

AP BIOLOGY

SUMMER ASSIGNMENT

Please read chapters 52 – 55 in your textbook. Most of the material is based on ecology and ecological relationships between organisms. Many of the ideas in these chapters are topics you have studied in Biology (or thought about) in the past. Please answer all the questions and write responses to the AP BIO style essay question.

Either before, during or after this assignment (after may be the best), take a trip into a natural area (away from any city influence) for several hours to a day to observe some of the relationships you learned in the book. Also, try to watch at least three “nature shows” on TV that describe these ecological relationships. I don't want you to write about these shows but I do want you to relate them to what you learned in these chapters.

This assignment will be checked on the first day of school for progress and will be due on **Monday Aug, 31**. If needed, you will have a chance to ask questions about topics that you did not understand the first several days of school.

Chapter 52:

- 1) Name and describe the **levels of organization** in organismal ecology.
- 2) Distinguish and give examples of **abiotic** and **biotic** factors in the environment and explain how abiotic and biotic factors are important in the survival of a species.
- 3) Identify the general climate and vegetation in each of the following biomes: **Tropical rain forest, Desert, Temperate grassland, Savanna, Temperate deciduous forest, Taiga, Tundra**. **Draw or Print** a map of the world and color and label the locations of the biomes.

Chapter 53:

- 1) Explain and **draw** the 3 main types of **survivorship** curves.
- 2) Briefly identify and describe three types of **density-dependent factors**. Then **compare and contrast** the characteristics of **density-dependent** and **density-independent** checks on population growth.
- 3) Describe and give examples of **Intraspecific Competition**.
- 4) Define **N, t, r, and K** in the following equation:
$$dN/dt = rN \frac{(K-N)}{K}$$
- 5) Explain the difference between **exponential and logistic growths** in populations. **Draw** a graph showing each growth pattern.
- 6) Explain the important term **carrying capacity**.
- 7) Identify five characteristics shared by **r-strategist species** and five characteristics shared by **K-strategist species**. Is it possible for a population to have characteristics of both r and K-strategies? **Explain**.

Chapter 54:

- 1) Describe and give examples of **Interspecific Competition**. (Please note: This question is different than Chapter 53 #4)
- 2) Diagram a typical **food web** and **food chain**, labeling organisms as **producers, primary consumers, secondary consumers, etc.**
- 3) Discuss **Predator- Prey interactions**, give two examples, and the effects it has on the population of those organisms.
- 4) Define, discuss and give two **detailed examples** of each of the following **symbiotic relationships: Commensalism, Mutualism, Parasitism**

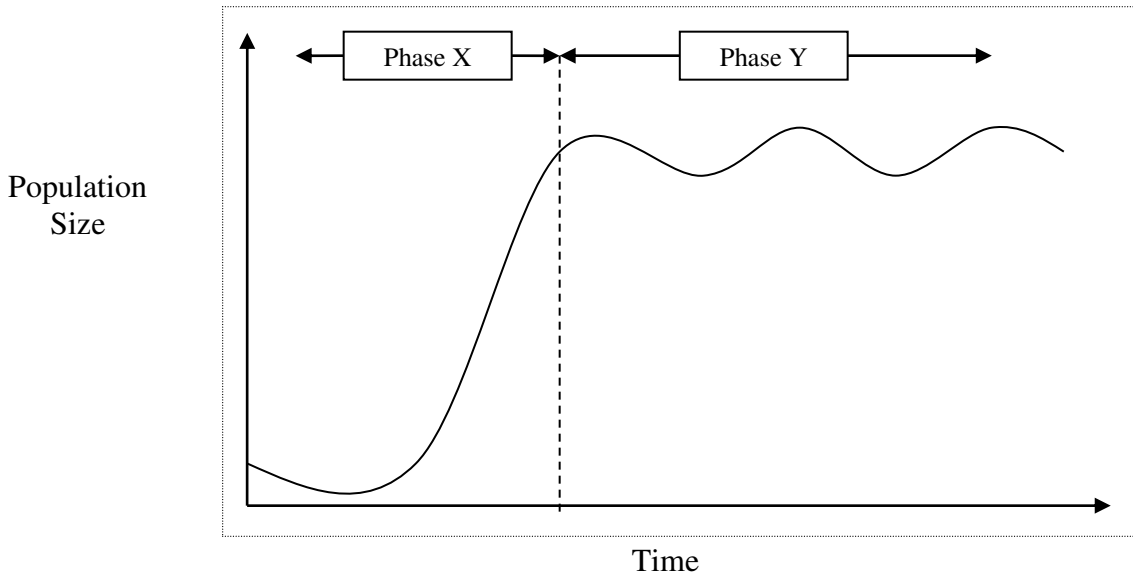
Chapter 55:

- 1) Describe the hydrologic (water) cycle and its importance in an ecosystem.
- 2) Explain why toxic compounds usually have the greatest effect on top-level carnivores.
- 3) Describe the **biogeochemical cycles of carbon and nitrogen**. Trace these elements from the point of their release from a decaying animal to the incorporation into a living animal. Explain the important role A) bacteria and fungi, B) plants and animals play in these processes.
- 4) **Autotrophic** organisms are very important for the health of any ecosystem. Describe the **trophic levels** in a typical ecosystem. Discuss the **flow of energy** through the ecosystem, the relationship between different organisms (**producers, different degrees of consumers**), and the factors that limit the number of trophic levels. Make a **labeled diagram** of your “energy pyramid.”

AP BIOLOGY SUMMER “ESSAY” QUESTIONS

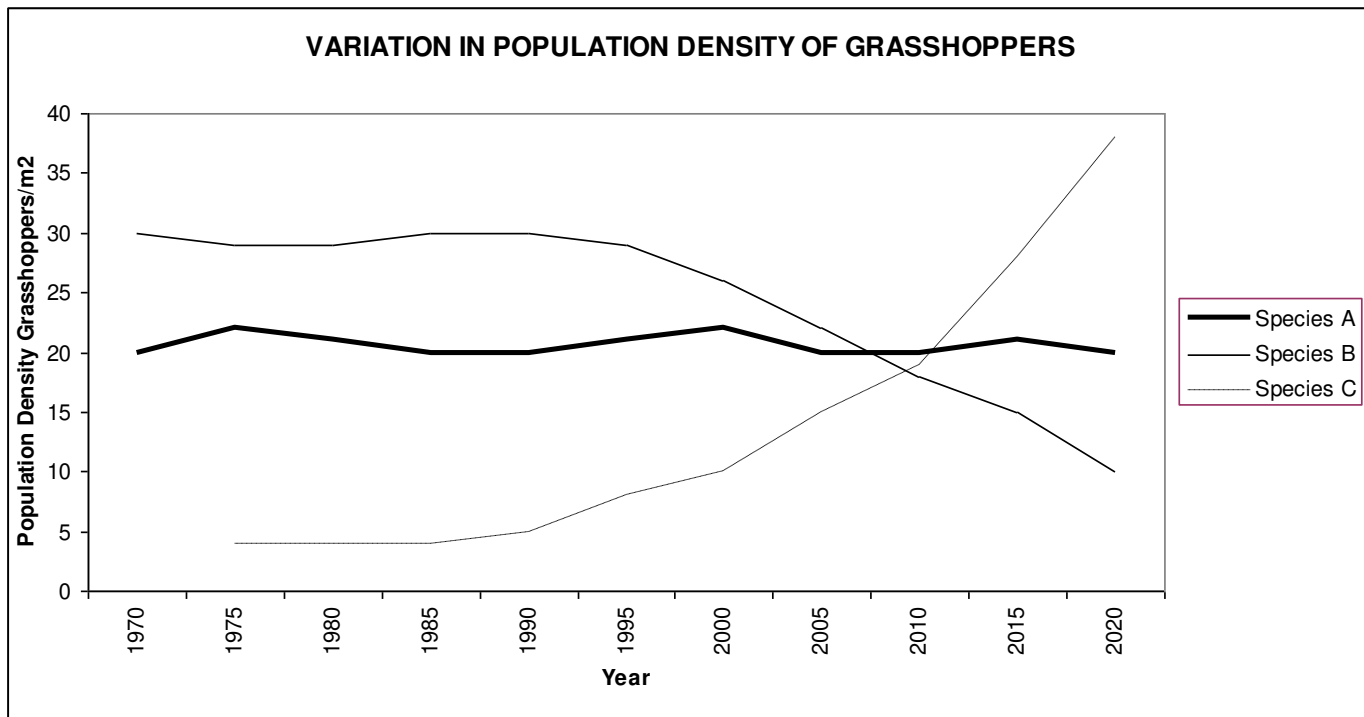
Answer these questions not like an English essay but as a large, multi-part question. Please label each section you answer.

1. Consider the following growth curve for a population of an organism:



- (a) **Discuss 3 reasons** why the population is changing during phase X.
- (b) **Discuss 3 reasons** why the population displays the pattern shown in phase Y.
- (c) Some species exhibit exponential (r) growth of its population and some exhibit logistic (K) growth. Discuss some of the characteristics of these two survival strategies and discuss how they affect population size over time.

2.



According to data collected over time, two species of grasshoppers (species A and B) have existed on a remote island in the Indian Ocean for over 50,000 years. In 1975 a third species of grasshoppers (species C) was introduced on the island by humans. The population characteristics of each species has been studied and the results are shown in the graph above.

- (a) Propose an explanation for the pattern of population density observed in species C.
- (b) Describe the effect that the introduction of grasshopper species C has had on the population density of species A and species B. Propose an explanation for the patterns of population density observed in species A and in species B.
- (c) Predict the population density of species C in 2025. Provide a biological explanation for your prediction.
- (d) Explain why invasive species are often successful in colonizing new habitats.