

**Chapter 16 Evolution of Populations**

**Section 16–1 Genes and Variation (pages 393–396)**

 **Key Concepts**

- What are the main sources of heritable variation in a population?
- How is evolution defined in genetic terms?
- What determines the numbers of phenotypes for a given trait?

**Introduction (page 393)**

1. Is the following sentence true or false? Mendel’s work on inheritance was published after Darwin’s lifetime. \_\_\_\_\_
2. Which two important factors was Darwin unable to explain without an understanding of heredity? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**How Common Is Genetic Variation? (page 393)**

3. All organisms have additional \_\_\_\_\_ that is “invisible” because it involves small differences in biochemical processes.

**Variation and Gene Pools (page 394)**

4. A group of individuals of the same species that interbreed is a(an) \_\_\_\_\_.
5. All of the genes in a population are called a(an) \_\_\_\_\_.
6. Is the following sentence true or false? A gene pool typically contains just one allele for each inheritable trait. \_\_\_\_\_
7. The number of times that an allele occurs in a gene pool compared with the number of times other alleles for the same gene occur is called the \_\_\_\_\_ of the allele.

**Sources of Genetic Variation (pages 394–395)**

8. What is a mutation? \_\_\_\_\_  
\_\_\_\_\_
9. Why do mutations occur? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. Circle the letter of each choice that is true about mutations.
- a. They do not always change an amino acid.
  - b. They always affect lengthy segments of a chromosome.
  - c. They always affect an organism's phenotype.
  - d. They always affect an organism's fitness.
11. Is the following sentence true or false? Most heritable differences are due to gene shuffling that occurs during the production of gametes. \_\_\_\_\_
12. Circle the letter of each choice that is true about sexual reproduction.
- a. It is a major source of variation in many populations.
  - b. It can produce many different phenotypes.
  - c. It can produce many different genetic combinations.
  - d. It can change the relative frequency of alleles in a population.

**Single-Gene and Polygenic Traits (pages 395–396)**

13. Is the following sentence true or false? The number of phenotypes produced for a given trait depends on how many genes control the trait. \_\_\_\_\_
14. Is the following sentence true or false? Most traits are controlled by a single gene. \_\_\_\_\_
15. Label the two graphs to show which one represents a single-gene trait and which one represents a polygenic trait.

