**Study Guide Unit 8: Mendel Genetics & Heredity (Ch.8)**

**Completion**

*Complete each sentence or statement.*

1. A phenomenon in which a heterozygous individual has a phenotype that is intermediate between the phenotypes of its two homozygous parents is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. Different forms or versions of a particular gene are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. The external physical appearance of an organism as determined by what alleles are present is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. A situation in which two dominant alleles are expressed at the same time is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

5. Identifying patterns of inheritance within a family over several generations is possible by studying a diagram called a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

6. In heterozygous individuals, only the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ allele is expressed.

7. An organism's \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ refers to the set of alleles (genes) it has inherited.

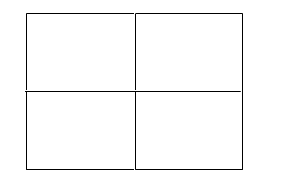
8. The likelihood that a specific event will occur is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

9. An organism that has two of the same (identical) alleles for a trait is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

10. A trait that is determined by a gene that is only found on the X chromosome is said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Problem**

11. **PROMPT #1 Use the punnet square below to cross two heterozygous individuals. In pea plants, Tall (T) plants are dominant over short (t) plants.**

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What percentage of the offspring will be tall?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_%

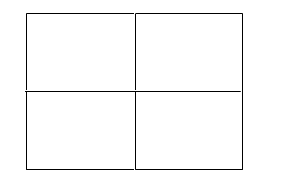
12. What percentage of the offspring will be homozygous dominant?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_%

13. What percent of the offspring will be short?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_%

14. What percentage of the offspring will be homozygous recessive? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_%

15. What percent of the offspring will be heterozygous?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_%

16. **PROMPT #2 Use the punnett square to cross a heterozygous individual with a homozygous recessive individual. In pea plants, Purple (P) flowers are dominant over white(p) flowers.**

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How many offspring will be heterozygous?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. How many possible phenotypes do the offspring show?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

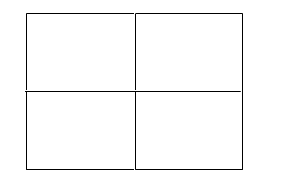
18. How many possible genotypes do the offspring show?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. How many of the **parents** have white flowers?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20. How many of the offspring will have at least one recessive trait?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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21. **PROMPT #3 Use the punnett square below to cross two wrinkled parents. In pea plants, Round (R) seeds are dominant over wrinkled (r) seeds.**

****

What is the dominant to recessive ratio of offspring?\_\_\_\_\_\_\_\_\_\_

22. What are the genotypes of the parents?\_\_\_\_\_\_\_\_\_\_

23. How many of the offpring will have wrinkled seeds?\_\_\_\_\_\_\_\_\_\_

**Word Problems**

**(Please use your scratch paper for the next set of matching questions).**

Please draw a line to match the following.

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Homozygous | g. | PP |
| b. | Phenotype | h. | tt |
| c. | Dominant | i. | 1:2:1 |
| d. | White | j. | Heterozygous |
| e. | 3:1 | k. | Genotype |
| f. | 4 |

\_\_\_\_ 24. A genetic trait that appears in every generation of offspring.

\_\_\_\_ 25. Having two of the same traits.

\_\_\_\_ 26. The recessive color flowers in Mendel’s pea plant experiment.

\_\_\_\_ 27. The dominant to recessive ratio in Mendel’s F2 Generation.

\_\_\_\_ 28. Homozygous Recessive.

\_\_\_\_ 29. Having two different traits.

\_\_\_\_ 30. Homozygous Dominant

\_\_\_\_ 31. The % of purple flowers in Mendel’s F1 Generation

\_\_\_\_ 32. The genotypic ratio when you cross a heterozygous  heterozygous.

\_\_\_\_ 33. It is the makeup of alleles an individual has.

\_\_\_\_ 34. The physical apperance of a trait.

**All statements are FALSE, please underline the incorrect portion of the statement and correct it below.**

35. A Punnett square represents the phenotype of an organism.

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36. The mating of garden-pea flowers can not be easily controlled because the male and female reproductive parts are enclosed within the same flower.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

37. If a white flowering pea plant has a genotype of pp, then it’s pheotype will be purple.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

38. Mendel discovered unpredictable patterns in the inheritance of traits.

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39. The allele for a recessive trait is usually represented by a capital letter.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

40. In Mendel's experiments, the recessive traits appeared in the F2 generation in approximately 100 percent of the plants.

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41. Heredity is the branch of biology that involves the study of how different traits are transmitted from one generation to the next.

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42. The law of segregation states that two or more pairs of alleles separate independently of one another during gamete formation.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

43. Individuals must exhibit a trait in order for it to appear in their offspring.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

44. In incomplete dominance, two dominant alleles are expressed at the same time.

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45. A recessive allele masks the effect of a dominant allele.

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46. Mendel's initial experiments were dihybrid crosses.

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47. A trait is sex-linked it will occur with equal frequency in both males and females.

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48. The geneotype of an individual can be determined just by looking at it.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

49. Heterozygous individuals have two of the same alleles for a particular gene.

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50. In heterozygous individuals, only the recessive allele is expressed.

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**Short Answer**

51. Cross out any statements that are **not true** about Gregor Mendel.

He was known as the “father” of Genetics.

He developed the Punnett Square.

He was American.

He worked with strawberry plants.

He studied genetics.

52. Which generation of pea plants did Mendel allow to self-pollinate, to make sure he started with true-breeding plants? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

53. What is the difference between the law of independent assortment and the law of segregation?

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

54. Tallness (*T*) is dominant to shortness (*t*) in pea plants. Write the genotype of a pea plant that is heterozygous for tallness. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

55. Why did Mendel first make the P Generation self-pollinate?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

56. Why was it very important that Mendel started with pure or “true-breeding” pea plants as his P Generation?

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Multiple Choice**

*Identify the letter of the choice that best completes the statement or answers the question.*

\_\_\_\_ 57. Which of the following statements is **NOT** true about genotype.

|  |  |
| --- | --- |
| a. | You can’t always determine it just by looking at the individual. |
| b. | There are three possible genotypes. |
| c. | It is the physical appearance of a trait. |
| d. | It is the makeup of alleles an individual has. |

\_\_\_\_ 58. If a characteristic is sex-linked, it

|  |  |  |  |
| --- | --- | --- | --- |
| a. | is always fatal. | c. | can never occur in females. |
| b. | occurs only in females. | d. | occurs most commonly in males. |

\_\_\_\_ 59. If an individual possesses two recessive alleles for the same trait, the individual is said to be

|  |  |  |  |
| --- | --- | --- | --- |
| a. | mutated. | c. | heterozygous for the trait. |
| b. | haploid for the trait. | d. | homozygous for the trait. |

\_\_\_\_ 60. A diagram in which several generations of a family and the occurrence of certain genetic characteristics are shown is called a

|  |  |  |  |
| --- | --- | --- | --- |
| a. | karyotype. | c. | punnett square. |
| b. | pedigree. | d. | monohybrid cross. |

\_\_\_\_ 61. Since the allele for colorblindness is located on the X chromosome, colorblindness

|  |  |  |  |
| --- | --- | --- | --- |
| a. | occurs only in adults. | c. | is sex-linked. |
| b. | cannot be inherited. | d. | None of the above |

\_\_\_\_ 62. The unknown genotype of an individual with a dominant phenotype can be determined using

|  |  |  |  |
| --- | --- | --- | --- |
| a. | a dihybrid cross. | c. | probability |
| b. | a ratio. | d. | a test cross. |

\_\_\_\_ 63. Which of the following is the correct cross between a heterozygous individual with a homozygous recessive individual?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | BB x Bb | c. | AA x aa |
| b. | BB x bb | d. | Aa x aa |

\_\_\_\_ 64. The passing of traits from parents to offspring is called

|  |  |  |  |
| --- | --- | --- | --- |
| a. | maturation. | c. | development. |
| b. | heredity. | d. | genetics. |

\_\_\_\_ 65. homozygous : heterozygous ::

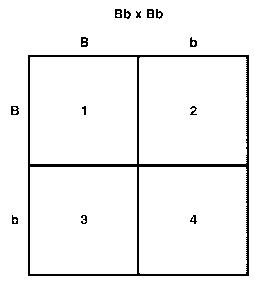
|  |  |  |  |
| --- | --- | --- | --- |
| a. | dominant : recessive | c. | allele: gene |
| b. | same: different | d. | BB: *bb* |

\_\_\_\_ 66. Which of the following is an example of a heterozygous geneotype?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | rr | c. | Pp |
| b. | PP | d. | Az |

**PROMPT #4 Draw your family pedigree tracing at least 2 generations.**

**PROMPT #5 In rabbits, black fur (B) is dominant to white fur (b). Consider the following cross between two heterozygous rabbits.**



\_\_\_\_ 67. Refer to Prompt #5 and the illustration above. The device shown, which is used to determine the probable outcome of genetic crosses, is called a

|  |  |  |  |
| --- | --- | --- | --- |
| a. | Punnett square. | c. | phenotypic paradox. |
| b. | Mendelian box. | d. | genetic graph. |

\_\_\_\_ 68. Refer to Prompt #5 and the illustration above. Both of the parents in the cross are

|  |  |  |  |
| --- | --- | --- | --- |
| a. | black. | c. | homozygous dominant. |
| b. | white. | d. | homozygous recessive. |

\_\_\_\_ 69. Refer to Prompt #5 and the illustration above. The genotypic ratio of the F1 generation would be

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 1:3. | c. | 3:1. |
| b. | 1:2:1. | d. | 1:1 |

\_\_\_\_ 70. Refer to Prompt #5 and the illustration above. The phenotype of the offspring indicated by box 3 would be

|  |  |  |  |
| --- | --- | --- | --- |
| a. | black. | c. | white. |
| b. | a mixture of white and black. | d. | None of the above |

**Prompt 6: Draw a Punnett Square and show a co-dominant cross between a person with type AO blood and a person with type BO blood.**

71. Refer to Prompt #6. What are the chances (%) that the offspring will be type O blood?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

72. Refer to Prompt #6. What are the chances (%) that the offspring will be type AB blood? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Prompt 7: Draw a Punnett Square and show an incomplete dominant cross between a pure red flower (RR) and a pure whiter (rr) flower:**

73. Refer to Prompt #7. What will the phenotype be of all off the offspring?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Study Guide Unit 6: Mendel Genetics (Ch.8)**

**Answer Section**

**COMPLETION**

1. incomplete dominance

2. alleles

3. phenotype

4. codominance

5. pedigree

6. dominant

7. genotype

8. probability

9. homozygous

10. sex-linked

**PROBLEM**

11. 75%

12. 25%

13. %

14. 25%

15. 50%

16. 2

17. 2

18. 2

19. 1

20. 4

21. 0:4

22. rr

23. 4

**MATCHING**

24. C

25. A

26. D

27. E

28. H

29. J

30. G

31. F

32. I

33. K

34. B

**TRUE/FALSE**

35. F

change phenotype to geneotype

36. F

remove the word NOT

37. F

change purple to white

38. F

remove the UN in unpredictable

39. F

change capital to lowercase

40. F

change 100 to 25

41. F

change heredity to genetics

42. F

change segregation to independent assortment

43. F

change must to may not always

44. F

change incomplete to co

45. F

rotate dominant and recessive

46. F

change dihybrid to monohybrid

47. F

change equal to unequal

48. F

change geneotype to phenotype

49. F

change heterozygous to homozygous

50. F

change heterozygous to homozygous recessive

**SHORT ANSWER**

51.

He was known as the “father” of Genetics.

**He developed the Punnett Square.**

**He was American.**

**He worked with strawberry plants.**

He studied genetics.

52. P generation

53. The inheritance of one trait had no effect on the inheritance of another and Alleles of different genes separate independently of one another during gamete formation.

54. Tt

55. So he could make sure that they were pure or true-breeding.

56. So that he could figure out what trait was dominant.

**MULTIPLE CHOICE**

57. C

58. D

59. D

60. B

61. C

62. D

63. D

64. B

65. B

66. C

67. A

68. A

69. B

1. A

**Prompt 6**

71. 25%

72. 25%

**Prompt 7**

73. Rr=Pink