

INCOMPLETE DOMINANCE & CO-DOMINANCE PROBLEMS

1. In some cattle the genes for brown hair (B) and for white hair (W) are co-dominant. Cattle with both alleles have both brown and white hairs. This condition gives the cattle a reddish color, and is referred to as Roan (BW). What are the phenotype and genotype ratios of the offspring when
 - a) a roan cow and a white bull
 - b) a brown cow and a roan bull



2. In Japanese four o'clock plants red color (R) is incompletely dominant over white (r) flowers, and the heterozygous condition (Rr) results in plants with pink flowers. What are the phenotype and genotype ratios of the offspring when
 - a) a red plant and a pink plant
 - b) two pink plants



3. In some cats the gene for tail length shows incomplete dominance. Cats with long tails and cats with no tails are homozygous for their respective alleles. Cats with one long tail allele and one no tail allele have short tails. For each of the following construct a punnett square and give phenotypic and genotype ratios of the offspring.
 - a) a long tail cat and a cat with no tail
 - b) a long tail cat and a short tail cat



4. In northeast Kansas there is a creature know as a wildcat. It comes in three colors, blue, red, and purple. This trait is controlled by a single locus gene with incomplete dominance. A homozygous (BB) individual is blue, a homozygous (bb) individual is red, and a heterozygous (Bb) individual is purple.
 - a) What would be the genotypes and phenotypes of the offspring if a blue wildcat were crossed with a red one?
 - b) What are the genotypic and phenotypic ratios of the F₂ generation?

5. The lubber grasshopper is a very large grasshopper, and is black with red and yellow stripes. Assume that red stripes are expressed from the homozygous RR genotype, yellow stripes from the homozygous rr genotype, and both from the heterozygous genotype.
 - a) Is this incomplete or complete dominance?
 - b) What will be the phenotypic ratio and genotypic ratio of the F₁ generation resulting from a cross of two grasshoppers, both with red and yellow stripes?
 - c) What would the phenotype and genotype ratios of the offspring be if a grasshopper with both color stripes is crossed with a grasshopper with yellow stripes only?

