CHAPTER 16

GENETICS: THE SCIENCE OF HEREDITY

SECTION 16–1 Mendel's Work (pages 556-561)

This section describes how Gregor Mendel identified the method by which characteristics are passed from parents to their offspring.

▶ **Introduction** (page 556)

1. Gregor Mendel experimented with thousands of pea plants to

understand the process of _____.

Match the term with its definition.

Term	Definition
_____ **2.** heredity	**a.** The scientific study of heredity
_____ **3.** genetics	**b.** Characteristics that parents pass to offspring
_____ **4.** traits	**c.** The passing of traits from parents to offspring

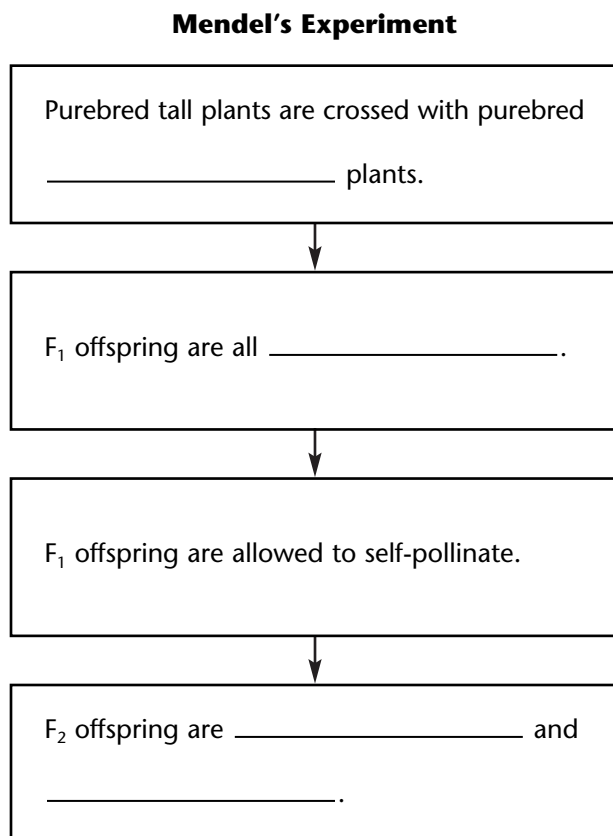▶ **Mendel's Peas** (pages 556–557)

5. Circle the letter of the characteristic in pea plants that make them good for studying the passing of traits from parent to offspring.

a. Peas produce small numbers of offspring.

b. Peas readily cross-pollinate in nature.

c. Peas have many traits that exist in only two forms.

d. Peas do not have stamens.

6. In a flower, the female sex cells, or eggs, are produced by the

_____. The male sex cells are produced by the

_____.

CHAPTER 16, Genetics: The Science of Heredity *(continued)*

▶ Mendel's Experiments (pages 557–558)

7. Why did Mendel use purebred plants in his experiments? _____

_____

_____

8. Complete the flowchart below, which summarizes Mendel's first experiment with pea plants.

Mendel's Experiment

Purebred tall plants are crossed with purebred _____ plants.

↓

F_1 offspring are all _____.

↓

F_1 offspring are allowed to self-pollinate.

↓

F_2 offspring are _____ and _____.

▶ Other Inherited Characteristics (page 558)

9. Circle the letter of other traits in garden peas that Mendel studied. Look at Figure 3 on page 559.

   a. seed size, seed shape, seed color

   b. seed color, pod color, flower color

   c. flower size, pod shape, seed coat color

   d. pod color, seed shape, flower position

10. Two forms of the trait of seed shape in pea plants are

_____ and _____ .

▶ Dominant and Recessive Alleles (page 559)

11. Circle the letter of each sentence that is true about alleles.

a. Genes are factors that control traits.

b. Alleles are different forms of a gene.

c. Dominant alleles always show up in the organism when the allele is present.

d. Recessive alleles mask dominant alleles.

12. Is the following sentence true or false? Only pea plants that have two

recessive alleles for short stems will be short. _____

▶ Understanding Mendel's Crosses (page 560)

Match the pea plant with its combination of alleles.

Pea Plant	Combination of Alleles
_____ **13.** purebred short	**a.** Two alleles for tall stems
_____ **14.** purebred tall	**b.** One allele for tall stems and one allele for short stems
_____ **15.** hybrid tall	**c.** Two alleles for short stems

▶ Using Symbols in Genetics (pages 560–561)

16. A dominant allele is represented by a(n) _____ letter.

17. A recessive allele is represented by a(n) _____ letter.

18. How would a geneticist write the alleles to show that a tall pea plant has

one allele for tall stems and one allele for short stems? _____

▶ Mendel's Contribution (page 561)

19. Is the following sentence true or false? Some scientists during Mendel's time thought Mendel should be called the Father of Genetics.

_____

CHAPTER 16, Genetics: The Science of Heredity *(continued)*

20. Is the following sentence true or false? The importance of Mendel's
work was not recognized until 34 years after he presented his results to

a scientific society. _____

📖 Reading Skill Practice

Concept maps can help you organize the terms and ideas in a chapter. Make a concept map to
show the relationships among the key terms *genes, alleles, recessive alleles,* and *dominant
alleles.* For more information about concept maps, see page 688 in the Skills Handbook of your
textbook. Do your work on a separate sheet of paper.

SECTION 16–2 Probability and Genetics (pages 564–569)

*This section explains what probability is and how the laws of probability can be used
in the study of genetics.*

▶ Introduction (page 564)

1. The likelihood that a particular event will occur is called

_____ .

▶ Principles of Probability (page 565)

2. Circle the letter of each answer that equals the probability that a tossed
coin will land heads up.

   a. 1 in 2

   b. $\frac{1}{2}$

   c. 50 percent

   d. 20 percent