

AP BIOLOGY: 2011-2012 SUMMER ASSIGNMENT

Dear AP Biologist,

We are glad you have enrolled in AP Biology! In order to “fit it all in” you’ll complete a summer reading guide prior to our first class meeting. The material is interesting to read and not very difficult to learn. Your time spent learning before the start of class will allow us to have more time for the “fun” of biology, and ensure that you’ll be well prepared for the AP exam in May. The text that we will be using is Biology, 8th Edition (AP Edition) by Neil Campbell & Jane Reece (ISBN #978-0-13-135691-7).

1. Read the **SIX** chapters in the text that pertain to **BEHAVIOR** and **ECOLOGY** (Chapters 51-56). You may wish to take notes as you read. Pay attention to diagrams, figures, and tables embedded in the text & be sure to read the captions for all figures and inquiry box figures.
2. The questions related to each chapter will help focus your reading to ensure that you are studying the pertinent topics. As you read, you can choose to answer the questions on loose-leaf paper. Answers should be organized by chapter number and page numbers are strongly encouraged. Include all relevant information from each question in your answer; this will enable you to study from the questions without referring to them. You may type your answers if you wish, but this is not a requirement.
3. A change for this school year is that students DO NOT have to turn in written answers to every question in this packet. Students are required to take 6 Quia quizzes. Each 20 question quiz corresponds to each of the assigned Campbell text chapters (51-56). You must score 75% (15/20) for each quiz to achieve “mastery”. If you achieve mastery on a particular quiz, you will earn 10/10 points in lab/homework/quiz grade category (35% of the term grade). You may retake each quiz an unlimited number of times, HOWEVER each retake will result in a 1-point deduction. For example, if you take Ch 52 Quiz 3 times to achieve 75% correct, you will receive 8/10 points for the Ch 52 Quiz. **Since there are 6 quizzes at 10 points each, the point total for the summer work is 60 points. You must achieve mastery on ALL SIX QUIZZES ON LINE no later than MONDAY, AUGUST 29 at 11:59pm! See packet page 2 for instructions regarding setting up your Quia Quiz Account!**
4. Be aware that simply being able to answer all the questions in the packet is insufficient to prepare for the ecology & behavior quia quizzes online and the unit test. You are responsible for **learning** all information in these chapters and applying what you’ve learned.
5. Prepare written responses to the Behavior and Ecology FRQ prompts (on page 3 of this packet). **Both FRQ’s will be collected and graded on Monday, August 29.** Each is worth 10 points in the lab/homework/quiz grade category. Please hand write each FRQ on a separate piece of paper! See the AP Biology course website for FRQ writing tips.

The Ecology and Behavior unit exam will address concepts in all six chapters, and will be administered the second week of school, after limited discussions of summer packet content and performing a behavior lab. The course starts out fast, and the frantic pace continues until the AP exam in May. AP Biology is challenging, and requires a lot of time, but the study of biology is quite exciting and we think you will enjoy this course!

We look forward to working with you. Get ready to think BIOLOGY!

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AP Biology Home Page: <http://www6.district125.k12.il.us/science/apbio/>



Your instructor requests that you enroll in the following class:

Class: AP Biology Summer Work
Code: CGADDJ763

Step 1. Go to the Quia website at <http://www.quia.com/web>.

Step 2. Now, click the area labeled *Students*. When the next page appears, enter your username and password if you already have a Quia account. If you do not have an account, click the link *Create my free account*. Fill out the form that appears. Select "Student" as the account type. When you are done, press the *Create my account* button. *(Be sure to write down your username and password! DON'T LOSE IT!)*

Step 3. You should now be in the Student Zone.
Type in the class code CGADDJ763 in the text field and press the *Add class* button. Now you're done!

Now that you have registered for your instructor's course, you can view your class web page, take quizzes, view your quiz results, and view time spent on Quia activities.

To take each quiz and to view your results, follow these steps:

Step 1. Log in to your account.
(Your teacher does not know your personal username and password, so write it down!)
Remember, go to the Quia Web home page at <http://www.quia.com/web> and click the area labeled *Students*.

Step 2. Click on the class name.

DIRECTIONS:

- Answer each free response question (FRQ) on separate paper!
- Write your name & the subject of the free response question on top of page 1 of your response.
- Please hand write each response neatly.
- For suggestions about how to answer the FRQ prompts, go to the following webpage: <http://www6.district125.k12.il.us/science/apbio/dosanddont.html>

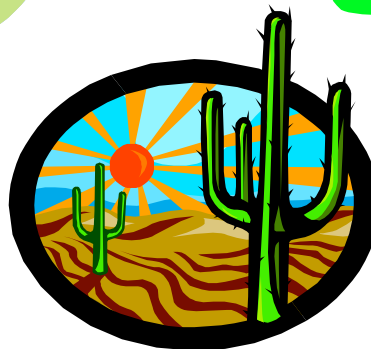
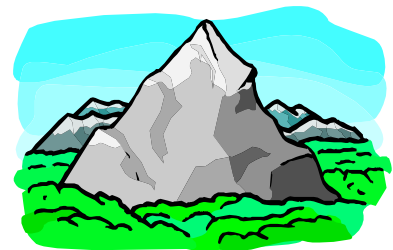
Behavior FRQ Prompt

Describe sign stimuli (releasers), imprinting, and communication, as each of these terms relates to animal behavior. You may include in your answer a discussion of the classical studies of Nikolas Tinbergen, Konrad Lorenz, and Karl von Frisch.

Ecology FRQ Prompt

Using an example of each, discuss the following ecological concepts.

- Succession
- Energy flow between trophic levels
- Limiting factors
- Carrying capacity



DIRECTIONS:

- Answer every question thoroughly & completely on separate paper. You're strongly encouraged you include the textbook page number(s) as a reference for each answer in your answer 'packet.'
- Indicate the chapter # and question # for each response.
- Be sure to include diagrams, graphs, or other figures as requested by the question. If you are drawing diagrams on separate paper, please include a note indicating the location of the figure in your answer packet.
- Feel free to search the web for pictures or more information about a particular concept.

Chapter 51: Behavioral Biology

1. Explain the differences between the proximal and ultimate causes of behavior.

2. What is ethology?

3. Define and give an example of a fixed action pattern.

4. What is a sign stimulus? Give at least 2 examples.

5. Use a diagram to describe the honeybee's waggle dance, and the information it conveys. Given the position of a food source in relation to the hive, predict the angle at which a waggle dance would be performed.



6. Distinguish between innate behaviors, learned behaviors, and habituation.

7. Describe the processes of parental and sexual imprinting, and explain what is meant by the critical period.

8. Distinguish between classical conditioning and operant conditioning.

9. What is cognition? Explain each of the following: kinesis, taxis, cognitive maps.



10. Explain the behavior and the evolutionary significance of the optimal foraging model.

11. Distinguish between monogamy and polygamy. Explain the role of parental investment in determining the evolution of these systems. Provide two examples of each.

12. Define inclusive fitness and explain the evolutionary advantage to a population which has members who exhibit altruistic behavior. Contrast kin selection and reciprocity as explanations of altruistic behavior. Which one of them is generally more applicable?

13. Describe the research of each of the following ethologists: Konrad Lorenz, Nicholas Tinbergen, Karl von Frisch.



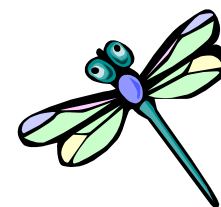
Chapter 52: An Introduction to Ecology and the Biosphere

1. Define population, community, ecosystem, and biosphere. Indicate how each is related to the others, and suggest one question (NOT COPIED FROM THE TEXTBOOK) that an ecologist studying each level of organization might attempt to answer.
2. Distinguish between biotic and abiotic factors. Name and describe 6 abiotic factors, and provide an example of how each may influence a living organism.
3. Explain 6 factors affecting the distribution and ecology of organisms. (At least 3 of these should be biotic).
4. Explain how the earth's curvature and axis of rotation influence the amount of sunlight reaching a given area, and how this influences the temperature and precipitation in that area.
5. What is microclimate? Why might variations in microclimate have a greater effect on some species than on others?
6. What abiotic factors seem to be the greatest determinants of terrestrial biome locations.
7. Describe the primary characteristics of the major types of aquatic biomes, citing typical organisms. Discuss the factors that divide each into zones, and describe each zone.
8. Distinguish between each of the following pairs of terms: benthic/pelagic, photic/aphotic, neritic/oceanic, limnetic/littoral, marine/aquatic.
9. Describe each major terrestrial biome with respect to climate, location, and representative flora and fauna.
10. What is a species geographic range? Explain the difference between a species potential and actual range.



Chapter 53: Population Ecology

1. Give two methods biologists use to estimate population densities. Distinguish between uniform, clumped, and random dispersions, and indicate the conditions under which each occurs and which one is the most common.
2. Study a graph of the general types of survivorship curves (Figures 53.5 & 53.6). **Sketch:**
 - a. A survivorship curve for a population in which the death rate is the same at every age, label the type of survivorship curve. Indicate variables on both the x and y axes!
 - b. A survivorship curve that reflects the loss of large quantities of young, such as would be seen in most plant species, and label the type of survivorship curve. Indicate variables on both the x & y axes!
3. Explain in detail the characteristics that make up the life history of any species. Describe the life history of humans.
4. Why are survival and reproduction considered to be “conflicting demands?”
5. **Sketch** an exponential growth curve. Describe at least one situation in which exponential growth could occur and cite a specific example of a species that could growth exponentially.
6. **Sketch** a logistic growth curve and label the carrying capacity, the inflection point, the portion of the curve showing an accelerating rate of population growth, and the portion showing a decelerating rate.
7. Draw an exponential growth curve with a sudden crash, and list five factors that might cause the crash. Distinguish between those that are density-dependent, and those that are density-independent.
8. Distinguish between an r-selected species and a K-selected species with respect to body size, life-span, number of offspring, relative time of reproduction (earlier or later in life), type of survivorship curve, type of environment (stable or unstable), and type of growth curve (S-shaped or boom-and-bust). Create a table to organize your answer to this question.
9. What is the Allee effect? How does the Allele effect apply to endangered species?
10. Discuss several ways in which negative feedback mechanisms affect population growth. (You might want to read the definition for negative feedback in Ch 1 BEFORE attempting to answer this question). Include in your discussion at least one example of physiological stress caused by overcrowding.
11. Describe the snowshoe hare/lynx relationship. Explain two causes for the changes in the size of the hare population over time.
12. What information can be gained from examining the age structure pyramids for human populations? What is meant by ecological footprint?



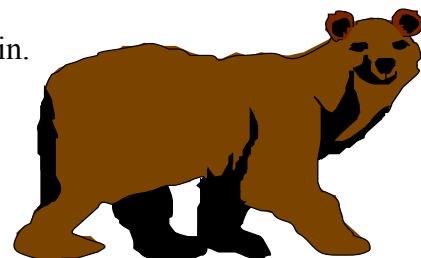
Chapter 54: Community Ecology

1. Explain G.F. Gause's competitive exclusion principle. Give one example (NOT from book!)
2. Define ecological niche. Distinguish between fundamental niche and realized niche.
3. "Coexistence" is the term given to a situation in which 2 closely related species are found in the same habitat. Explain how resource partitioning and character displacement might allow this to occur.
4. Distinguish between intraspecific competition & interspecific competition. Name an example of each.
5. Describe three strategies that prey species have adopted for survival. Include one plant and one animal example.
6. Compare and contrast Batesian and Mullerian mimicry. Provide examples of each.
7. Define and give an example of each of the following species interactions: predation, parasitism, commensalism, and mutualism.
8. Distinguish between species diversity, species richness, and relative abundance.
9. Name at least THREE differences between a food chain and a food web?
10. The energetic hypothesis and the dynamic stability hypothesis both attempt to answer what question? How are these hypotheses different from each other?
11. Differentiate between a dominant species and a keystone species. Give an example of each.
12. The "top-down model" and the "bottom-view model" are views of community structure. Explain how each would answer this question: What has caused a decrease in the population size of primary consumers?
13. What is a disturbance? Give an example of a natural and an anthropogenic (human-caused) disturbance. Are disturbances always bad? Explain.
14. Define the following terms: ecological succession, primary succession, secondary succession.
15. What are 3 possible ways in which early arriving and late arriving species may interact during succession?
16. Describe the steps and name some representative organisms that would be characteristic of succession if the Stevenson grounds crew stopped mowing the grass in the front of the school.
17. Explain the latitudinal gradient of species diversity.
18. What information can be gained from interpreting a species-area curve?
19. What is predicted by the theory of island biogeography?



Chapter 55: Ecosystems

1. Define ecosystem. Where does the flow of energy in an ecosystem begin?
2. What are trophic levels? What is always at the first trophic level? State the trophic level of each of the following: cow, grass, human.
3. What are detritivores? State *several* examples.
4. What is primary productivity? Distinguish between gross primary productivity (GPP) and net primary productivity (NPP).
5. How could primary productivity be increased?
6. What is meant by biomass? Which ecosystem would tend to have a greater biomass/unit area, a prairie or a deciduous forest? Explain.
7. What are the major limiting 'nutrients' in aquatic ecosystems?
8. Describe the series of events that create eutrophic lakes?
9. Sketch and explain a pyramid of energy and a pyramid of biomass.
10. Use a diagram to describe the water cycle. Label evaporation, transpiration, and precipitation.
11. Use a diagram to describe the carbon cycle. In doing so, explain how carbon enters the living system, and how it leaves, indicate the role of microorganisms in the cycle and identify the reservoir for carbon.
12. Use a diagram to describe the nitrogen cycle. In doing so, discuss nitrogen fixation, nitrification, and denitrification. Indicate the role of microorganisms in the cycle and identify the reservoir for nitrogen.
13. What is the major distinction between the phosphorus cycle and the nitrogen, carbon, and water cycles.
14. Explain the effects of deforestation on chemical cycling as demonstrated by the Hubbard Brook experiment.
15. Explain the process of biological magnification. Cite at least one example.
16. What is contributing to the great increase in atmospheric carbon dioxide? What are potential effects of the increasing atmospheric CO₂ levels?
17. What is the greenhouse effect? What contributes to it? Explain.



Chapter 56: Conservation Biology and Restoration Ecology

1. Distinguish between genetic diversity, species diversity, and ecosystem diversity.
2. What are ecosystem services? Why might ecologists be attempting to assign dollar values to them?
3. What is an introduced species? Cite 2 examples of introductions, and briefly explain their effects on the native species.
4. Explain the three threats to biodiversity and give an example of each.
5. Why is a vortex used to explain the course of extinction in a small population?
6. Explain the idea of an “MVP.”
7. There are some members of the general public who question the value of conducting basic ecological research. In the context of the “declining population approach,” explain the value of knowing, for any given population, its: life history, fundamental and realized niche, relative abundance, dispersal, distribution.
8. What are edges and corridors? How does each affect dispersal?
9. What is restoration ecology? Distinguish between bioremediation and augmentation.
10. What is biophilia?

