

AP Biology Summer Assignment

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Welcome to AP Biology! This course is designed to be the equivalent of a two-semester introductory biology course usually taken in the first year of college. In other words, it's a little like drinking from a fire hose. It will be a rewarding experience, but as with most things that are, it will also be challenging. Throughout the course, you will become familiar with major recurring ideas that persist throughout all topics and material.

The 4 Big Ideas of AP Biology

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

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

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

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

On the pages that follow, you'll find detailed instructions of the three assignments that comprise your summer work for AP Biology. The main purpose of these assignments is to make sure that you are adequately prepared for the upcoming year and also to get you in the biology state of mind. And, hopefully you will have some fun along the way! Contact me at aaschenbach@centralreg.k12.nj.us with any questions or concerns.

All of these are due the second week of class and will be worth multiple grades. Please be aware that WE WILL hit the ground running so plan on having homework and assignments that first day—whether we are Live or eLearning! That being said – although you CAN do these after you return to school, it would be MUCH EASIER for you if you get at least the bulk done over the summer. Word of caution—don't wait to try to do this assignment a couple of days before it is due. Set yourself up for success from day one.

Included in this packet are the following documents:

Assignment #1 – Introductory Email (HW Grade)

- Email me with information about yourself

Assignment #2 – Review expected previous knowledge (HW & Quiz Grade)

- Biomanbio: Inky the Squid
- Biomanbio: Scientific Method Quiz

Assignment #3 – Biological Photo Collection (HW & Quiz Grade)

- Instructions and Grading Rubric
- Biological Collection List
- Biological Collection List Table of Contents

Assignment 1: Introduction letter

I would like to know a little about you, so your first assignment is to send me an email. Yup.... that's it! Your first AP Biology grade will be sending me an email...if only all of the grades were this easy! Here is what I would like you to email to me at aaschenbach@centralreg.k12.nj.us before the end of this summer:

Subject Line: AP Biology Intro Letter 24-25

Body: Your full name (& nickname that you go by) & stuff about you!

1. Who was your last science teacher? What class?
2. What other science classes have you taken? Are planning to take next year?
3. What do you like to do (hobbies, sports, music, interests, etc.)?
4. What are your personal strengths when it comes to learning new material?
5. What causes you to struggle in a course?
6. What is the most effective way for you to prepare for a test?
7. How many AP classes have you taken so far? How many AP Exams have you scored a 3 or higher?
8. How many AP classes are you taking this year? Please list.
9. Have you or will you be taking Anatomy and Physiology?
10. Have you or will you be taking APES (AP Environmental)? If you took it, what grade did you get and what did you find interesting and/or difficult?
11. Have you or will you be taking AP Chemistry? If you took it, what grade did you get and what did you find interesting and/or difficult?
12. Was there anything that you liked or disliked about your earlier Biology class?
13. What are you looking forward to the most in AP Biology?
14. What are you most anxious about in AP Biology?
15. **Why** are you taking AP Biology? What do you hope to accomplish/gain from this course?
16. Please feel free to add any information you'd like to share—it's all CONFIDENTIAL!

Don't fret. There is no right or wrong answer--you can only lose credit by not following instructions. Please be honest so that I can determine the best way for me to be prepared to help you next year!

Assignment #2: Pre-requisite Knowledge – Scientific Method

*******to be done no earlier than Aug 31, 2024*******

1. Access the Scientific Method Section of biomanbio.com (no special code required) (<https://biomanbio.com/HTML5GamesandLabs/SciMethodGames/scimethod.html>)
2. Complete both the “Inky the Squid” game and Companion Scientific Method Quiz.
3. At completion, please submit them through Bioman to my email: aaschenbach@centralreg.k12.nj.us (email must be typed in, not copy/paste). Correct submission will be confirmed with a “Congratulations”. Screenshots will not be accepted. You may play both the game and take the quiz as many times as you like, but only the first submission will be accepted as your grade. Any submission before August 31, 2024 will be deleted—**these assignments must be submitted NO EARLIER for credit.**

Assignment #3 - Biological Photo Collection

For this assignment, you will “collect” 25 photographic examples of biological terms/concepts and compile them on one document. Select any 25 of the items from the Biological Collection List to include in your document. This will introduce you not only to the language of biology, but also emphasize that biology is something that’s *DONE*, not just memorized.

The format of the document created must be typed, organized and easy to follow. The table of contents must be completed and placed at the beginning of the document. Assuming we are back LIVE, a color hard copy will be due by the second week of class –for now, I will be asking you to submit it online via Google Classroom. Class codes will be provided ASAP. Contact me via email with any questions or concerns.

Directions for the Biological Photo Collection:

1. **“Collect” an item by taking a picture of it.** Then **define**, IN YOUR OWN WORDS, the biological term/concept. Also, within a couple of statements, **explain** how the picture represents the term or concept. Use the Biological Collection List given on the next page. **The connection between the item and the definition must be clear or no credit will be given.**
2. **Upload the photo, definition, and explanation** to a document that you create for the class. **Title each entry with the term that you are using.**
3. **Be creative.** If you choose an item that is internal to a plant or animal, like a phloem, you could submit a photograph of the whole organism or a close up of one part, and then explain *what* a phloem is and **specifically where** the phloem is in the specimen. However, **each item can only be used for one term.** So, if you use a picture of a daisy for the term phloem you must find a completely different kind of plant to explain the term xylem.
4. **Use original photos ONLY.** You MAY NOT use an image from any publication or from the internet. You must take the photo yourself. The best way to prove that the photo is your work is to have a Proof Object in each photo. A Proof Object is something in your picture that represents you. This could be a key chain, a bracelet, a small toy, etc. **The item must be *unique* and at the end of the document you must have a picture of you with your Proof Object.**
 - **Proof Object** – Your proof must be an object that is inanimate and separate from you. It must be unique – not a yellow #2 pencil or a penny. If you lose your Proof Object before you are able to take a picture with it then you must start over. For that reason, I suggest taking a picture with your Proof Object early on. I will not allow more than two objects used per project--so if you lose it twice, you will need to redo some of your photos! Safe guard your Proof Object carefully.
5. **You should only use natural items.** Take a walk in your neighborhood, go to the park or zoo, go for a hike in the woods, etc. Humans are natural items and may be used, but only for a **total of two** entries.
6. **This is an individual project.** While brainstorming, discussing, and even going on collecting adventures together (while abiding by Social Distancing and Masking Guidelines, of course!) is welcome, your items and photos are to be unique. With over 90 concept choices, probability says there is a very slim chance that any two students will have the same items chosen from their list.
7. **Be careful and respectful!** Never touch plants or animals you are unfamiliar with. Don’t kill or hurt any organisms. Don’t remove any organisms from the natural environment. If any pictures deem that you didn’t follow this rule then they will not be accepted.

Biological Collection List for Assignment 3

1. Adaptation of an animal
2. Modified leaf of a plant
3. Adaptation of a plant
4. Ethylene
5. Modified root of a plant
6. Altruistic behavior
7. Eubacteria
8. Modified stem of a plant
9. Amniotic egg
10. Eukaryote
11. Mullerian mimicry
12. Analogous structures
13. Exoskeleton
14. Mutualism
15. Animal that has a segmented body
16. Fermentation
17. Mycelium
18. Flower ovary
19. Mycorrhizae
20. Anther and filament of stamen
21. Frond
22. Niche
23. Gametophyte
24. Parasitism
25. Archaeobacteria
26. Genetic variation within an organism
27. Parenchyma cells
28. Asexual reproduction population
29. Phloem
30. ATP
31. Genetically modified
32. Pollen
33. Autotroph
34. Pollinator
35. Auxin producing area of a plant
36. Gibberellins
37. Population
38. Glycogen
39. Predation
40. Basidiomycete
41. Gymnosperm cone – male or female
42. Prokaryote
43. Batesian mimicry
44. R-strategist
45. Bilateral symmetry
46. Gymnosperm leaf
47. Radial symmetry (animal)
48. Biological magnification
49. Hermaphrodite
50. Redox reaction
51. C3 Plant
52. Heterotrophy
53. Rhizome
54. C4 Plant
55. Homeostasis
56. Seed dispersal (animal, wind, water)
57. CAM Plant
58. Homologous structure
59. Calvin Cycle
60. Hydrophilic
61. Spore
62. Cambium
63. Hydrophobic
64. Sporophyte
65. Cellular respiration
66. Introduced species
67. Stigma and style of carpel
68. Coevolution
69. Keystone species
70. Succession
71. Commensalism
72. Krebs cycle
73. Taxis
74. Connective tissue
75. K-strategist
76. Territorial behavior
77. Cuticle layer of a plant
78. Lichen
79. Tropism
80. Detritivore
81. Lipid used for energy storage
82. Unicellular organism
83. Dominant vs. recessive phenotype
84. Littoral zone organism
85. Vestigial structures
86. Long-day plant
87. Xylem
88. Ectotherm
89. Endosperm
90. Endotherm
91. Meristem
92. Enzyme

**Rubric for Biological Photo Collection
Assignment #3**

Points	Biological Photo Collection Entry (per photo)	Points	Table of Contents*
1	Original photo posted		* Points in this section are awarded in an all or none format. If guideline is not <u>fully</u> met, no points will be awarded.
1	Biological term/concept identified	5	Picture of you with your proof object submitted
1	Biological term/concept defined in own words	10	Each biological term/concept listed in the order it appears
2	Biological term/concept and photo relationship explained fully	10	Document is easy to follow and neatly presented

Biological Photo Collection Table of Contents

Name _____

Assignment #3

Photo Order	Biological terms/concepts	Teacher Comments	Points Earned
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Example Entries for Assignment #3 Photo Collection

Notice the toy giraffe in the pictures below. This is the Proof Object and is used to demonstrate that the photos in the document are indeed original. **Make sure you have Proof Object in each of your photos.**

4. Detritivore



This is a picture of an earthworm. The earthworm represents a *detritivore*. A detritivore, also called a decomposer, is an organism that consumes non-living organic materials (corpses, fallen plant material, and wastes) to obtain its energy and nutrients. They can be found in many different areas (land and water). They can also be found in many different types, for example, fungi, bacteria, and protists, as well.

10. Modified Leaf



This is a picture of pine needles. Pine needles are an example of a *modified leaf* of a *plant*. A modified leaf is one that has adapted to perform another function, other than photosynthesis and transpiration. A pine needle's shape functions to retain moisture, which is helpful in dry and windy areas.

