**PRACTICE: NON-MENDELIAN GENETICS**

UNFAMILIAR PROBLEMS

1. Cat fur color is determined by codominance. The allele for tan fur (TT) and the allele for black fur (BB) are codominant. Heterozygous cats are called tabby cats. What would occur if a tan cat was crossed with a tabby cat? Identify the genotypes and phenotypes of their offspring.

If two tabby cats are crossed with each other, what is the ratio of different phenotypes of their offspring?

1. Suppose you identify a new gene in mice. One of its alleles specifies white fur color. A second allele specifies brown fur color. You want to determine whether the relationship between the alleles is simple dominance (and if so which color is dominant) incomplete or co-dominance. What sorts of genetic crosses would give you the answer? On what types of observations would you base your answers?



1. Mr. Howell died and left all his money to his two children. A young man claiming to be a lost third child sued for his share of the estate. The judge ordered blood tests for all family members and for the young man. Mr. Howell’s blood type was already on record. He had type AB blood. His wife had type A, and the young man who claimed to be the long lost son had type O blood. The judge quickly dismissed the case.

Do you agree or disagree with the judge’s decision? Explain your answer fully, using **correct** scientific reasoning.

1. Amelogenesis imperfecta is a dental abnormality, which is inherited as an X-linked recessive trait. Neither of your parents have the disorder but your father’s brother does. (Assume your mother is homozygous). What is the chance you will receive the recessive gene?
2. In cats, one gene for coat color is X-Linked. Male cats are either black or orange, depending on which allele they carry. Females are black, orange or tortoise-shell (Patches of black and orange), with the tortoise shell resulting form the heterozygous genotype. Cross a black furred female with an orange male. What are the possible phenotypes and genotypes?
3. In cats, one gene for coat color is X-Linked. Male cats are either black or orange, depending on which allele they carry. Females are black, orange or tortoise-shell (Patches of black and orange), with the tortoise shell resulting from the heterozygous genotype. Two cats mate and have kittens. Of the females, ½ are tortoise-shell, ½ are orange. Of the male kittens, ½ are orange and ½ are black. What are the genotypes and phenotypes of the parent cats?