



Summer Assignment AP Biology

Directions: Welcome to AP Biology! The content and rigor of this course is equivalent to a 2 semester college level course usually taken in the first year of college. To successfully complete this course you will need to be dedicated and organized. Time management is essential as you will need to complete reading and homework assignments. Unlike most high school courses, you will be expected to explore many concepts on your own. However, you will have many tools at your disposal that can help you study so you can earn an optimal score on the AP Biology Exam. This summer's activities packet is designed to give you a head start by introducing you to the first 2 chapters of the AP Biology textbook being used in this course.

TEXTBOOK - Reece, Jane et al., Campbell Biology, 9th Edition. Benjamin Cummings, 2011.

Academic Integrity: All work should be completed independently and without the assistance of unapproved resources. Any work violating academic integrity will be subject to a "0" and any additional consequences as outlined in the Knox Academic Integrity Policy attached to this assignment.

Due Date: Your work is due the first day of your Biology class. All late work will be subjected to a grade reduction or penalty as outlined in the course syllabus and copied below:

All major assignments not submitted on the due date will face a 10% deduction of max points per day for up to five (5) days and up to a 50% deduction.

Summer Assignments for AP Classes that are not submitted on time will result in the student being dropped from the course.

If you have any questions or concerns regarding this assignment, please contact the Dean of Academics, Mrs. Pergola, at dpergola@knoxschool.org .

A Brief Introduction to AP- Biology

Success in AP Biology is dependent on many factors including your effort, dedication and willingness to research and learn more than what is presented in the classroom. Unlike high school Biology which focuses on vocabulary and simple concepts, AP Biology requires you to go beyond the basics by learning how to synthesize new ideas, make connections between these ideas, and master scientific inquiry.

This course will also prepare you to take the AP Biology Exam. This exam will test your ability to apply the concepts learned including your ability to apply the seven science practices detailed below. Throughout the course we will engage in practice questions and other methods that will assess your readiness for the exam.

Much more detail regarding the course and the AP Biology Exam will be provided at the beginning of the school year.

The Four Big Ideas

The course centers around 4 “Big ideas”, or themes, that permeate each unit.

AP Biology - The 4 Big Ideas	
1	EVOLUTION: The process of evolution drives the diversity and unity of life.
2	ENERGETICS: Biological systems use energy and molecular building blocks to grow, reproduce, and maintain dynamic homeostasis
3	INFORMATION STORAGE AND TRANSMISSION: Living systems store, retrieve, transmit, and respond to information essential to life processes.
4	SYSTEMS INTERACTIONS: Biological systems interact, and these systems and their interactions exhibit complex properties.

Try to identify these themes as you read chapter 1.

The Seven Science Practices

In addition to the Big ideas, the course will also integrate seven (7) practices that describe the knowledge and skills you should learn and demonstrate to reach a goal or complete a learning activity.

AP Biology Science Practices	
1	The student can use representations and models to communicate scientific phenomena and solve scientific problems.
2	The student can use mathematics appropriately
3	The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.
4	The student can plan and implement data collection strategies in relation to a particular scientific question. (Note: Data can be collected from many different sources, e.g., investigations, scientific observations, the findings of others, historic reconstruction and/or archived data.)
5	The student can perform data analysis and evaluation of evidence.
6	The student can work with scientific explanations and theories.
7	The student is able to connect and relate knowledge across various scales, concepts and representations in and across domains.

The Summer Assignment 2022

DUE: Second Class Day

The assignment consists of 2 parts.

Part 1 - Reading

Read chapters 1 and 2 of the Campbell textbook and complete the tasks described. In addition to reading, take notes as you go along.

Part 2 - Photo Journal

This section involves taking photos that represent concepts you will encounter within the course. Detailed instructions are below.

PART I - Campbell Biology Textbook

Chapters 1 and 2

For each chapter complete the following:

1 - Create Flashcards

Flashcards are a great way to study vocabulary and concepts. They should be designed so additional information can be added as you learn new terms and concepts in biology.

Using the vocabulary above create flashcards using 3x5 index cards. Alternatively you can create them online using popular flash card sites. It is recommended that you include diagrams to help you visualize the term.

2 - Design A Concept Map

A Concept map is a great way to group terms and ideas that are related. They can also allow you to visualize relationships you don't realize exist. Using the terms in this chapter, create a concept map. You can use as many nodes (categories) and sub-nodes (sub-categories) as you wish and arrange them any way you want.

3 - Answer the Questions

Answer the questions using the blank form. If the answer is not within the text, then use reliable sources online to help you. Please note that you must write the answer in your own words. DO NOT copy text from any source. Plagiarism is considered cheating and will be treated as such.

Chapter 1 - Evolution, The Themes of Biology, and Scientific Inquiry

Read chapter 1

Chapter Concepts

- 1.1 - The study of life reveals unifying themes
- 1.2 - The Core Theme: Evolution accounts for the unity and diversity of life
- 1.3 - In studying nature, scientists make observations and form and test hypotheses
- 1.4 - Scientists benefit from a cooperative approach and diverse viewpoints

Vocabulary

In AP Biology the emphasis is on concepts and how they are connected. However it is vocabulary that forms the foundation.

Chapter 1 - Vocabulary			
experimental group	model organisms	deoxyribonucleic acid (dna)	gene
Bacteria	tissue	dependant variable	systems biology
Archaea	variable	gene expression	Eukarya
molecule	organism	inquiry	experiment
deductive reasoning	climate change	eukaryotic cell	emergent properties
bioinformatics	producer	inductive reasoning	organ
genome	biosphere	cell	hypothesis
science	biology	control group	ecosystem
independent variable	consumer	natural selection	proteome
evolution	data	genomics	technology
feedback regulation	controlled experiment	community	organelle
theory	population	proteomics	scientific inquiry

AP Biology Chapter 1 - Questions

Name _____

Date _____

Chapter 1 - Questions

Answer the questions in the space provided.

Thinking about the muscles and nerves in your hand, how does the activity of texting reflect the four themes of biology described in this section.

How could natural selection have led to the evolution of adaptations such as camouflaging coat color in beach mice?

Based on the results of the mouse coloration case study, suggest another hypothesis researchers might use to further study the role of predators in the natural selection process.

What are the roles of gathering and interpreting data in the process of scientific inquiry?

What are the roles of gathering and interpreting data in the process of scientific inquiry?

DRAW IT:

Draw a biological hierarchy similar to the one in figure 1.3 but using a CORAL REEF as the ecosystem. A FISH as the organism, STOMACH as the organ, and DNA as the molecule. Include all levels in the hierarchy.

Chapter 2 - The Chemical Context of Life

Read chapter 2

Chapter Concepts

- 2.1 - Matter consists of chemical elements in pure form and in combinations called compounds
- 2.2 - An element's properties depends on the structure of its atoms
- 2.3 - The formation and function of molecules depend on chemical bonding between atoms

Chapter 2 - Vocabulary			
atomic mass	molecule	half-life	atomic nucleus
chemical equilibrium	dalton	cation	reactant
product	hydrogen bond	matter	polar covalent bond
orbital	energy	valence electron	nonpolar covalent bond
ionic bond	valence shell	double bond	chemical bond
radiometric dating	atom	radioactive isotope	valence
electron	matter	salt	single bond
essential element	van der waals interactions	isotope	electron shell
compound	trace element	ion	chemical reaction
electronegativity	proton	atomic number	

AP Biology Chapter 2- Questions

Name _____

Date _____

Chapter 2 - Questions

Answer the questions in the space provided.

Compare an element, a compound, and a molecule.

DRAW IT:

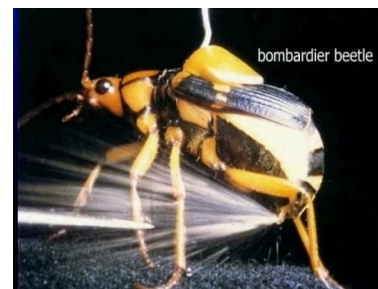
Draw the electron distribution diagram for NEON and ARGON. Use these diagrams to explain why these elements are chemically unreactive. - Label the parts of the atom using vocab words.

COMPARE:

Nonpolar covalent bonds, polar covalent bonds, and formation of ions in terms of sharing electrons

What would happen to the concentration of product if more reactants were added to a reaction that was in chemical equilibrium? How would this addition effect the equilibrium?

This bombardier beetle is spraying a boiling hot liquid that contains irritating chemicals, used as a defense against its enemies. It stores two sets of chemicals separately in its glands. (A) Using what you learned about chemistry in this chapter, propose a possible explanation for why the beetle is not harmed by the chemicals it stores. (B) What causes the explosive discharge?



Part II - Photo Scavenger Hunt

In this section you will be refamiliarizing yourself with some of the terms and concepts you will study in more depth while completing the AP Biology course.

For this section you will “collect” 15 photographic examples of biological terms/concepts and post them using google slides. Select any of the items from the **Biology Concepts and Terms List** to include in your assignment. A hardcopy of your **Photo Slides Table of Contents** AND a link to your photo slides is due the second day of class. The link should be written on the table of contents AND emailed to your AP Biology teacher. Please see your teacher if access to the needed technology is an issue.

Instructions for the Photo Slides :

THE SLIDES

Petals

Definition: Petals are usually found in flowers and are modified leaves that surround the reproductive parts of a flower. They are usually colorful to attract pollinators.

Example: In this photo the yellow structures are the petals.



Slide 1 - Dr. G

Each slide should contain the following:

- Title - the concept(s) you are trying to show
- Definitions of keywords
- Connection - How the items are connected/related
- Photo - should be at least 1/3rd - 1/2 of the slide.
- The Slide number (corresponding to Table of Contents)
- You Name - next to the slide number.
- You can use an additional slide if you need it for explanation.

All Explanations MUST BE in your own words.

Any indication that it might have been copied will result in no credit.

THE PHOTOS

Each photo has to be an **original**. Which means YOU must take the photo. **Photos from the internet are not allowed.** You also can't take a photo of a photo. In order to show that you took the photo you must include an identifying item that appears in each photo. It should be something small that **has your name on it**. It can be a toy, a personal item like a brush, even a photo ID is OK. However, it must have your name on it and must appear in all your photos. It must appear clearly enough that your name can be read. **Each photo can only be used one time.**

BE CREATIVE:

If you choose an item that is internal to a plant or animal, like the term “xylem”, you could submit a photograph of the whole organism or a close up of one part of the organism, and provide a drawing (you create yourself) explaining what xylem is and where xylem is found in your specimen.

INDIVIDUAL WORK:

This is an individual project. You can discuss, and go on collecting adventures together, however, your items and photos are to be unique.

NATURAL ITEMS ONLY:

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!

ADDITIONAL GUIDELINES

1. Please take care in NOT DESTROYING any habitats, or organisms as you collect or visit.
2. Do not remove any item from the habitat in which it is found.
3. Familiarize yourself with the types of items you will need.

RUBRIC - Photo Scavenger Hunt			
Pts	Slide Contents	Pts	Table of Contents
1	Original photo posted to blog	3	Submitted to - jgmdscience@gmail.com
1	Biological term/concept identified	2	Picture of you with holding proof object
1	Biological term/concept defined in own words	10	Each biological term/concept listed in the order it appears on blog
2	Biological term/concept and photo relationship explained fully	10	Blog is easy to follow and neatly presented
5	<i>Possible points per slide</i>	25	<i>Possible points for Table of Contents</i>

Points in this section are awarded in an all or none format. If the guideline is not fully met, no points will be awarded. Your photo blog is worth a maximum of 150 points (125 points for your photo blog (5 points for each photo blog entry) and 25 points for a completed Blog Table of Contents)

Table of Contents - Biology Photo Project

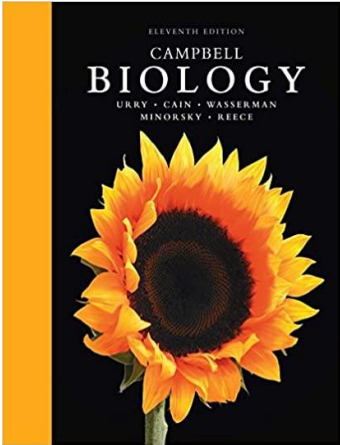
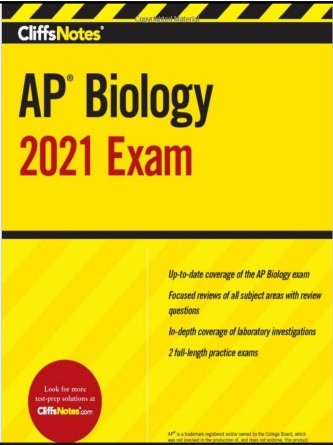
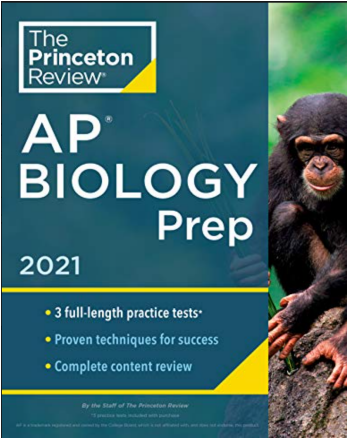
Name _____

Slide	Concept/Term	Teacher Comments	Points
1			
2			
3			
4			
5			
6			
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9			
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12			
13			
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15			

Biological Concepts to Choose from

1. Find and name two organisms that belong to the same phylum
2. Find a parasite and its host. (2 different photos can be used)
3. Find and name three different heterotrophs. Make sure to show - specifically why they are labeled as heterotrophs.
4. Name two organisms that are in competition with one another. What are they competing for?
5. Find two examples of adaptations being used by organisms to prevent dehydration.
6. Find 2 invertebrates.
7. Find an example of a predator/prey relationship.
8. Find members of and describe what makes them a population.
9. Find a dominant trait and compare it to expression of its recessive trait
10. Find and describe a defense mechanism.
11. Find an organism that carries out photosynthesis. What are the reactants and products
12. Find an organism with an exoskeleton. What biological molecule is the exoskeleton made of?
13. Find and list three organisms that make a food chain.
14. Find two structures that are homologous to one another.
15. Pick any living organism and create a biological hierarchy (organ, tissue, etc).
16. Find an example of a symbiotic relationship.
17. Find an organism that uses cellular respiration for energy. Explain using the formula
18. Find an organism that is responding to the environment. Describe its response._
19. Find an organism that appears to be a plant but is incapable of doing photosynthesis.
20. Find an adaptation of an animal and describe how this adaptation probably evolved
21. Find an adaptation of a plant and how this adaptation has helped with its survival
22. Show an example of a biotic and abiotic interaction
23. Show an example of two phenotypic expressions expressed by the same gene.
24. Create a model (on paper) showing a phenomenon that occurs in nature. Describe how this model is a good representation
25. Find an example of how environmental factors can influence the expression of the genotype of an organism
26. Chart the temperature during the course of any five(5) consecutive days. Create a graph (you pick the correct type) that shows the evening temperature vs the morning temperature. Describe your observations.

I highly recommend that you invest in an AP Biology Study guide such as the following

TEXTBOOK	Recommended Study Guides	
 The cover of the eleventh edition of Campbell Biology, featuring a large sunflower against a black background. The authors listed are Urry, Cain, Wasserman, Minorsky, and Reece.	 The cover of CliffsNotes AP Biology 2021 Exam, featuring a yellow background with a black and yellow hazard stripe at the top. It lists features such as up-to-date coverage, focused reviews, and in-depth coverage of laboratory investigations.	 The cover of The Princeton Review AP Biology Prep 2021, featuring a dark blue background with a photo of a chimpanzee on the right. It lists features such as 3 full-length practice tests, proven techniques for success, and complete content review.
Provided by The Knox	ONE of these is suggested but not required	