

Table of Contents

<u>Date</u>	<u>Assignment</u>	<u>Pg #</u>
12/16/16	Cell Exam Corrections <i>Genetics</i>	27R
1/4/17	DNA Extraction Lab	28R
1/6/17	Discovering DNA	29R
1/10/17	DNA Notes	30R
1/12/17	Trait Inventory	31R
1//17	Baby Face Lab	32R
1/19/17	Punnett Squares	33R

Catalyst:

How would you determine what traits a baby would inherit from its parents?

Reflection:

Punnett Squares 1/19/17

33L

33R

Catalyst:

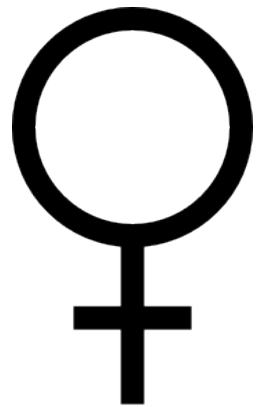
How would you determine what traits a baby would inherit from its parents?

Reflection:

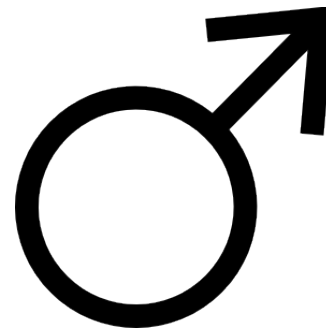
Punnett Squares 1/19/17

Important to know before getting started:

Female



Male



Punnett's Square

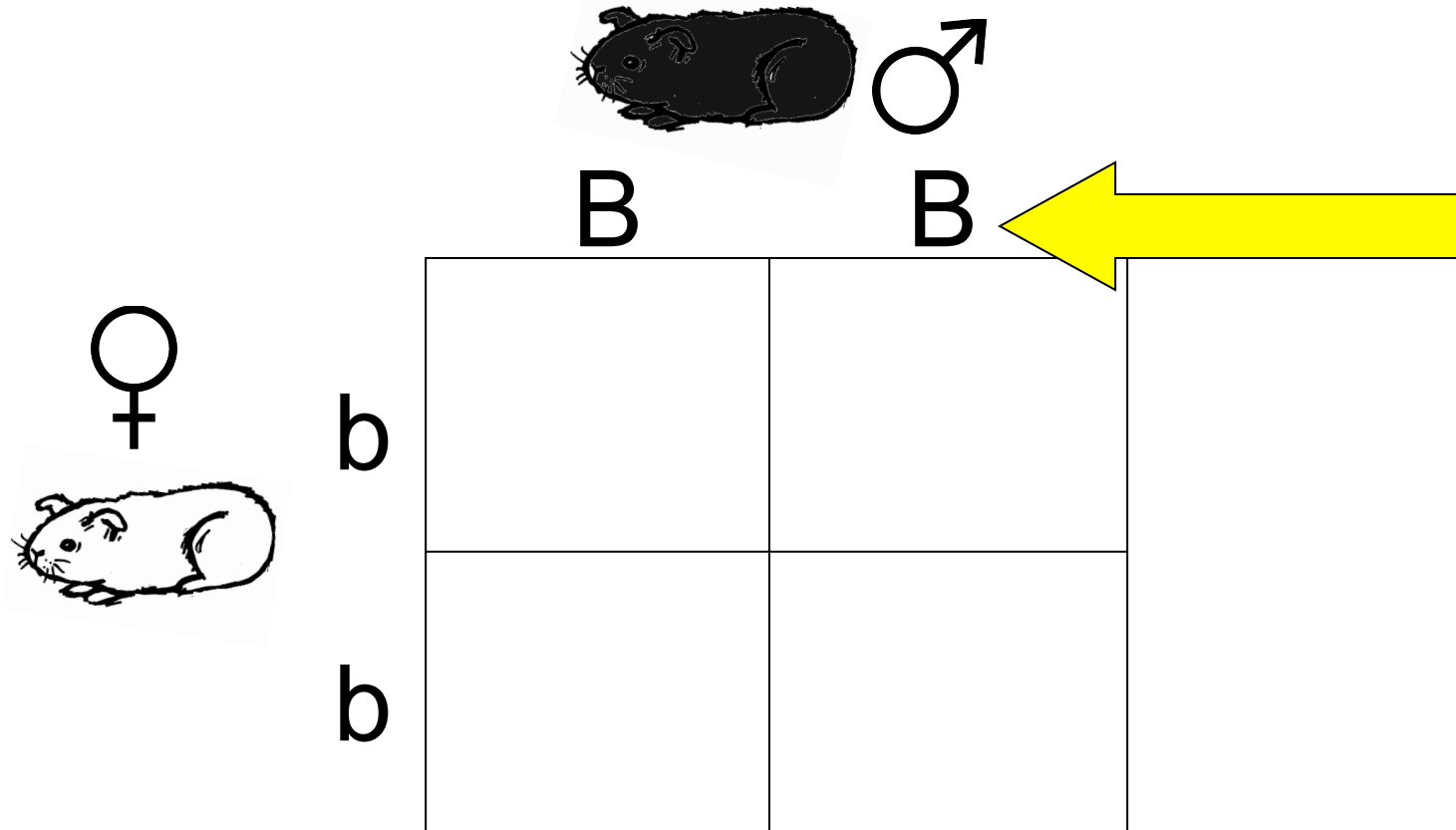
Scientists use a Punnett's square to determine the possible genetic outcomes for the offspring that result from the combination of the parent's genes.

We will use the Punnett's Square to determine the offspring of guinea pigs. The offspring will either be black or white.



*Black colored fur is the **dominant** trait.*

Generation 1



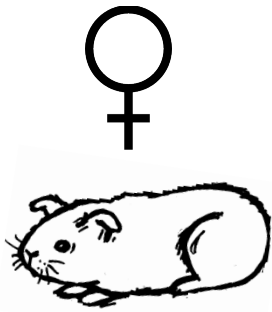
In this case we have a dad with black fur and a mother with white fur. Because black is the dominant gene, we write it with a capital 'B'.

Generation 1



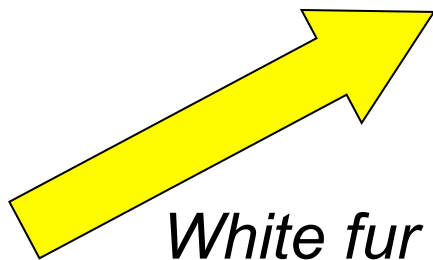
B

B



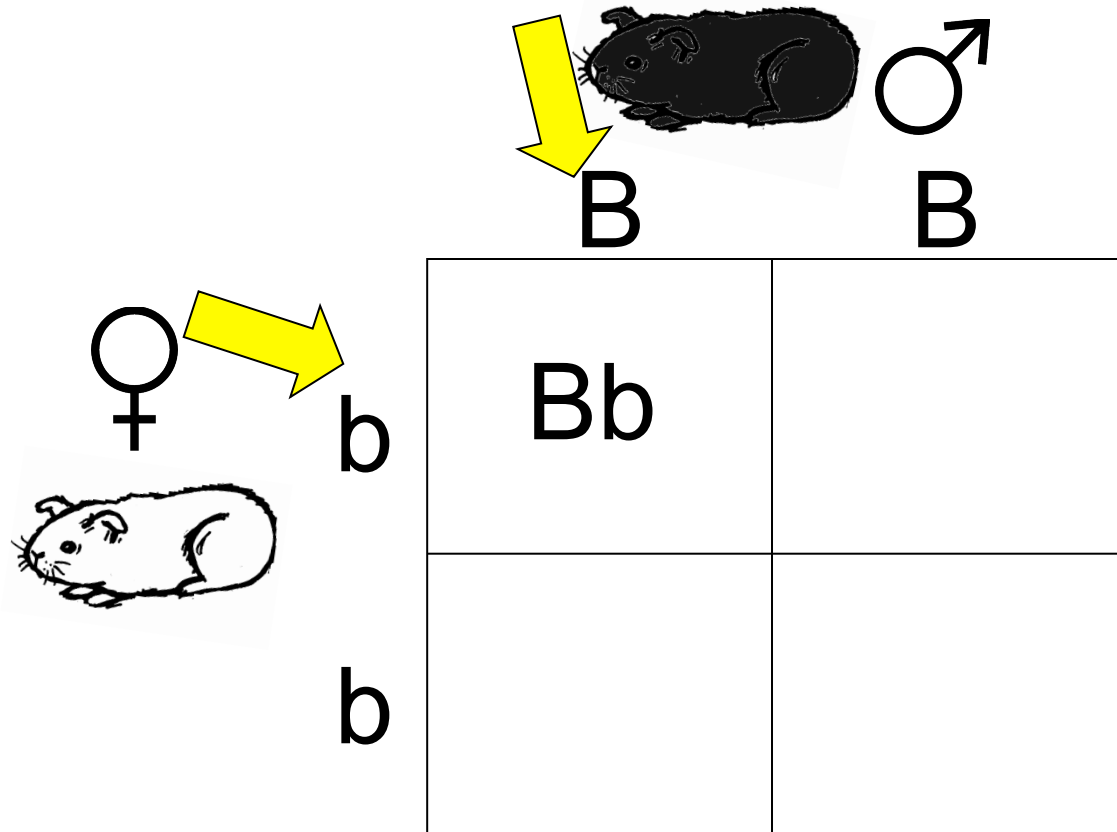
b

b



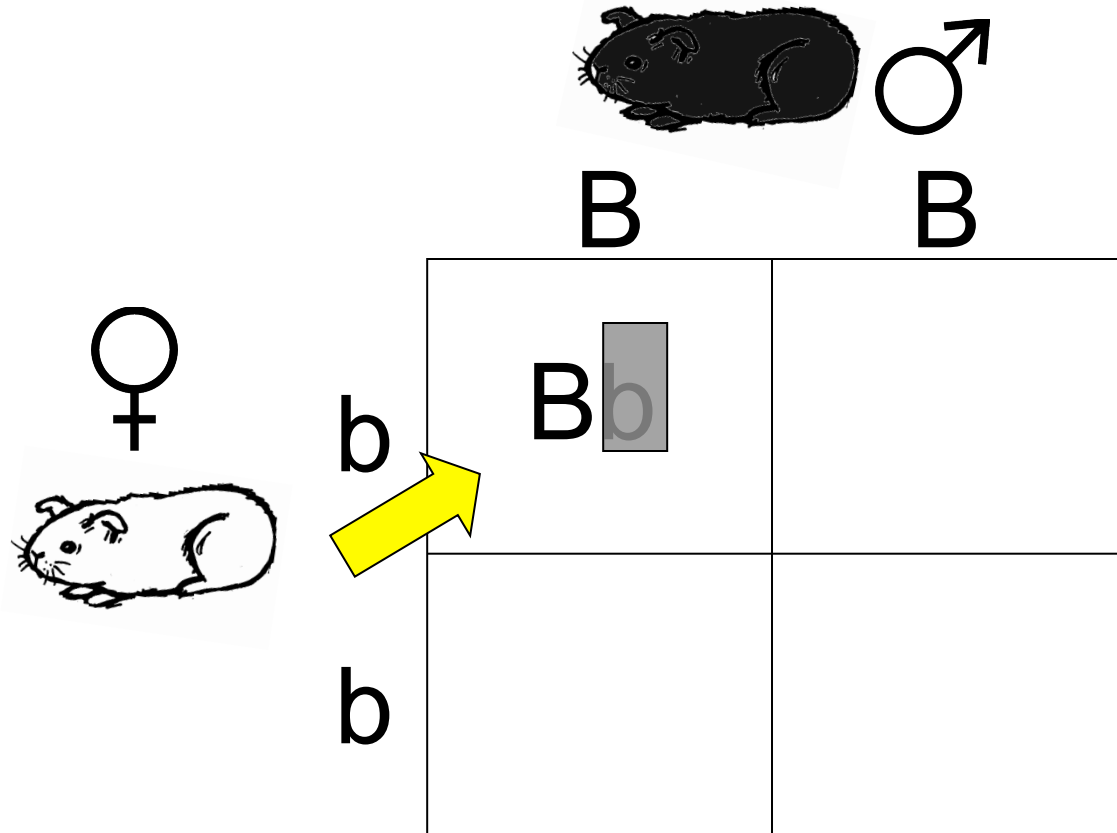
*White fur is a **recessive** trait. It is written with a lowercase 'b'. It does not matter what letter we choose to represent a gene, but capital letter is always dominant and lowercase is always recessive.*

Generation 1



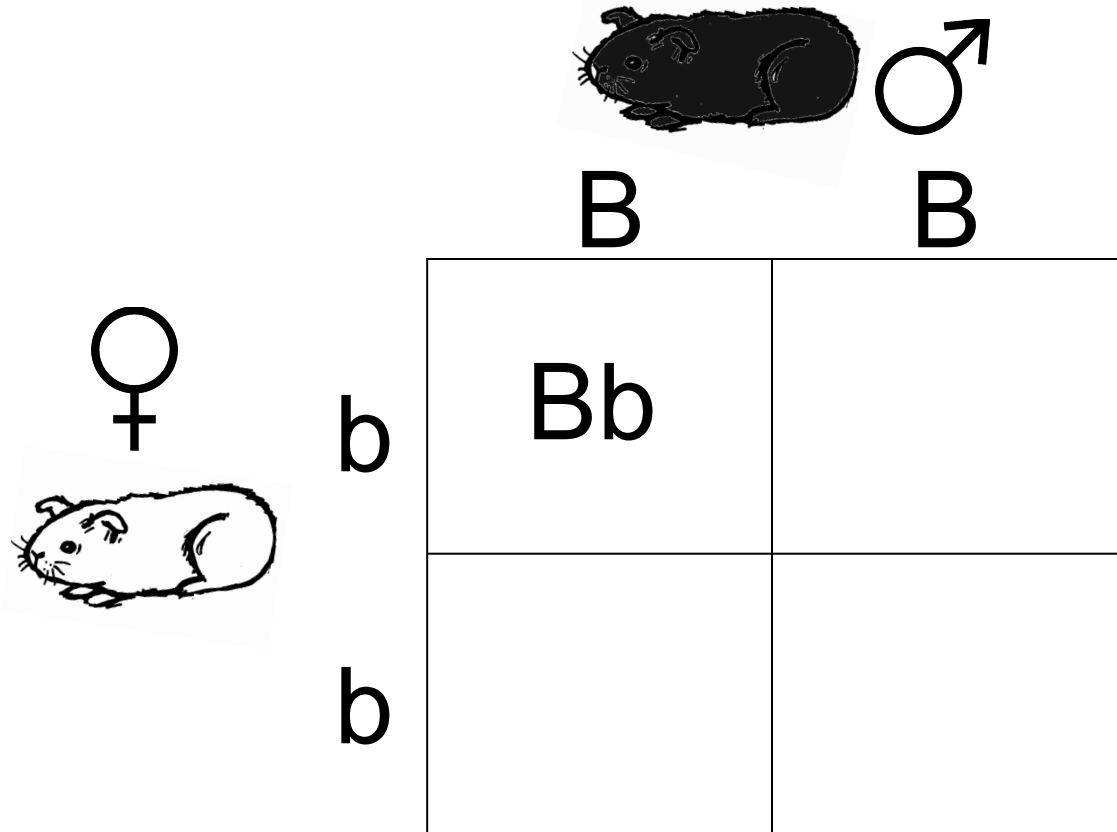
To complete the Punnett's square we combine the gene from mom with the gene from dad. We always write the dominant gene first.

Generation 1



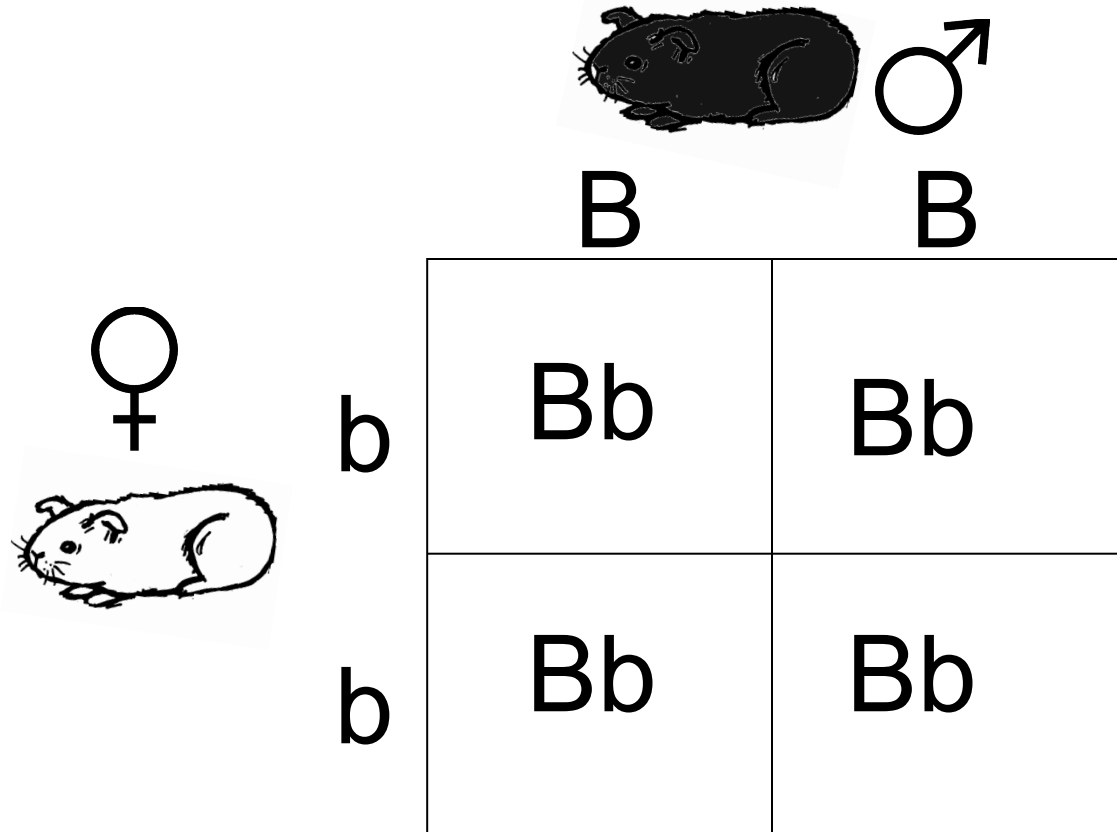
We write the dominant gene first because it “masks” the recessive gene. Therefore, the color of the guinea pig with the genes Bb would be black.

Generation 1



Copy this Punnett's square into your notebook. Try and fill out the remaining offspring on your own. When you are done, go to the next slide.

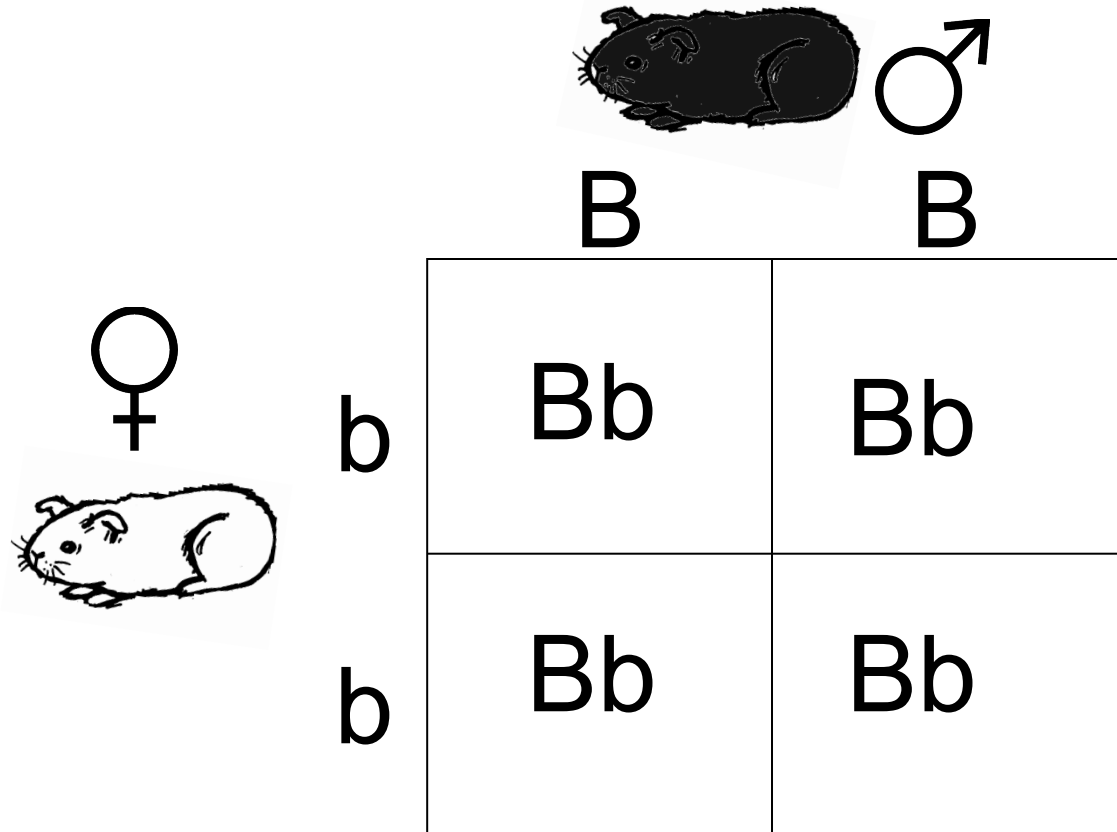
Generation 1



We say an individual is **heterozygous** when it has two different genes.

What percentage of these offspring are heterozygous?

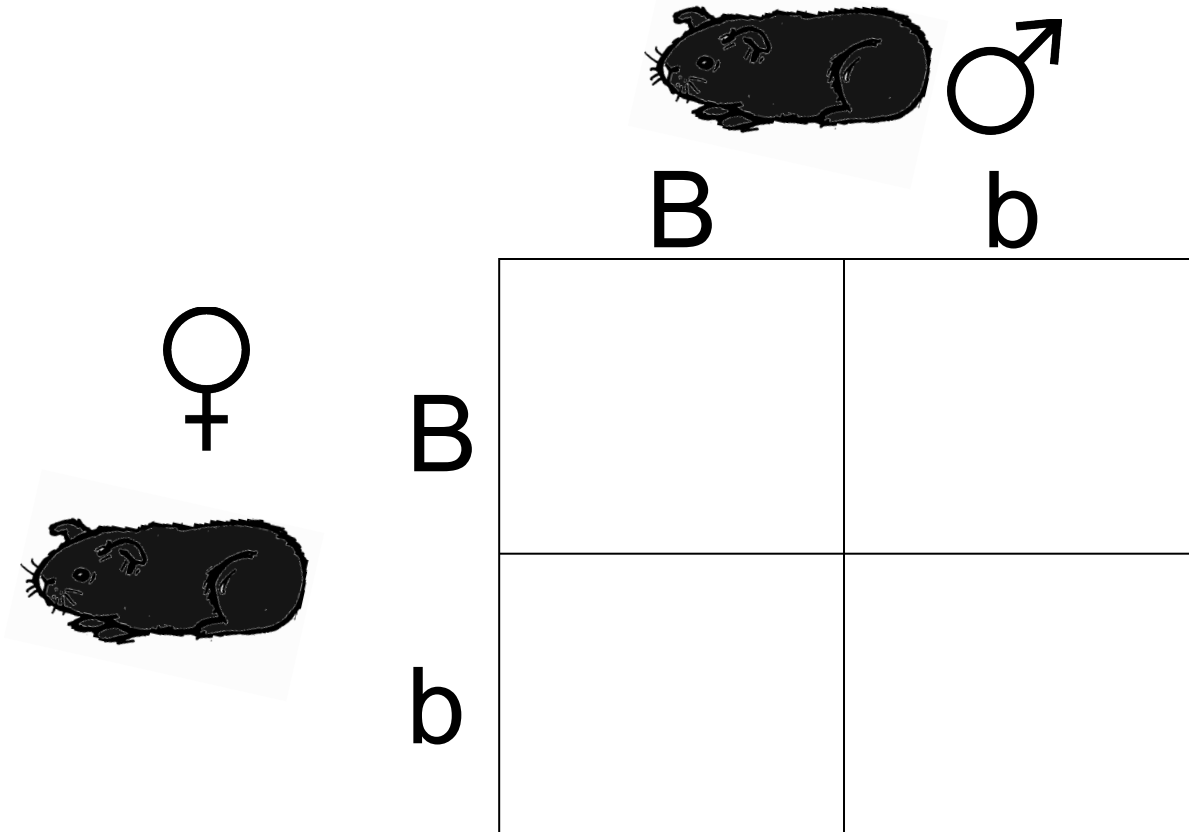
Generation 1



100% are heterozygous black.

We will now take one female and one male from this generation to cross for our second generation.

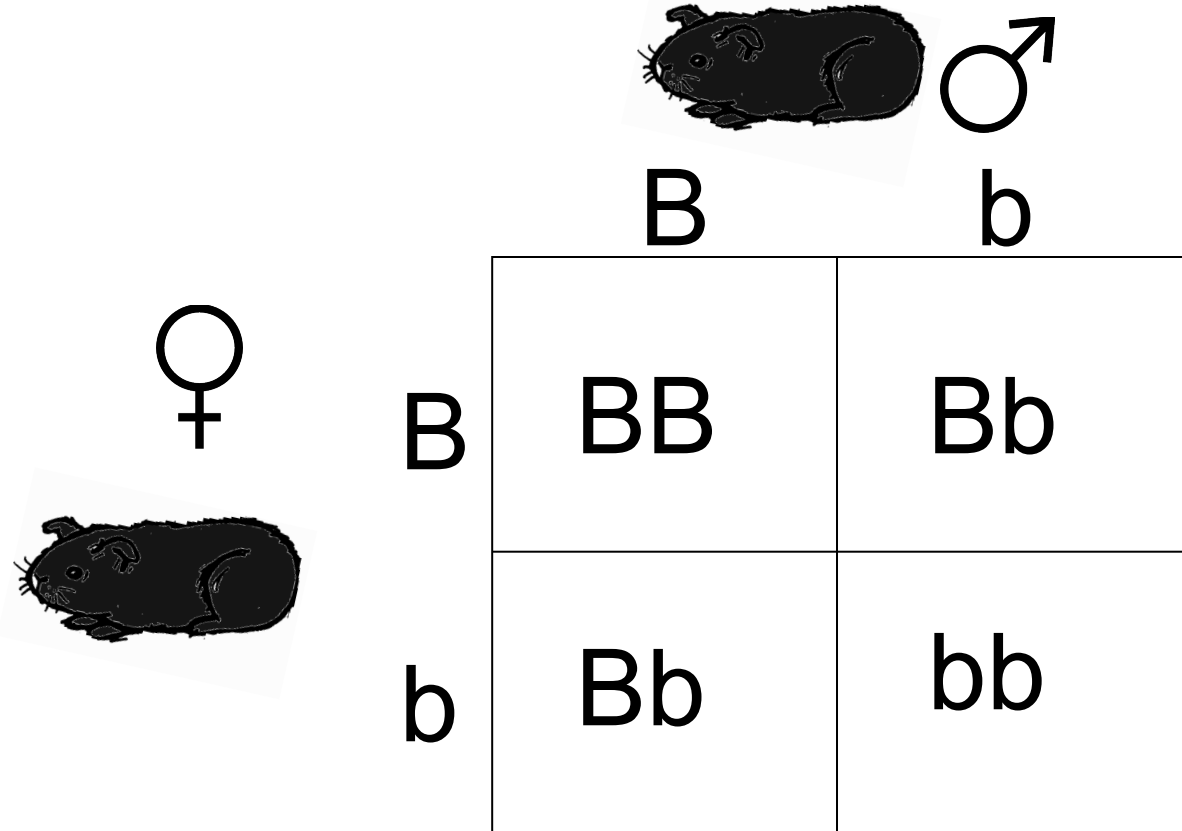
Generation 2



What will the gene combinations be for these offspring?

Copy this into your notebook and try to fill out the Punnett's square. Continue when you are done.

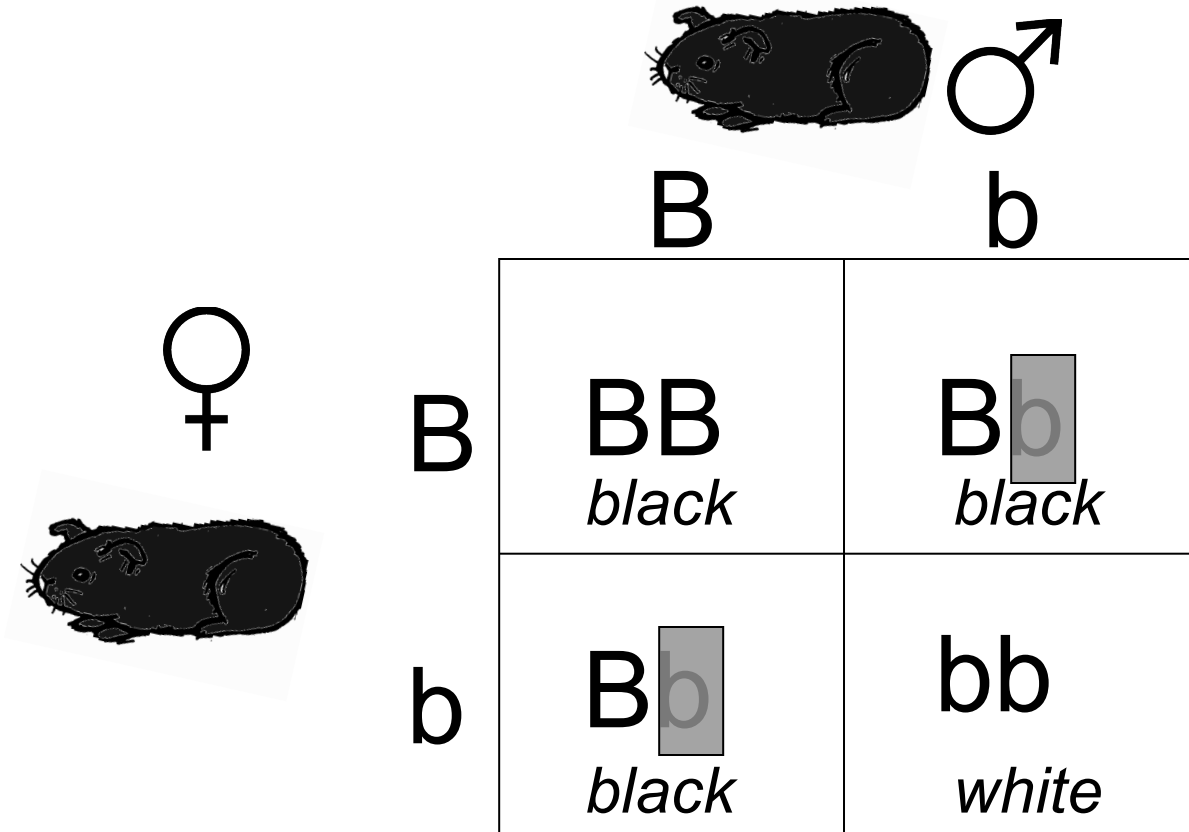
Generation 2



*What you have completed is the **genotype** for all the offspring. Genotype refers to the gene combination that an individual has.*

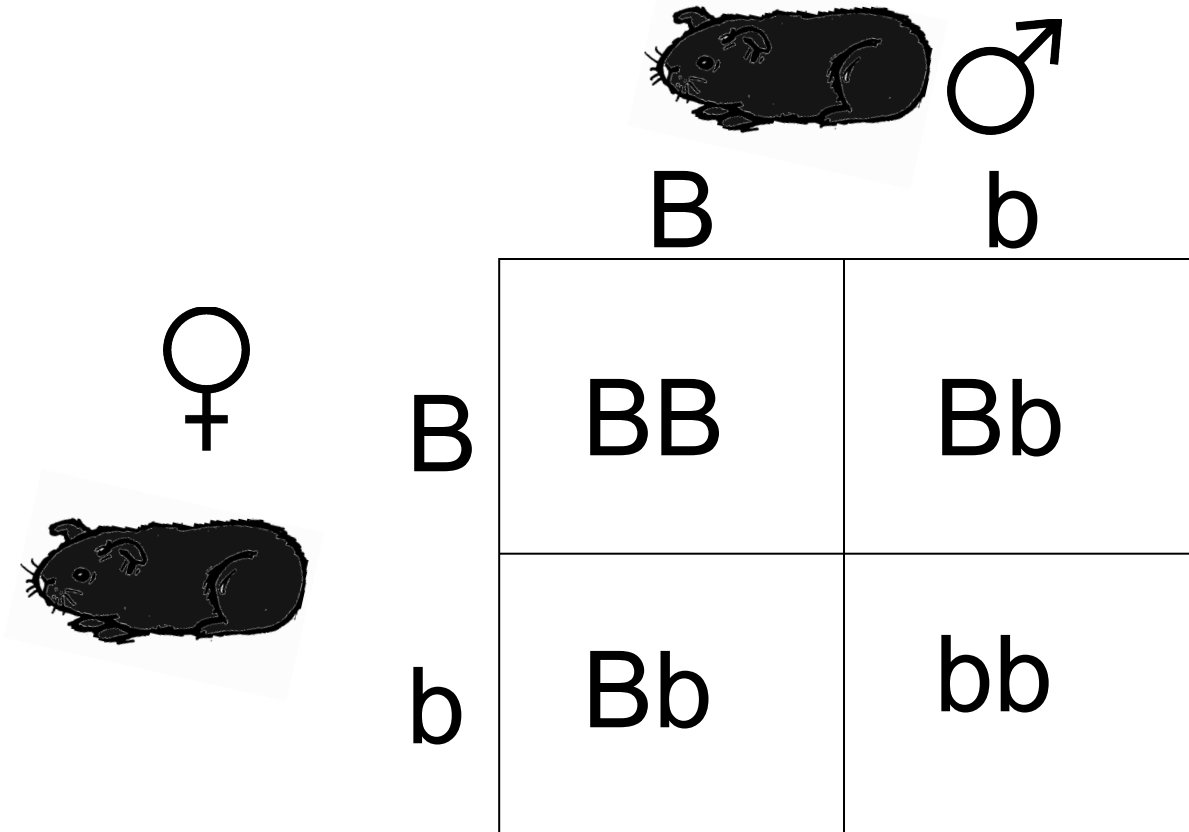
Can you figure out what color these offspring will be?

Generation 2



*What you have just determined is called the **phenotype**. The phenotype is what we see as a result of an individual's genes.*

Generation 2



We say an individual is **homozygous** when it has two of the same genes.

Can you find a homozygous black guinea pig?

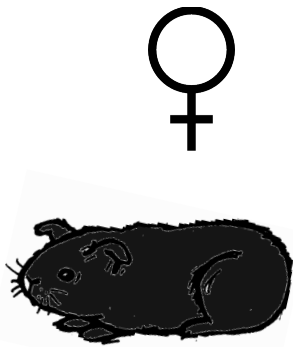
Generation 2

This individual is homozygous black.



B

b



♀

B

BB

Bb

b

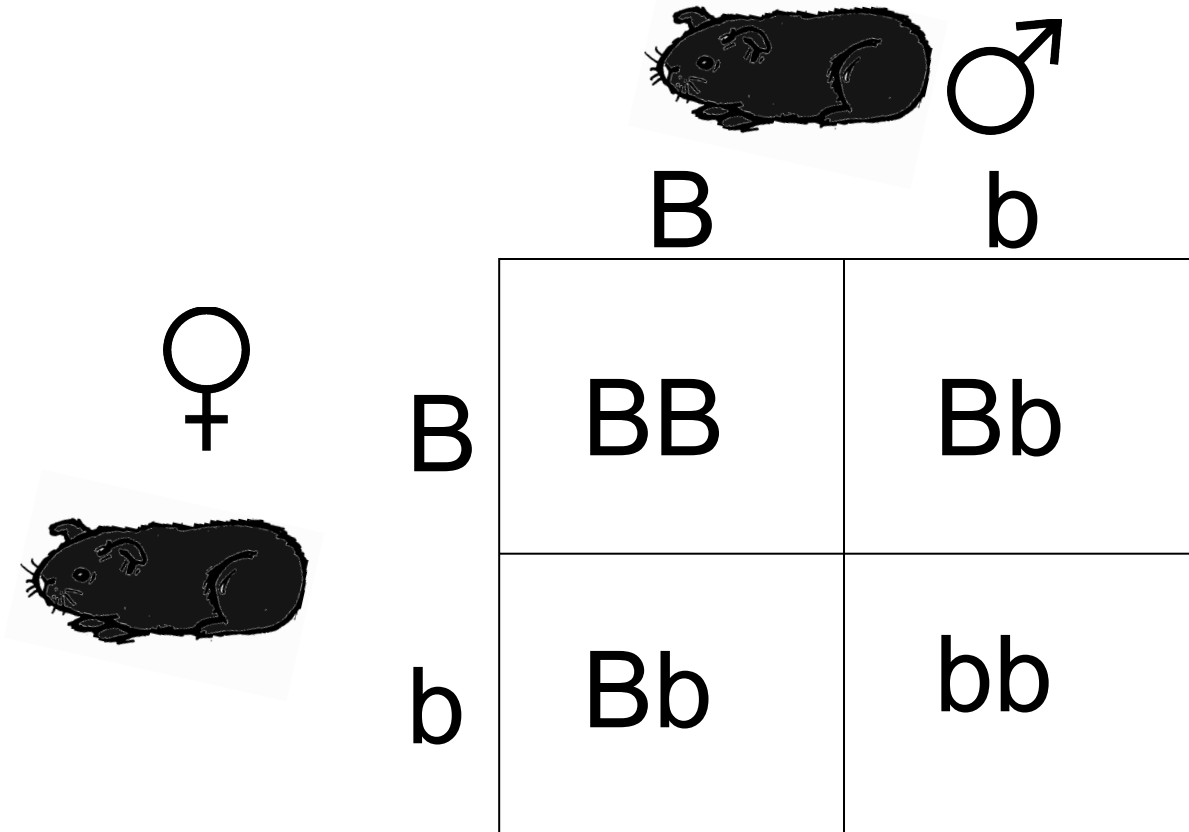
Bb

bb

The entire Punnett's square represents all possible outcomes. That means each small box represents 25% of the offspring.

What percentage of the offspring are homozygous black?

Generation 2



25% of the offspring are homozygous black.

Try the next two on your own:

_____ % are homozygous white

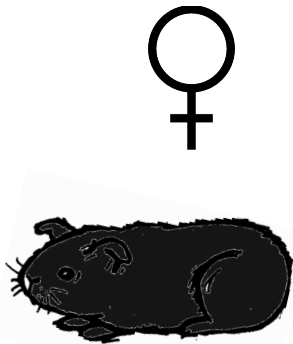
_____ % are heterozygous black

Generation 2



B

b



B

BB

Bb

b

Bb

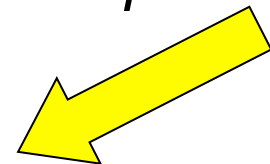
bb

25% are homozygous black.

25% are homozygous white

50% are heterozygous black

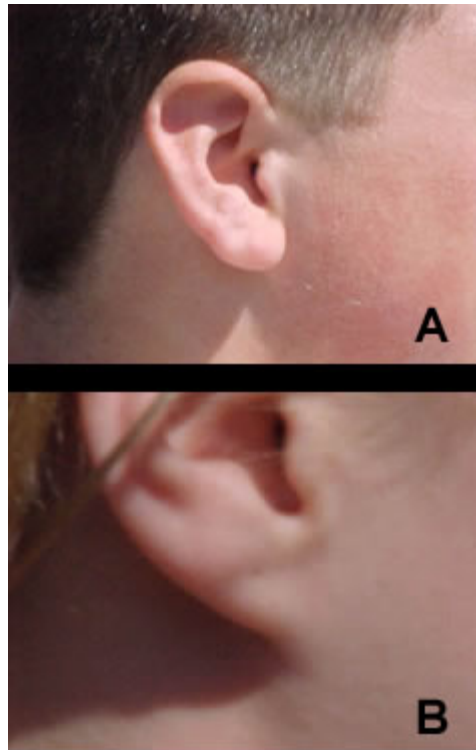
Notice: This will always add up to 100%.



Now we will examine some human traits.

Earlobes can be either unattached (A) or attached (B)

Unattached

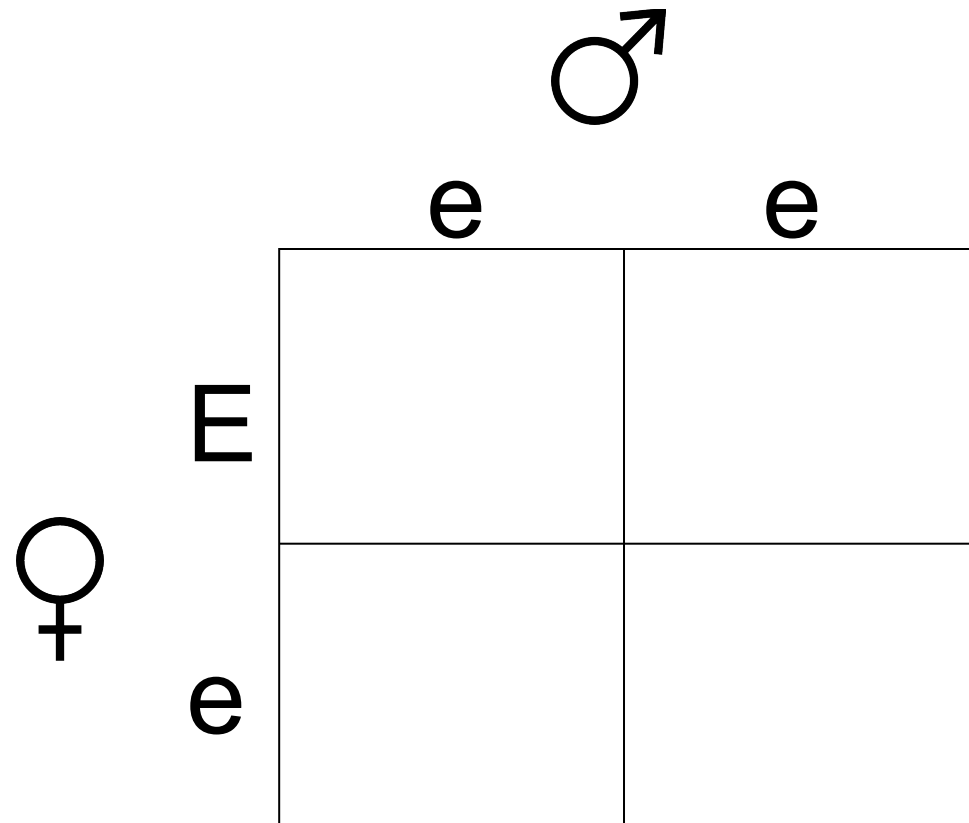


Attached

*The unattached earlobe is the **dominant** trait.*

*The attached earlobe is the **recessive** trait.*

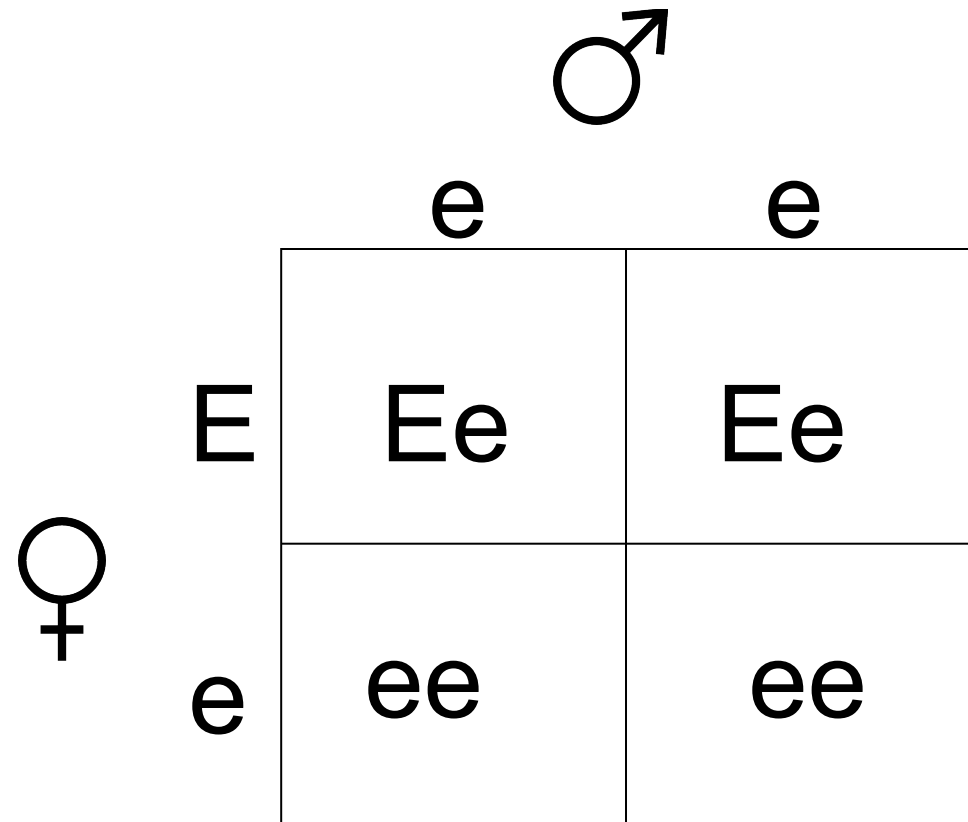
Earlobes



*Copy this Punnett's square into your notebook.
Determine both the genotype and phenotype.*

What percent of offspring will have attached earlobes?

Earlobes



50% percent of offspring will have attached earlobes.

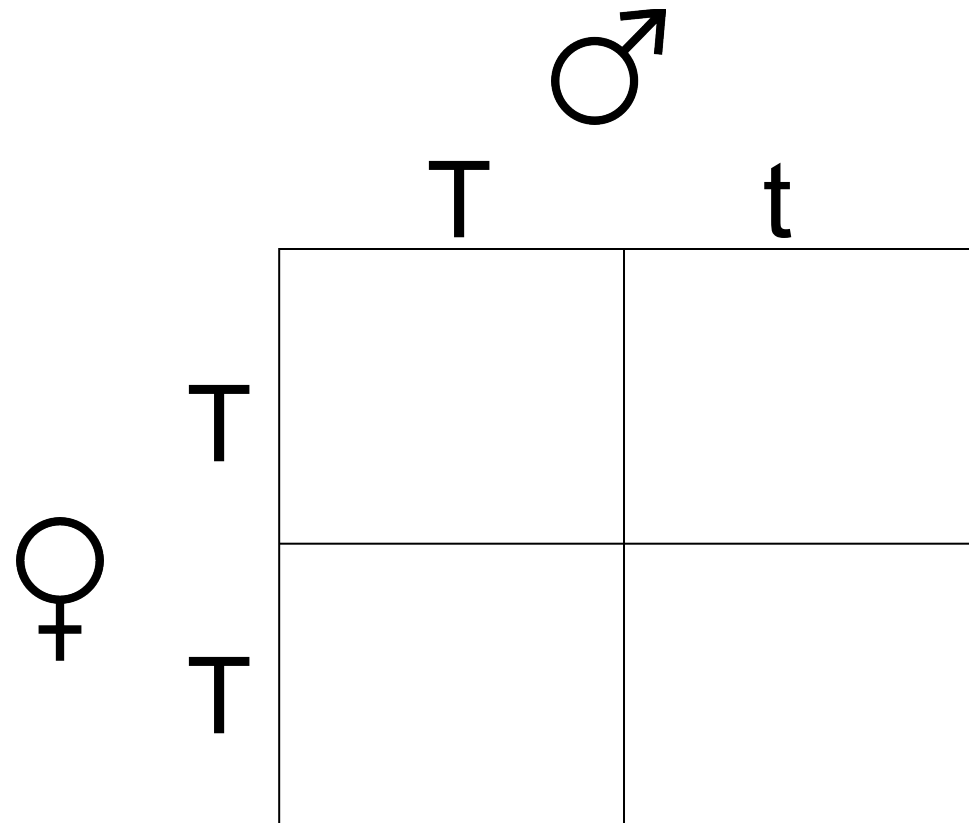
The ability to curl your tongue is also genetic.



*Tongue curling is the **dominant** trait.*

*Non-curling is the **recessive** trait.*

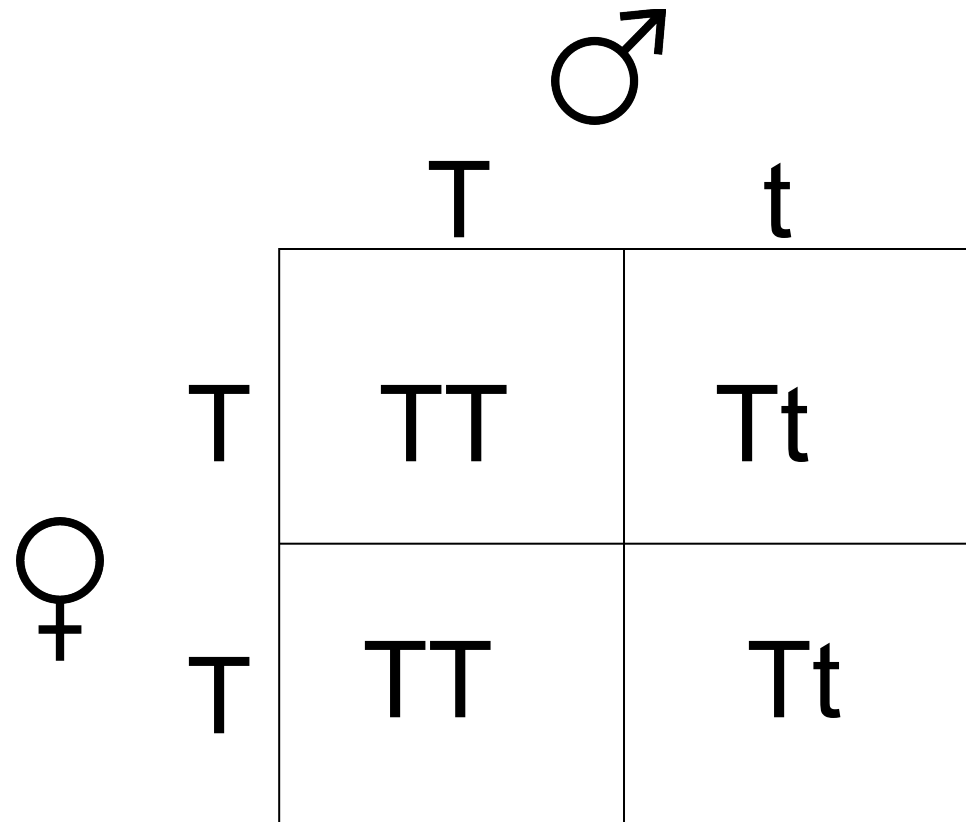
Tongue Curling



Copy into your notebook and complete the Punnett's Square.

What percentage of offspring will be able to curl their tongue?

Tongue Curling



100% percent of offspring will be able to curl their tongues.

Incomplete Dominance

*The petal color of pea flowers is an example of **incomplete dominance**. Both genes for white and red flowers are equally dominant, which results in a new phenotype.*

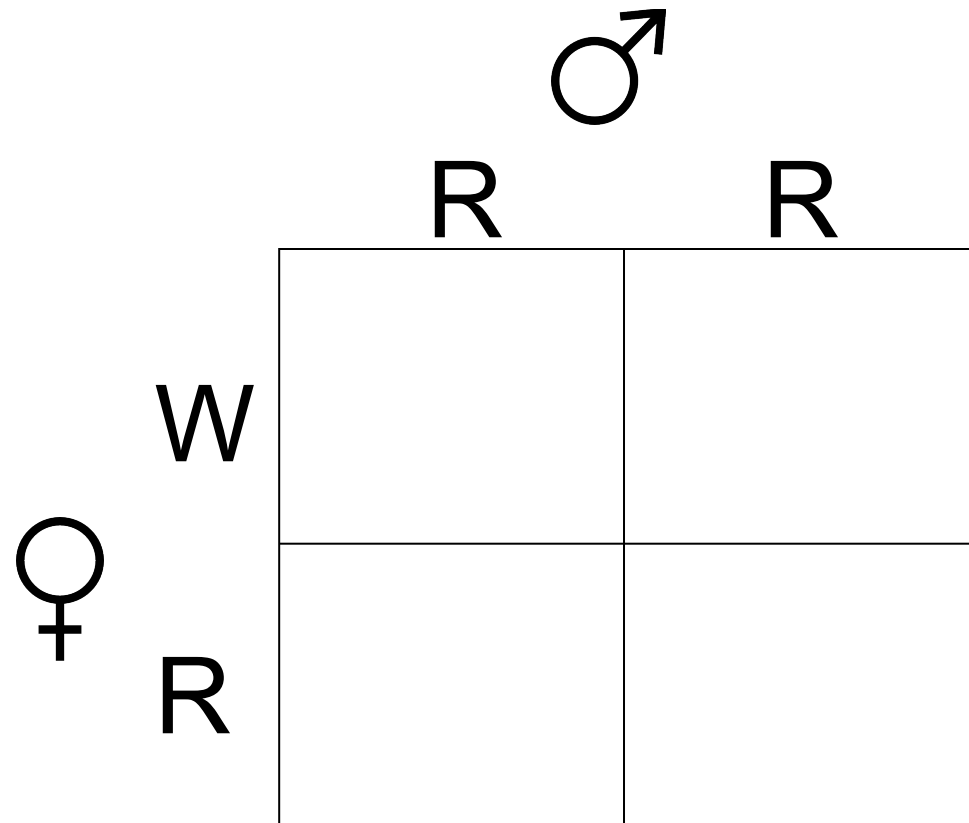


W= white

R = red

WR = pink

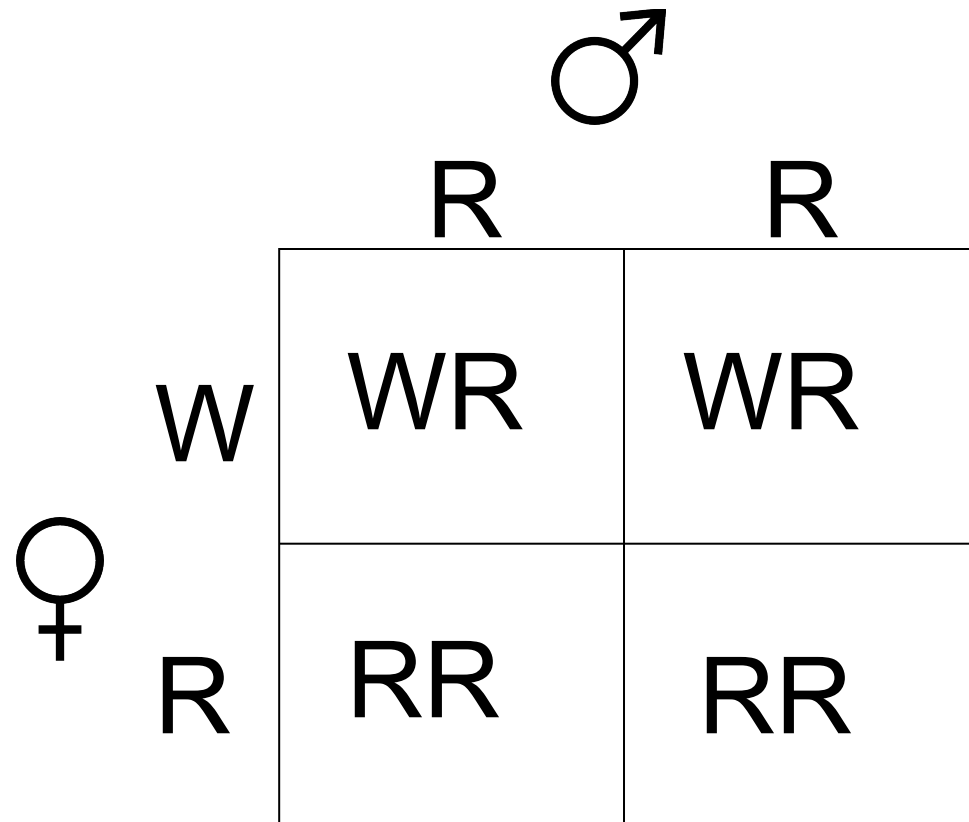
Pea Flower Petals



Copy and complete this Punnett's square in your notebook.

What percentage of offspring will have white flowers?

Pea Flower Petals



0% of the offspring will have white flowers.

50% will have red flowers.

50% will have pink flowers.

Catalyst:

How would you determine what traits a baby would inherit from its parents?

Reflection:

Write step by step instructions for how to set up and solve a punnett square problem.

Punnett Squares 1/19/17