

Name: _____

Genetic Problems – CO-DOMINANCE & INCOMPLETE DOMINANCE



For each of the following problems:

- make a key
- write out the cross
- make a Punnett square
- answer the associated questions

YOU MUST DO THIS FOR EVERY CROSS IN EACH QUESTION!

1. Sickle cell anemia is a co-dominant disorder, where A stands for normal red blood cells and S stands for sickle-shaped red blood cells. SS results in death. Heterozygous individuals have a phenotype showing both sickle-celled and normal-shaped red blood cells. Cross two people who are heterozygous for this trait.

a. What is the % chance their offspring are likely to have sickle cell anemia?

b. What is the % chance their offspring are likely to have normal red blood cells? _____

Parents: _____ X _____

Key: AA= Normal Red blood cells
SS= All Sickle (results in stillbirth)
AS= Sickle Cell Anemia

2. Co-dominance is observed in tabby cats. A cross between a black cat and a tan cat produces a tabby pattern (black and tan fur together).

a. Cross a black cat with a tabby cat. Give the phenotypic ratio: _____ and genotype ratio: _____ of the offspring.

b. Is it possible to get a black cat if the parent generation is a tan cat crossed with a tabby cat? _____ Prove it in the Punnett square.

c. Cross two tabby cats. Give the phenotypic ratio: _____ and genotype ratio: _____ of the offspring.

Parents: _____ X _____

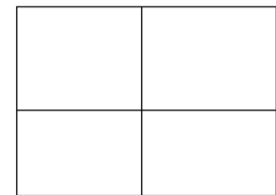
Key: BB= Black
TT= Tan
BT= Tabby

Parents: _____ X _____

3. In some cattle, the allele for Brown hair (B) and the allele for white hair (W) are incomplete-dominance. The heterozygous condition results in red cattle, called roan.

- Cross a red cow with a white bull. What percent of the offspring will be red? _____ What percent of the offspring will be heterozygous? _____
- Cross a red bull with a red cow. Give the phenotypic ratio: _____ and genotype ratio: _____ of the offspring.
- Cross a red cow with a brown bull. Can they have a white offspring? _____ What percent of their offspring are brown? _____ red? _____
- Cross a brown cow with a white bull. What is the genotype of all the offspring? _____ and phenotype of all the offspring? _____

Key: BB=Brown
 WW=White
 BW= Red (Roan)



4. In Labradors, the allele for Black hair (B) and the allele for yellow hair (Y) show incomplete-dominance. The heterozygous condition (BY) results in a brown Labrador. Use a Punnett square to prove your answers.

- If an entire litter of puppies is brown and the mother is yellow, what color was the father likely to be? _____
- If 50% of the puppies were brown and 25% were yellow, what was the likely genotype of each parent? _____ X _____
- What must the parents be to have an entire litter of black puppies? _____ X _____
 Yellow puppies? _____ X _____

Key: BB= Black
 YY= Yellow
 BY=Brown

