

## Chapter 11 - Genetics & Meiosis Review Questions (w/ Answers)

### Modified True/False

Indicate whether the statement is true or false. If false, change the identified word or phrase to make the statement true.

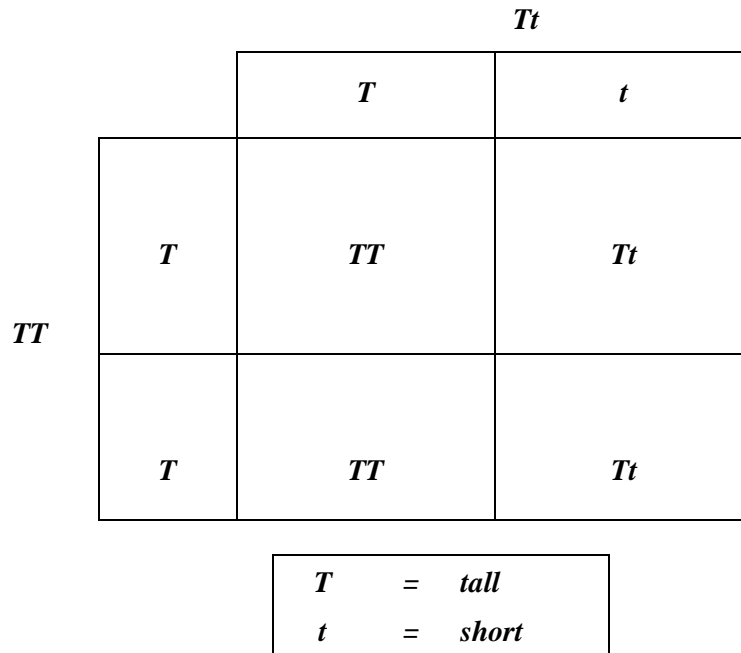
- \_\_\_ 1. A trait is a specific characteristic that varies from one individual to another. \_\_\_\_\_
- \_\_\_ 2. Gregor Mendel concluded that the tall plants in the P generation passed the factor for tallness to the F<sub>1</sub> generation. \_\_\_\_\_
- \_\_\_ 3. An organism with a dominant allele for a particular form of a trait will sometimes show that trait. \_\_\_\_\_
- \_\_\_ 4. True-breeding plants that produced axial flowers were crossed with true-breeding plants that produced terminal flowers. The resulting offspring produced terminal flowers because the allele for terminal flowers is recessive. \_\_\_\_\_
- \_\_\_ 5. When alleles segregate from each other, they join. \_\_\_\_\_
- \_\_\_ 6. If the alleles for a trait did not segregate during gamete formation, offspring would always show the trait of at least one of the parents. \_\_\_\_\_
- \_\_\_ 7. The principles of probability can explain the numerical results of Mendel's experiments. \_\_\_\_\_
- \_\_\_ 8. The probability that a gamete produced by a pea plant heterozygous for stem height (*Tt*) will contain the recessive allele is 100%. \_\_\_\_\_
- \_\_\_ 9. If roan cows and roan bulls are mated, according to the principle of codominance, 25% of the offspring are expected to be roan. \_\_\_\_\_
- \_\_\_ 10. Coat color in rabbits is determined by a single gene that has multiple alleles. \_\_\_\_\_
- \_\_\_ 11. If an organism has 16 chromosomes in each of its egg cells, the organism's diploid number is 32. \_\_\_\_\_
- \_\_\_ 12. If an organism is heterozygous for a particular gene, the two different alleles will be separated during anaphase II of meiosis, assuming that no crossing-over has occurred. \_\_\_\_\_
- \_\_\_ 13. Mitosis results in two cells, whereas meiosis results in one cell. \_\_\_\_\_

### Completion

Complete each statement.

14. The plants that Gregor Mendel crossed to produce the F<sub>1</sub> generation made up the \_\_\_\_\_ generation.
15. The different forms of a gene are called \_\_\_\_\_.
16. If the allele for shortness in pea plants were dominant, all the pea plants in Mendel's F<sub>1</sub> generation would have been \_\_\_\_\_.
17. If the alleles for traits in pea plants did not segregate during gamete formation, offspring that were recessive for a trait could be produced only by crossing two plants that were \_\_\_\_\_ for that trait.
18. \_\_\_\_\_ is the likelihood that a particular event will occur.

19. If you flip a coin five times and it comes up heads each time, the probability that it will come up heads the next time is \_\_\_\_\_.



**Figure 11-1**

20. In the Punnett square shown in Figure 11-1, the genotypes of the offspring are \_\_\_\_\_.
21. Pea plants that are *TT*, \_\_\_\_\_, or *tt* have different genotypes.
22. When two heterozygous tall pea plants are crossed, the expected genotype ratio of the offspring is \_\_\_\_\_.
23. The principle of independent assortment states that \_\_\_\_\_ for different traits can segregate independently during the formation of gametes.
24. If pea plants that are homozygous for round, yellow seeds (*RRYY*) were crossed with pea plants that are heterozygous for round, yellow seeds (*RrYy*), the expected phenotype(s) of the offspring would be \_\_\_\_\_.
25. Crossing a pink-flowered four o'clock with a white-flowered four o'clock will produce pink-flowered offspring and \_\_\_\_\_-flowered offspring.
26. An organism's gametes have \_\_\_\_\_ the number of chromosomes found in the organism's body cells.
27. Crossing-over occurs during the stage of meiosis called \_\_\_\_\_.
28. The relative locations of each known gene can be shown on a \_\_\_\_\_ map.

**Short Answer**

29. Define *genetics*.
30. What attributes of the garden pea plant made it an excellent organism for Gregor Mendel's genetic studies?
31. What might have caused Gregor Mendel NOT to conclude that biological inheritance is determined by factors that are passed from one generation to the next?
32. How many recessive alleles for a trait must an organism inherit in order to show that trait?

		<i>RrYy</i>				
		<i>RY</i>	<i>Ry</i>	<i>rY</i>	<i>ry</i>	
<i>RrYy</i>	<i>RY</i>	<i>RRYY</i>	<i>RRYy</i>	<i>RrYY</i>	<i>RrYy</i>	Seed Shape <i>R</i> – round <i>r</i> – wrinkled
	<i>Ry</i>	<i>RRYy</i>	<i>RRyy</i>	<i>RrYy</i>	<i>Rryy</i>	
	<i>rY</i>	<i>RrYY</i>	<i>RrYy</i>	<i>rrYY</i>	<i>rrYy</i>	Seed Color <i>Y</i> – yellow <i>y</i> – green
	<i>ry</i>	<i>RrYy</i>	<i>Rryy</i>	<i>rrYy</i>	<i>rryy</i>	

**Figure 11-2**

33. What is the phenotype ratio of the offspring in the Punnett square shown in Figure 11-2?
34. A pea plant heterozygous for height and seed color (*TtYy*) is crossed with a pea plant heterozygous for height but homozygous recessive for seed color (*Ttyy*). If 80 offspring are produced, how many are expected to be tall and have yellow seeds?
35. What might happen if the gametes of a species had the same number of chromosomes as the species' body cells?
36. How many sets of chromosomes are in a diploid cell?
37. Define *homologous chromosomes*.
38. What happens to the number of chromosomes per cell during meiosis?
39. Contrast the cells produced by mitosis with those produced by meiosis.

## Chapter 11 - Genetics & Meiosis

### Answer Section

#### MODIFIED TRUE/FALSE

1. ANS: T PTS: 1  
2. ANS: T PTS: 1  
3. ANS: F, always

PTS: 1

4. ANS: F, dominant

PTS: 1

5. ANS: F, separate

PTS: 1

6. ANS: T PTS: 1

7. ANS: T PTS: 1

8. ANS: F, 50%

PTS: 1

9. ANS: F, 50%

PTS: 1

10. ANS: T PTS: 1

11. ANS: T PTS: 1

12. ANS: F, anaphase I

PTS: 1

13. ANS: F, four cells

PTS: 1

#### COMPLETION

14. ANS: P

PTS: 1

15. ANS: alleles

PTS: 1

16. ANS: short

PTS: 1

17. ANS: recessive

PTS: 1

18. ANS: Probability

PTS: 1  
19. ANS:  $\frac{1}{2}$   
50%

PTS: 1  
20. ANS:  $TT$  and  $Tt$

PTS: 1  
21. ANS:  $Tt$

PTS: 1  
22. ANS: 1  $TT$  : 2  $Tt$  : 1  $tt$

PTS: 1  
23. ANS: genes

PTS: 1  
24. ANS: round, yellow seeds

PTS: 1  
25. ANS: white

PTS: 1  
26. ANS: half

PTS: 1  
27. ANS: prophase I

PTS: 1  
28. ANS: gene

PTS: 1

## SHORT ANSWER

29. ANS:  
Genetics is the scientific study of heredity.

PTS: 1  
30. ANS:  
Garden pea plants produce many offspring, they have traits that come in two forms, and crosses between the plants can be controlled easily.

PTS: 1  
31. ANS:  
Answers may vary. If the  $F_1$  pea plants had had traits of neither parent, Mendel might not have concluded that factors for traits are passed from one generation to the next.

PTS: 1

32. ANS:

An organism must inherit two recessive alleles for a trait in order to show that trait.

PTS: 1

33. ANS:

The phenotype ratio is 9 round, yellow peas : 3 round, green peas : 3 wrinkled, yellow peas : 1 wrinkled, green pea.

PTS: 1

34. ANS:

Thirty of the offspring are expected to be tall and have yellow seeds.

PTS: 1

35. ANS:

When the gametes fused during fertilization, the offspring would have more chromosomes in their body cells than their parents have. As a result, the species' chromosome number would not be constant.

PTS: 1

36. ANS:

A diploid cell has two sets of chromosomes.

PTS: 1

37. ANS:

Homologous chromosomes are the two sets of chromosomes found in a body cell—one set inherited from the male parent and the other inherited from the female parent.

PTS: 1

38. ANS:

The number of chromosomes is cut in half.

PTS: 1

39. ANS:

Mitosis produces diploid body cells, whereas meiosis produces haploid gametes.

PTS: 1