2011-2012 AP Biology Summer Assignment

Enclosed in this packet is the assignment that must be completed over the summer and is due the first day of school in September. We will take a few days to go over the assignment and then we will have a test on the material. The unit is on Ecology and how species interact with one another and their environment as well as human impact on nature. About ¾ of the material should be a review from freshman Honors Biology (less if you were not). The material covers Chapters 50-55 and the questions included in the packet indicate where in each chapter you should find the answer. You need to first read each chapter, answer the questions in the packet, and take the 10 question multiple choice self-quiz at the end of each chapter (check your answers to the self-quizzes in Appendix A). If you do need help, I will be occasionally checking my e-mail this summer. Do not wait to do this until right before school starts or do it at the beginning of summer and never look at it again. My advice is to work on a chapter a day (no, a chapter should not take a whole day or anywhere that close). Be ready when September comes to have your packet with you on that first day and to discuss the material and everything should be completed by the 2nd day of school. Good luck and welcome to AP Biology!

Chapter 50

1. Define ecology, abiotic factor, biotic factor, ecosystem, and biosphere. (pg. 1080-81)
2. Identify 6 major abiotic factors and how each might influence the biota. (pg. 1086-87)
3. What is the difference between microclimate and a macroclimate? (1087)
4. What would happen in a lake if there were no biannual turnover? (1090-91)
5. Use page 1093 to answer the following:
    a. Distinguish between photic and aphotic.
    b. What is the benethic zone and why is detritus a major food source?
    c. What 5 factors are freshwater biomes linked to?
    d. In both freshwater and marine communities, what influence how communities are distributed?
6. How do marine biomes affect the world climate? (1093)
7. Fill in the table for the aquatic biome information using pages pages 1094-97
8. What is the difference between oligotrophic and eutrophic lakes
9. Fill in the table for the terrestrial biome information using pages 1100-03

Aquatic Biomes	Physical Environment	Chemical Environment	Geologic Features	Producers	Animals	Human Impact
Lakes (ponds) a. Littoral b. Limnetic						
Wetlands						
Streams and Rivers						
Estuaries						

Intertidal Zone					
Ocean Pelagic					
Coral Reef					
Marine Benthic Zone					

Biome	Distribution	Precipitation	Temp. Range	Plants	Animals	Human Impact
Tropical Rainforest						
Desert						
Savanna						
Chaparral						

Temperate Grassland (prairies)					
Coniferous Forest					
Temperate Broadleaf (Deciduous) Forest					
Tundra a. Alpine b. Arctic					

Chapter 51

1. What is behavior? (1107)
2. Define ecology. (1107)
    a. What questions did Tinbergen feel must be answered to fully understand any behavior? (1107)
3. Bluegill sunfish reproduce in the spring instead of the fall. Explain this behavior in terms of proximate and ultimate causes of behavior. Which is the evolutionary reason? (1107)
4. What is imprinting? What is the benefit and danger of it? What is a critical period? (1108)
5. What is a FAP? Use the stickleback as an example. (1108)
6. What does "nature vs. nurture" mean? (1109)
7. Explain how birds orient themselves during migrations. (1110-1111)
8. Review the study on page 1112 Fig. 51-10. Do you think these studies support genetic basis of behavior? Why or why not?
9. Compare and contrast taxis and kinesis. Give an example of each. (1110)
10. Define habituation and give an example. (1115)
11. How did Tinbergen think wasps used landmarks? (1115)
12. Look up Pavlov's experiments with dogs. How is this an example of classic conditioning and associative learning? (1116)
13. How does operant conditioning help a predator? (1117)
14. How is cognition similar to reasoning? (1117)
15. How does the funnel spider's foraging behavior change based on the environment? (1119-20)
16. How does the Northwestern crow demonstrate the optimal foraging theory? (1122)
17. Why is monogamy an advantage in some species where as being promiscuous might be an advantage in others? (1123-24)
18. How does mate choice reduce variation? (1125-26)
19. How is altruism beneficial to the individual? (1128-29)

Chapter 52

1. Define the following terms: density, dispersion, mark-recapture method, territoriality, and demography. (1137-39)
2. Distinguish between immigration and emigration. (1137)
3. Copy Figure 52.5-Survivorship curves and define each type and give an example of each. (1139-40)
4. Distinguish between exponential and logistic growth. Explain what carrying capacity is. (1144-45)
5. Compare density-dependent and density-independent factors and give 2 examples of each. (1148=50)
6. Carefully read about population cycles of the snowshoe hare and the lynx. Use Figure 52.21 on page 1152 to help.
7. Explain the difference between r- and K-strategists and give an example of each. (1147)
8. Why does the human population growth pattern show exponential growth? (1153-54)
9. Why is age structure of a population an important factor in studying population? (1154)
10. Looking at diagram 52.25, why is Afghanistan's population likely to rapidly grow and Italy's will decrease?

Chapter 53

1. Define Community. (1159)
2. How grasshoppers and bison an example of interspecific competition? (1160)
3. How did Gause demonstrate competitive exclusion? (1160)
4. What is a niche and how do fundamental and realized niche vary? (1160)
5. What is competition and how is resource partitioning and character displacement avoiding competition. Use Figures 53.3 and 53.4 to support your answer. (1160-61)
6. What is the difference between a predator and a prey? How is cryptic coloration and aposematic coloration help avoid predation? Give an example of each. (1161-62)
7. What is the difference between Batesian and Mullerian mimcry? Which leads to a predator learning faster to avoid prey? (1162)
8. Plants can not escape their predators. What defense do they have against herbivores? (1163)
9. Define symbiosis (1163) and why parasitism, commensalism, and mutualism are examples. Give an example of each relationship. (1163-64)
10. Use an example to explain species richness. (1165-66)
11. Define relative abundance (also known as equitability) and trophic structure. (1165-66)
12. Using Figure 53.12, copy one food chain and describe primary producers→quaternary consumers. (1166)
13. What is a food web and how does it differ from a food chain? Why are food chains limited in number of levels? (1166-68)
14. Why are invasive species a problem? (1168)
15. Why is the elimination of a keystone species detrimental to an ecosystem? (1168-69)
16. Define succession and distinguish between primary and secondary succession. Explain which is happening at Glacier Bay. (1173-74)
17. Define biogeography. (glossary)

Chapter 54

1. Define primary productivity and how it differs from gross and net primary productivity. Explain the two ways used to measure primary productivity. (1186-88)
2. Explain the concept of a limiting factor using limiting nutrient. (1188)
3. Look at the energy pyramid on page 1192 Figure 54.11. Explain the energy pyramid and tell how much energy is transferred between trophic levels.
4. Why can some aquatic biomass pyramids look inverted such as in Fig. 54.12. (1192-93)
5. What is a biogeochemical cycle? Summarize the water, carbon, nitrogen, and phosphorous cycle using pages 1196-97.
6. Explain the dangers of DDT in a food chain. Use figure 54.23 to help. (1202-03)
7. Explain the following types of water pollution:
   a. Eutrophication (1189-90)
   b. Sewage (1200)
   c. Biological Magnification (1202)
   d. Thermal pollution (1204-03)
8. What is the Gaia hypothesis? (attached sheet)
9. What chemicals are depleting the ozone layer and how does it occur? What consequences does this have for life on Earth? (1205-06)

Chapter 55

1. Compare conservation biology to restoration ecology. (1209)
2. What are the three levels of biodiversity? Give an example of each. (1210-11)
3. What are the benefits of species and genetic diversity? (1211-12)
4. What are the 4 major threats to biodiversity? (1212-14)
5. What is an extinction vortex and what is the key factor driving it? (1215)
6. How do you determine the minimum viable population using population viability analysis? (1216)
7. Use the case study of the Red-cockaded woodpecker to talk about the declining population approach. (1218-19)
8. Compare bioremediation to biological augmentation. (1225)

The Gaia Hypothesis. (chapter49, second addition p.1133)

The Gaia hypothesis was first postulated by James Lovelock, and is named for mythical goddess of Earth. According to the original hypothesis, life actually shapes the climate and atmosphere of Earth. For example, transpiration by tropical forests produces clouds that affect global weather patterns. Chemical cycling in ecosystems has generated an atmosphere of O_2, and the concentration has been maintained within a range of 15%-25% for the past 200 million years. The concentration of oxygen is probably influenced by organisms that release methane into the atmosphere. (Termites probably account for 50% of the methane released by organisms) CH_4 reacts with oxygen to form CO_2 and H_2O, and thus it controls the concentration of oxygen. Plankton was considered to be a CO_2 sink. For example a massive population of unicellular algae belonging to the phylum Haptohyta drifts in the water off Scotland. At one stage of the lifecycle, the cells of the algae are covered with plates of calcium carbonate (The algae are then known as coccolithophorid) During the bloom of the algae carbon dioxide is incorporated into the shells, which settle to the sea floor in large numbers. Some ecologists rejected the idea because it sounded like the earth is a sort of "superorganism" with self-regulating metabolism. In the more modern view, Gaia is a metaphor for interconnectedness of nature.

Community properties include the following:

Species richness, equitability, and diversity.

Species richness => the number of species

Equitability => measure of relative abundance of the different species.

Diversity => considers both species richness and equitability.

ECOLOGY QUESTION 1985:   L. PETERSON/AP BIOLOGY

Describe the process of ecological succession from a pioneer community to a climax community. Include in your answer a discussion of species diversity and interactions, accumulation of biomass, and energy flow.