A.M.D.G.

AP Biology

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Welcome to AP Biology!

This is an advanced general biology course where you will hone your knowledge of biology and its place in the modern world. A student in AP Bio is essentially taking the course for high school and college credit. Many colleges allow students to skip to a higher level biology course or give credit for a science elective if a student is successful on the AP exam, especially if your major will **NOT** be biology. Check with your individual college to determine what score a student must earn, and if the student is allowed to use the AP exam as part of the coursework for a Biology major. Many colleges also expect students to take an entrance placement test, and many do not allow a Biology major to get credit from the AP Biology exam. As noted, this varies with each college, so it is important to check this out. If a student will be a bio major in college, and is not going to receive AP credit, it is still worthwhile to take AP Biology and the AP test because the student will be much better prepared for college biology classes. This can be important to pre-med majors as well as others that want to keep their grade point average high in college with hopes of obtaining a graduate degree.

You will be expected to keep up with what is in the news-such as epidemics/ pandemics, the results of natural disasters, and advances in molecular biology such as cloning. You can do this by reading reliable articles and specific general public magazines such as Science News and Discover, or go on-line to these and similar sources.

I am looking forward to having all of you in class. We will have a fantastic year! If you have any questions please feel free to email me at ffuentes@xavierprep.org. Stay safe, stay healthy, and have an AWESOME summer!

AP BIOLOGY SUMMER ASSIGNMENT

Xavier College Preparatory High School (Tax ID: 71-0908497) is a 501(c)(3) not-for-profit corporation.

PART ONE: A tour through the AP Biology Text Book.
Textbook: Biology (9th edition) Campbell-AP

The major purpose of this summer assignment is to introduce you to the wide spectrum of modern biology and to familiarize you with your textbook and other relevant resources that you may be using throughout the year. This book contains a LOT of information. We will not be covering EVERYthing in the book so don't get overwhelmed as you work your way through the text. Most, but not all, chapters will be covered in the summer assignment.

The summer assignment should be placed in a **one-inch diameter three-ring notebook** with tabbed and labeled dividers separating each of the three parts. You should type all of the questions and write your answers, **by hand**, below the questions. **DO NOT PUT THE QUESTIONS ON ONE PAGE AND THE ANSWERS ON ANOTHER PAGE.**

Be sure to look over the questions first and estimate the amount of space that you will need for each answer. Then, insert spaces between the questions before you print them. Write neatly; if I can't read your writing I can't give you credit for your answers.

You will earn points for detail, completeness, and depth of thought. To earn the full points, you will need to have adequately addressed all parts of each question.
Please print the grading rubric and use it as the title page for your notebook. I will not grade your notebook without this page.

Proper format includes the following: Notebook and dividers as described above, rubric in front, typed questions with **hand-written** answers; All questions and answers presented in numerical order within each section; SKIPPING LINES BETWEEN EACH QUESTION; and neatness.

Don't overlook the illustrations, charts, and graphs….they can be very helpful.

AP Biology Summer Assignment Grading Rubric

Name: _____

PARTS		COMMENTS	POINTS POSSIBLE	POINTS EARNED
1	Chapter Explorations (100 points)			
	UNIT 1			
	UNIT 2			
	UNIT 3			
	UNIT 4			
	UNIT 5			
	UNIT 6			
	UNIT 7			
	UNIT 8			
2	Biology Photo Collection: (100 points)			
3	BIG IDEAS (80 points)			

ALL parts of the summer work are DUE on the first day of school, No EXCEPTIONS!!!

Total Points for summer work is 280 points, if done well that is a nice cushion to start the first semester.

Part I – Chapter Explorations – START EACH UNIT ON A NEW PAGE
The assignments in the chapters are not meant to be inclusive of all of the major topics that we will discuss in class this year. The assignments will give you an overview of the field of biology.

(UNIT 1)
CHAPTER 1
THEMES IN THE STUDY OF LIFE

1. Why do Biology courses build their content around themes and major concepts?
2. List each major theme and briefly describe.
3. How does biology account for the unity and diversity of life?
4. What is meant by the statement that science is a process?

CHAPTER 2

Write the key concepts from chapter 2 (include the concept number, also). These are listed for you in the front of the chapter

CHAPTER 4 and 5

We are called "carbon-based life-forms." What about the carbon atom makes it an ideal atom to form the "backbone" or skeleton for most biological compounds?

Fill in the blanks in the table describing the 4 main groups of organic compounds in living things.

COMPOUND	**CARBOHYDRATES**	**LIPIDS**	**PROTEINS**	**NUCLEIC ACIDS**
Elements found in all members of this group				C, H,O, N, P
Major purposes		Long-term energy storage, regulation	Regulation, transport, protection, structural support	
Examples	Sugars, starches, cellulose, chitin			

(UNIT 2)
CHAPTER 6

Describe the similarities and differences between prokaryotic and eukaryotic cells. Then, select 3 eukaryotic cell organelles that you think you will enjoy studying. For each one, draw and explain the function of this organelle and tell what you find most interesting about it.

CHAPTER 7

Describe the differences between passive and active transport. For each of these types of cell transport, describe several different examples.

CHAPTER 8

What is metabolism? Describe how ATP and enzymes are related to metabolism.

CHAPTER 9

In your own words, describe the major purpose of cellular respiration. Also, find a website that describes a lab activity that could be used to study the rate of cellular respiration. Select a site and an activity that is something that you understand and that would be appropriate for high school or younger students. Briefly describe the activity and be sure to include the website address in your answer.

CHAPTER 10

Describe the importance of photosynthesis to life on earth.

CHAPTER 13

Compare and contrast sexual and asexual reproduction and list the advantages and disadvantages of each type of reproduction. Also, describe the most significant differences between mitosis and meiosis.

(UNIT 3)
CHAPTER 14

What do you think will be the most interesting topic to study in this chapter? Explain.

CHAPTER 16

What is the role of DNA in living things?
Describe the structure and parts of a DNA molecule.
Briefly, describe how DNA replicates. Use illustrations.

CHAPTER 17

Describe the relationship between genes and proteins.
Compare and contrast the structures and functions of DNA and RNA.

CHAPTER 18

Compare and contrast viruses and bacteria.
Describe some diseases caused by each type of microbe.
Are viruses living things? Explain your answer.

(UNIT 4)
CHAPTER 22

This is the introductory chapter for the evolution unit. Look through the topics covered in this chapter and describe the ones that you think will be most interesting to study. Explain your choices. Choose at least 2 topics.

CHAPTER 23

Why are populations considered to be the smallest unit of evolution?
Explain the roles of mutation and sexual recombination in the process of evolution.

CHAPTER 24

Reproductive isolation is one of the major processes that keeps species separate from each other. Distinguish between pre-zygotic and post-zygotic barriers that contribute to reproductive isolation and provide an example of each.

(UNIT 5)
CHAPTER 27

Prokaryotes can have both harmful and helpful impacts on humans. List and describe 2 harmful and 2 helpful impacts

(UNIT 6)
CHAPTERS 35-39

Look through these 5 chapters and find TWO concepts that you think you will enjoy studying. Briefly describe this concept and explain why it appeals to you. You only need to find 2 within the 5 chapters, **NOT 2 per chapter.**

(UNIT 7)
Chapters 40-49

Look through these 10 chapters (during the year, we will cover some parts of all of these chapters but not all 10 in detail!). Select the **FOUR** chapters that you think you will most enjoy studying. For each chapter, briefly describe the purposes and major structures of the body systems featured. Also, describe what appeals to you in these particular chapters.

(UNIT 8)
CHAPTERS 50-55

Ecology is the study of interactions between organisms and the environment.
These interactions are critical to keeping us alive. Look through each chapter and list the single concept within each chapter that you think is the most important concept in the chapter (for each chapter, write the concept and the concept number).

PART 2: Biology Photo Collection:

Biology collection:

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. On the next page is the list of terms.

1. **Each item is worth 2 points.**
Earn 100 points by "collecting" 50 items from the list of terms.
When I say "collect", I mean you should search that item by finding it and taking a **photograph** (digital or paper printed) of that item. You will put your photographs with appropriate **explanations / descriptions** in a portfolio that will be due the first day of school.

2. **YOU CAN BE CREATIVE:**
If you choose an item that is internal to a plant or animal, like the term "phloem", you could submit a photograph of the whole organism or a close up of one part, and then explain in the portfolio *what* phloem is and specifically *where* phloem is in your specimen.

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 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 cell phone, etc. It must be the same item in each photograph.

All items 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 an example.

BIOLOGY COLLECTION TERMS:

Below are the items you are to "collect". An individual organism can only be used **once**. Humans are acceptable for **one** category only. You must take all photos yourself; no Internet photos!

GROUPINGS

Each specimen in a category is worth 2 points. In this category you must do all 12. **This section is worth 24 points of your total 100 points!**

1. 2 Different biomes (2 pts.)
2. 2 Different types of carbohydrates (2 pts.)
3. 2 Different classes of proteins (2 pts.)
4. Evidence of different alleles for the same trait (2 pts.)
5. Distinguishing characteristics between monocots & dicots (2 pts.)
6. Organisms in different kingdoms (2 pts.)
7. Organisms in different animal phyla (2 pts.)
8. Organisms in different plant divisions (2 pts.)
9. Organisms in same class but different orders (2 pts.)
10. Organisms in same order but different family (2 pts.)
11. Organisms in same genus but are different species (2 pts.)
12. Organisms on different levels of the same food chain (2 pts.)

INDIVIDUAL ITEMS

Each vocabulary word is worth 2 points. YOUR groupings photos CANNOT be used to get the remaining 100 points or be used for any of the individual terms. These photos now need to be separate. At the end of this portion of the summer work you should have a total of 62 photos. I know that equals 124 points (but remember you received 24 points total from the groupings section and that requires 2 photos for each grouping, and then you need the remaining 76 points which will account for 38 pictures for individual terms.) These do not need to be native to California. Please remember that you only need to have a total of 100 points. Be creative and choose wisely.

1. adaptation of an animal
2. adaptation of a plant
3. altruistic behavior
4. amniotic egg
5. analogous structures
6. animal that has a segmented body
7. anther & filament of stamen
8. archaebacteria
9. asexual reproduction
10. ATP
11. autotroph
12. auxin producing area of a plant
13. basidiomycete
14. Batesian mimicry
15. bilateral symmetry
16. biological magnification
17. C3, C4 or CAM plant
18. Calvin cycle
19. cambium
20. commensalism
21. connective tissue
22. cuticle layer of a plant
23. detritivore
24. dominant vs. recessive phenotype
25. ectotherm
26. endosperm
27. endotherm
28. enzyme
29. epithelial tissue
30. ethylene
31. eubacteria
32. eukaryote
33. exoskeleton
34. fermentation
35. flower ovary
36. frond
37. gametophyte
38. genetic variation within a population
39. genetically modified organism
40. gibberellins
41. glycogen
42. gymnosperm cone –male or female
43. gymnosperm leaf
44. hermaphrodite
45. heterotroph
46. homeostasis
47. homologous structures
48. introduced species
49. Krebs cycle
50. *K*-strategist
51. lichen
52. lipid used for energy storage
53. littoral zone organism
54. long-day plant
55. mating behavior **(*be careful!)***
56. meristem
57. modified leaf of a plant
58. modified root of a plant
59. modified stem of a plant
60. Mullerian mimicry
61. mutualism
62. mycelium
63. mycorrhizae
64. niche
65. parasitism
66. parenchyma cells
67. phloem
68. pollen
69. pollinator
70. population
71. predation
72. prokaryote
73. *r*-strategist
74. radial symmetry
75. redox reaction
76. rhizome
77. seed dispersal (animal, wind, water)
78. spore
79. sporophyte
80. stigma & style of carpel
81. succession
82. taxis
83. territorial behavior
84. tropism
85. unicellular organism
86. vestigial

Part 3 – Big Ideas in Biology

You have just finished looking through your entire textbook. For each of the big ideas listed below, think about what they mean, and then look through your textbook to find chapters that you think are related to the big ideas. Under each big idea, list each chapter that you think contains topics that exemplify that big idea. Write a specific justification for why you think these particular chapters should be included under that big idea. You do not need to write a justification for each individual chapter, but summarize why you chose that group of chapters and cite a few specific examples. You may find that a chapter goes with more than one big idea. Reading chapter 1 will give you a good feel for some of these topics.

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