Chapter 8

Answers to Section 1 Review

1. Answers may vary. Students should mention size, density, and dispersion.
2. Exponential growth will increase by a multiplicative factor (may double or triple with each generation), while linear growth merely adds the same number to each generation.
3. Populations can have increased growth rates if individuals reproduce earlier in life, reproduce more often, or produce more offspring at a time.
4. Interactions with the environment will change the characteristics of a population over time. The population may change in size, density, dispersion, or niche.
5. Answers may vary. To predict future population size, one would need to know all the environmental factors that might act on the population, including predators, prey, abiotic factors, climate, etc. One might only be able to accurately predict population size if all of these factors were stable.
6. Answers may vary. Students should describe how each population exceeded its resources, then crashed.

Answers to Section 2 Review

1. Answers may vary. Students should mention habitat traits, food sources, and other species with which the organism interacts, and consider interactions with abiotic factors and with members of each biological kingdom.
2. Answers may vary. Any prey organism or any plant would qualify. Predators that do not eat the same food would qualify. Even predators that eat the same food, but also eat different foods, would qualify. Examples: zebras, grass, anteaters, hyenas.
3. Competition harms both organisms, predation and parasitism harms one and benefits one, mutualism benefits both, commensalism benefits one and has no effect on the other.
4. Unlike predators, a parasite spends some of its life in or on the host, and generally does not kill the host.
5. Answers may vary. A mutualistic relationship may evolve from a close relationship that did not originally benefit both parties. As two species interact closely over time, either organism may evolve methods that take better advantage of the relationship with the other. However, organisms cannot evolve a trait on purpose.

Chapter 8 Review

Using Key Terms

1. Sample answer: Reproductive potential is the fastest possible rate at which a population can reproduce.
2. Sample answer: The carrying capacity of an ecosystem for a given species is determined by a limiting resource.
3. Sample answer: Organisms are subject to competition from members of their own species, and often from other species as well.
4. Sample answer: Any close relationship between organisms can be said to be a symbiosis.
5. A habitat is the environment in which an organism lives; a niche is the pattern of use of its environment.
6. Predator and prey are the two parties in a predation relationship. The predator hunts and eats the prey.
7. In predation, one organism eats another or part of another. In parasitism, one organism lives in or on another, and usually does not kill its host.
8. In mutualism, both organisms benefit. In commensalism, one benefits and one experiences no positive or negative effect.

Understanding Key Ideas

9. c.
10. b.
11. a.
12. b.
13. a.
14. d.
15. c.
16. a.

Short Answer

17. This is parasitism. The organism benefits to the detriment of the cow, and it lives in the cow during part of its life.
18. Some species may use the same resource, but at different times of the day. Individuals of an earlier

generation may deplete a resource so that those in a later generation cannot use it to survive.
19. A few individual snail kites may have had slightly hooked bills that allowed them to eat more snails than other individuals. These birds were able to produce more hook-billed offspring, and gradually the population evolved to include only hook-billed individuals.
20. The snails would die off, and then the snail kite population would starve and die off.

Interpreting Graphics

21. The population seemed to increase in a linear fashion until the mid-1930s, when it increased exponentially and then crashed in the late-1930s.
22. The food resource was probably depleted by 1937, which caused the population crash.
23. Answers may vary. It's difficult to estimate the carrying capacity, because the population did not recover to a stable level after crashing. It looks like the level of 250 individuals was steady over time in the early-1920s.

Concept Mapping

24. Answers to the concept mapping questions are on pp. 715–720.

Critical Thinking

25. Answers may vary. The relationship cannot be known from the information given. It could have been competition—if both populations were using one common food source, then both would decline if their food source was lost. However, it could have been predation—if the first species to die off was the prey of the second, the predator might have had no other food source.
26. Answers may vary. Humans have often altered their use of habitats (changed their niche) and have been clever about exploiting resources in new ways so that resources in a particular area are no longer limiting. However, these activities remove resources from other areas and species, and drastically alter ecosystems. Humans may be able to stretch the Earth's carrying capacity to the sum of its ecosystems.
27. Answers may vary. It would be difficult to say that competition never played a role unless you knew the complete history of all organisms in the ecosystem. Moreover, competition—at least within a species—is inevitable in natural ecosystems.

Cross-Disciplinary Connection

28. Viruses will be spread quickly in dense populations. The spread of viral diseases can be slowed by limiting contact or transfer of infected materials between individuals (hygiene, physical separation).

Portfolio Project

29. Answers may vary. Be sure the students include all possible interactions between the organism, its habitat, and other species.

Math Skills

30. For a population to increase, births must be greater than deaths. To decrease, deaths must be greater than births.
31. Answers may vary. Two people may have moved to town, or perhaps a mother has given birth to twins. Also, the original equation left out the possibility that individuals might move in or out of a population (immigration and emigration).

Writing Skills

32. Answers may vary. Limited resources in an area limit the size of any population, so it cannot increase indefinitely.
33. Answers may vary.
34. Answers may vary.

Reading Skills

1. c
2. b

Standardized Test Prep Answers

1. B
2. G
3. A
4. H
5. Answers will vary. See Test Doctor for detailed scoring rubric.
6. Answers will vary. See Test Doctor for detailed scoring rubric.

7. A
8. I
9. C
10. G
11. C
12. H