

CHAPTER

16

DIRECTED READING

Populations

► Section 16-1: How Populations Grow

The Individuals of a Species Live in Populations

Complete each statement by writing the correct term or phrase in the space provided.

1. A(n) _____ consists of all the individuals of a species that live together in one place at one time.
2. _____ is the statistical study of all populations.
3. The way individuals of a population are arranged in space is called _____.
4. Demographers are interested in predicting how the _____ of a population will change.

Read each question, and write your answer in the space provided.

5. Why is size an important feature of a population?

6. Why is density an important feature of a population?

Scientists Use Models to Explain How Populations Grow

Read each question, and write your answer in the space provided.

7. What is a population model?

8. How is the growth rate of a population calculated?

9. What are density-dependent factors? Give an example of a density-dependent factor.

10. What is the logistic model of population growth?

Complete each statement by writing the correct term or phrase in the space provided.

11. In a(n) _____, _____, the rate of population growth is constant.

12. The population size that an environment can sustain is called the _____.

Real Populations Exhibit a Range of Growth Patterns

In the space provided, write the letter of the description that best matches the term or phrase.

- | | |
|---------------------------------------|--|
| _____ 13. density-independent factors | a. grow exponentially when environmental conditions allow them to reproduce |
| _____ 14. <i>r</i> -strategists | b. environmental conditions |
| _____ 15. <i>K</i> -strategists | c. their population density is usually near the carrying capacity of their environment |
| _____ 16. density-dependent factors | d. amount of limited resources |

Mark each statement below T if it is true or F if it is false.

- _____ 17. Mosquito populations are *K*-strategists.
- _____ 18. Many *r*-strategists are found in a rapidly changing environment.
- _____ 19. In general, *r*-strategists have a short life span, reproduce early in life, and have many offspring each time they reproduce.
- _____ 20. Populations that grow slowly are *K*-strategists.

► Section 16-2: How Populations Evolve

Forces That Change Population Allele Frequencies

Mark each statement below T if it is true or F if it is false.

- _____ 1. The Hardy-Weinberg principle states that dominant alleles will eventually replace recessive alleles.
- _____ 2. Evolutionary forces can cause the frequency of alleles in a population to change.
- _____ 3. Because mutation rates in nature are very slow, mutations can only change allele frequency over long periods of time.
- _____ 4. Gene flow refers to the mixing of genes due to immigration.
- _____ 5. An example of nonrandom mating is the self-fertilization of plants.
- _____ 6. The fact that females often select mates because of various traits that the mates possess has the effect of changing the frequency of alleles in a population.
- _____ 7. Genetic drift refers to a change in allele frequency because of random occurrences.
- _____ 8. Large populations are more likely to undergo genetic drift than are small populations.
- _____ 9. An allele can increase or decrease in frequency, depending on its effects on survival and reproduction.
- _____ 10. Natural selection is one of the most powerful agents of genetic change.

Natural Selection Acts Only on Phenotypes

Read each question, and write your answer in the space provided.

11. Explain why natural selection does not act directly on genes.

12. Given that people with hemophilia rarely survive to adulthood and rarely reproduce, why has natural selection not eliminated hemophilia from the population?

Natural Selection Changes Trait Distribution in a Population

Complete each statement by writing the correct term or phrase in the space provided.

13. A trait that is influenced by several genes is called a(n) _____ trait.

14. A hill-shaped curve centered around an average value is called a(n)

Read each question, and write your answer in the space provided.

15. What is directional selection?

16. What is stabilizing selection?

14. T
15. T
16. T
17. T
18. T

CHAPTER 16

Populations

SECTION 16-1

1. population
2. Demography
3. dispersion
4. size
5. Size is important because the number of individuals contained in a population can affect the population's ability to survive.
6. If there are too few individuals in an area, they may seldom encounter one another, making reproduction rare.
7. A population model is a hypothetical population that attempts to exhibit the key characteristics of a real population.
8. The growth rate is the difference between the death rate and the birthrate.
9. Density-dependent factors, such as food and water, refer to resources that are affected by the population density.
10. The logistic model is a population model in which exponential growth is limited by a density-dependent factor.
11. exponential growth curve
12. carrying capacity
13. b
14. a
15. c
16. d
17. F
18. T
19. T
20. T

SECTION 16-2

1. F
2. T
3. T
4. F
5. T
6. T
7. T
8. F
9. T
10. T
11. Natural selection enables individuals that express favorable phenotypes to reproduce and pass those traits on to their offspring.

12. Hemophilia is caused by a recessive allele. Natural selection acts only on homozygous individuals, who express the trait.
13. polygenic
14. normal distribution
15. Directional selection is a type of selection in a population in which the frequency of a particular trait moves in one direction.
16. In stabilizing selection the extremes at both ends of a range of phenotypes are eliminated, causing the frequencies of the intermediate phenotypes to increase.

CHAPTER 17

Ecosystems

SECTION 17-1

1. f
2. a
3. e
4. b
5. d
6. c
7. F
8. T
9. F
10. F
11. F
12. F
13. F
14. Pioneer species are small, fast-growing plants that are the first organisms to live in a habitat.
15. Succession is a somewhat regular progression of species replacement. Succession on land where plants have not grown before is called primary succession. Succession on previously occupied land is called secondary succession.
16. The glacier in Glacier Bay has receded 100 km (62 mi) over the past 200 years. Thus, we can observe recently exposed land that contains few nutrients as well as land that has had more time to undergo succession.

SECTION 17-2

1. Producers are organisms that capture energy and use it to produce energy-storing molecules. Consumers obtain their energy by consuming producers or other consumers.
2. A trophic level identifies an organism's source of energy. A food chain is the path of energy through the trophic levels of an ecosystem.
3. Herbivores are animals that eat plants. Carnivores are animals that eat herbivores.
4. Detritivores obtain their energy from organic wastes and dead organisms. Decomposers are fungi and bacteria that cause decay. Decomposers are one group of detritivores.