

# ***AP Biology Syllabus ~ 2022-2023***

## **Instructor's Information**

Course: Advanced Placement Biology

Instructor: Mr. Peter Oesen, Ed.S.

E-mail: [poesen@hopatcongschools.org](mailto:poesen@hopatcongschools.org)

## **Google Classroom**

*22-23 AP Biology*

*class code – [epeauqw](#)*

## **AP College Board Classroom**

<https://myap.collegeboard.org/>

AP Biology - 22-23 AP BIOLOGY

Join Code: **D77W3Q**

## **Text book**

*Biology AP Edition* - Campbell & Reece (**9<sup>th</sup> Edition**)

## **Course Description and Overview**

This course is a college level course that follows closely the syllabus recommended by the College Board and prepares students for the Advanced Placement examination in Biology. This course is designed to provide a more in-depth study of the biological sciences for students who have a special interest in Biology or its related fields. It will emphasize comparative Anatomy and Physiology, Ecology, Microbiology, Genetics, Cytology, and Biochemistry. Individual research work and laboratory work will be expected of all students. Students enrolled in Advanced Placement are required to take the College Board Advanced Placement test on **Wednesday May 10, 2023.**

## **AP Biology Big Ideas:**

- **Big Idea 1:** The process of evolution drives the diversity and unity of life. (approximately 15% of course instructional time)
- **Big Idea 2:** Biological systems utilize free energy and molecular building blocks to grow, to reproduce, and to maintain dynamic homeostasis. (approximately 30% of course instructional time)
- **Big Idea 3:** Living systems store, retrieve, transmit, and respond to information essential to life processes. (approximately 30% of course instructional time)
- **Big Idea 4:** Biological systems interact, and these systems and their interactions possess complex properties. (approximately 25% of course instructional time)

**Prerequisites** - Successful completion of one year of the following courses: Biology Honors, Chemistry Honors, meet AP selection criteria, **and** mandatory summer assignment.

## Required Course Materials

- ✓ chromebook or computer equivalent
- ✓ three ring binder
- ✓ pens
- ✓ pencils
- ✓ highlighters
- ✓ colored pencils (8 pkg.)
- ✓ calculator (not a scientific calculator – must be a simple calculator)
- ✓ Student Planner or Calendar

## Attendance

With the rigorous requirements of the AP Biology curriculum, it is imperative that you try to be present every day. This class will move at a very rapid pace compared to other high school courses you have taken. It will be your responsibility to read while absent and makeup missed assignments upon returning. You must take the responsibility to make-up all missed work within one week upon returning to school or zeros will be recorded for the missing assignments. If you are absent on your lab day, you must stay after school to complete the experiment. If you are absent for an extended time, please make arrangements to pick-up any notes or assignments that were distributed in class. Arrangements can be made by sending Mr. Oesen an email.

**Labs:** Students are required to complete labs set forth by The College Board Advanced Placement Program. Students are expected to read each lab carefully before coming to the laboratory and are responsible for following all correct laboratory and safety procedures. Due to the large amount of time required for laboratory set-up, it is essential that you are always present on lab days. Within one week of completing the lab, students will turn in lab reports in the format provided by the instructor.

## Projects

1. **Wildflower Collections:** allow you to learn and appreciate the flowers native to your area. To become familiar with various flowers, students will identify, collect, dry, and then mount these flowers on herbarium. Identification of wildflowers will be done primarily through the use of online identification sites.  

or
2. **Insect Collection:** You will be responsible for collecting insects from different Orders. The insects will need to be preserved, pinned properly, and classified correctly.
3. **Abstracts:** Students will read and abstract a current article from a scientific journal. Articles will be provided by your teacher. The abstracts will count as a test grade.

**Summer Assignment:** The summer assignment is due the first day of the course in the Fall semester (**September 6, 2022**). The content for this assignment consists of free-response questions that are derived from the first five chapters of the textbook. This assignment is designed primarily to familiarize students with the vast diversity of life and how evolution serves as a foundation and unites modern biology. Secondly, this assignment serves as a review of the chemical foundation for which all life is built and an introduction to the level of academic dedication and maturity necessary to be successful in AP Biology.

### ***Facts about the class & Exam:***

**The A.P. Biology Exam** is 50% multiple choice and 50% free response. You will be given ninety minutes to complete 60 multiple choice questions and another 90 minutes to complete the free response answers. Your exam score will be rated as a 1 (poor) – 5 (best). You can receive recognition by more than 90 percent of colleges in the United States & colleges in more than 60 other countries, which grant credit, advanced placement or both on the basis of AP Exam grades. Check out your potential schools policies online at <http://collegesearch.collegeboard.com/apcreditpolicy/index.jsp>

The exam is given **Wednesday May 10, 2023**. It is the student's responsibility to pay for exam fees, usually around \$85 - \$90 by March or April.

***AP Biology is a rigorous course that demands personal responsibility from the student.*** In order for students to plan effectively, they are provided with due dates for all major projects, labs and tests. They are strongly encouraged to complete nightly readings and study each day's lecture notes on their own time.

### **Weighted Grades**

Grades are calculated on a percentage basis.

|                           |     |
|---------------------------|-----|
| Exams, Quizzes, Projects, | 50% |
| Labs and Lab Reports      | 30% |
| Homework / Readings       | 20% |

### **Yearly Grade Calculation**

|                                  |       |
|----------------------------------|-------|
| MPI, MP2, MP3, MP4 (22% each MP) | = 88% |
| EI- Final Exam                   | = 12% |

**Letter Grades** will be assigned according to the standardized scale of the District of Hopatcong's grading policy. (See student handbook)

Grade Scale

|          |                                  |
|----------|----------------------------------|
| 100 – 90 | = A+, A, A- (Superior)           |
| 89 – 80  | = B+, B, B- (Good)               |
| 79 – 70  | = C+, C, C- (Average)            |
| 69 – 65  | = D+, D, D- (Borderline Passing) |
| 64 – 0   | = F (Failing)                    |



### ***A Final Note:***

Don't be intimidated! **If you want to succeed you will.** Don't get me wrong, it will take some work, but if you trust me & do what you say I will provide you with all of the tools necessary to be successful & this time next year you will be leaving AP Biology & have a whole new perspective on the world around you & even yourself. It is important to remember, though, that I can't do the work for you!

Please feel free to email me if you have questions.

***Put this syllabus in your binder for future reference.***

Please sign, remove this page from the packet, and return it to your teacher.

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**2022-2022**

***AP Biology***

***Hopatcong High School***

#### **STATEMENT OF UNDERSTANDING**

By signing this contract, the parent and the student acknowledge that they have read the preceding syllabus for Mr. Oesen's AP BIOLOGY class and that they *understand* and *agree* to the commitment necessary to be successful in this course.

\_\_\_\_\_ / Date  
printed student name

\_\_\_\_\_ / \_\_\_\_\_  
signature of student date

\_\_\_\_\_ / \_\_\_\_\_  
signature of parent or guardian date

Please return ***completed*** STATEMENT OF UNDERSTANDING to Mr. Oesen to be eligible for enrollment in the AP Biology Course.

**AP Biology Summer Assignment Part I**  
**Introduction to AP Biology, Chemistry/Biochemistry and Biological Language (prefix and suffix)**

Welcome to AP Biology, I am excited to work with all of you this upcoming year. We are going to hit the ground running when we return, and for that reason I need you all to be prepared with some summer work.

The AP Biology Test is our final goal and in order to be ready for that, we have many chapters to cover. Some of these chapters will feel like review from previous Biology classes, but some will be new. Essentially, we will begin the year already short on time.

In order to cover ALL of the material, you are responsible for reviewing the Chemistry section on your own. Below are your reading guides for both the Introductory Chapter and the Chemistry Unit. Chapter 2 is a review of basic chemistry – we will not spend very much class time on these concepts as they should have been learned in chemistry. Please make sure that you know them and if not, be sure to study through them. Chapter 3 is biochemistry or Carbon based chemistry, we will spend the first week or two covering these concepts. **We will have a test on Chapter 1, 2, 3 shortly after the school year begins.**

**A few guidelines: The packet can be printed out and written in or can be typed on but please use a red as the font color.**

**If answers are on a separate piece of paper – these should be stapled to the back of the packet when turned in.**

**ALL WORK MUST BE STAPLED AND READY TO TURN IN. THESE PACKETS WILL BE COLLECTED ON THE FIRST DAY OF CLASS – NO EXCEPTIONS.**

**Any questions let me know. See you soon!!**

**Peter Oesen**  
**[poesen@hopatcongschools.org](mailto:poesen@hopatcongschools.org)**

Name \_\_\_\_\_  
Date \_\_\_\_\_

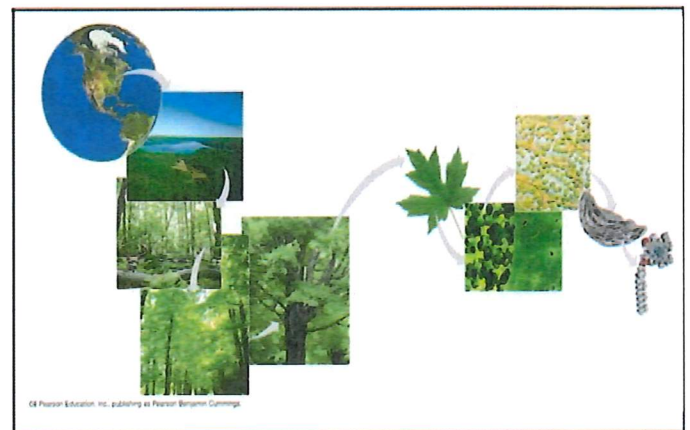
## AP Biology

**Chapter 1: Introduction: Themes in the Study of Life** Begin your study of biology this year by reading Chapter 1. It will serve as a reminder about biological concepts that you may have learned in an earlier course and give you an overview of what you will study this year.

### *Concept 1.1 Themes connect the concepts of biology*

- What are **emergent properties**? Give two examples.

- Life is organized on many scales. Figure 1.3 zooms you in from viewing Earth from space all the way to the level of molecules. As you study this figure, write in a brief definition of each level.



**biosphere**

**ecosystem**

**community**

**population**

**organism**

**organs/organ systems**

**tissues**

**cells**

**organelles**

**molecules**

- As you read this section, you will be reminded of things you may have studied in an earlier course. Since this material will be presented in detail in future chapters, you will come back to these ideas, so don't fret if some of the concepts presented are unfamiliar. However, to guide your study, define each of the terms in bold as you come to them.

**eukaryotic cell**

**prokaryotic cell**

**DNA**

**genes**

**genome**

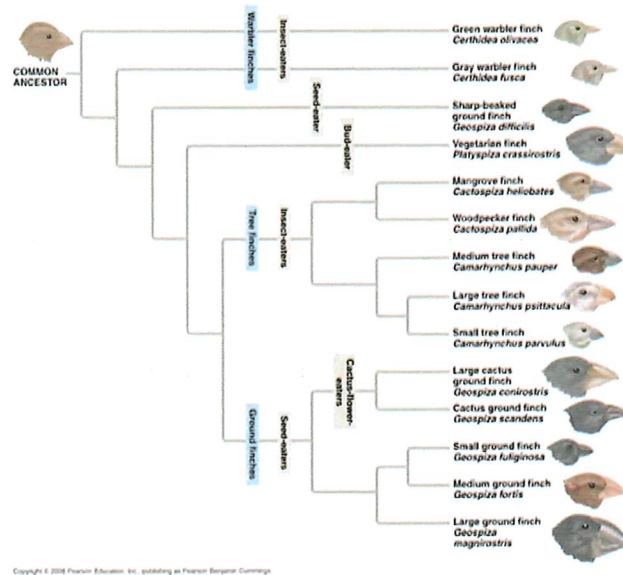
**negative feedback/positive feedback**

Compare and Contrast prokaryote vs. eukaryote

|            |              |           |
|------------|--------------|-----------|
| Prokaryote | Similarities | Eukaryote |
|------------|--------------|-----------|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

- Study Figure 1.16, which shows an evolutionary “tree.” What is indicated by each twig? What do the branch points represent? Where did the “common ancestor” of the Galápagos finches originate?



### Concept 1.3 Scientists use two main forms of inquiry in their study of nature

- What are the two main types of scientific inquiry? Give an example of each.
- What is *data*?
- Distinguish between quantitative and qualitative data. Which type would be presented in a data chart and could be graphed? Which type is found in the field sketches made by Jane Goodall?



- In science, how do we define *hypothesis*?
- A scientific hypothesis has two important qualities. The first is that it is *testable*. What is the second?
- Are scientific hypotheses proved? Explain your answer!
- Look at Figure 1.19. Use it to write a hypothesis using the “If . . . then . . .” format.
- What is a *controlled experiment*?
- The text points out a common misconception about the term “controlled experiment”. In the snake mimicry experiment, what factors were held *constant*?
- Why are supernatural explanations outside the bounds of science?
- Explain what is meant by a scientific *theory* by giving the three ways your text separates a theory from a hypothesis or mere speculation.

1.

2.

3.

**Testing Your Knowledge: Self-Quiz Answers (Pg. 17)** Now you should be ready to test your knowledge. Place your answers here:

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_

## Summer Assignment

### Part II

**you will only need to do 15 out of 100 for this summer.  
the rest will be worked on during the school year.**

**“Collect” 15 items from the list of terms below.**

When I say “collect”, I mean you should collect that item by finding it and taking a

photograph (digital) of that item. You will upload your

photographs with corresponding explanations to me via email ([poesen@hopatcongschools.org](mailto:poesen@hopatcongschools.org)).

A Google Slides would be preferred for ease of presentation. You do not need to find the exact item on the list!



### EXAMPLES:

- If it is an internal part to an organism such as “tendon”, you don’t have to dissect out your little brother’s Achilles tendon and take a picture of it. A photo of his heel, and what the tendon does would suffice, but you must apply the term to the specimen you find and briefly explain in your document how this specimen represents the term.
- If you choose the term “phloem,” you could submit a photograph you have taken of a plant leaf or a plant stem and then explain in your document what phloem is and specifically where phloem is in your specimen.

### ORIGINAL PHOTOS ONLY:

You cannot use an image from any publication or the Web. You must have taken the photograph yourself. The best way to prove that is to place an item in all of your photographs that only you could have added each time, something that you might usually have on you like a pen or a coin or a key or your phone, etc.

### NATURAL ITEMS ONLY:

Some specimens may be used for more than one item, but all must be from something that you have found in nature. Take a walk around your yard, neighborhood, and town. **DON’T SPEND ANY MONEY!** Research what the term means and in what organisms it can be found... and then go out and find one.

### TEAM WORK:

You may work with other students in the class to complete this project, but each student must turn in his or her own project with a unique set of terms chosen. There are 100 choices... probability says there is a very small chance that any two students will have most of the same **100 terms** chosen.

1. Acid
2. Adaptation of an animal
3. Adaptation of a plant
4. Altruistic behavior
5. Alkaline (base)
6. Amino acids
7. Amniotic egg
8. Analogous structures
9. Angiosperm
10. Animal that has a segmented body
11. Asexual reproduction
12. Autotroph
13. Basidiomycete
14. Batesian mimicry
15. Bilateral symmetry
16. Biological magnification
17. Buffer
18. Carnivorous plant
19. Cartilage
20. Calvin cycle
21. Cambium
22. Cellular respiration
23. Cellulose
24. Chitin
25. Coenzyme
26. Coevolution
27. Commensalism
28. Connective tissue
29. Cuticle layer of a plant
30. Detritivore
31. Disaccharide
32. Dominant vs. recessive phenotype
33. Ectotherm
34. Endosperm
35. Endotherm
36. Enzyme
37. Epithelial tissue
38. Ethylene
39. Eukaryote
40. Exoskeleton
41. Fermentation
42. Flower ovary
43. Fungi
44. Genetic variation with a population
45. Genetically modified organism
46. Glycogen
47. Gymnosperm cone - male or female
48. Gymnosperm leaf
49. Habitat
50. Hermaphrodite
51. Heterotroph
52. Homeostasis
53. Homologous structures
54. Hybrid
55. Hydrophilic
56. Hydrophobic
57. Introduced species
58. Keystone species
59. Krebs cycle
60. K-strategist
61. Lichen
62. Lipid used for energy storage
63. Littoral zone organism
64. Mating behavior (be careful!)
65. Methane
66. Modified leaf of a plant
67. Modified root of a plant
68. Modified stem of a plant
69. Monosaccharide
70. Mullerian mimicry
71. Mutation
72. Mutualism
73. Mycelium
74. Mycorrhizae
75. Niche
76. Parasitism
77. Phloem
78. Pollen
79. Pollinator
80. Polysaccharide
81. Population
82. Predation
83. Prokaryote
84. Purebred
85. R-strategist
86. Radial symmetry (animal)
87. Reox reaction
88. Rhizome
89. Seed dispersal (animal, wind, water)
90. Selective permeability
91. Spore
92. Succession
93. Taxis
94. Territorial behavior
95. Tropism
96. Unicellular organism
97. Water adhesion
98. Water cohesion
99. Vestigial structures
100. xylem