Biology 102
Example Genetic Problems

IN ORDER TO RECEIVE CREDIT ON AN EXAM OR QUIZ, YOU MUST SHOW ALL OF YOUR WORK.

1. If an allele **R** is dominant over **r,** how many different phenotypes are present in the progeny of a cross between **Rr** and **Rr**, and in what proportion are they formed?

   b). How many phenotypes are there, and in what ratio are they formed if there is **incomplete dominance** of **R** over **r**?

2. Distinguish between dominance and epistasis.

3. The coat colors of Labrador Retriever dogs are black, determined by the genotype **B_E_,** brown by genotype **bbE_**, and yellow by genotype **ee.** If dihybrid dogs with the following genotypes are mated, **BbEe x BbEe**, what phenotypes can be expected in the offspring and in what proportions?

4. A husband is suspicious because he has blood type B, his wife has blood type A, and their newborn child has blood type O. Are the husband's suspicions justified from considerations of genetics? **Show your work.**

5. A mouse having a single X chromosome and no Y chromosome (XO) is a fertile female. Assume that at least one X chromosome is required for viability, and give the sex ratio expected among surviving progeny from the mating XO x XY.

6. In a cross of a black-feathered Andalusian chicken with a strain having splashed-white feathers (in which there is uneven sprinkling of black pigment throughout the feathers), all the F_1 progeny are slate blue. The cross F_1 x F_1 produces black, slate blue and splashed-white in the ratio 1: 2: 1, respectively. What genetic hypothesis can account for these data?