

Complex Inheritance - Incomplete Dominance and Codominance

1. Many genetic traits have a stronger dominant allele and a weaker recessive allele. This is known as complete dominance. What is a trait, however, is NOT completely dominant and/or recessive.

Summarize the difference between incomplete dominance and codominance.

Incomplete dominance – they combine with different big letter

Codominance -- they see both together and have different big letters.

2. 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)?

co dominance

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

Black Chickens BB

White Chickens WW

Erminette Chickens BW

3. A black chicken is crossed with a white chicken.

- a. Give the expected **probabilities** for each genotype and phenotype.

0:4:0

	B	B
W	BW	BW
W	BW	BW

- b. Give the expected **ratios** for the genotypes and phenotypes.

0:4:0

100% both

	B	W
B	BB	BW
W	BW	WW

4. Two erminette chickens are crossed.

- a. Give the expected **probabilities** for each genotype and phenotype.

1:2:1

- b. Give the expected **ratios** for the genotypes and phenotypes.

1:2:1

50%

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

RR RW WW
red pink white

going to be a mix color.

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

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

Red Genotype: RR

White Genotype: WW



6. A pink flowered snapdragon is crossed with a white flowered snapdragon.

- a. Give the expected probabilities for each genotype and phenotype.

$0:4:0$

both

- b. Give the expected ratios for the genotypes and phenotypes.

$0:4:0$

	P	P
W	PW	PW
W	PW	PW

	R	R
W	RW	RW
W	RW	RW

7. 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 100 % pink snapdragons.

8. What would be Edward's second choice in order to produce pink snapdragons. Show the punnett square to defend your answer.

- a. This cross should produce 50 % pink snapdragons.

	R	R
R	RR	RR
W	RW	RW

9. Hair color in certain breeds of horses can be Brown (B), White (W) or Palomino (a tan color resulting from the heterozygous genotype BW). Show the cross between a brown horse and a palomino horse.

	B	B
B	BB	BB
W	BW	BW

- a. This is an example of which inheritance pattern?

incomplete dominance

- b. Give the expected genotype & phenotype probabilities.

50% 50% corn of tan

- c. Give the expected genotype and phenotype ratios.

G $2:2:0$

P $2:2:0$

10. Can palominos be considered a purebred line of horses? Explain your answer.

no because it is a mix

11. 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.

	B	B
W	BW	BW
W	BW	BW