

Review for Quiz on Monohybrid Crosses

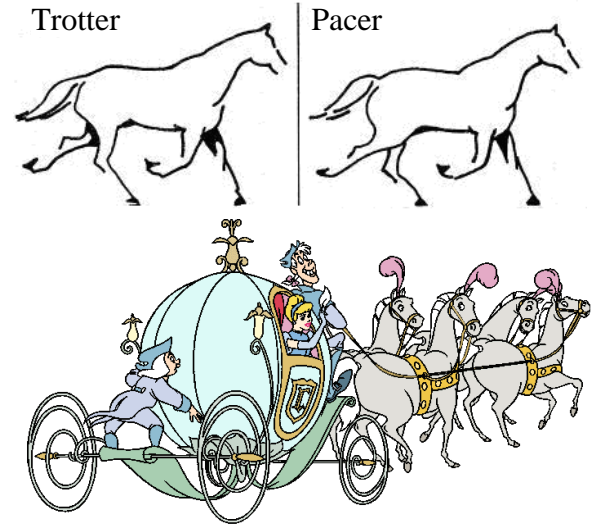
1. In a certain species of plant, a purebred plant has hairy leaves and another purebred plant has smooth leaves. A cross of these two plants produces offspring that all have smooth leaves. Predict the ratio of genotypes and phenotypes of the F₂ generation.



2. A new breed of cat has a gene that controls tail-length. These cats can have a long tail, a short stumpy tail, or no tail at all.
- Is this an example of complete dominance, incomplete dominance or co-dominance?
 - If a short-tailed male cat is bred with a long-tailed female, predict the genotypes and phenotypes of their kittens.



3. A horse's gait (how it moves) is determined genetically: the trotter characteristic is completely dominant over the pacer characteristic.
- A hybrid male trotter is mated with a purebred pacer. Predict the possible genotypes and phenotypes of their foals.
 - The horses pulling a carriage must have the same gait. When Cinderella's fairy godmother waves her magic wand, she always produces trotters, but she does not know if they are homozygous or heterozygous. Design a breeding experiment she could do to determine a male trotter's genotype and explain how to interpret the results.
 - Compare the pictures of a trotter and a pacer. How are the gaits different? (This is not testable material – just for fun:)



4. A dark reddish-brown 'chestnut' horse is homozygous for an allele for coat colour, while a creamy white 'cremello' horse is homozygous for the other allele. Heterozygous horses are a beautiful beige-midbrown colour called 'palomino'.
- What type of inheritance pattern is involved?
 - If a breeder wants to produce ONLY palomino horses, what colour parents should he breed? Use a Punnett square to support your answer.

5. In cattle, there is an allele for red coat colour (R) and an allele for white coat colour (W). In a heterozygous individual the coat has both red and white hairs and is called "roan".



- What type of inheritance pattern is involved?
- What are the predicted genotypes and phenotypes of calves produced by mating two roan cattle?

6. For one breed of dog, a spotted coat is completely dominant over a non-spotted coat.
- Using a Punnett square, determine the genotypes and phenotypes of the puppies of two heterozygous dogs.
 - A breeder purchases a spotted female dog of unknown genotype. If the breeder wants to know the female's genotype, describe the type of male she should use for breeding and explain how this will allow her to determine the female's likely genotype.

7. Tigers' stripes go side-ways and wrap around their body. A scientist was excited to find an unusual male tiger with stripes that ran long-ways from head to tail. He captured the long-ways striped tiger and bred it to a side-ways striped female tiger. One of the kittens had 'plaid' markings with stripes running both ways.

- What type of inheritance pattern is involved?
- If one of the plaid female kittens was later bred to the long-ways striped male, predict the genotypes and phenotypes of their offspring.

