

**AP Biology
Syllabus
2021-2022**

A. Introduction

The course goal is to prepare each of you for the A.P. Exam that will be taken in May, and hopefully, you will earn college credit. My goal is to open your eyes to important information, new techniques, generally turn you on to the study of the world around you, and the relevance Biology has in your life. Throughout this class, you will develop analytical skills, be introduced to new laboratory techniques, and refine your written communication. The AP Biology Curriculum is framed around four big ideas:

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

Please be prepared to work hard in this class, but I hope that you develop a passion for the subject matter as well as discover a real world connection. It is my expectation that you come to class prepared each day (with reading and any daily work done before arrival) so you can be actively involved in classroom discussion.

Be prepared to do work that may not be assigned such as reading the book. **Reading the book is critical to your full comprehension of the material. It is an expectation that you are doing this.** Those who read the book typically have deeper understanding and perform better on exams.

B. Honor Code Cheating will not be tolerated. Included in cheating is plagiarizing.

C. Course Description and Prerequisites:

The Advanced Placement Biology course is designed to be the equivalent of a **College Introductory Biology Course** taken by science majors during their first year. A college biology course differs significantly from the usual high school course in respect to the textbook used, the range and depth of topics covered, the laboratory work done by students, and the time and effort required. Again, each night you need to read the material which will be discussed in class the next day. Without this preparatory work, you will be unable to participate in class discussion which is essential to developing a deep conceptual connection with the material. Videos will also be suggested or assigned through Schoology.

Students in AP Biology will only succeed if they appreciate that this course will be taught at the college level and will be challenging. It is recommended that students be prepared to spend a minimum of 1 hour of study time per 1-hour class period. Students who do not wish to invest this type of effort should NOT enroll in AP Biology.

Students in class need to have taken biology and chemistry with a B average. It is strongly recommended that students have completed physics. They also need to be hard workers ready for a challenge.

D. Grading Scale

Since the purpose of the AP Biology course is to prepare for the national exam, calculation of grades will be predominantly on exam and lab performance. Your grade will be a composite of the following areas:

Exams

Labs

Quizzes

Homework

Grades will be calculated at total points.

E. Requirements

1. Textbook: Campbell, *Biology in Focus*. Pearson, 2nd edition. 2017
2. You will need to come prepared to class every day with reading/outlining done. A lecture class will include a mixture of PowerPoint lectures, discussion, and problem solving questions. Videos will be assigned throughout the class as well.
3. We will be doing AP labs as well as a few additional ones to help enhance your knowledge and understanding of the topics of the year. Students will be asked to answer analysis questions after all of the laboratories as well as graphing and manipulating data. For each of the AP labs, you may be asked to write a full lab report or poster presentation, take a pre-lab quiz, and take a post-lab quiz. Some labs will have a certification which needs to be completed prior to starting the lab. Laboratory will give each of you the opportunity to learn new physical skills, learn to work in groups, find out how biology really works, and create student driven experiments. Students will learn proper measurement techniques. You will be given the laboratory instructions several days in advance so you can come prepared to work. You will find that in the AP labs, you will be required to “design your own experiment” in order to ask a question. This student-driven learning will carry over into other activities done in the classroom.
4. The non-laboratory classroom time will be a mixture of teacher lecture, student/teacher discussion, and practice in writing skills. Students will be given homework problems and other activities to help master the information. These problems will be worked on in class if requested. Some classes we will be completing POGIL activities and online labs through HHMI and pHet.
5. Tests will be designed to help you prepare for the format and timing of the AP exam.
6. In December, students will take a cumulative test to maintain knowledge of prior topics. You may also be asked periodically to take vocabulary quizzes to keep terminology fresh in your mind.
7. During the spring semester, we will take a full length AP exam (possibly two) in order to better narrow down which topics are essential to review. They will also act as a measuring stick of where you are at that point.
8. The A.P. exam will be in early May. All students taking the class will have the opportunity to take the AP exam.
9. Other suggested materials include AP Biology 1 and AP Biology 2 student workbooks by Biozone. Please note that this company has very strict copyright rules. Their materials absolutely cannot be copied and/or distributed. They have been punished to the fullest extent of the law. These workbooks are amazing!

F. Missed Classes

- You will be expected to make up all missed homework and tests as soon as possible. I will expect you to check in with Schoology.
- If you have a pre-planned absence you are expected to notify me ahead of time. We will have to make a plan for missed labs. Tests can be taken upon return.
- Make up tests may be different from tests given on the test day.

G. Assignments and Laboratories

- All homework assignments will be due on the day announced in class or posted on Google Classroom. Materials turned in after that time will not be accepted.
- All laboratory reports, calculations, and follow up questions are due on the day assigned (no exceptions).
- Students need to be prepared to take a short quiz at the start of lab class to ensure they read it before coming to class. Students may be given a short post-lab quiz the day which lab materials are submitted to the teacher.

H. AP Biology Topics

BIG IDEA 1: EVOLUTION (EVO)

The process of evolution drives the diversity and unity of life. Evolution is a change in the genetic makeup of a population over time, with natural selection as its major driving mechanism. Darwin's theory, which is supported by evidence from many scientific disciplines, states that inheritable variations occur in individuals in a population. Due to competition for limited resources, individuals with more favorable genetic variations are more likely to survive and produce more offspring, thus passing traits to future generations. A diverse gene pool is vital for the survival of species because environmental conditions change. The process of evolution explains the diversity and unity of life, but an explanation about the origin of life is less clear. In addition to the process of natural selection, naturally occurring catastrophic and human-induced events as well as random environmental changes can result in alteration in the gene pools of populations. Scientific evidence supports that speciation and extinction have occurred throughout Earth's history and that life continues to evolve within a changing environment, thus explaining the diversity of life.

BIG IDEA 2: ENERGETICS (ENE)

Biological systems use energy and molecular building blocks to grow, reproduce, and maintain dynamic homeostasis. Cells and organisms must exchange matter with the environment. Organisms respond to changes in their environment at the molecular, cellular, physiological, and behavioral levels. Living systems require energy and matter to maintain order, grow, and reproduce. Organisms employ various strategies to capture, use, and store energy and other vital resources. Energy deficiencies are not only detrimental to individual organisms but they can cause disruptions at the population and ecosystem levels. Homeostatic mechanisms that are conserved or divergent across related organisms reflect either continuity due to common ancestry or evolutionary change in response to distinct selective pressures.

BIG IDEA 3: INFORMATION STORAGE AND TRANSMISSION (IST)

Living systems store, retrieve, transmit, and respond to information essential to life processes. Genetic information provides for continuity of life, and, in most cases, this information is passed from parent to offspring via DNA. Non-heritable information transmission influences behavior within and between cells, organisms, and populations. These behaviors are directed by underlying genetic information, and responses to information are vital to natural selection and evolution. Genetic information is a repository of instructions necessary for the survival, growth, and reproduction of the organism. Genetic variation can be advantageous for the long-term survival and evolution of a species.

BIG IDEA 4: SYSTEMS INTERACTIONS (SYI)

Biological systems interact, and these systems and their interactions exhibit complex properties. All biological systems comprise parts that interact with one another. These interactions result in characteristics and emergent properties not found in the individual parts alone. All biological systems from the molecular level to the ecosystem level exhibit properties of biocomplexity and diversity. These two properties provide robustness to biological systems, enabling greater resiliency and flexibility to tolerate and respond to changes in the environment.

SCIENCE PRACTICES

Skill	Description	Exam Weighting (Multiple-Choice Section)
1. Concept Explanation	Explain biological concepts, processes, and models presented in written format	25%–33%
2. Visual Representations	Analyze visual representations of biological concepts and processes	16%–24%
3. Question and Method	Determine scientific question and method	8%–14%
4. Representing and Describing Data	Represent and describe data	8%–14%
5. Statistical Tests and Data Analysis	Perform statistical tests and mathematical calculations to analyze and interpret data	8%–14%
6. Argumentation	Develop and justify scientific arguments using evidence	20%–26%