Chapter 5 Review

READING TOOLBOX

1. **Venn Diagram** Make a Venn diagram to help you compare the similarities and differences between niche, realized niche, and fundamental niche.
2. **Concept Map** Draw a concept map that shows characteristics of a population. Try to include the following words in your map: *mutualism, commensalism, predation, abiotic factors, biotic factors, population, parasitism, carrying capacity, logistic growth,* and *exponential growth.*

Using Key Terms

Use each of the following terms in a separate sentence.

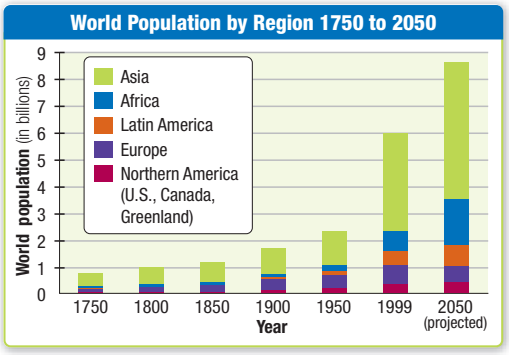
3. *population*
4. *competitive exclusion*

For each pair of terms, explain how the meanings of the terms differ.

5. *exponential growth* and *logistic growth*
6. *immigration* and *emigration*

Understanding Key Ideas

7. Which of the following is an abiotic factor that could influence population size?
   a. amount of food
   b. amount of water
   c. presence of predators
   d. presence of competitors
8. Which of the following has *not* been a factor in decreasing the death rate of the human population?
   a. vaccine
   b. disease
   c. Industrial Revolution
   d. agricultural technology
9. Which of the following describes a relationship between two species in which one species benefits and the other is unaffected?
   a. predation
   b. mutualism
   c. parasitism
   d. commensalism
10. Which of the following is *not* an example of coevolution?
    a. Prey evolve faster running to escape, and predators evolve to be smarter at catching prey.
    b. Predators evolve heavy jaws to crunch the bones of herbivores, and herbivores evolve thick fur for warmth.
    c. Plants evolve chemical defenses, and herbivores evolve ways to neutralize the chemicals.
    d. Insects evolve green wings to blend into the environment, and predators evolve better eyesight to find the prey.
11. Which of the following describes an organism's role in a community?
    a. niche
    b. abiotic factor
    c. habitat
    d. coevolution
12. Which of the following may help stabilize an ecosystem?
    a. severe weather
    b. invasive species
    c. low biodiversity
    d. high biodiversity
13. Which region of the world will contribute the least to world population in 2050?



Explaining Key Ideas

14. **List** three factors that could affect population size.
15. **Describe** what has happened to the human population since the Industrial Revolution.
16. **Explain** how predators and parasites differ in their effect on the organisms on which they feed.

Assignment Guide

Section	Questions
1	3, 5, 6, 7, 8, 14, 15, 17, 18, 19, 20, 23, 24, 25, 26, 30, 31
2	2, 9, 10, 16, 21
3	1, 4, 11, 12, 22, 27, 28, 29

Review

Reading Toolbox

1. See the previous page for a sample Venn diagram.
2. See the previous page for answer to concept map.

Using Key Terms

3. A *population* is a group of organisms of the same species that live together in the same area and interbreed.
4. One species eliminating another species as a result of competition is called *competitive exclusion.*
5. *Exponential growth* occurs when numbers increase by a certain factor in each successive period. *Logistic growth* occurs when growth starts with a minimum number of individuals and reaches a maximum depending on the carrying capacity.
6. *Immigration* is the movement of individuals into a population. *Emigration* is the movement of individuals out of a population.

Understanding Key Terms

7. b 8. b 9. d 10. b
11. a 12. d
13. northern America

Explaining Key Ideas

14. availability of water, presence of predators, and climate change
15. The human population has increased exponentially. The population is now over 6 billion.
16. Predators kill their prey. Parasites usually do not kill the organism that they feed on. They live on their hosts; therefore, the host is also the parasites' habitat.

Using Science Graphics

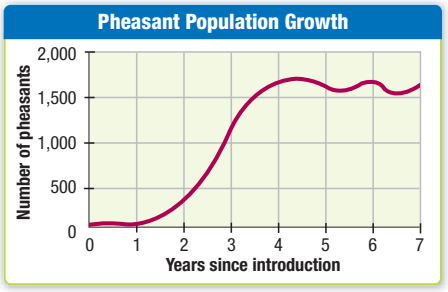
17. about 350
18. about 1,750

Critical Thinking

19. No, humans travel and reproduce across country borders. A population is the same species living together. Country borders do not separate human species. The human population is larger than a single country.

Using Science Graphics

Use the diagram to answer the following questions.



17. Biologists introduced pheasants onto an island in Washington State in the 1930s. Using the data in the graph, estimate the number of pheasants on the island two years after they were first introduced.

18. Estimate the island's carrying capacity for pheasants.

Critical Thinking

19. Evaluating an Argument A classmate tells you that the boundaries of human populations are at the borders of countries. Is your classmate correct? Explain why or why not.

20. Forming Reasoned Opinions Why is it important to know and understand human population growth?

21. Making Comparisons Differentiate between mutualism, commensalism, and symbiosis.

22. Evaluating Conclusions You watch a television program that states that biological communities are shaped by interactions between predators and prey and that organisms must always struggle with one another for existence. Do you agree? Explain why or why not.

23. Predicting Outcomes How might population size influence the chances that a population will grow, shrink, or become extinct?

24. Evaluating Models Is a population growth model that is based on exponential growth more or less realistic than a population growth model that is based on logistic growth? Explain your answer.

Writing for Science

25. Comparing Relationships Write an essay describing several examples of how humans can influence the size of populations.

26. Analyzing Results In an essay, explain why few populations grow exponentially for long periods of time. Include in your argument factors that influence population growth.

Methods of Science

27. Forming Hypotheses You measure the conditions under which a species, cattail, can survive when there are no competitors around. Next, you introduce another species of closely related cattail in the same area. Hypothesize what will happen to the niche of the first cattail.

28. Designing an Experiment You want to find out how a highway cut through a forest would affect the biodiversity of the forest. You decide to compare the biodiversity of two similar forests, one with a highway and one without. Design an investigation that measures and compares the number and types of species in each forest.

Alternative Assessment

29. Recognizing Relationships Use Internet resources to find out about the niche of your favorite organism. Write an essay describing this organism's role in an ecosystem. Include a description of the organism's fundamental niche and realized niche.

30. Forming Hypotheses Formulate a hypothesis about human population growth. Then, use library or Internet resources to find estimates of the current rate of human population growth and forecasts for future growth. Predict trends from the data, and communicate your conclusions in the form of a report to your class.

Math Skills

31. Problem Solving A population of bacteria has two individuals. If the population doubles in size with each generation, how many bacteria will there be in the eighth generation? Assume that there are no deaths.

20. Sample answer: As the human population grows, feeding everyone will be more difficult, and the impact of humans on the environment will increase. Understanding human population growth can help people make better decisions about resource conservation and environmental protection.

21. All three terms describe symbiotic relationships in which two species live in close association with each other. However, commensalism is when only one species in the relationship benefits; mutualism is a relationship in which both species benefit.

22. Sample answer: No. Interactions other than predation also affect communities. Mutualisms and commensalistic interactions are also very important in biological communities.

23. Sample anwer: Small populations are more likely to disappear because of random events or disturbances. However, small populations often grow quickly because resources are abundant.

24. The exponential growth model is less realistic because it does not account for the carrying capacity that eventually limits the growth of the population.

Writing for Science

25. Essays might include habitat destruction, introducing diseases, changing the climate, or providing shelter and extra food.

26. Populations rarely undergo prolonged periods of exponential growth because resources become limiting at high densities. These density-dependent factors may include disease, food, nutrients, shelter, and water. Weather conditions can also cause populations not to exhibit exponential growth, but they do not cause a population to level out at a carrying capacity.

Methods of Science

27. The niche should shrink. The presence of competitors causes species not to realize their fundamental niche. Instead, they can inhabit a smaller range of conditions: their realized niche.

28. Students should explain how they will measure both forests equally. For example, first plot equal areas of both forests, and then visit both plots equally. Students should also include other possible causes of species variation besides the presence of the highway. For example, one forest may be closer to a natural water source.

Alternative Assessment

29. Answers will vary, but students should talk about the role of the organism, the physical factors that influence where it can live, and potential competitors that may keep it from taking advantage of its fundamental niche.

30. Hypotheses will vary. The rate of growth of the human population in 2000 was 1.4%. This yields an annual increase of about 85 million people. Because of the large and increasing population size, the number of people added to the global population will remain high for several decades, even as growth rates decline.

31. 256 (with parents as the first generation)