

Co-dominance Problem Set

1. In some cattle the genes for brown hair (B) and for white hair (W) are co-dominant. Cattle with alleles for both brown and white hair, have both brown and white hairs. This condition gives the cattle a reddish appearance from a distance, and is referred to as roan (BW).

For each of the following construct a punnett square and give phenotypic and genotype ratios of the offspring.

- a) a roan cow and a white bull
- b) a brown cow and a brown bull
- c) a white cow and a brown bull
- d) the F₂ of c)

2. Coat colour in cats is a codominant trait. Cats can be black, yellow or calico. A calico cat has black and yellow splotches. In order to be calico, the cat must have an allele for the black color and an allele for the yellow color. A female calico cat is crossed with a male black cat. What are the phenotypes and genotypes of the offspring and in what proportion?

3. Sickle-cell anemia has a codominant feature where the hemoglobin molecule can either be made in an A form or an S form. Heterozygotes will have both A and S form hemoglobin in their red blood cells. If two heterozygotes have a child together, what is the chance their child will also be heterozygous?