

AP Biology Summer Assignment 2024

Ms.Canning

ccanning@bbrsd.org

The AP Biology course is designed to enable you to develop advanced inquiry and reasoning skills, such as designing a plan for collecting data, analyzing data, applying mathematical routines, and connecting concepts in and across domains. The result will be readiness for the study of advanced topics in subsequent college courses — a goal of every AP course.

This AP Biology course is equivalent to a **two-semester college introductory biology course** and has been endorsed enthusiastically by higher education officials.

The Emphasis on Science Practices

A practice is a way to coordinate knowledge and skills in order to accomplish a goal or task. The science practices enable you to establish lines of evidence and use them to develop and refine testable explanations and predictions of natural phenomena. Because content, inquiry, and reasoning are equally important in AP Biology, each learning objective combines content with inquiry and reasoning skills described in the science practices. The science practices capture important aspects of the work that scientists engage in, at the level of competence expected of you, an AP Biology student.

Organized around Big Ideas:

The key concepts and related content that define the revised AP Biology course and exam are organized around a few underlying principles called the big ideas, which encompass the core scientific principles, theories and processes governing living organisms and biological systems.

Big Idea 1: Evolution

The process of evolution drives the diversity and unity of life.

Big Idea 2: Cellular Processes: Energy and Communication

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

Big Idea 3: Genetics and Information Transfer

Living systems store, retrieve, transmit, and respond to information essential to life processes.

Big Idea 4: Interactions

Biological systems interact, and these systems and their interactions possess complex properties

To successfully complete the course and meet all of the required objectives, you will need to do independent work both during the summer and throughout the school year.

If you have **any** questions regarding any part of the summer assignment, do not hesitate to e-mail!

There are TWO parts to your summer assignment; the due date for both is the first day of school.

1. Review Packet

Complete the review packet. These are concepts and vocabulary you should be familiar with from your previous Biology class. I will have hard copies you can take home with you; the packet can also be found on Google classroom for AP Biology. This must be handwritten, NOT typed on the computer. **This will be collected on the first day of school.**

2. Digital Scavenger Hunt

For this part of your summer assignment, you will be familiarizing yourself with science terms that we will be using at different points throughout the year by creating a slideshow of vocabulary. On the next page is the list of terms.

1. Select 25 terms from the list provided and define them.

Carefully and completely define each term. This is important to do prior to your photographs so that you fully understand what the word means and can select appropriate examples. These definitions DO NOT need to be handed in separately. Definitions for each word will be included in the presentation (slide show, PowerPoint or Prezi) along with the written information about how your photograph exemplifies that particular term.

2. Find real-life examples.

Each student will collect a series of 25 digital photographs illustrating or exemplifying an aspect of each of the chosen terms above. The presentation of the 25 items can be done via PowerPoint, Slides or Prezi.

These photographs must be unique and “collected” by you – meaning, they must be original photographs with an identification incorporated.

Note:

- 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.

Example slide below:



Radial Symmetry

The body organization of lower invertebrates in which the body parts are arranged around a central axis, like the spokes on a wheel. There is no left or right side to the animal, however it usually has a top (dorsal) and a bottom (ventral). This is a picture of a green sea anemone on the beach of Olympic National Park. It is a cnidarian (has stinging cells) and is related to corals and jellyfish, which also display radial symmetry.

3. 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 this 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.

4. 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.

Scavenger Hunt Items list is on the next page

1. Adaptation of an animal
2. Adaptation of a plant
3. Abscisic acid
4. Actin
5. Adhesive property of water
6. Amniotic egg
7. Amylase
8. Angiosperm
9. Annelid
10. Anther and filament of stamen (flower)
11. Aposematic coloration
12. Arthropod
13. Autotroph
14. Bacteria
15. Batesian mimicry
16. Biological magnification
17. Bilateral symmetry (organism exhibiting)
18. Bryophyte
19. Cellulose
20. C4 plant
21. Chitin
22. Chordate
23. Cnidarian
24. Cohesive property of water
25. Connective tissue
26. Cuticle layer of a plant
27. Deciduous leaf
28. Dicot plant with flower and leaf
29. Diploid chromosome number
30. Echinoderm
31. Ectotherm
32. Endosperm
33. Endotherm
34. Enzyme
35. Epithelial tissue
36. Estuary
37. Ethylene
38. Eukaryote
39. Eutrophication
40. Exoskeleton
41. Fermentation
42. Flower ovary
43. Frond
44. Fruit - dry with seed
45. Fruit- fleshy with seed
46. Fungi
47. Gastropod
48. Genetically modified
49. Germination
50. Gibberellins
51. Glycogen
52. Gymnosperm cone
53. Haploid chromosome number
54. Heartwood
55. Herbivore
56. Hypertonic
57. Hypotonic
58. Insect
59. Invasive Species
60. Isotonic
61. K-strategist
62. Keratin
63. Lichen
64. Littoral zone (organism found in)
65. Lignin
66. Long day plant
67. Marsh
68. Meristem
69. Meiosis (evidence of meiosis)
70. Mitosis (evidence of mitosis)
71. Modified leaf of a plant
72. Modified root of a plant
73. Monocot plant with flower and leaf
74. Mutualism
75. Mycelium
76. Mycorrhizae
77. Myosin
78. Nematode
79. Nonpolar liquid
80. Omnivore
81. Parasite
82. Phloem
83. Phototropism
84. Pollen
85. Pollinator
86. Polyploid
87. Prokaryote
88. Protein - fibrous
89. Protein - globular
90. R-strategist
91. Radial symmetry (organism exhibiting)
92. Rhizome
93. Scale from an animal with a two-chambered heart
94. Spore
95. Stem - herbaceous
96. Stem - woody
97. Stigma and style of carpel
98. Tendril of a plant
99. Thorn of a plant
100. Xylem

AP Biology - Concepts Review

Name: _____

1. List 3 properties of water. How do these properties make water essential for life?

2. What are biomolecules?

3. Complete the biomolecule chart below

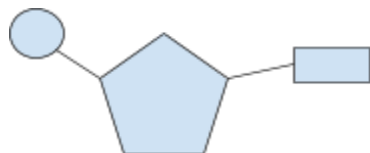
Name	Main Functions	Monomer	Polymer	Example(s)

4. What is digestion? What is biosynthesis?

5. Why are energy and matter conserved during the processes from the question above?

6. What is the function of an enzyme?

7. What is photosynthesis and where does it occur?
8. Write the equation for photosynthesis
9. What is cellular respiration and where does it occur?
10. Write the equation for cellular respiration
11. What type of living organisms do cellular respiration?
12. Decide if each of the following would lead to a faster or slower chemical reaction
- A plant is added to a fish tank, and it starts producing oxygen as it does photosynthesis. Will this increase or decrease the fishes' rate of cellular respiration?
 - A cold front moves through and the temperatures drop in a farmer's field. Will this increase or decrease the rate of photosynthesis?
 - A heater is added to a fishtank. Will this increase or decrease the rate of cellular respiration in the fish?
 - A plant is moved to the top of a mountain, where the atmosphere is thin and there is little air. Will this increase or decrease the rate of photosynthesis?
13. Label the three parts of the picture below. What is the name of this molecule?



14. Match the following words to their correct definitions:

- | | |
|---------------------|---|
| _____ Nitrogen Base | A. A section of DNA that hold information about one trait |
| _____ Gene | B. The three part repeating subunit that makes up DNA |
| _____ Double helix | C. The biomolecule coded for using DNA that does all the major jobs within the body |
| _____ Nucleotide | D. The macromolecule that carries trait information |
| _____ Protein | E. Part of the nucleotide that can change; can have the letters A, T, G, C |
| _____ DNA | F. The twisted 3D shape of DNA |

15. Describe the process of how DNA is used to make proteins. Your description should include the molecules and organelles involved.

16. Use the base-pairing rule and the codon chart to build a protein from each DNA molecule

DNA: TAG GGG AAC ATG CCA AGG

mRNA: _____

Protein: _____

		Seond letter					
		U	C	A	G		
U	UUU	Phe	UCU	UAC	UGU	Tyr	Cys
	UUC						
	UUA	Leu	UCA	UAA	Stop	A	
	UUG						UCG
C	CUU	Leu	CCU	CAU	CGU	His	
	CUC						Pro
	CUA	CCA	CAA	CAG	Gin	A	
	CUG						CCG
A	AUU	Ile	ACU	AAU	AGU	Asn	
	AUC						Thr
	AUA	Met	ACA	AAA	AGA	A	
	AUG						ACG
G	GUU	Val	GCU	GAU	GGU	Asp	
	GUC						Ala
	GUA	GCA	GAA	GAG	GGA	A	
	GUG						GCG

17. What is a mutation?

18. Circle all the ways mutations can change the traits of a person
- Change the number of amino acids in a protein
 - Change the order of amino acids in a protein\
 - Insert a “stop” amino acid early, making a shorter protein
 - Change the DNA and mRNA, but still have the same amino acids in the protein
 - Change the shape of a protein

19. Write a definition for each of the following terms

- Genotype
- Phenotype
- Homozygous
- Heterozygous
- Dominant
- Recessive

20. Circle the correct genotype and phenotype below. Tall is dominant to short.

Description	Genotype (circle one)	Phenotype (circle one)
A person is heterozygous	TT Tt tt	Tall Short
A person is homozygous dominant	TT Tt tt	Tall Short
A person is homozygous recessive	TT Tt tt	Tall Short

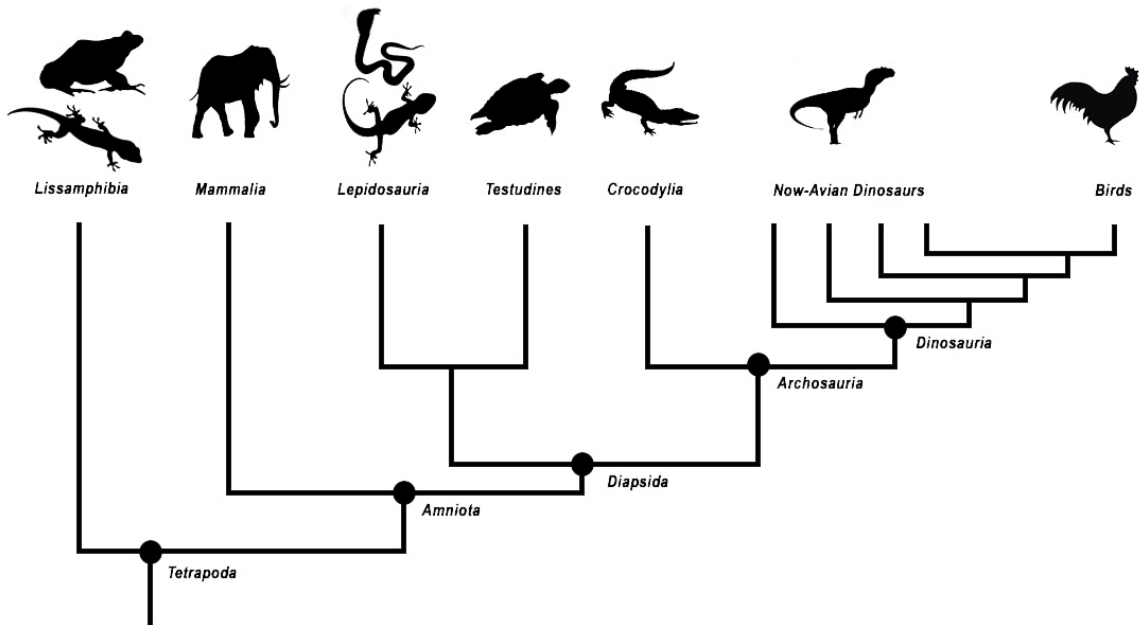
21. Baldness is dominant to non-baldness. A heterozygous man and a homozygous recessive woman have children. Use a punnett square to show what percentage of their offspring will be bald when they grow up?

22. Spots are dominant to no spots. Two cats have kittens, and 25% of them do not have spots. Use a punnett square to determine the genotypes of both parent cats.

23. What does “common ancestry” mean?

24. What are two methods used to provide evidence for common ancestry among different species?

25. Give two conclusions you could draw from the cladogram below



Ceballos V. G.

26. What are the laws of natural selection? Describe each below.

27. Describe each of the following stages of the cell cycle:

- a. Interphase
- b. Mitosis
- c. Meiosis
- d. Cytokinesis

28. Use the cell shown below to show the stages of mitosis.



29. Use your images from question 28 to answer the following

- a. How many chromosomes are in the parent cell?
- b. How many chromosomes are in the new daughter cells?
- c. Are the new cells diploid or haploid?
- d. Are the new cells identical or different?

30. What are three differences between mitosis and meiosis?

31. Write the definition of the following words

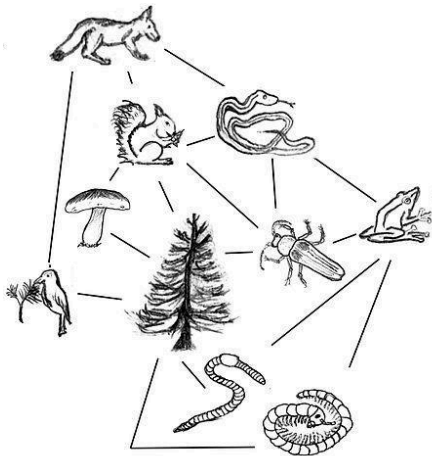
- a. Zygote
- b. Gamete
- c. Fertilization

32. The following processes lead to genetic variation in meiosis. Describe each in your own words.

- a. Crossing over
- b. Random fertilization
- c. Random mutations in gametes
- d. Independent assortment

33. Use the food web below to answer the following questions

- a. What is the producer
- b. What is the top consumer?
- c. What do beetles eat?
- d. What eats beetles?
- e. What population contains the MOST energy?



34. What is carrying capacity?

35. What are limiting factors in an ecosystem?

36. Fill in the taxonomic levels below from largest to smallest

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

37. Circle all processes that ADD carbon to the atmosphere

Photosynthesis, cellular respiration, decomposition, combustion

38. Circle all processes that REMOVE carbon to the atmosphere

Photosynthesis, cellular respiration, decomposition, combustion

39. What is biodiversity? What are the benefits of biodiversity?

40. Give 3 different threats that currently exist to biodiversity?

41. What is homeostasis?

42. What is a feedback loop?

43. Compare and contrast negative and positive feedback loops and describe an example of each.