6 Days	8 Days	6 Days	8 Days	26 Days	8 Days
Chapters From text	2, 3, 4, 5 and 6	7, 8, 11, 12	9, 10	13, 14, 15,	16, 17, 18, 19, 20, 21	22, 23, 24, 25, 26	27, 28, 29, 30, 31, 32, 33, 34	35-40 Plants 40-49 Animals	50-55
Labs	Lab 2 Enzyme Catalysis	Lab 1 Diffusion and Osmosis	Lab 4 Plant pigment and Photosynthe sis Lab 5 Cell Respiration	Lab 3 Mitosis and Meiosis Lab 7 Genetic of Organism	Lab 6 Molecular Biology	Lab 8 Population Genetic Equilibrium	Lab 11 Animal Behavior	Lab 9 Transpiration Lab 10 Physiology of Circulation	Lab 12 Dissolved Oxygen
Major Theme Emphasis	1, 5 ,7	1, 5, 6	1, 3	1, 2, 5, 8	1, 6	1, 2, 4, 7, 8	2, 4, 5, 6, 7	4, 5, 7	1, 3, 4, 7, 8

