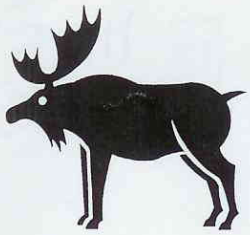
Genetics Problems
Set 2: Dihybrid Crosses

Show all work (genotypes, phenotypes and punnet squares) for each.

Example: 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.

*F1 Generation: BBRR x bbrr... all F1 will be BbRr, brown and rough

*F2 Generation: BbRr x BbRr...

-9 unique genotypes (see square)
-Phenotypes: 9:3:3:1 (Brown rough, Brown smooth, Albino rough, Albino smooth)

	BR	Br	bR	br
BR	BBRR	BBRr	BbRR	BbRr
Br	BBRr	BBrr	BbRr	Bbrr
bR	BbRR	BbRr	bbRR	bbRr
br	BbRr	Bbrr	bbRr	bbrr

*BbRr x BBRr...

-6 unique genotypes (see square)
-Phenotypes: 6 Brown rough, 2 Brown smooth, 0 Albino rough, 0 Albino smooth (6:2:0:0)

	BR	Br	bR	br
BR	BBRR	BBRr	BbRR	BbRr
Br	BBRr	BBrr	BbRr	Bbrr

Problems

1. In pea plants, round seeds (R) are dominant to wrinkled seeds (r) and tall plant height (T) is dominant to dwarf (t). Cross two pea plants that are both heterozygous for seed type and height. Show your genotypes, phenotypes and punnet square.

2. In cocker spaniels, black color is dominant (B) and red color is recessive (b). Solid coloring is also dominant (S) to spotted coloring (s). A solid red male was mated to a spotted black female. Of the five puppies, one was black and white, two were red and white, one was black and one was red. What were the genotypes of the parents?

3. In tomato plants, Red fruit (R) is dominant to yellow fruit (r) and cut leaf types (C) are dominant to uncut leaf types (c). Determine the results of a cross between a tomato plant that is homozygous dominant for both traits and another plant that is heterozygous for both traits. Show the genotypic and phenotypic ratios.

4. Now show a cross between one tomato plant that is homozygous recessive for color, heterozygous leaf type and another plant that is heterozygous for fruit color, homozygous dominant for leaf type. Use the alleles given in problem #3 for color and leaf type. Show the genotypic and phenotypic ratios.

5. Two black crested chickens are mated. They produce 13 offspring – 7 crested, 3 red crested, 2 black plain and one red plain. (Black is dominant to red and crested is dominant to plain heads.) What were the genotypes of the parents?

6. A plant is wanted which has the genotype Aabb. Given parental combinations of AABB and aabb, show how you would obtain such a plant. How would you test the genotype of the plant once you think you have obtained it?