

Study Guide for Unit 7: Populations & Population Growth

Assignment G

Answer all of the questions on the Populations and Population Growth Study Guide.

Population, Population Density, and Minimum Viable Populations

Carrying Capacity and Population Growth

Life History Strategies: r-selected species and K-selected species

Ecological Succession

Read all of Unit 5 (Populations and Population Growth).

Population, Population Density, and Minimum Viable Populations

1. What is a population? Give a few examples.
2. What is the range of a population?
3. Which of the following best describes a population?
 - a. All the bears in the San Gabriel Mountains.
 - b. All the elephants in Africa and Asia.
 - c. All the species of songbirds in the Europe.
 - d. The different kinds of spiders, bats, insects, and fungus in a cave.
4. True or false? "If a population is too small, the species cannot survive in the wild."
5. What is population density?
6. What are some of the problems with a low population and a low population density, for both the population and the ecosystem that it is in? Give examples.

Carrying Capacity and Population Growth

7. What is the carrying capacity of an environment?

Can a population go over the carrying capacity of its environment?

8. What is the ecological footprint of a person?

9. What are things that can help a population grow larger?

10. What are things that can make a population grow slower, or keep it from growing, or make it go down?

11. How do you calculate the growth rate of a population (r)?

12. There are 100 elephants in a forest. Each year, an average of 20 elephants are born, and 4 elephants die. What is the growth rate of the elephant population?

13. There are 1,000 sunnyside fish in an estuary. Each year, an average of 1,000 sunnyside fish are born, and 880 sunnyside fish die. (A lot of fish get eaten.) What is the growth rate of the sunnyside fish population?

14. What is exponential growth? What causes it? (What is colonization?) What does it look like on a graph?

15. What is logistic growth? What causes it? What does it look like on a graph?

16. What causes population growth to go from exponential growth to logistic growth?

17. Can predators keep a population from reaching the carry capacity of their environment and thus using ALL the resources like food and nutrients available to them?

18. Why might it be bad for a population if it goes over its carrying capacity?

19. What is a boom-and-bust cycle?

Life History Strategies: r-selected species and K-selected species

20. What are characteristics of r-selected species? Give a few examples.

21. What are the characteristics of K-selected species? Give a few examples.

22. What are the advantages of r-selected species? What are their disadvantages?

23. What are the advantages of K-selected species? What are their disadvantages?

24. True or false? "Small populations are more vulnerable to changes in environments. A natural event like a flood or fire could cause the population to dip below the minimum viable population level (so that the population would eventually die)."

When answering the questions about "Life History Strategies, consider issues like:

- *Which species' offspring are more likely to survive?*
- *Which species would be better suited to survive an unexpected environmental change?*
- *Which species' population size is more likely to be closer to its carrying capacity at any given time?*
- *Which species' population is more likely to overshoot its environment's carry capacity ("boom") and then crash ("bust") – and possibly do this again and again?*
- *Which species' population size is probably more stable (does not go up or down as much or as quickly)?*

Ecological Succession

25. What is ecological succession?

26. What is it important that ecosystems can undergo ecological succession?

27. What kinds of organisms can take bare rock and begin to turn it into a place where other things can live? How do they do so?

28. Which kind of species, r-selected species or K-selected species move in FIRST? Why?

29. Which kind of species, r-selected species or K-selected species "take over" LATER? Why?

30. Will the kind of species that "take over" later on remain "on top" forever? Why or why not?