Genetics Problems
Set 1: Monohybrid Crosses

Show <u>all work</u> (genotypes, phenotypes and punnet squares) for each problem.

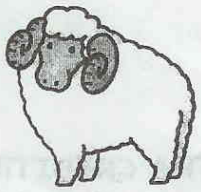
1. In bears, black fur (B) is dominant to white fur (b). Determine the expected genotypic and phenotypic ratios resulting from crosses between the following:

- Homozygous black x white
- Two heterozygous blacks
- Heterozygous black x white

2. Determine the result of a cross between two tomato plants that are homozygous dominant for fruit color (R for red, r for yellow). Now show a cross between two plants that are heterozygous for fruit color. Show the genotypic and phenotypic ratios.

3. In sheep, white color is due to the dominant gene (W) and black is die to the recessive allele (w). A white ewe is mated to a white ram and the mating produces black twins. If they produce another offspring, could it be white? (Show your work!) What are the genotype of the ewe and the ram?

4. In humans, brown eyes (B) are dominant to blue eyes (b). If two parents have 6 children who all have brown eyes, what are the possible genotypes for each member of the family?



5. The parents of a blue eyed man were both brown eyed. He marries a brown eyed woman whose father was brown eyed and whose mother was blue eyed. What are the probable genotypes for each of these individuals?

6. In cattle, black coat is dominant to white coat. A farmer has a black male of undetermined genotype. How can the farmer determine the genotype of the male?

7. Determine the results of a cross between two tomato plants that are both heterozygous for stem color (P is purple, p is green). List all genotypes and phenotypes of the first generation offspring and give the ratios for each.

8. Determine the results of a cross between two tomato plants that are both homozygous recessive for leaf type (C is cut, c is uncut). List all genotypes and phenotypes of the first generation offspring and give the ratios for each.

9. Determine the results of a cross between two tomato plants that are both homozygous dominant for fruit color (R is red, r is yellow). List all genotypes and phenotypes of the first generation offspring and give the ratios for each.

10. Determine the genotypes for parents of one of your blonde haired friends, if both of his or her parents have brown hair (B is brown, b is blonde).

EXTRA CREDIT!!

In moose, brown coat (B) is dominant to albino (b), and rough coat (R) is dominant to smooth coat (r). Two animals are selected for breeding and their genotypes are BBRR and bbrr. Specify the following:

- The genotypes and phenotypes for the F1 generation.
- The genotypes and phenotypes for the F2 generation.
- A cross between a F1 and a BBRr moose (genotypes and phenotypes).