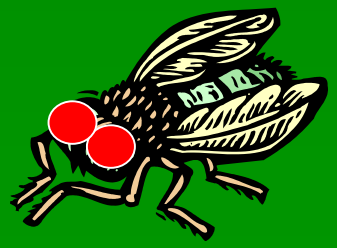
Dihybrid Crosses

Review of Monohybrid Crosses

- Remember, monohybrid crosses involve only **ONE** trait

Example: **In fruit flies, red eyes are dominant over white eyes.**

In this example you are only examining the EYE COLOR trait.



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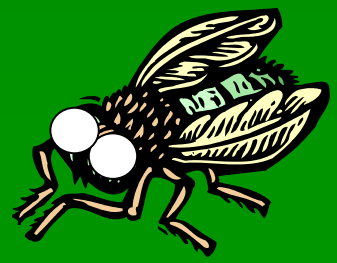

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Dihybrid Cross:

The study of **2** pairs of contrasting traits at the same time

Example: Fur color WITH Coat Texture

Fur Color:
- B: Black
- b: White

Coat Texture:
- R: Rough
- r: Smooth

Mother is black fur AND rough coat

Father is black fur AND rough coat

BbRr x BbRr

Notice that each parent has **2 traits** so that results in **4 alleles** (1 trait= 2 alleles)

Mendel's Law

The Law of Independent Assortment

- During gamete formation, segregating pairs of unit **factors** (alleles) assort independently of each other when on different chromosomes.
  - the two traits are inherited totally independently of each other.
  - Ex. Fur color is inherited independently of coat texture.

Example: We will cross a heterozygous individual with another heterozygous individual. Their genotypes will be

BbRr x BbRr

Dihybrid Cross

BbRr x BbRr

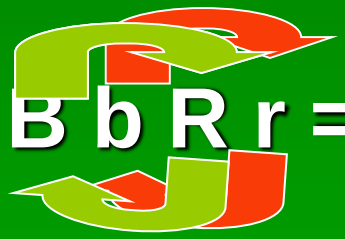
Step 1: Find ALL possible gametes that can be made from each parent.

Remember, each gamete must have one B and one R.

Determine the Gametes . .

HINT: Foil to get the gametes

- BbRr X BbRr



B b R r = BR, Br, bR, br

Mom's 4 gametes will have only 1 allele for each trait due to meiosis (half)

Dad's 4 sperm will result in the same 4 since he is also heterozygous

Dihybrid Cross

BbRr x BbRr

Possible gametes:

BR

Br

bR

br

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

BbRr x BbRr

Fur Color:

B: Black

b: White

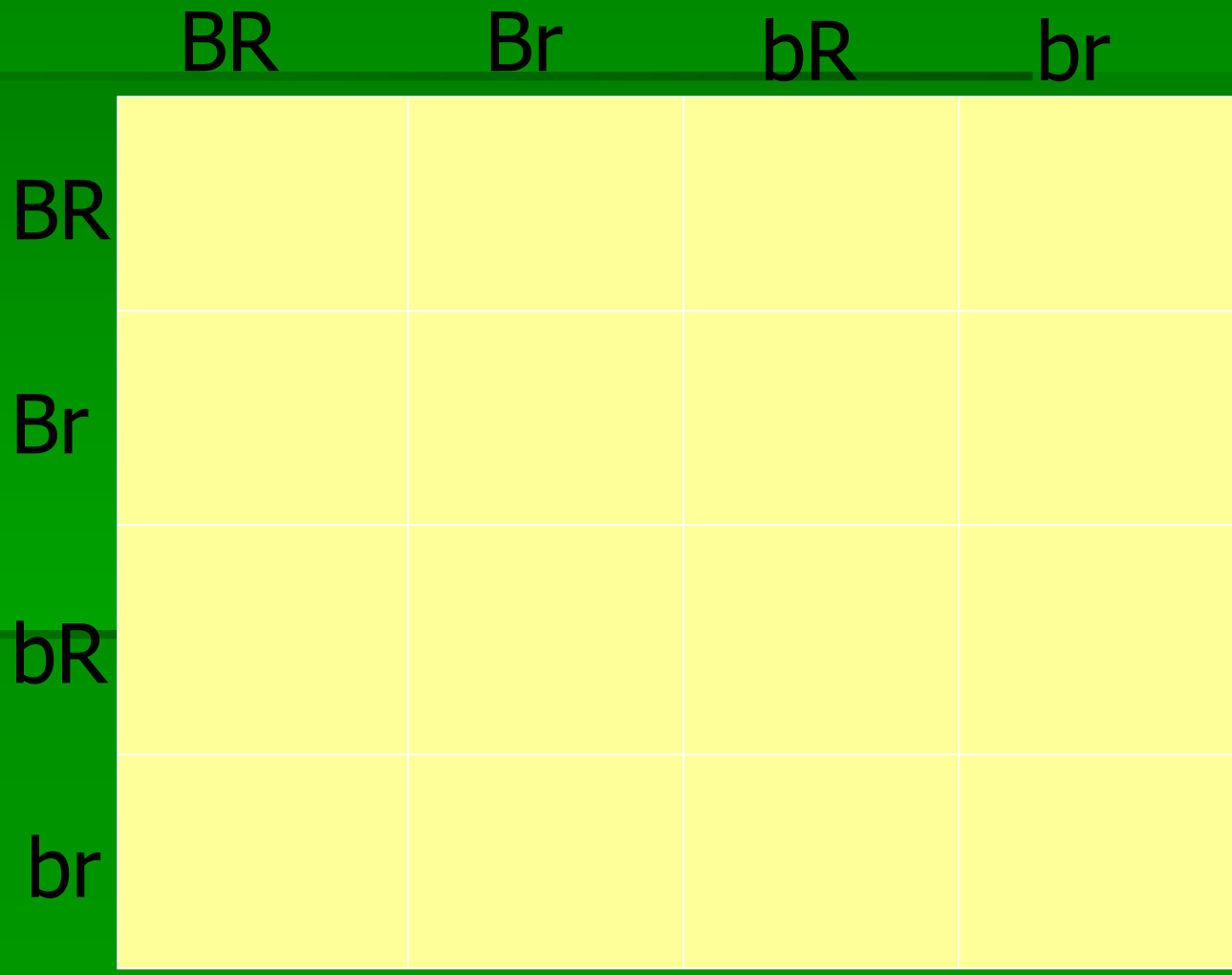
Coat Texture:

R: Rough

r: Smooth

Step 3: Fill in the Punnett Square

(find the possible genotypes of the offspring)



Dihybrid Crosses:

BbRr x BbRr

Fur Color:
- B: Black
- b: White

Coat Texture:
- R: Rough
- r: 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

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?

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

Fur Color:
B: Black
b: White

Coat Texture:
R: Rough
r: Smooth

How many of the offspring would have 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?

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

Phenotypic Ratio=

9:3:3:1

Fur Color:
B: Black
b: White

Coat Texture:
R: Rough
r: Smooth