Name_____**Date**_____**Period**_____ Bio K/H

Day 5 Mendelian Genetics- Dihybrid Crosses (Crossing 2 Traits/Factors)

Review of Monohybrid Crosses:

- Remember, monohybrid crosses involve only _____trait

  Example: In fruit flies, red eyes are dominant over white eyes. RR x rr

  In this example you are only examining the _____ _____ trait.

Dihybrid Cross: the study of _____ pairs of contrasting traits at the same time

Example: Fur color WITH Coat Texture

Fur Color:	Coat Texture:
B: Black	R: Rough
b: White	r: Smooth

Mother is black fur AND rough coat
BbRr

Father is black fur AND rough coat
BbRr

Notice that each parent has _____ _____so that results in _____ _____ (1 trait= 2 alleles)

The Law of Independent Assortment

- During_____formation, segregating pairs of unit _____ (alleles) assort _____ of each other when on different chromosomes.
  - The two traits are inherited totally independently of each other.
  - Example: Fur color is inherited independently of coat texture.

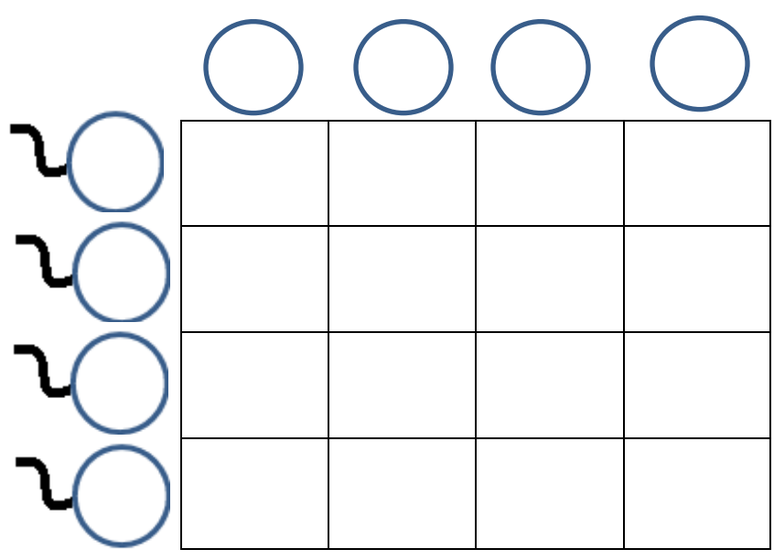
Sample problem 1: We will cross a heterozygous individual with another heterozygous individual. Their genotypes will be **BbRr x BbRr**

Step 1: Find ALL possible gametes that can be made from each parent.
Remember, each gamete must have one B and one R. **USE THE FOIL METHOD**

B b R r x B b R r

Step 2: Arrange all possible gametes for one parent on the top of your Punnett Square and the other parent on the side

Fur Color:	Coat Texture:
B: Black	R: Rough
b: White	r: Smooth



Step 3: Fill in the Punnett Square
(find the possible genotypes of the offspring)

Step 4: Figure out the genotypic and phenotypic ratios:

How many of the offspring would have a black, rough coat? _____
How many of the offspring would have a black, smooth coat? _____
How many of the offspring would have a white, rough coat? _____
How many of the offspring would have a white, smooth coat? _____

Phenotypic ratio _____:_____:_____:_____

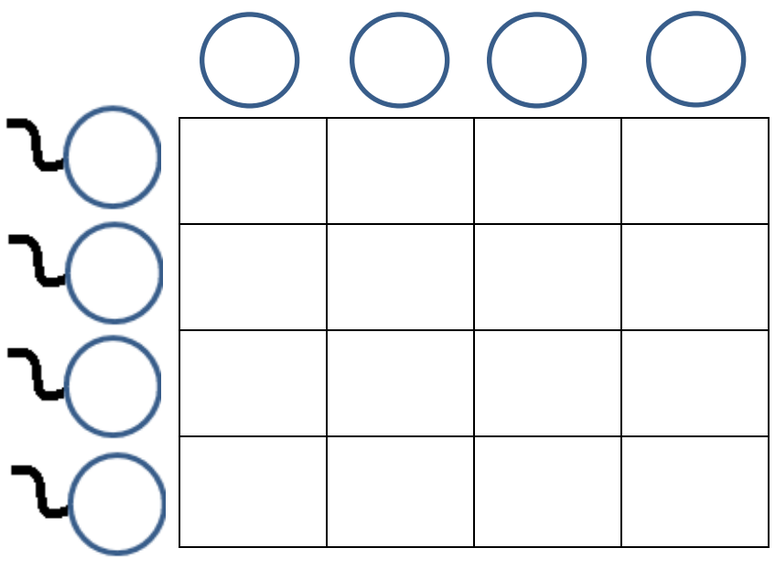
Sample Problem 2:
What are the genotypic and phenotypic ratios in the offspring resulting from a cross between two people heterozygous for eye color and eyelash length? What is the phenotype of the parents in this cross?

B – Brown L - Long
b – Blue l – short

Parents are **heterozygous** for both traits. The cross is B b L l x B b L l.

STEP 1: Determine the possible gametes that the parents can produce. USE FOIL for independent assortment

STEP 2: Enter the possible gametes at the top and side of the Punnett square.
Always keep the same letter first and capitals of each first.



STEP 3: Complete the Punnett square by writing the alleles from the gametes in the appropriate boxes. The alleles from the gamete above the box and the alleles from the gamete to the side of the box are combined inside each of the boxes. The letters inside each box represent the probably genotypes of the offspring resulting from the cross.

STEP 4: Determine the genotypes of the offspring.
Count each row from left to right (as you read). Mark each one as it is used.

Determine the phenotypes of the offspring.
Count each row vertically (top to bottom).

Genotypes: Phenotypes:

Practice Problems: In mice, the ability to run normally is a dominant trait. Mice with this trait are called running mice (R). The recessive trait causes mice to run in circles only. Mice with the trait are called waltzing mice (r). Hair color is also inherited in mice. Black hair (B) is dominant over brown hair (b). For each of the following problems, draw a Punnett Square in the space provided and fill in the information on the indicated lines.

CREATE THE KEY:

1. Cross a heterozygous running, brown mouse with a heterozygous running, homozygous black mouse

Parents: _____X_____

Genotype:

Phenotype:

2. Cross a hemophilic man with blood type AB with a hemophilic-carrier woman with blood type A (homozygous).

Parents: _____X_____

Genotype:

Phenotype:

3. A colorblind man with type B blood, whose dad was type O marries a normal woman with no colorblindness in her family and has type AB blood. What are the possible ratios for future children?

Parents: _____X_____

Genotype:

Phenotype: