
■ **INTERACTIVE QUESTION 50.2**

Give an example of a purposefully introduced species and an accidentally introduced species that have become pests in North America.

■ **INTERACTIVE QUESTION 52.5**

- a. List some density-dependent factors that may limit population growth.
 - b. List some abiotic factors that may cause population fluctuations.
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■ **INTERACTIVE QUESTION 51.7**

- a. Explain the basis for the distinction between male competition and female choice in courtship behavior
 - b. Natural selection has resulted in exclusive male parental care being much more frequent in species with external fertilization, where the male's genetic contribution to the offspring is more certain. Explain how such behavior could evolve.
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■ **INTERACTIVE QUESTION 54.2**

- a. Why is production efficiency higher for fishes than for birds and mammals?
 - b. Assuming a 10% trophic efficiency (transfer of energy to the next trophic level), approximately what proportion of the chemical energy produced in photosynthesis makes it to a tertiary consumer?
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■ **INTERACTIVE QUESTION 50.1**

List the five levels of ecological study and give examples of the focus of inquiry at each level.

- a.
 - b.
 - c.
 - d.
 - e.
-

■ **INTERACTIVE QUESTION 50.3**

Mountains affect local climate. Describe their influence in the following three areas:

- a. solar radiation:
 - b. temperature:
 - c. rainfall:
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■ **INTERACTIVE QUESTION 51.9**

- a. According to kin selection, would an individual be more likely to exhibit altruistic behavior toward a parent, a sibling, or a first (full) cousin?
 - b. Explain your answer in terms of the coefficient of relatedness and Hamilton's rule.
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■ **INTERACTIVE QUESTION 53.1**

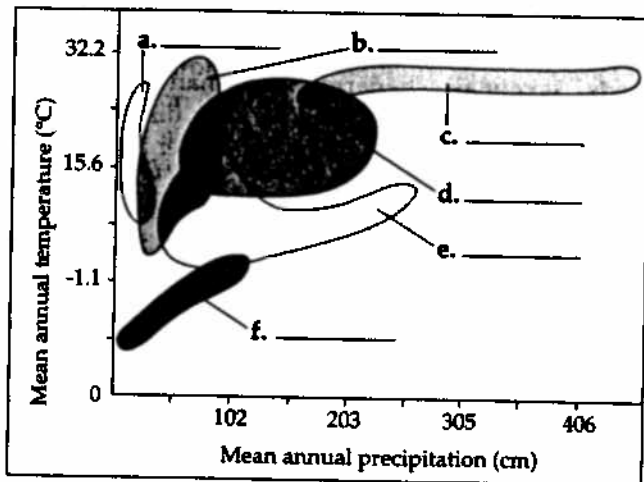
Species composition and distribution in most plant communities appear to be individualistic. What may explain the occasional occurrence of sharp delineations in species composition between communities?

■ **INTERACTIVE QUESTION 54.4**

- a. In which natural ecosystem do nutrients cycle the fastest? Why?
 - b. In which natural ecosystem do nutrients cycle the slowest? Why?
 - c. What is the effect of loss of vegetation on nutrient cycling?
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■ INTERACTIVE QUESTION 50.6

Temperature and precipitation are two of the key factors that influence the vegetation found in a biome. On the climograph shown below, label the North American biomes (arctic and alpine tundra, coniferous forest, desert, grassland, temperate forest, and tropical forest) represented by each area of temperature and precipitation.



■ INTERACTIVE QUESTION 53.4

Experimental data from tree hole communities showed that food chains were longest when food supply at the producer level was greatest. Which hypothesis about what limits food chain length do these results support?

■ INTERACTIVE QUESTION 51.1

Many animals breed in the spring or early summer.

- What is a probable proximate cause of this behavior?
- What is the probable ultimate cause of this behavior?

■ INTERACTIVE QUESTION 52.1

In a mark-recapture study, an ecologist traps, marks, and releases 25 voles in a small wooded area. A week later she resets her traps and captures 30 voles, 10 of which were marked. What is her estimate of the population of voles in that area?

■ INTERACTIVE QUESTION 55.1

Give an example of how each of the following causes of the biodiversity crisis has reduced population numbers or caused extinctions.

- habitat destruction
- introduced species
- overexploitation
- disruptions of food chains

■ INTERACTIVE QUESTION 51.4

Indicate the type of learning illustrated by the following examples:

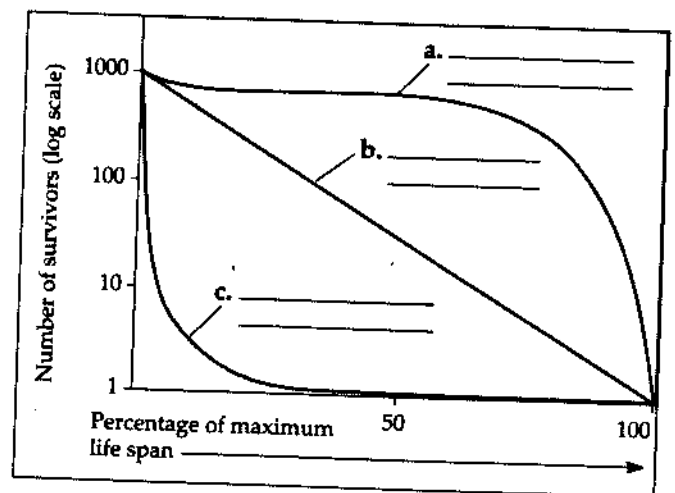
- a. Ewes will adopt and nurse a lamb shortly after they give birth to their own lamb but will butt and reject a lamb introduced a day or two later.
 - b. A dog, whose early "accidents" were cleaned up with paper towels accompanied with harsh discipline, hides under the bed any time a paper towel is used in the household.
 - c. Ducklings eventually ignore a cardboard silhouette of a hawk that is repeatedly flown over them.
 - d. Kittens stalk and pounce on each other, biting and kicking as they roll around together.
 - e. In Pavlov's experiments, the ringing of a bell caused a dog to salivate.
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■ INTERACTIVE QUESTION 53.5

Many freshwater lake communities appear to be organized along the top-down model. What actions might ecologists take if they wanted to use *biomanipulation* to control excessive algal blooms in a lake with four trophic levels (algae, zooplankton, primary predator fish, and top predator fish)?

■ INTERACTIVE QUESTION 52.2

Identify the types of survivorship curves shown below and give examples of groups that exhibit each curve.



■ INTERACTIVE QUESTION 55.2

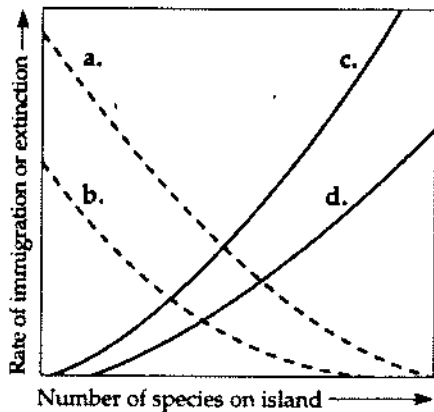
Is the effective population size usually larger or smaller than the actual number of individuals in the population?

■ INTERACTIVE QUESTION 51.5

Sow bugs are placed in experimental chambers that are either humid or dry and have both light and dark areas. In the humid chamber, the sow bugs move into the dark area and stop moving. In the dry chamber, they move into the dark area and continue to move about in that area. Explain these experimental results.

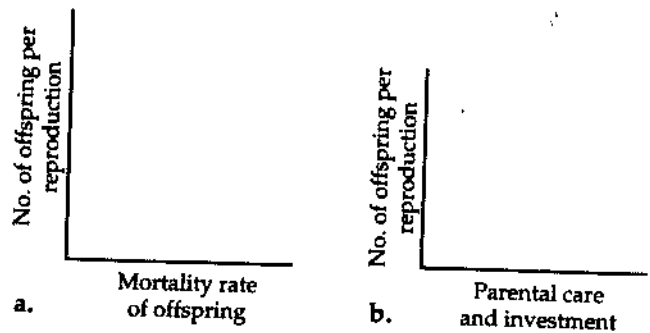
■ INTERACTIVE QUESTION 53.7

Many biogeographic studies have found that large islands have greater species richness than small islands. Label the lines on the following graph that show how immigration rate and extinction rate vary with the number of species on large and small islands. Indicate the location of the equilibrium number on the x axis for a small and a large island.



■ INTERACTIVE QUESTION 52.3

Mortality, number of offspring per reproduction, and parental investment are usually interrelated. On the following graphs, sketch the relationship you would predict between the variables.



■ INTERACTIVE QUESTION 55.3

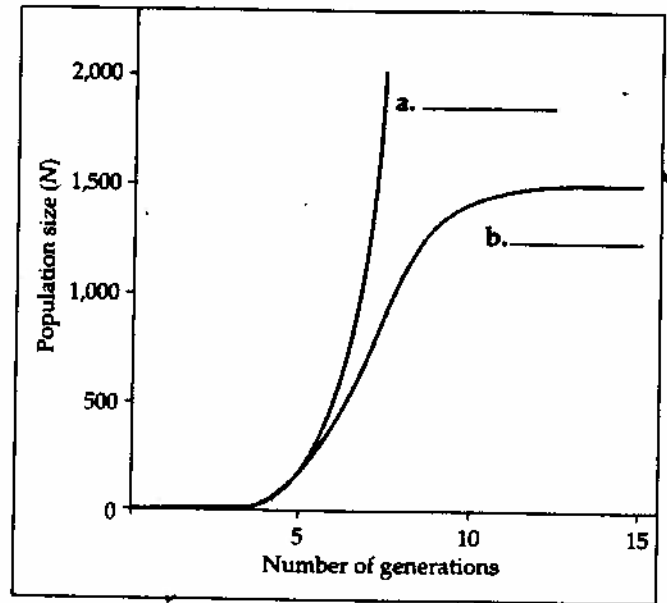
Explain the basic premise of the small population approach. What conservation strategy is recommended for preserving small populations?

■ INTERACTIVE QUESTION 51.6

- Why are many interactions between members of same species agonistic?
- What mechanisms reduce violent encounters between conspecifics?

■ INTERACTIVE QUESTION 52.4

Label the exponential and logistic growth curves, and show the equation associated with each curve. What is K for the population shown with curve b?



■ INTERACTIVE QUESTION 54.1

- List some ecosystems with high rates of production.
- List some ecosystems with low rates of production.
- The open ocean has low net primary production yet contributes the greatest percentage of Earth's net primary production. Explain.
- Antarctic seas are often more productive than most tropical seas, even though they are colder and receive lower light intensity. Explain.

■ INTERACTIVE QUESTION 55.4

Describe the declining-population approach to the conservation of endangered species.