Name _____ Date _____ Period _____

Complex Inheritance - Incomplete Dominance and Codominance

1. *When a trait is not completely dominant or recessive, we describe this type of inheritance as being…*

___ ___ ___ --___ ___ ___ ___ ___ ___ ___ ___ ___

2. Many genetic traits have a stronger dominant allele and a weaker recessive allele. This is known as <u>complete dominance</u>. What if a trait, however, is NOT completely dominant and/or recessive?

Summarize the difference between

   a. ***Incomplete dominance***

   b. ***Codominance***

3. How do you complete this type of Punnett Square problem?

4. So, if a **<u>black mouse</u>** crossed with a **<u>white mouse</u>** leads to a **<u>heterozygous grey mouse</u>**…

   a. *Identify the type of inheritance:*

   b. Write the ***genotypes*** for each ***phenotype***.

      Black _____ White _____ Grey _____

5. Use the Punnett square below to show the cross between a **<u>black mouse</u>** and a **<u>white mouse</u>**.

   a. Genotype Probability (%):

   b. Phenotype Probability (%):

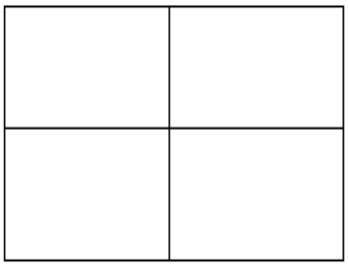
   c. Genotype/Phenotype Ratio - _____ : _____ : _____

6. Use the Punnett square to the right to show the cross between **<u>two grey mice</u>**.

   a. Genotype Probability (%):

   b. Phenotype Probability (%):

   c. Genotype/Phenotype Ratio - _____ : _____ : _____

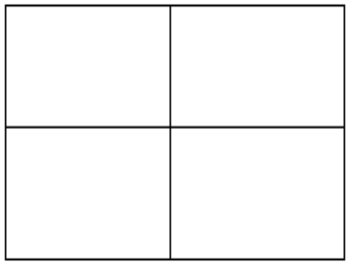


7. If a **red poinsettia** crossed with a **white poinsettia** leads to a **candy cane poinsettia with both red AND white**…
   a. *Identify the type of inheritance:*

   b. Write the ***phenotype*** for each ***genotype***.

   R R _____ W W _____ R W _____

8. Use the Punnett square below to show the cross between a **white poinsettia** and a **candy cane mouse**.



   a. Genotype Probability (%):

   b. Phenotype Probability (%):

9. Genotype/Phenotype Ratio - _____ : _____ : _____

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10. In some chickens, the ***heterozygous genotype*** leads to a phenotype known as **erminette**, feathers which are speckled with both black AND white. The allele for Black is B and the allele for white is W.
    a. This is an example of which inheritance pattern (*incomplete dominance or codominance*)?

b. For each *phenotype* below, identify the *genotype*.

Black Chickens _____ **White Chickens _____** **Erminette Chickens _____**

11. A ***black chicken*** is crossed with an ***erminette chicken***.
    a. Genotype Probability (%):

    b. Phenotype Probability (%):

    c. Genotype/Phenotype Ratio - _____ : _____ : _____

12. A ***white chicken*** is crossed with an ***erminette chicken***.

    a. Genotype Probability (%):

    b. Phenotype Probability (%):

    c. Genotype/Phenotype Ratio - _____ : _____ : _____

13. Two ***erminette chickens*** are crossed.
    a. Genotype Probability (%):

    b. Phenotype Probability (%):

    c. Genotype/Phenotype Ratio - _____ : _____ : _____

14. In snapdragons, flower color is controlled by ***incomplete dominance***. The allele for red is R and the allele for white is W.

    a. Knowing this trait is incompletely dominant, what would be the **phenotype** for the heterozygous condition (RW)? _____

    b. For each *phenotype* below, identify the *genotype*.
    Red Genotype: _____ **White Genotype: _____**

15. A ***pink flowered snapdragon*** is crossed with a ***white flowered snapdragon***.
    a. Genotype Probability (%):

    b. Phenotype Probability (%):

    c. Genotype/Phenotype Ratio - _____ : _____ : _____

16. Edward is extremely romantic and wants to give Bella an entire bouquet of ***pink snapdragons***, her favorite flower. Unfortunately, Edward only has ***red snapdragons*** in his greenhouse. In order to produce *the most number of pink snapdragons*, what color flower should Edward cross with his red snapdragons? Show the punnett square to defend your answer.

    a. This cross should produce _____% ***pink*** snapdragons.

17. Bella is convinced that a greenhouse full of ***pink snapdragons crossing with other pink snap dragons*** will only make pink snapdragons! Edward uses a punnett square to help her understand the error of her ways…

    a. This cross should produce _____% ***pink*** snapdragons.

18. Hair color in certain breeds of horses can be **Brown (B), White (W) or Palomino (*a <u>tan</u> color resulting from the heterozygous genotype BW*).**
    a. This is an example of which ***inheritance pattern***?

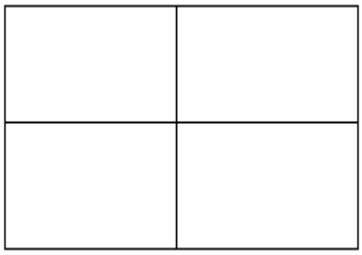
    b. Write the ***genotypes*** for the following ***phenotypes***.

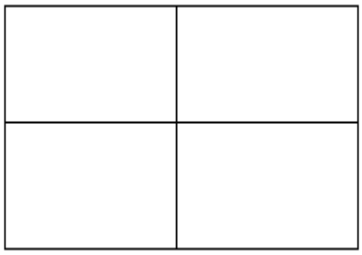
    Brown _____ **Palomino _____** **White _____**

19. Can palominos be considered a **purebred** line of horses? *Defend your answer with an explanation*.

20. **Palomino horses are worth a great deal of money.** Which color horses would you breed if you wanted to produce *the most number of palominos in the shortest amount of time*? Show the punnett square to defend your answer.

21. If you are a breeder with a **male palamino horse**, what color female horse would you breed with your male *in order to produce the most number of palominos in the shortest amount of time*? Show the three possible crosses and circle your best option(s) for the female.





22. ***Research it!*** Use a device to find a real life example of each complex pattern of inheritance in <u>humans</u>.

Incomplete Dominance	*Codominance*