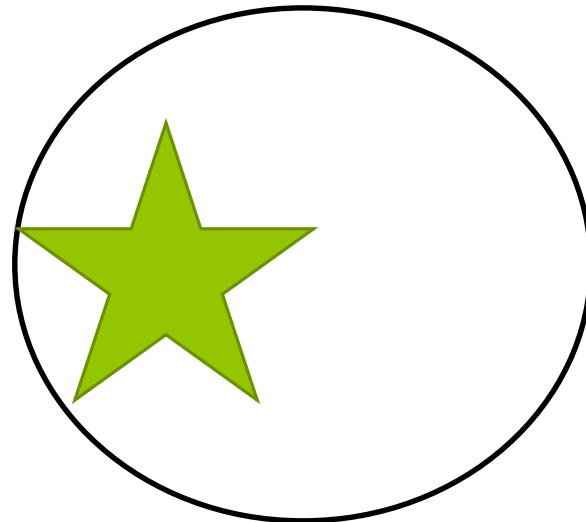
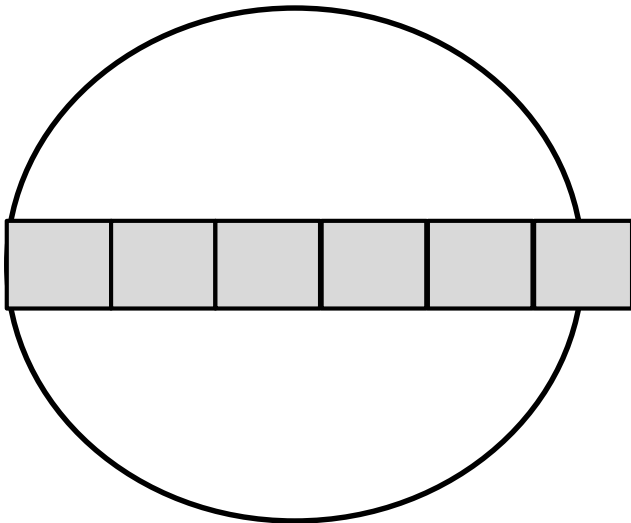


Bell Ringer

- Please take out your field of view lab
- Answer the following questions in your journal
 1. What is the diameter for the field of view on the left?
 2. What is the diameter for the object in the field of view on the right?



When you are finished...

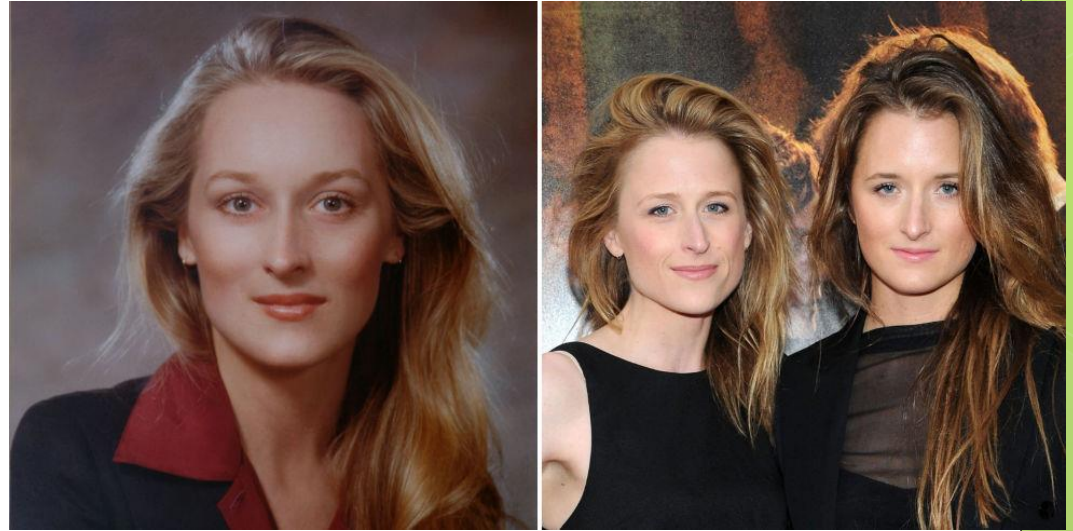
- **Pick up the vocab list for Chapter 3 AND directions for how to turn in your Powtoon.**
- **Pick up or download a copy of the new Genetics and Heredity Note packet**
- **Vocab is due on Friday**
- **Powtoon is due on Monday**

Genetics & Heredity

Bell Ringer

In your journal write down some characteristics about you? Are you...

- Tall
- Short
- Have blue eyes
- Have brown eyes
- What else....?
- (BE APPROPRIATE)



Where do think these traits come from?

How did you get them?















What is Heredity?

- Heredity is the passing of physical characteristics from parents to offspring
- Each different form of a characteristics is called a trait.



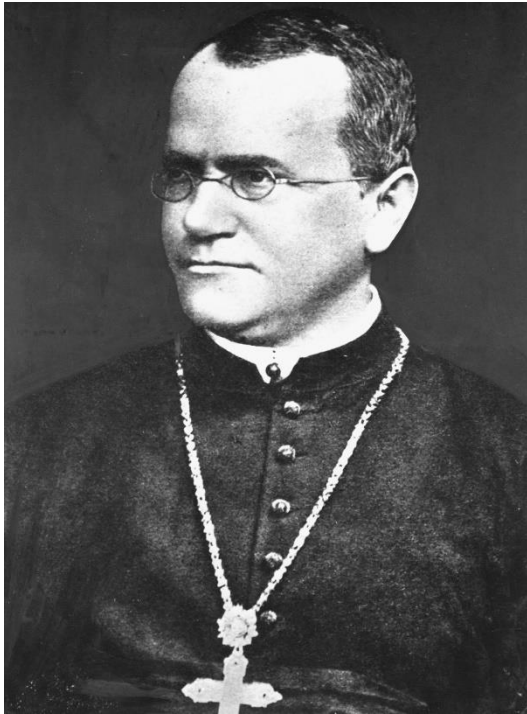
- Genetics is the scientific study of heredity.

What are the traits being measured here

Height	Seed Shape	Seed Color	Seed Coat Color	Pod Shape	Pod Color	Flower Position
 Tall	 Round	 Yellow	 Green	 Inflated (full)	 Green	 Axial
 Short	 Wrinkled	 Green	 White	 Constricted (flat)	 Yellow	 Terminal

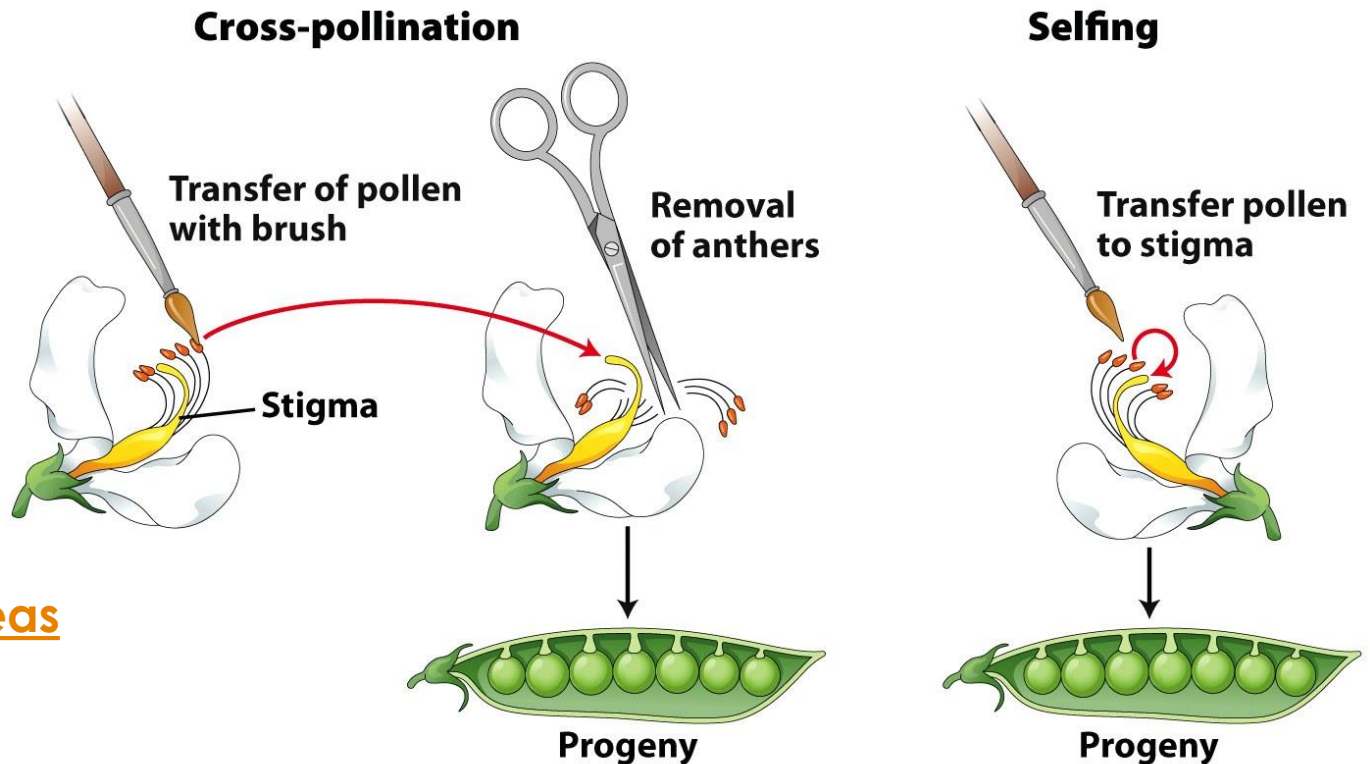
Gregor Mendel [Brain pop Heredity](#)

- A priest who studied the traits of pea plants. He experimented with thousands of pea plants to understand the process of heredity



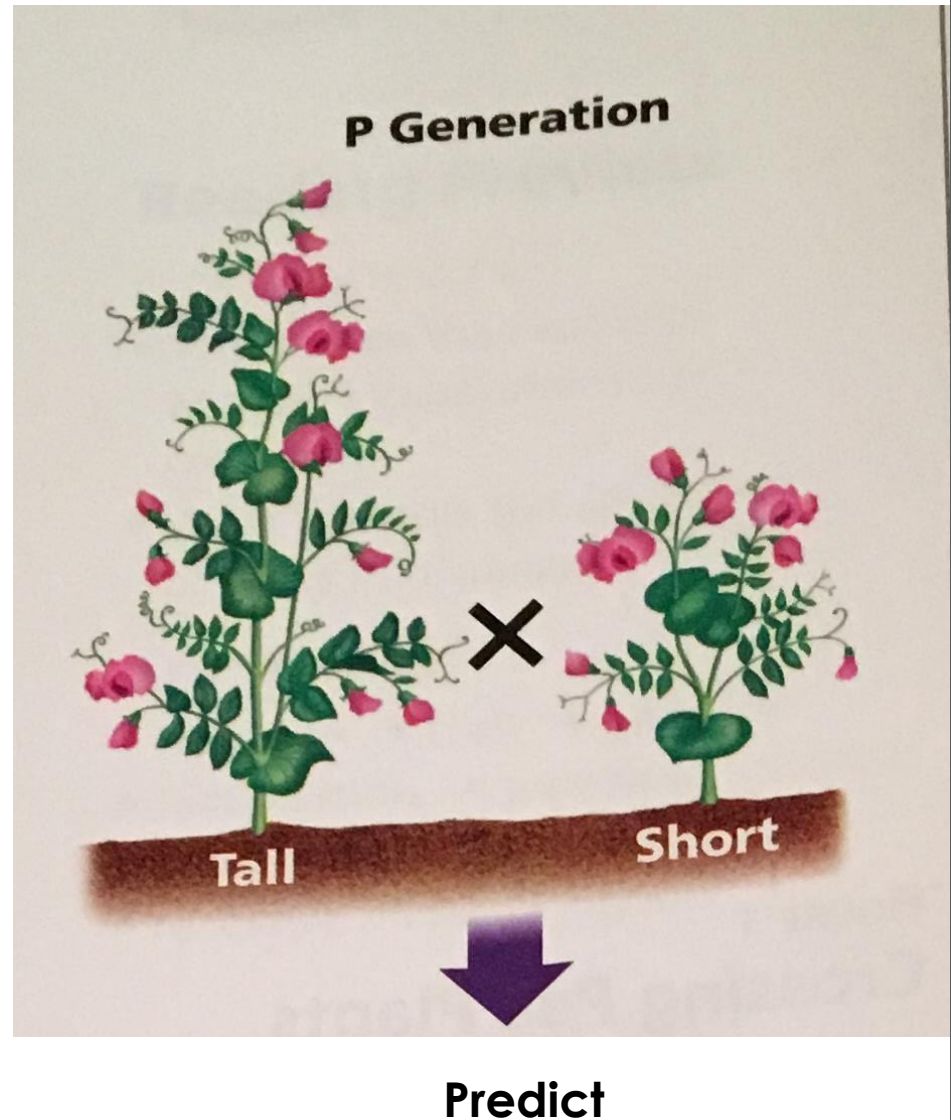
Gregor Mendel

- Pea plants can self pollinate or self-fertilize
- Fertilization is the process in which a new organism begins to form from the joining of egg and sperm sex cells
- Mendel found a way to cross pollinate the pea plants.



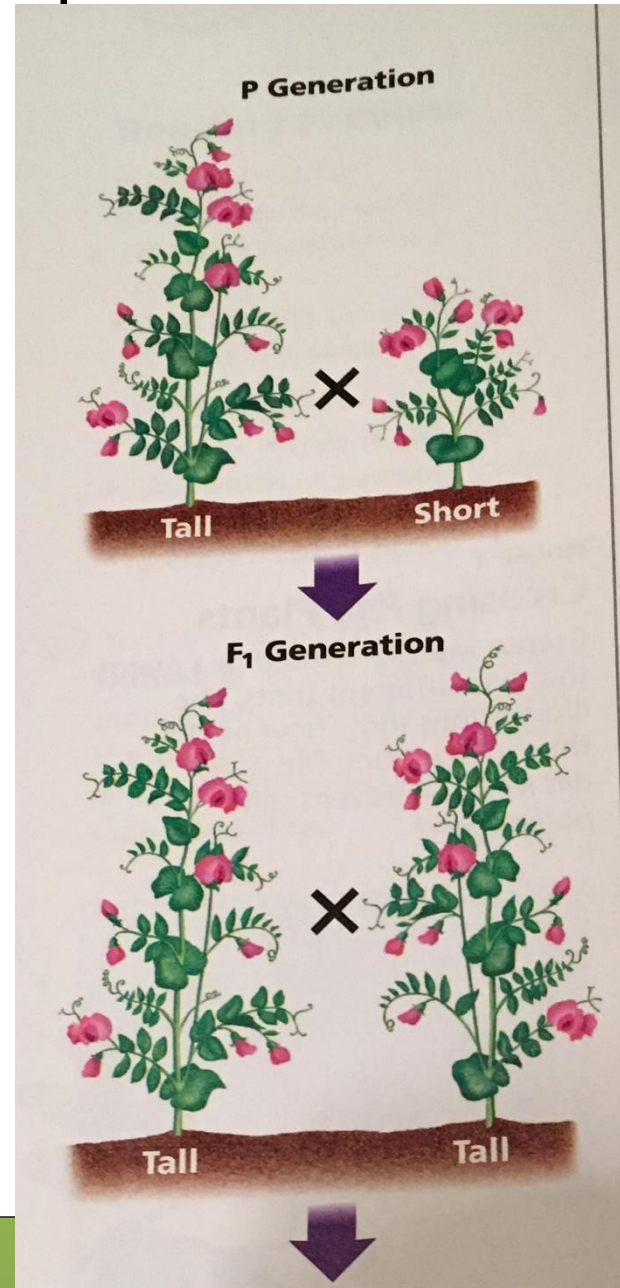
Gregor Mendel's Experiment

- Mendel started his experiments with purebred pea plants. Purebred organisms are the offspring that contain the same trait.
- He crossed two different purebred parent pea plants (P generation). One parent had the shortness trait the other parent had the tallness trait.



Gregor Mendel's Experiment

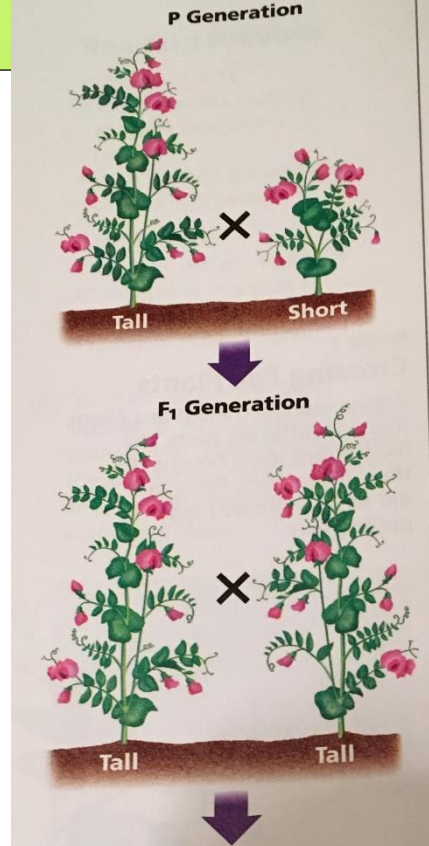
- The offspring from the P generation is called the F₁ generation. Mendel noticed that all of the F₁ generation were **tall**, even though one parent had the shortness trait.



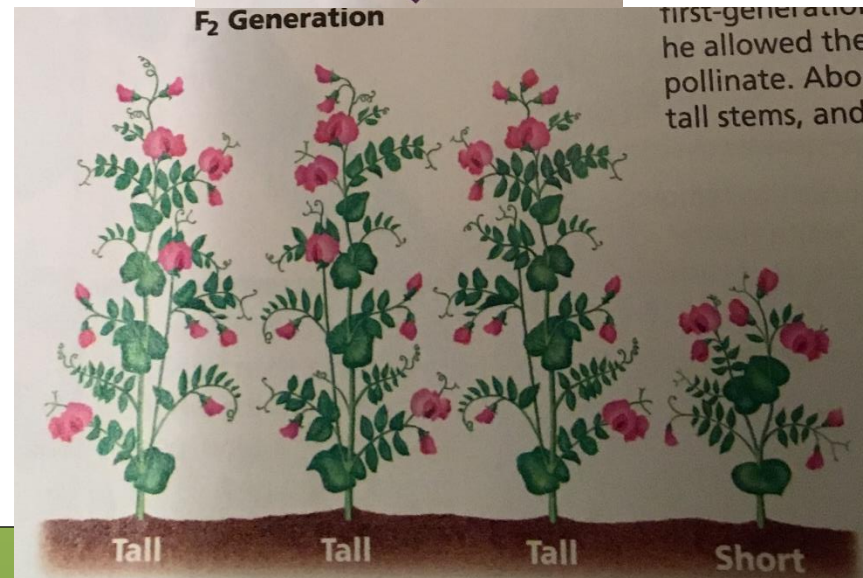
Gregor Mendel's Experiment

- Then Mendel allowed the F_1 generation to self pollinate and create their offspring (F_2 generation).

- The results showed that about $\frac{3}{4}$ of the F_2 generation were tall while $\frac{1}{4}$ of them were short.

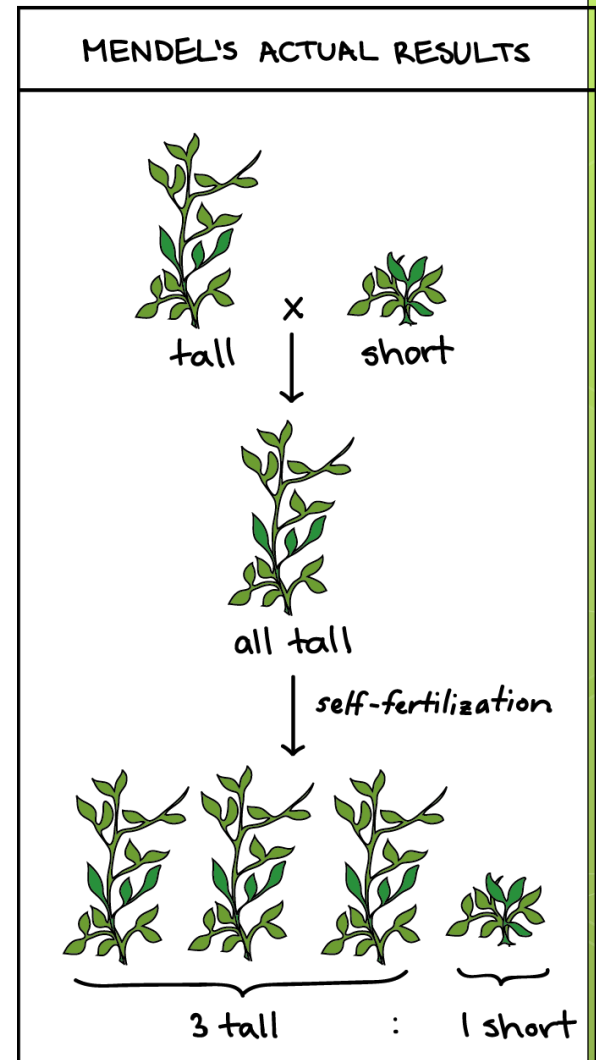


Predict



Gregor Mendel Results

- In all of Mendel's crosses only one form of the trait appeared in the F_1 generation. However, in the F_2 generation, the "lost" form of the trait always reappeared in about one fourth of the plants
- **The factors that control each trait exist in pairs, one from the female parent and one from the male parent.**
- **One factor can mask, or hide the other factor**

















Bell Ringer

- In your science journal write down what **traits** got passed down in Doug's family and to Chuckie from their parents.



Dominant & Recessive Alleles

- Dominant allele is one whose trait always shows up when the allele is present
- Recessive allele is hidden whenever the dominant allele is present.

Genetics of Pea Plants							
Traits	Seed Shape	Seed Color	Seed Coat Color	Pod Shape	Pod Color	Flower Position	Stem Height
Controlled by Dominant Allele	 Round	 Yellow	 Gray	 Smooth	 Green	 Side	 Tall
Controlled by Recessive Allele	 Wrinkled	 Green	 White	 Pinched	 Yellow	 End	 Short

Dominant & Recessive Alleles

- We use the term gene for the factors that control a trait. Alleles are the different forms of a gene.
- For example the gene that controls plant height in peas, has one allele for tall stems and one allele for short stems
- What is another gene and alleles?
- An organisms traits are controlled by the gene and allele combination it inherits from its parents. Some alleles are dominant, while other alleles are recessive.

Trait = Height

Gene = Tall (Tt)

Alleles = T & t

Trait =

Gene =

Alleles =

Symbols for Alleles

- Dominant alleles are written with a capital letter. Tall is a dominant allele (T)
- Recessive alleles are written with a lowercase letter. Short is a recessive allele (t)
- How many alleles will an organism have for a particular trait or gene?
 - Since one allele comes from each parent, the offspring will each have two alleles for every gene.
 - So how many different combinations of alleles could the pea plants have for the height gene?
 - **Three! Tt, TT, tt**

Allele Symbols for Height Gene

1.

TT

Two tall dominant alleles=



2.

tt

Two short recessive alleles=



3.

Tt

One tall dominant and one short recessive =



Free vs
attached
ear lobe

Widow's
peak vs
none

Cleft Chin
vs none

Dimples
vs none



Curly Vs Straight Hair

Dominant vs Recessive Activity

<u>Trait</u>	# in group	# in class	% of class	<u>Trait</u>	# in group	# in class	% of class
Free ear lobes				Attached ear lobes			
Dimples				No dimples			
Widow's peak				No widow's peak			
Curly hair				Straight hair			
Cleft Chin				Smooth Chin			

Bell Ringer: Probability & Heredity

❖ Please take out the following things;

- Vocab Chapt 3
- Your Genetics notes

❖ Please answer the following questions in your journal

1. Give an example of one trait, the two alleles types of the trait and the gene. You will have to assign letters for the alleles

Trait =
Gene =
Alleles =

2. What is the probability that a quarter will land on "heads" ?

- 50% chance since heads is only 1 of 2 options that can happen.



Probability & Heredity

- **Probability is a number that describes how likely it is that an event will occur**

- Say I flip a quarter and it lands on heads for each of the three times
- What is the probability that it will land on heads a fourth time?
 - It is still 50% because the results from the past flips do not affect the result on the future flips.

Punnett Square

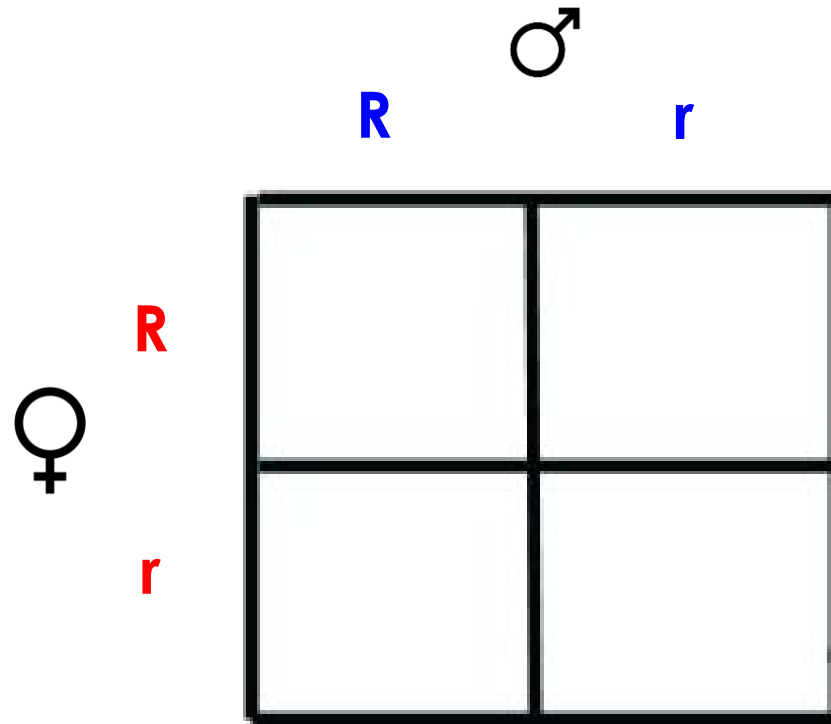
- Punnett Squares are a chart that shows all of the possible combinations of alleles that can result from a genetic cross.
- In a genetic cross the allele that each parent will pass on to its offspring is based on probability.

		Father's Genes	
		B	b
M o t h e r s G e n e s	b	Bb	bb
	b	Bb	bb

Punnett Square Practice

- Lets practice with a cross between pea plants for round (R) versus wrinkled (r) seeds.
- If the male and female both have dominant hybrid alleles for this trait, what would the allele be?

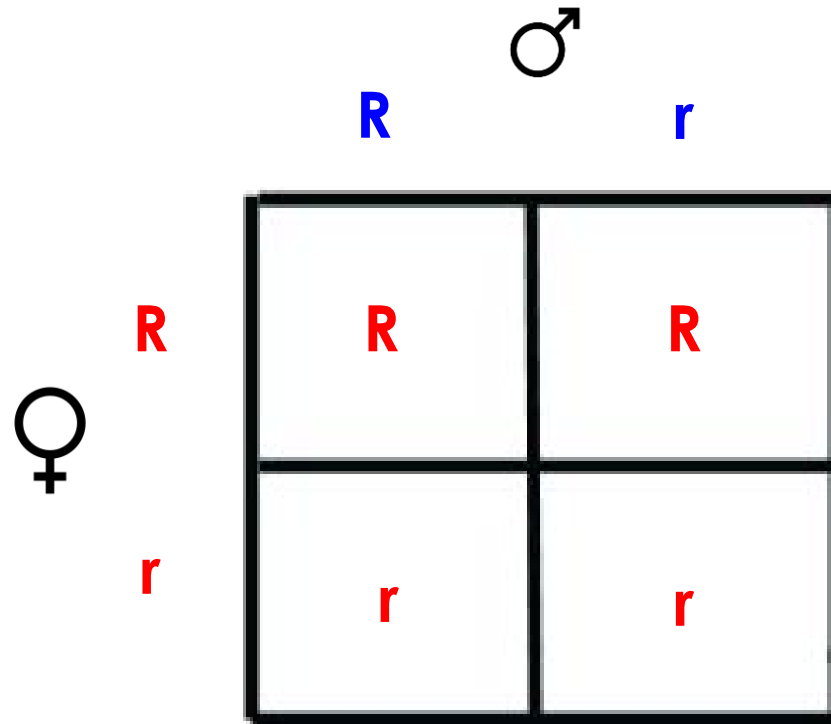
- **Step 1:** write the male parents alleles along the top of the square and the female parent's along the left side



Punnett Square Practice

- Lets practice with a cross between pea plants for round (R) versus wrinkled (r) seeds.
- If the male and female both have dominant hybrid alleles for this trait, what would the allele be?

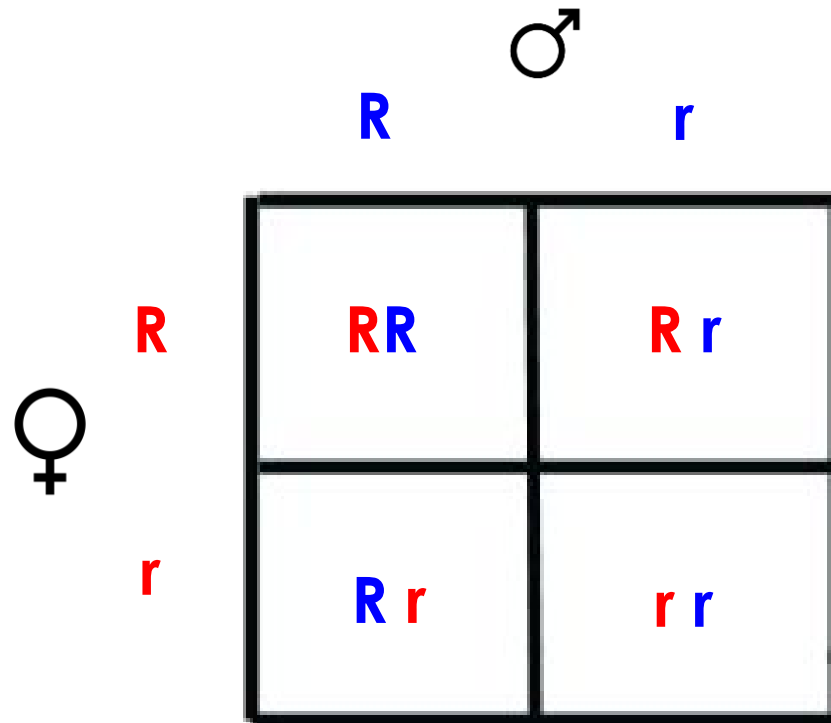
- **Step 2: Copy the female parent's alleles into the boxes to their right**



Punnett Square Practice

- Lets practice with a cross between pea plants for round (R) versus wrinkled (r) seeds.
- If the male and female both have dominant hybrid alleles for this trait, what would the allele be?

- **Step 3: Copy the male parent's alleles into the boxes beneath them**

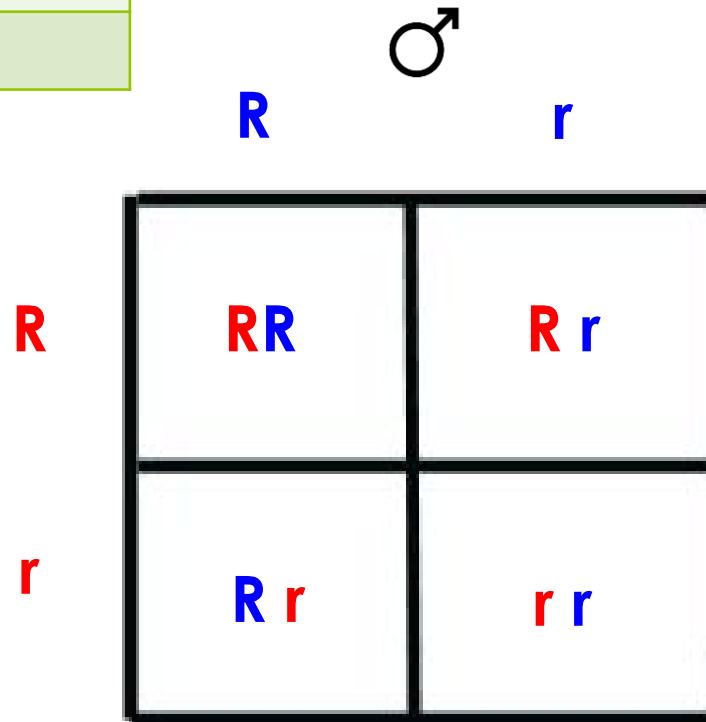


Punnett Square Practice

- The completed Punnett square shows all the possible allele combinations in the offspring

RR	Rr	rr

	Round (R)	Wrinkled (r)
Ratio		
Percent		



1. Punnett Square Practice

- Complete the Punnett Square for nose shape.
- Pointy is dominant (P), round is recessive (p)
- A Pp dad and a pp mom

♂

PP	Pp	pp

♀

	Pointy (P)	round (p)
Ratio		
Percent		

2. Punnett Square Practice

- Complete the Punnett Square for Hair Texture.
- Curly is dominant (C), straight is recessive (c)
- A CC dad and a cc mom

CC	Cc	cc

♀

Ratio		
Percent		

♂

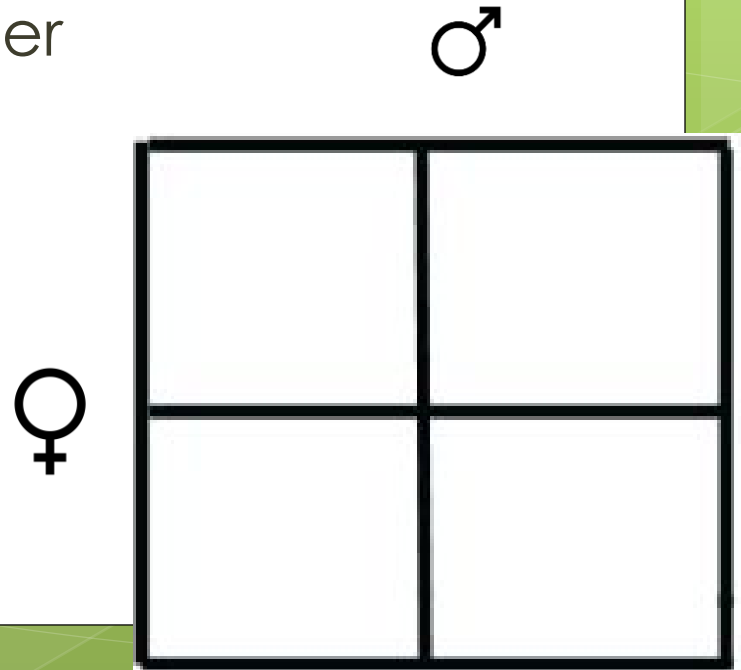
Bell Ringer

- Harry Potter was born to James and Lily Potter. James was pure blood (MM) while Lily was half blood (Mm). Find out what was Harry's chances of gaining magical abilities from his parents.

Magical Ability-

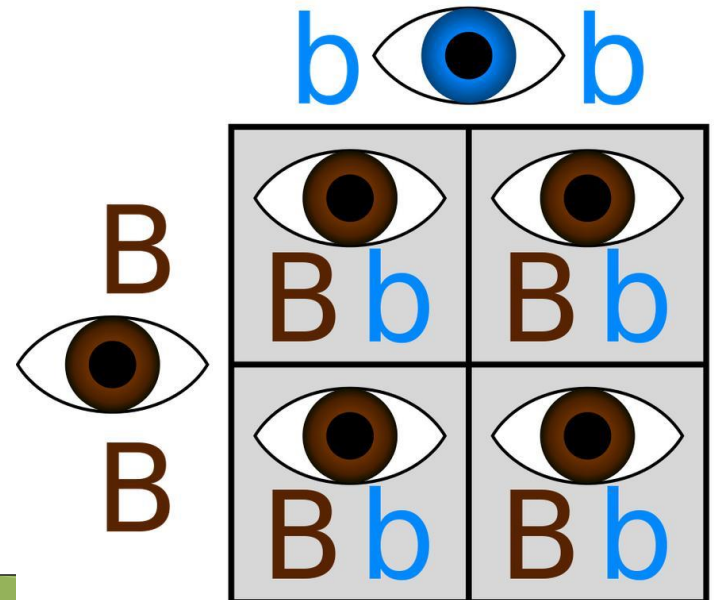
- -Magic is dominant (M)
- -non-magic is recessive (m)
- -A MM father and a Mm mother

- What were the possible outcomes for the Harry?
- What percentage lead to magical ability?
- What percentage lead to no magical ability?



Phenotype versus Genotype

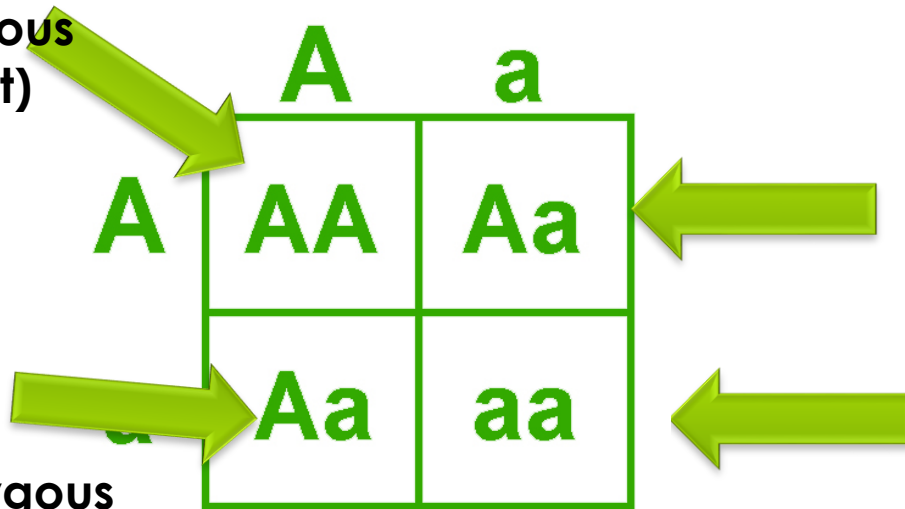
- **Phenotype** is the **Physical appearance** or visible traits.
- **Genotype** is the **Genetic make up** or allele combinations
- What is the genotype for the brown eyes and blue eyes?
 - Bb and bb
- What is the phenotype for all of the offspring?
 - Brown



Homozygous vs. Heterozygous

- To tell the difference between different types of allele combinations scientists use two terms
- **Homozygous means the organism has two identical alleles for a gene or trait (ex. RR or rr)**
- **Heterozygous means the organism has two different alleles for a gene or trait (ex. Rr)**

Homozygous
(dominant)



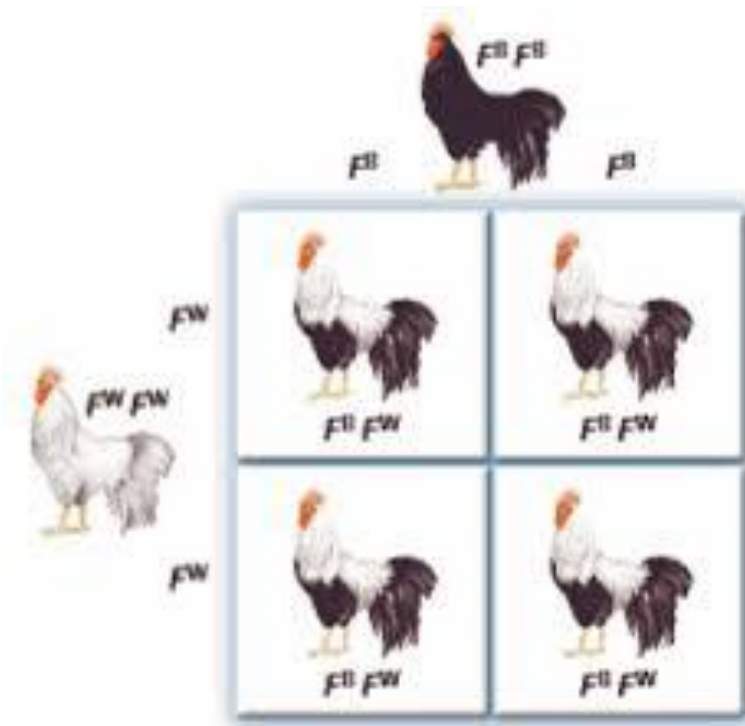
Heterozygous

Heterozygous

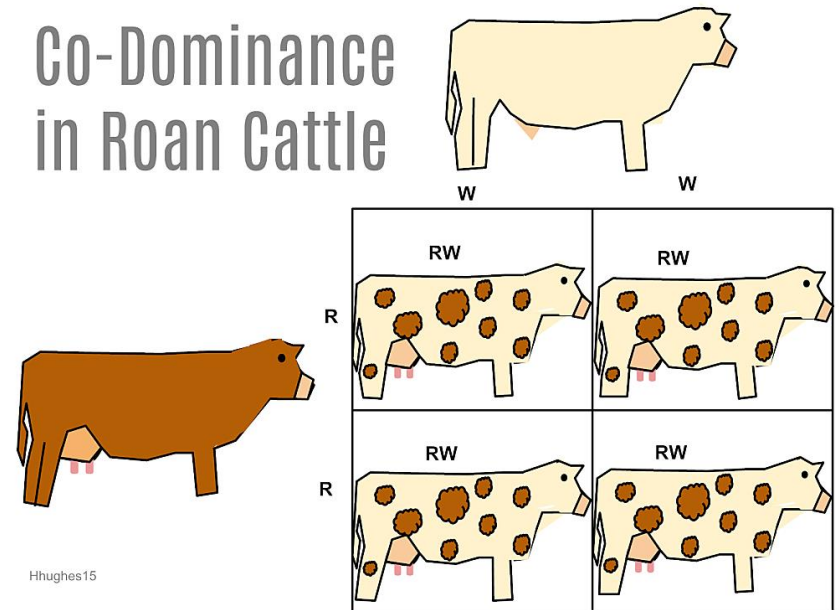
Homozygous
(recessive)

Codominance

- When the alleles are neither dominant nor recessive. As a result both alleles are expressed in the offspring



Co-Dominance in Roan Cattle



Squad 1 Trait

- Lets use the coin toss to help us determine the alleles for certain genes.
 - **Heads = dominant allele**
 - **Tails = recessive allele**
- Lets find the alleles for the gene that determines...



Trait	gene	alleles
Magical Ability	Muggle (m) vs wizard (M)	M vs m

Squad 2 Trait

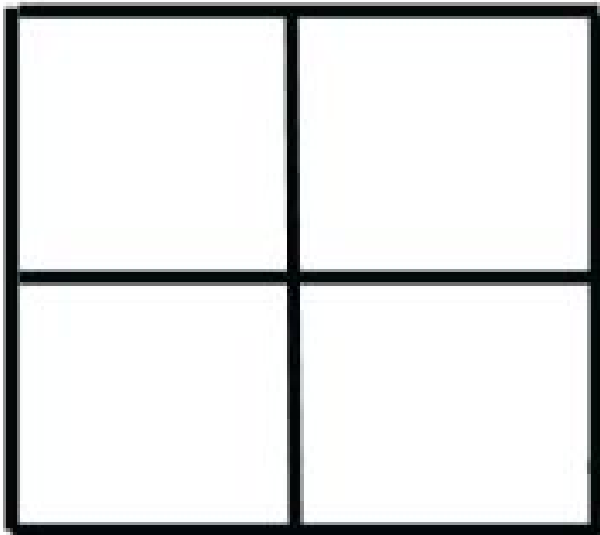
- Lets use the coin toss to help us determine the alleles for certain genes.
 - **Heads = dominant allele**
 - **Tails = recessive allele**
- Lets find the alleles for the gene that determines...



Trait	gene	alleles
Turn into an animal	Animagus (a) vs non Animagus (A)	A vs a

Squad 3 Trait

- Lets use the coin toss to help us determine the alleles for certain genes.
 - **Heads = dominant allele**
 - **Tails = recessive allele**
- Lets find the alleles for the gene that determines...



Trait	gene	alleles
Talk to snakes	Non-parseeltongue (P) vs Parseeltongue (p)	P vs p

Squad 4 trait

- Lets use the coin toss to help us determine the alleles for certain genes.
 - **Heads = dominant allele**
 - **Tails = recessive allele**
- Lets find the alleles for the gene that determines...



Trait	gene	alleles
Hagrid's Height	Giant (G) vs average (g)	G vs g

Bell Ringer

- Grab a piece of scrap paper and your **notebook** complete the Punnett square and answer the questions

Webbed toes-



- -Not webbed is dominant (W)
- -webbed is recessive (w)
- -A Ww father and a Ww mother

- What are the possible outcomes for the offspring?
- What percent will have webbed toes?
- What percent will not have webbed toes
- What is the genotype of the dad and mom
- What are the phenotypes of dad and mom