

### Complex Genetics: Punnett Squares Practice

100 K5

1. Complete dominance = If a Red (RR) and White flower (rr) were crossbred, resulting in 100% Rr, what phenotype would be seen:

- If it was a case of COMPLETE dominance? Red
- If it was a case of INCOMPLETE dominance? Pink
- If it was a case of CODOMINANCE? Red+white

**Incomplete Dominance practice problems**

2. Snapdragons are incompletely dominant for color; they have phenotypes red, pink, or white. The red flowers are homozygous dominant, the white flowers are homozygous recessive, and the pink flowers are heterozygous. Give the genotypes for each of the phenotypes, using the letters "R" and "r" for alleles:

- a. Red snapdragon genotype: RR                      b. Pink snapdragon genotype: Rr                      c. White snapdragon genotype: rr

Show genetic crosses between the following snapdragon parents, using the Punnett squares provided, and record the genotypic and phenotypic %s below:

a. Rr x Rr  
pink x pink

	<u>R</u>	<u>r</u>
<u>R</u>		
<u>r</u>		

RR \_\_\_\_\_ %  
Rr \_\_\_\_\_ %  
rr \_\_\_\_\_ %  
  
Red \_\_\_\_\_ %  
Pink \_\_\_\_\_ %  
White \_\_\_\_\_ %

b. red x white


RR \_\_\_\_\_ %  
Rr \_\_\_\_\_ %  
rr \_\_\_\_\_ %  
  
Red \_\_\_\_\_ %  
Pink \_\_\_\_\_ %  
White \_\_\_\_\_ %

c. pink x white


RR \_\_\_\_\_ %  
Rr \_\_\_\_\_ %  
rr \_\_\_\_\_ %  
  
Red \_\_\_\_\_ %  
Pink \_\_\_\_\_ %  
White \_\_\_\_\_ %

3. In horses, some of the genes for hair color are incompletely dominant. Genotypes are as follows: brown horses are BB, white horses are bb and a Bb genotype creates a yellow-tannish colored horse with a white mane and tail, which is called "palomino". Show the genetic crosses between the following horses and record the genotypic and phenotypic percentages:

a. brown x white


BB \_\_\_\_\_ %  
Bb \_\_\_\_\_ %  
bb \_\_\_\_\_ %  
  
Brown \_\_\_\_\_ %  
Palomino \_\_\_\_\_ %  
White \_\_\_\_\_ %

b. brown x palomino


BB \_\_\_\_\_ %  
Bb \_\_\_\_\_ %  
bb \_\_\_\_\_ %  
  
Brown \_\_\_\_\_ %  
Palomino \_\_\_\_\_ %  
White \_\_\_\_\_ %

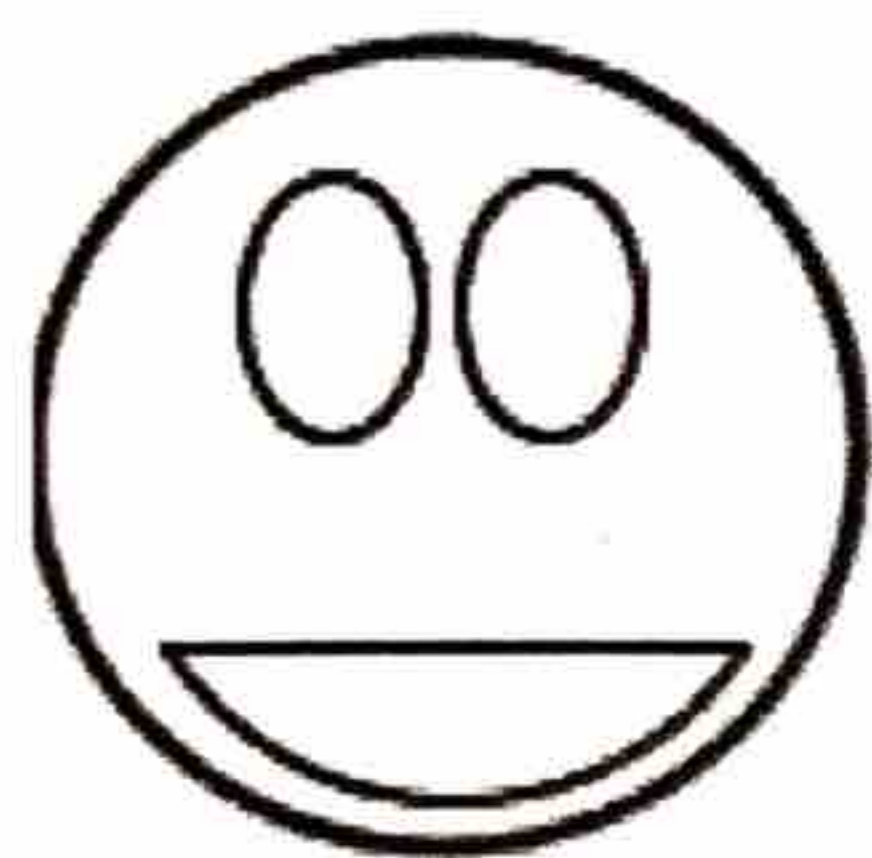
c. palomino x palomino


BB \_\_\_\_\_ %  
Bb \_\_\_\_\_ %  
bb \_\_\_\_\_ %  
  
Brown \_\_\_\_\_ %  
Palomino \_\_\_\_\_ %  
White \_\_\_\_\_ %

4. Can palominos be considered a purebred line of horses? Why or why not?

5. Which two colors of horse would you want to breed if you wanted to produce the maximum numbers of palominos in the shortest amount of time?

6. In Smileys, eye shape can be starred (SS), circular (CC), or a circle with a star (CS). Write the genotypes for the pictured phenotypes



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_


a. Show the cross between a star-eyed and a circle eyed.  
Write the phenotype and genotype frequencies next to the Punnett Square.


b. Show the cross between a circle-star eyed, and a circle eyed.  
Write the phenotype and genotype frequencies next to the Punnett Square.


c. Show the cross between two circle-star eyed.  
How many of the offspring are circle-eyed? \_\_\_\_\_  
How many of the offspring are circle-star eyed? \_\_\_\_\_  
How many are star eyed? \_\_\_\_\_

**Codominance Problems**

7. In some chickens, the gene for feather color is controlled by codominance. The allele for black is B and the allele for white is W. The heterozygous phenotype is known as erminette (black and white spotted).

- a. What is the genotype for black chickens? \_\_\_\_\_ White chickens? \_\_\_\_\_ Erminette chickens? \_\_\_\_\_
- b. If two erminette chickens were crossed, what is the probability that they will have a:  
Black chick? \_\_\_\_\_%      White chick? \_\_\_\_\_%


8. Camellia flowers can be red (R), white (W), or red-and-white flecked. Determine the genotype and phenotype probabilities from crossing a red flower with a red-and-white flecked flower.
