

Chapter 16 Evolution of Populations

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

This section describes the main sources of heritable variation in a population. It also explains how phenotypes are expressed.

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)

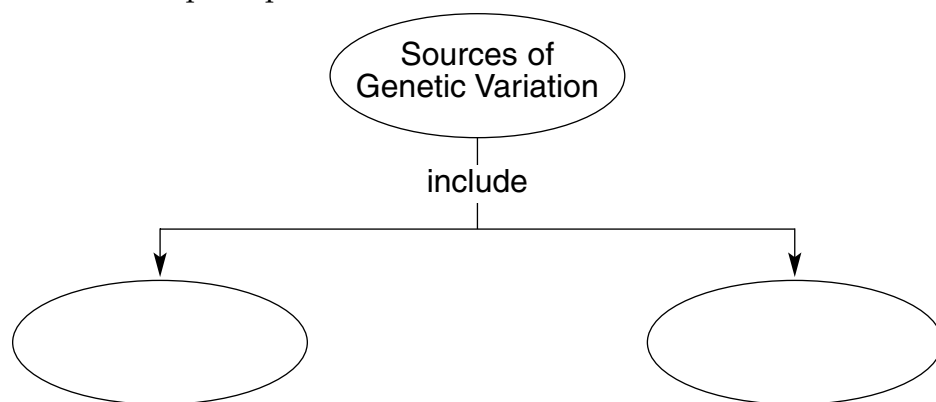
3. All organisms have additional _____ that is "invisible" because it involves small differences in biochemical processes.

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. Complete the concept map.



9. What is a mutation? _____

10. Why do mutations occur? _____

11. 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.

12. Is the following sentence true or false? Most heritable differences are due to gene shuffling that occurs during the production of gametes. _____

13. Circle the letter of each choice that is true about sexual reproduction.

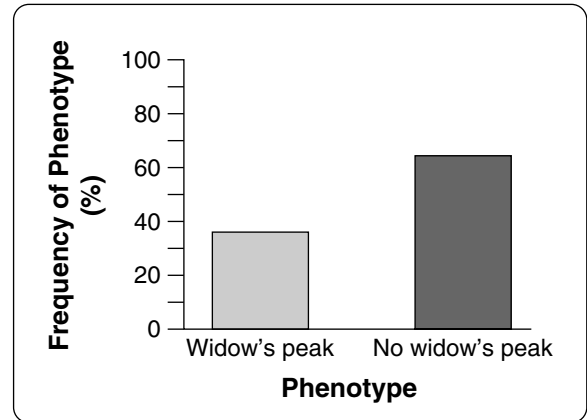
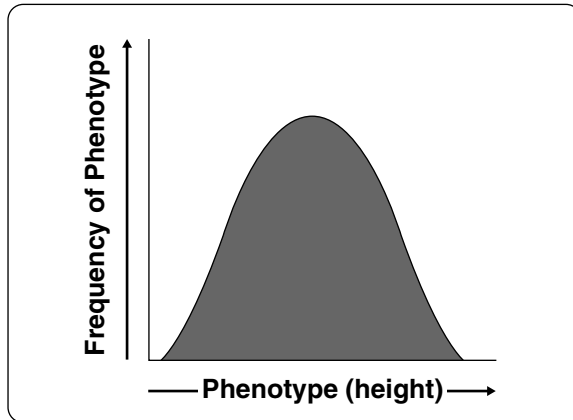
- a. It is a major source of variation in many populations.
- b. It can produce many different phenotypes.
- c. It can produce many different genetic combinations.
- d. It can change the relative frequency of alleles in a population.

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

14. Is the following sentence true or false? The number of phenotypes produced for a given trait depends on how many genes control the trait. _____

15. Is the following sentence true or false? Most traits are controlled by a single gene. _____

16. Label the two graphs to show which one represents a single-gene trait and which one represents a polygenic trait.



Reading Skill Practice

When you read about related concepts, making a graphic organizer such as a Venn diagram can help you focus on their similarities and differences. Make a Venn diagram comparing and contrasting single-gene and polygenic traits. For more information on Venn diagrams, see Appendix A of your textbook. Do your work on a separate sheet of paper.