Monday, September 12

Please copy into your agenda:

Monday: Finish mitosis vs meiosis summary – due Tues

Tuesday: Finish unique you – due Wed

Wednesday & Thursday: make sure notebook is complete for NB check on Friday

Advanced only add to this week for homework:

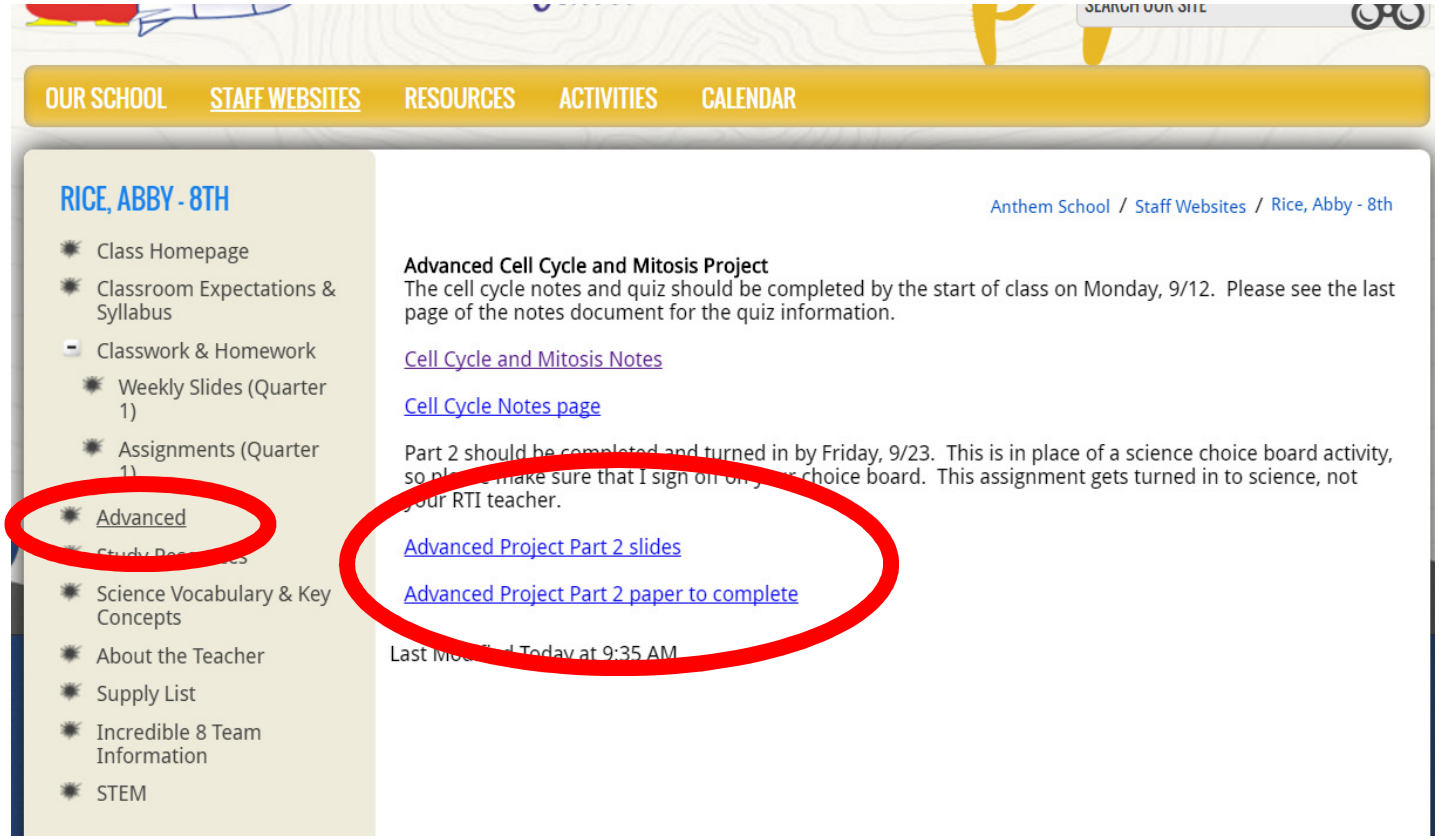
Cell project part 2 – due Fri 9/23

Advanced – please give me your Part 1

- Advanced project – Part 2 is due Friday, 9/23

This is your Choice Board activity for science and this part gets turned in to ME.

-If anyone does not have internet access at home, please let me know right away.



How and why are new cells formed?

Objective of the day...

-Explain the purposes of cell division (growth and repair / reproduction)

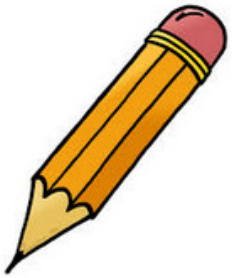
-Describe the process of cell division

Mission: We will be **incredible** science students.

Pods Jobs – Whiteboard Challenge

Asker – repeats the question to the group or reads the problem to the group

First – this person gives their answer fir
then go around the group and **everyon**
answers the question



Scribe – writes down all of the answers

Voice – read answers to the class

Pods Jobs – Whiteboard Challenge

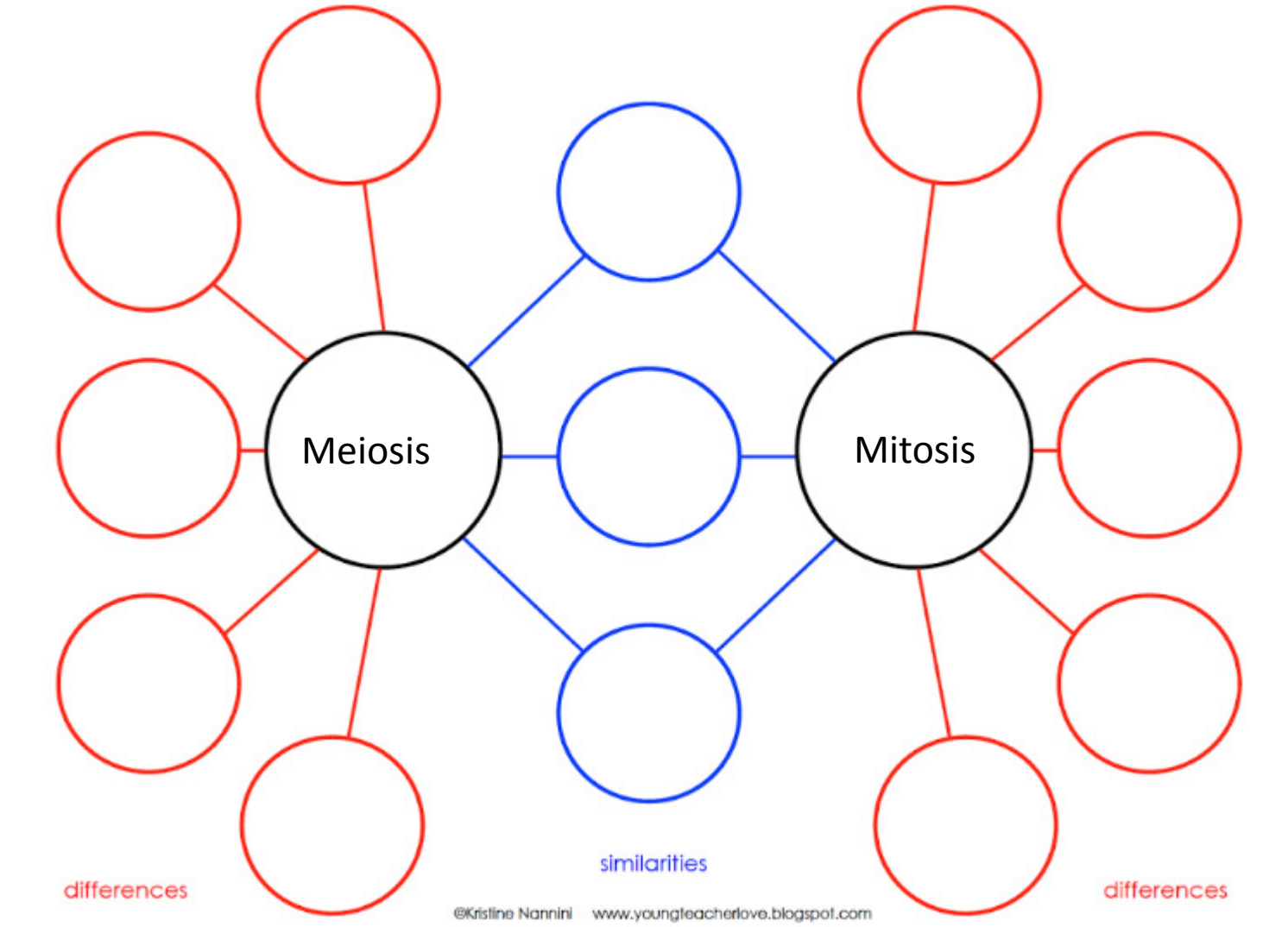
- Write down everything you know about Cell Division

Double-bubble map or Venn diagram

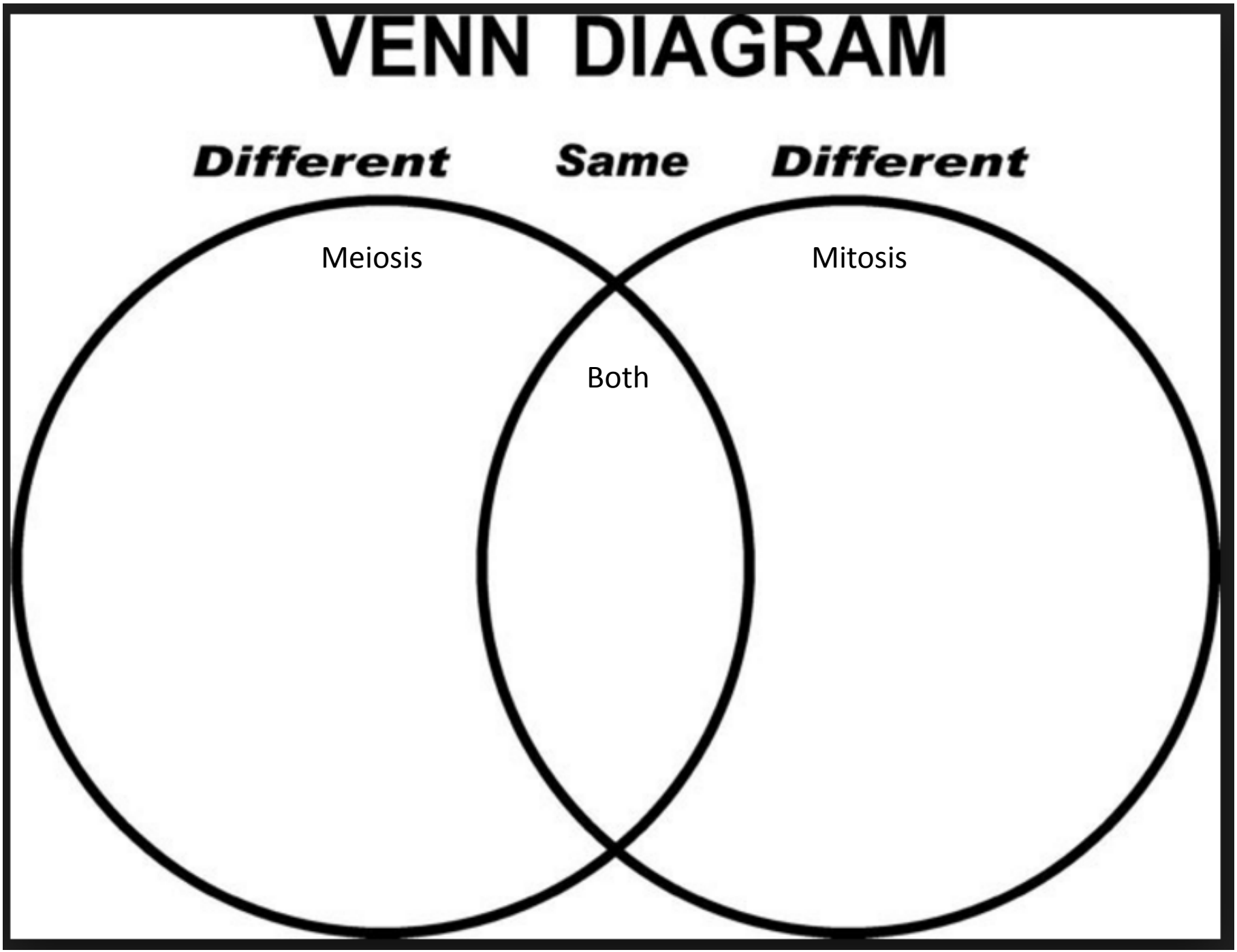
Create a double bubble map or a Venn diagram on your whiteboard to compare and contrast meiosis with mitosis.

- Double bubble map - Write any similarities between them and differences on the sides.
- Venn diagram – differences go in each circle and similarities in overlapping circle


Meiosis
Mitosis


Meiosis
Mitosis
differences
similarities
differences
©Kristine Nannini www.youngteacherlove.blogspot.com

VENN DIAGRAM



- Creates new cells
- Creates new cells for growth
- Creates new cells for development
- Creates new cells for repair
- Creates cells for asexual reproduction
- Creates cells used for sexual reproduction
- Homologous chromosomes (those with the same genes but different alleles) separate from each other
- Sister chromatids (the 2 identical strands) separate from each other
- Begins with DNA replication
- At the end of this process there will be 2 cells
- At the end of this process there will be 4 cells
- The cells that are created have a full set of chromosomes
- The cells that are created have a half a set of chromosomes
- The cells that are created are called gametes
- Cell divides twice
- Cell divides only one time
- Ends with cytokinesis splitting the cells
- DNA condenses to form chromosomes
- The cells created through this are different from one another
- The cells created through this are identical to each other

- Gallery walk
- Look at what other people included
- See if there is anything that you should add to your board or anything that you need to fix
- If you aren’t sure if something is correct, then please ask

Add to your **Table of Contents**

Date	**Title**	**Page #**
9/12	Mitosis vs Meiosis	16

Copy your double bubble map or Venn diagram onto page 16 in your notebook.

Summary

- On a separate sheet of paper (NOT in your notebook)
- Write 2 very well written "juicy" paragraphs (if you want to write more, that's OK) that compare and contrast mitosis and meiosis. In the paragraph you need to include **at least 3 similarities** and **at least 3 differences**.
- Please highlight the similarities in one color and the differences in another color.

- **This is due at the start of class tomorrow.**

Tuesday, September 13

Please start a new warm-up

Write #3 on top of your new warm up paper please ☺

9/13: What are 2 questions you have about genetics?

Share your answers.

Please turn your homework (mitosis vs meiosis summary) to the basket on center teal table

- Advanced – if you did not take the cell cycle quiz in Socrative that was due yesterday or if you need to retake it, then **please do so by Friday at 2:45.**

- Room: Rice8

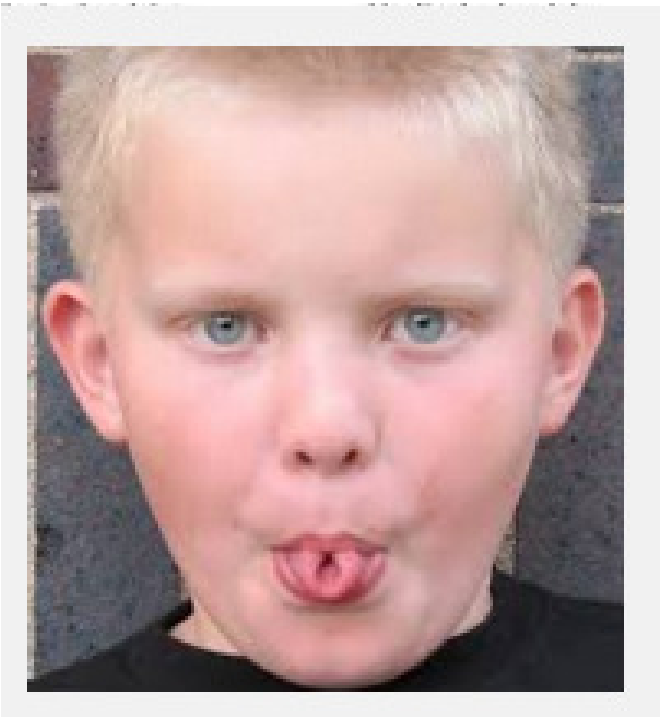
How unique are you?

Objective of the day...

Welcome to Genetics!!

What are traits?

- Physical characteristics that are determined by your genes



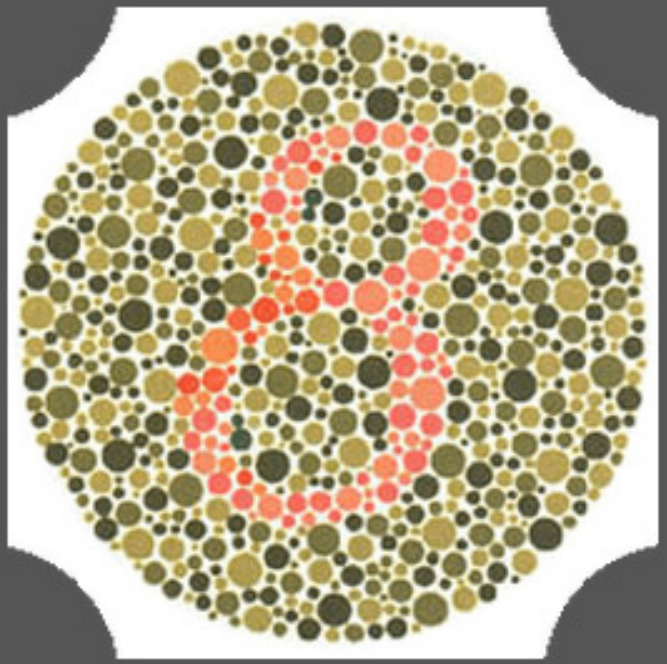
We are going to be looking at how unique each one of us is.

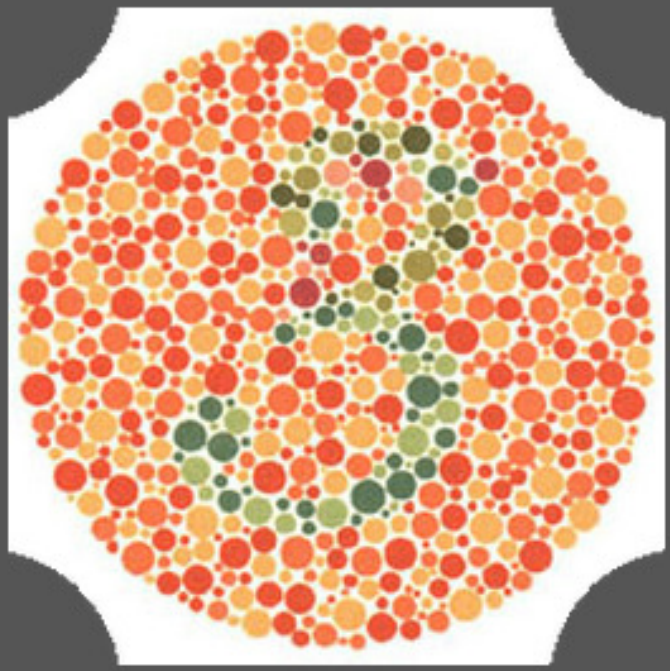
- First please sit quietly and cross your hands (interlace your fingers).

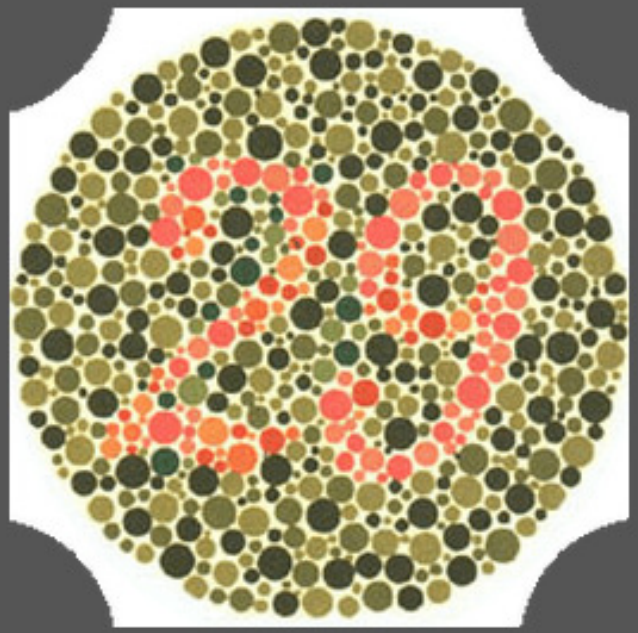
Please be courteous and respectful to each other. We should all be proud of our traits. ☺

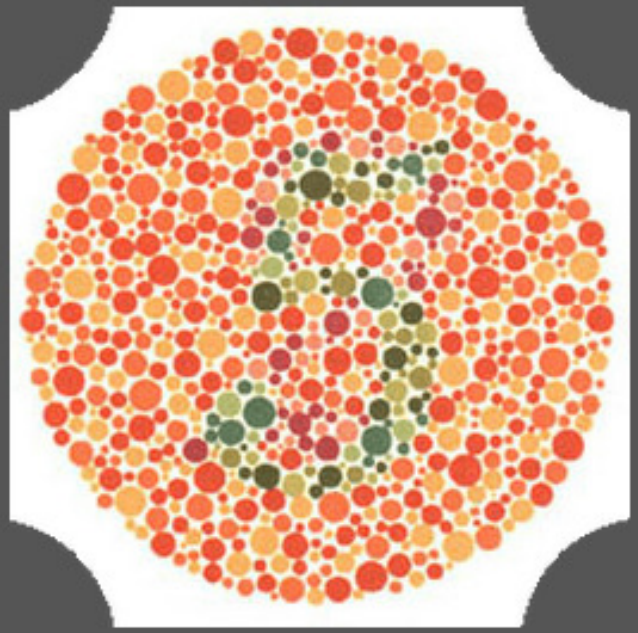
- Look down – which thumb is on top? Remember this!!

What do you see??







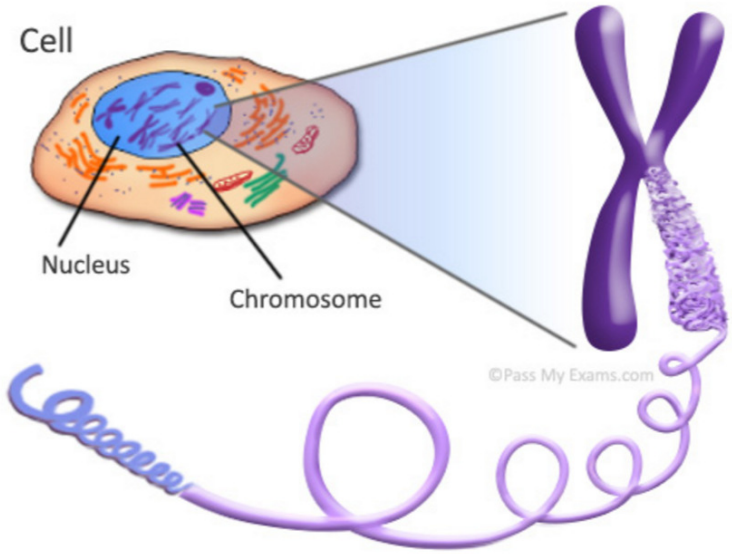


- We have **46** chromosomes (or **23** pairs).

Segments of the chromosomes (which are long strands of DNA) are genes – which code for specific traits.

- How many genes do you think that we have on those chromosomes? Write your prediction at the top of your paper.

Around 24,000



Today we are going to explore just 11 traits. You will survey your own traits and record the results on the data table.

Only pick 1 option for each trait. Go with the trait that you have now (not when you were born) and that is natural

#	Trait	Self
1	**Eye color** – what color are your eyes?	☐ brown eyes ☐ blue eyes ☐ green eyes ☐ hazel eyes
2	**Freckles** – do you have freckles? Say "yes" only if you have LOTS of freckles all over your nose and cheeks. Sun freckles do not count.	☐ yes have freckles ☐ no freckles
3	**Tongue rolling** – can you roll your tongue into a tube? 	☐ yes can roll tongue ☐ cannot roll tongue
4	**Dimples** – do you have dimples on your cheeks? 	☐ yes have dimples ☐ no dimples
5	**Earlobe attachment** – are your earlobes attached to the side of your face?  *Attached ear lobe* *Free ear lobe*	☐ attached earlobes ☐ free earlobes

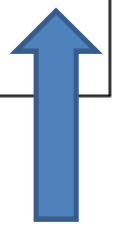
Write your name on the back of your code card

1	2	3	4	5	6	7	8	9	10	11	UF

This represents a strand of your DNA with codes that determine what traits you have.

Each box corresponds to the traits that you just surveyed (Box 1: eye color, Box 2: freckles, Box 3: tongue rolling etc.).

1	2	3	4	5	6	7	8	9	10	11	UF



Leave the UF box blank

Write the following letters or symbols in the boxes according to the traits that you have:

Box 1 (eye color):

Brown eyes: A

Blue eyes: B

Green eyes: C

Hazel eyes: D

Box 2 (freckles):

Freckles: X

No Freckles: Z

Box 3 (tongue rolling):

Can roll tongue: !

Cannot roll tongue: *

Box 4 (dimples):

Dimples: G

No dimples: H

Box 5 (earlobe):

Attached: $

Free earlobes: %

Box 6 (widow's peak):

Widow's peak: 5

Straight hairline: 8

Box 7 (thumb on top):

Left on top: @

Right on top: =

Box 8 (hair color):

Black: <

Brown: &

Blonde: ~

Red: #

Box 9 (hair texture):

Curly: ■

Wavy: ▲

Straight: ●

Box 10 (colorblindness):

Red-green colorblind: ☾

Normal vision: ☺

Box 11 (thumb):

Straight: 2

Hitchhiker's: 4

Each box corresponds to the traits that you just surveyed (Box 1: eye color, Box 2: freckles, Box 3: tongue rolling etc.).

1	2	3	4	5	6	7	8	9	10	11
C	Z	*	G	%	5	=	&			4

Write the following letters or symbols in the boxes according to the traits that you have:

Box 1 (eye color):

Brown eyes: A

Blue eyes: B

Green eyes: C

Hazel eyes: D

Box 2 (freckles):

Freckles: X

No Freckles: Z

Box 3 (tongue rolling):

Can roll tongue: !

Cannot roll tongue: *

Box 4 (dimples):

Dimples: G

No dimples: H

Box 5 (earlobe):

Attached: $

Free earlobes: %

Box 6 (widow's peak):

Widow's peak: 5

Straight hairline: 8

Box 7 (thumb on top):

Left on top: @

Right on top: =

Box 8 (hair color):

Black: <

Brown: &

Blonde: ~

Red: #

Box 9 (hair texture):

Curly:

Wavy:

Straight:

Box 10 (colorblindness):

Red-green colorblind: 

Normal vision: 

Box 11 (thumb):

Straight: 2

Hitchhiker's: 4

Find someone to talk to...

- When I say “go” please stand up and move to someone who you are not sitting with (groups of 2 or no more than 3).
- Share your code cards with one another and record how many traits you have in common and which ones they are (just list the box #).

Name	Which traits do you have in common? (just write the box numbers from the code card)	Number of traits in common
	Total traits in common with 5 classmates:	

Find someone to talk to...

- When I say “go” please stand up and move to someone who you are not sitting with (groups of 2 or no more than 3).
- Share your code cards with one another and record how many traits you have in common and which ones they are (just list the box #).
- Please don’t switch groups until I tell you to switch. You will meet and share data with a total of 5 people.

Name	Which traits do you have in common? (just write the box numbers from the code card)	Number of traits in common
	Total traits in common with 5 classmates:	

Add up your total number of traits in common

Calculate what percentage of your traits you had in common with the 5 people that you met with and what percentage where unique.

To determine percentage in common, add up the total number of traits in common and divide that by 55 (since you were looking at a total of 55 traits). Then, multiply that by 100 to get the percentage (example: If I had a total of 21 traits in common then I would divide that by 55 and get 0.381. When I multiply that by 100 I would get 38.1%).

Percentage of traits in common: _____

What percent "unique" were you (to find this, subtract the percentage above from 100. So, if I shared 38.1% of the same traits with my classmates, then my unique factor would be 61.9%). Write this number also on your code card.

Uniqueness factor: _____

Put your name on the back of this paper and then fill in your code according to the key on the table:

1	2	3	4	5	6	7	8	9	10	11	UF

Unique factors

Please tape your code slips to the large orange paper on the counter. Do not tape over anyone else's.

Look at how many similarities you have to others and how many differences as well.

- Please answer the remaining questions in complete sentences for homework. These should be answered on a separate sheet of paper.

Wednesday, September 14

Write the date & question:

9/14: Approximately how many genes do humans have?

Please turn your homework (trait survey) in to the basket on the center table.

Wednesday, September 14

Write the date & question:

9/14: Approximately how many genes do humans have?

Humans have approximately 24,000 genes located on 23 pairs of chromosomes

Reminders:

-There is a notebook check on Friday.

- Table of contents complete
- All pages numbered (even on left, odd on right)
- All papers taped down
- All notes and pages complete

Class webpage has copies
Of pages 1-16

www.dvusd.org/Page/44894

- Class Homepage
- Classroom Expectations & Syllabus
- Classwork & Homework
  - Weekly Slides (Quarter 1)
  - Assignments (Quarter 1)
  - Advanced
- Study Resources
- Science Vocabulary & Key Concepts
- About the Teacher
- Supply List
- Incredible 8 Team Information
- STEM

For Advanced Science project information, please go to the Advanced page.
For notes, including the warm-up & reflection questions, please go to the Weekly Slides page.

Warm-up and Reflection Document

About Me Survey

Pendulum Procedure Assignment

Choice Board 1 (due 9/2)

Pendulum Lab Report

Quiz 1 Review (due 9/2)

Bacteria Problem/Cell Division homework (due 9/9)

Choice Board 2 (due 9/23)

Mitosis vs Meiosis Comparison- Write 2 very well written "juicy" paragraphs (if you want to write more, that's OK) that compare and contrast mitosis and meiosis. In the paragraphs you need to include **at least 3 similarities** and **at least 3 differences**. Please highlight the similarities in one color and the differences in another color. Make a key that shows which color is which. (due 9/16)

Notebook as of 9/16 If you are missing anything from your notebook, use this as a guide to get it organized. Remember that you can find all class notes on the Weekly Slides page.

How do we get our traits?

Objective of the day...

-Explain the basic principles of heredity

-Distinguish between dominant and recessive traits

Mission: We will be **incredible** science students.

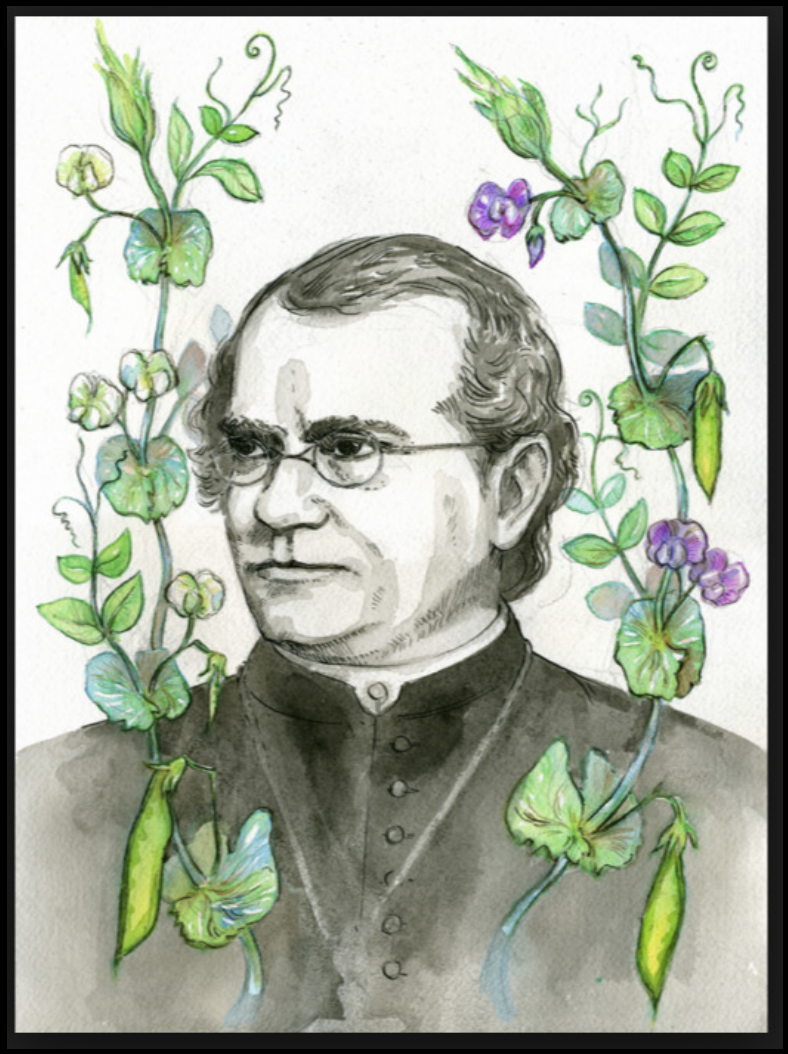
Add to your **Table of Contents**

Date	**Title**	**Page #**
9/14	Cell Division, Reproduction summaries	17

- Mitosis (as part of the regular cell cycle) and meiosis are both types of **CELL DIVISION**
- These create new **cells**

- Reproduction creates new organisms. Asexual reproduction and sexual reproduction are not the same as mitosis and meiosis.

After reading through the textbook pages today, you will come back to this paper



- Gregor Mendel Biograph
- https://www.youtube.com/watch?v=QmSJGhPTB5E

1. Read pages 101-107
2. Answer all questions in complete sentences:

    -Checking your reading – pgs. 102, 103, 104, 105, 106 and 107

    -4.1 Review on page 107 – 2-6

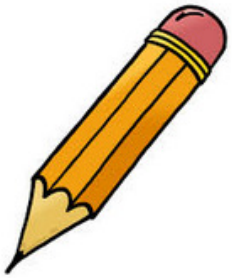
11 questions total

3. After you read and answer these questions, go back to page 17 in your notebook and read it carefully. Highlight the important facts.
4. If needed, re-write your comparison paragraphs.

Pods Jobs – Mendel Summary

Asker – repeats the question to the group or reads the problem to the group

First – this person gives their answer fir
then go around the group and **everyon**
answers the question



Scribe – writes down all of the answers

Voice – read answers to the class

Write everyone's name on the top of the paper

- Summarize why Gregor Mendel is known as the "Father of Modern" genetics. Each person shares their ideas (go around the table and write those down) and then pull together into one complete paragraph.

-What experiments did he do?

-What did he learn and contribute to our understanding of genetics?

Thursday, September 15

Write the date & question:

9/15: Who is the father of modern genetics?

Thursday, September 15

Write the date & question:

9/15: Who is the father of modern genetics?

Gregor Mendel

Reminders:

-Progress reports are due by Monday to 2nd hour

-There is a notebook check tomorrow.

- Table of contents complete
- All pages numbered (even on left, odd on right)
- All papers taped down
- All notes and pages complete

Class webpage has copies
Of pages 1-16

How do we get our traits?

Objective of the day...

-Explain the basic principles of heredity

-Distinguish between dominant and recessive traits

Mission: We will be **incredible** science students.

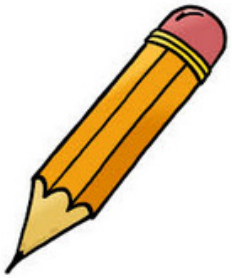
What are some of the things that scientists do?

(think about scientific methods…)

Pods Jobs – Mendel's Experiments

Asker – repeats the question to the group or reads the problem to the group

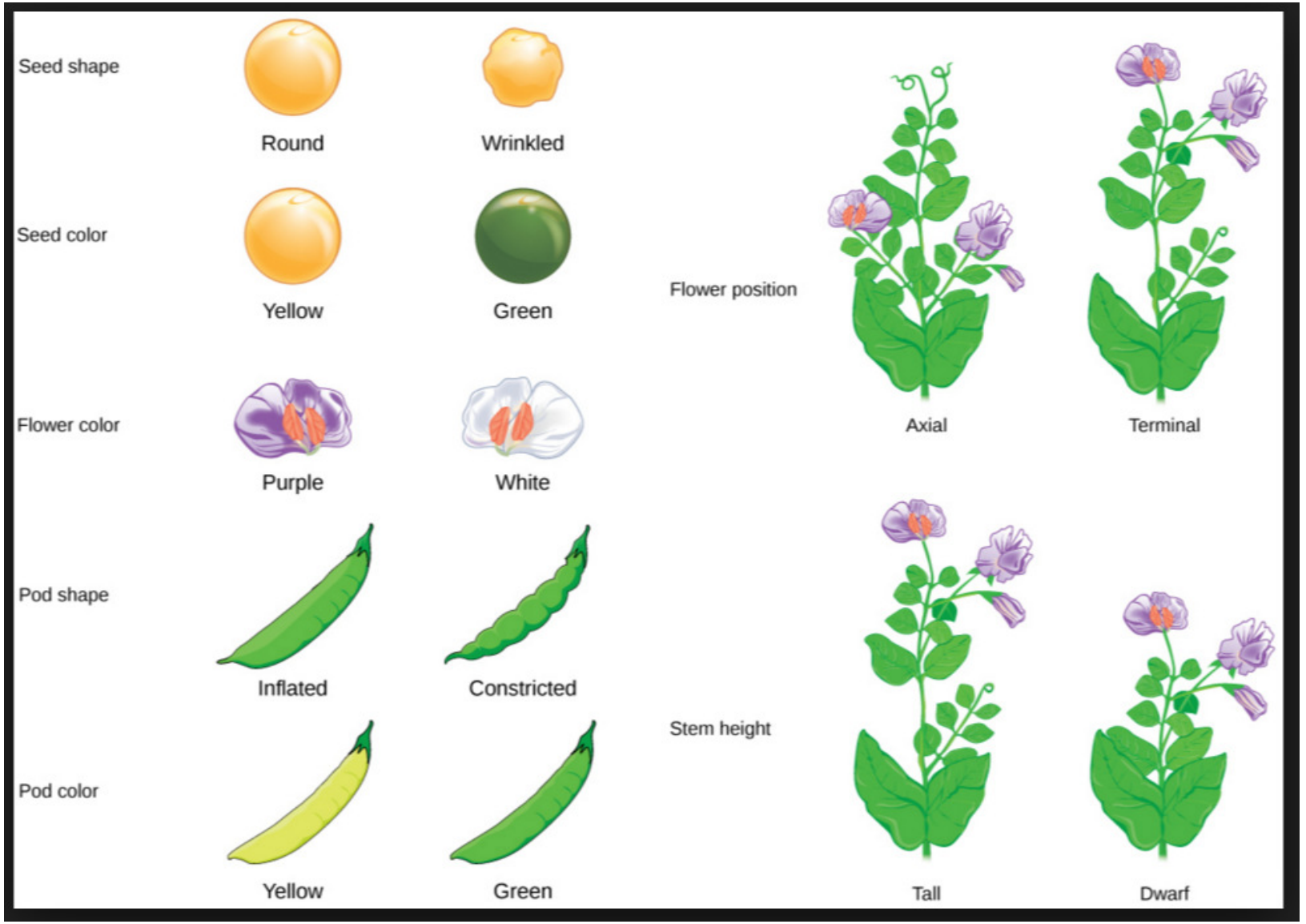
First – this person gives their answer first, then go around the group and **everyone** answers the question



Scribe – writes down all of the answers

Voice – read answers to the class

Observations…What do you see?
Questions…What questions can you ask?



Observations…What do you see?
Questions…What questions can you ask?

Mendel's Seven F_1 Crosses on Pea Plants

Seed Shape	Seed Color	Seed Coat	Pod Shape	Pod Color	Flower Position	Plant Height
Round	Yellow	Gray	Smooth	Green	Axial	Tall
X	X	X	X	X	X	X
Wrinkled	Green	White	Constricted	Yellow	Terminal	Short
↓	↓	↓	↓	↓	↓	↓
Round	Yellow	Gray	Smooth	Green	Axial	Tall

Add to **Table of Contents**

Date	Title	Page #
9/15	Mendelian Genetics Notes 1 **(Mendel's Work)**	18
9/15	Mendelian Genetics Notes 2 **(150+ Years later)**	19
9/15	Genetics vocabulary **(starts with allele)**	20
9/15	Genetics vocabulary **(starts with incomplete dominance)**	21

Tape these onto the correct pages please

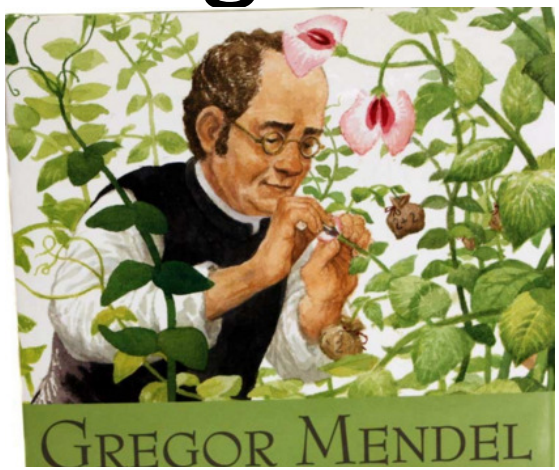
Mendel's Work

When you see a pea pod appear, stand up and say Mendel

Practice

Gregor Mendel

- In the 1850s, he was a priest and a teacher in Europe
- While working in a garden he became curious about the pea plants that he was growing



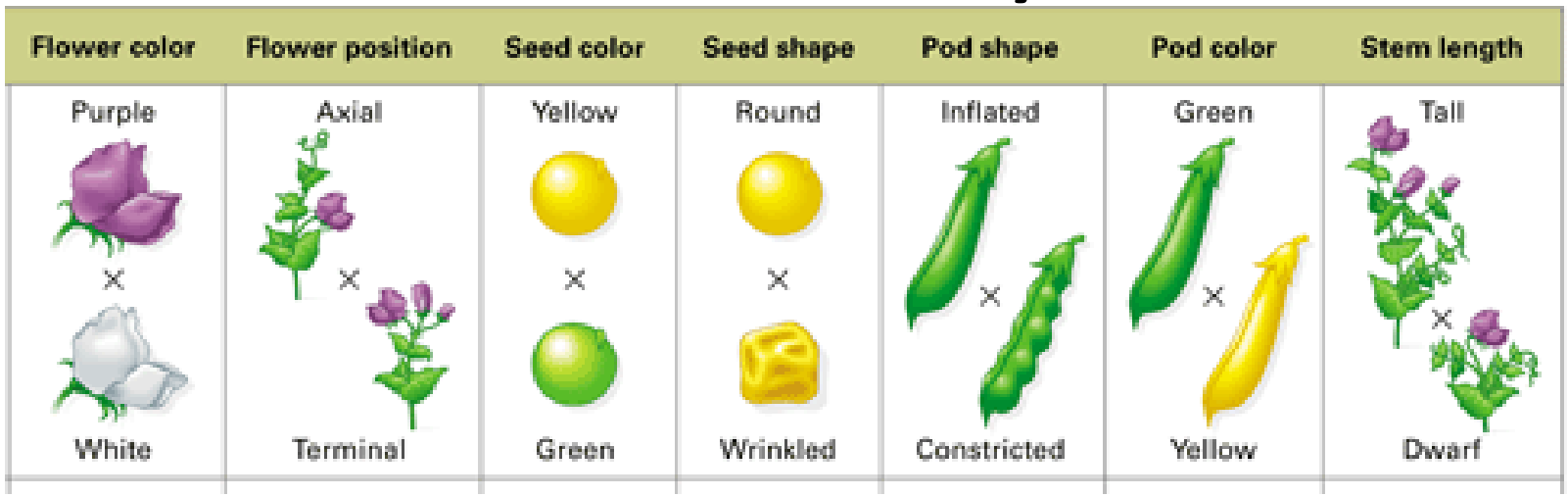
Mendel's studies led to the foundation of genetics – the scientific study of heredity

The Scientific Method

Observation

- Pea plants show different traits (physical characteristics)

Flower color	Flower position	Seed color	Seed shape	Pod shape	Pod color	Stem length
Purple × White	Axial × Terminal	Yellow × Green	Round × Wrinkled	Inflated × Constricted	Green × Yellow	Tall × Dwarf



Inquiry

- Why did the pea plants show different traits (physical characteristics)?

Research

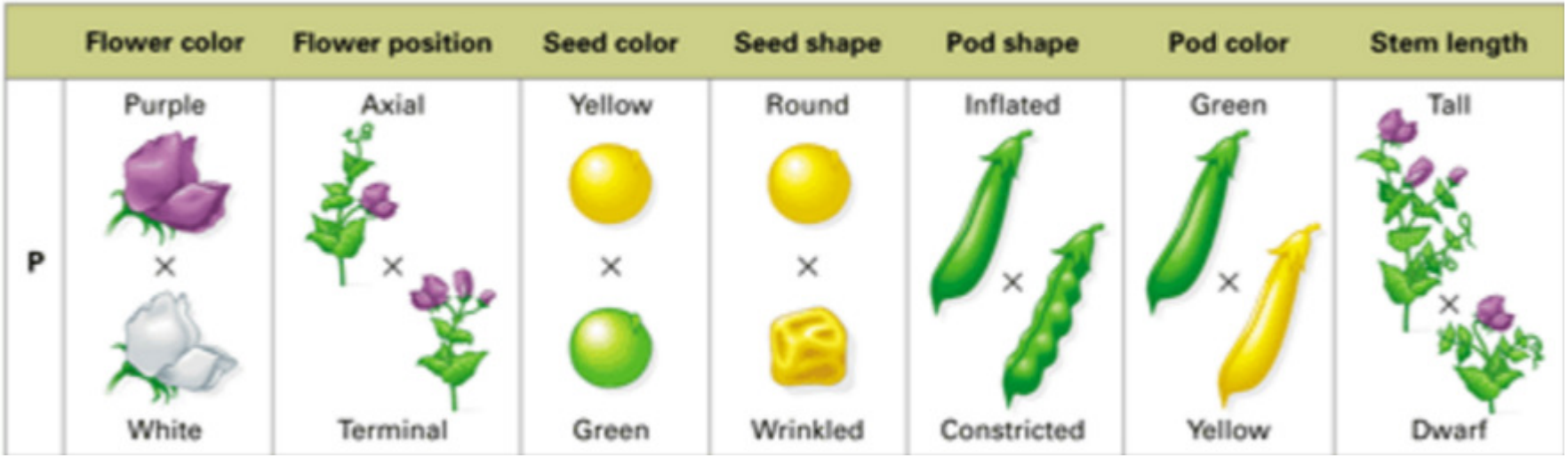
- Mendel spent a lot of time looking at the plants available and comparing generations of plants

Hypothesis

- Mendel hypothesized that the traits of pea plants were passed down from parents to offspring
- Today we call this heredity

Experiment & Results

- It was good that he studied pea plants because many of their traits exist in only 2 forms – short or tall, green seed or yellow seed, round seed or wrinkled seed
- They can produce large numbers of offspring and they can self-pollinate

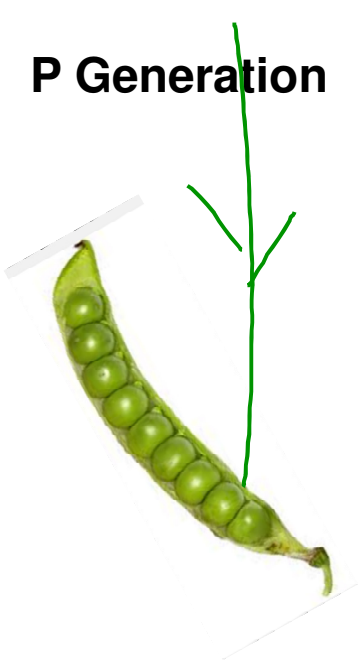


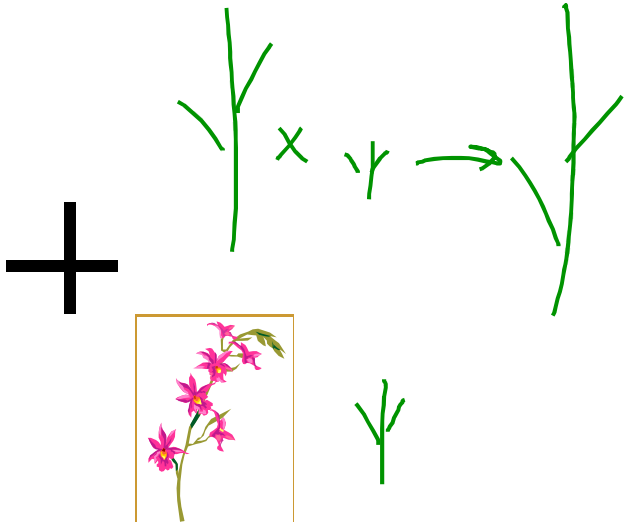
- He crossed plants with opposite traits
- He started with purebred plants (a purebred plant is one that always produces offspring with the same traits as the parents)
- In order to get purebreds, he let them self-pollinate many times

Experiment #1

- Mendel crossed purebred tall plants with purebred short plants
- The parents were called the P generation
- The first generation was called the F_1 generation – all of these were tall

P Generation



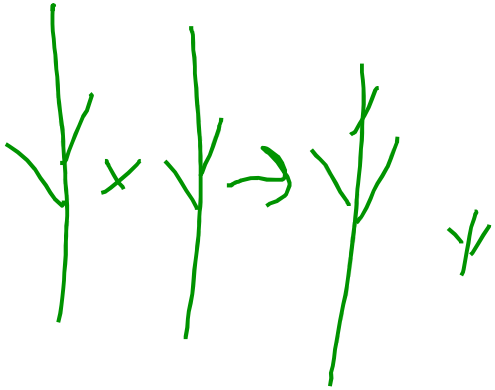


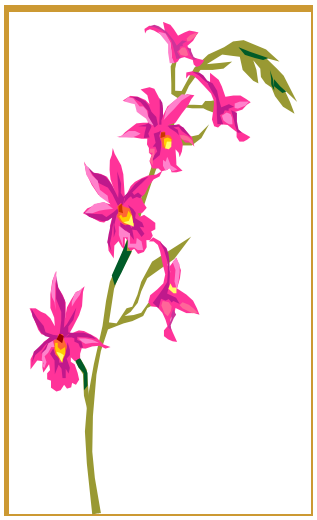
F_1 Generation

Experiment #2

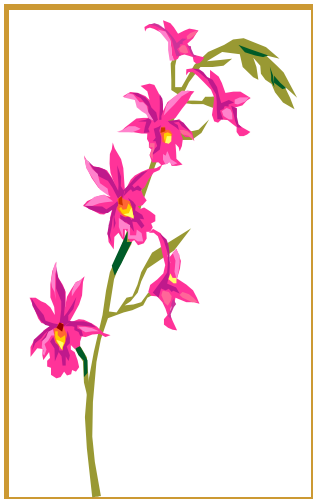
- Mendel then allowed the F_1 generation to self-pollinate
- The second generation was called F_2
- The F_2 generation consisted of both tall and short plants

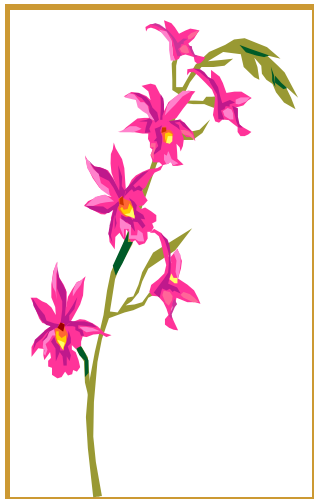
F_1 Generation



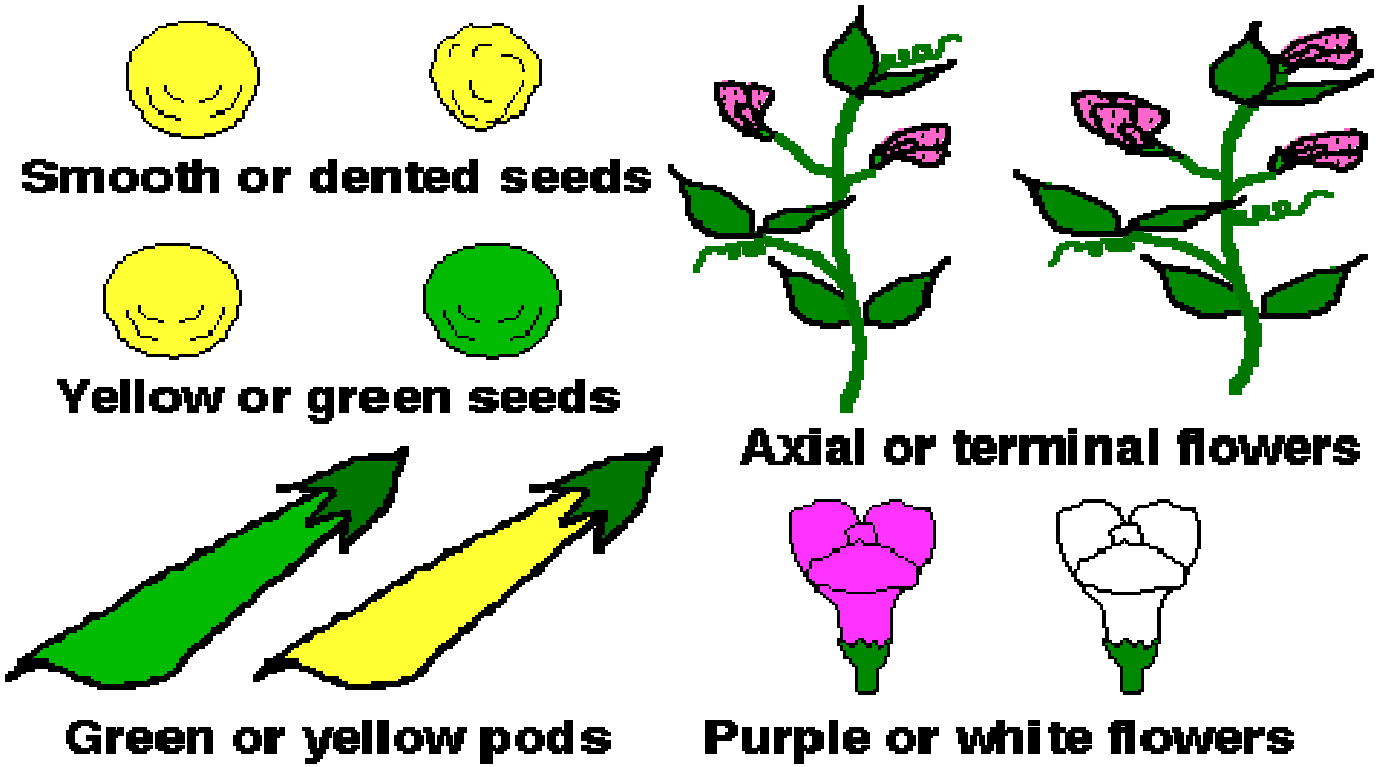


F_2 Generation





Mendel then repeated his experiments looking at other traits such as…

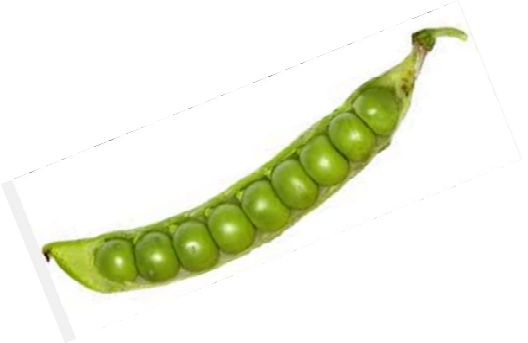


Conclusion

- Mendel reasoned that individual factors must control the inheritance of traits
- The factors that control each trait exist in pairs

Publish

- In 1866, Mendel presented his findings to a group of scientists that did not realize and understand the importance of his discoveries



Publish

- Mendel's work was forgotten for 34 years, until 1900 when other scientists discovered his papers and realized the importance of his work

Silently - without talking - stand up and find a partner who is not at your table. Stand with your partner **without talking.**

The person who is older is partner A. The other is partner B.

-Partner A: In your own words, summarize what Mendel observed and what question he asked.

-Partner B: In your own words, summarize what Mendel's hypothesis was and the experiments that he did. What results did he get?

-Partner A: In your own words, summarize what Mendel concluded or learned from his experiments.

Say thank you to your partner and then silently and quickly return to your seats.

160 YEARS LATER…

What we know now!

Genes are factors that control traits.

For example, there is a gene that controls the height of pea plants.

Genes can come in different forms called alleles.

In pea plants, there are 2 alleles for height – tall and short

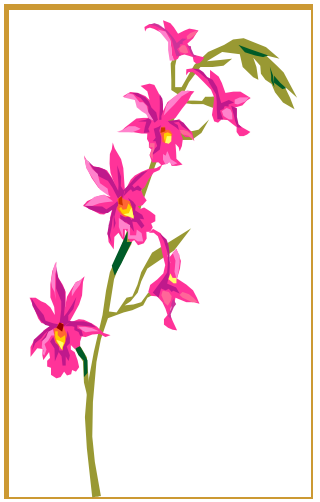
Our pea plant has 2 alleles for each gene:

1 is inherited from mom
1 is inherited from dad

Some alleles are dominant. A dominant allele is one whose trait always shows up in the organism when the allele is present.

Dominant alleles are symbolized with a capital letter.

T = tall



Some alleles are recessive. A recessive allele is one whose trait is masked (covered up) when the dominant allele is present.

Recessive alleles are symbolized with a lower case letter.

t = short 

The combination of alleles that an organism has is called it genotype.

Ex: TT, Tt, or tt

The actual physical appearance of the organism is called its phenotype.

Ex: tall or short

TT and Tt = tall

tt = short

Vocab pages – 20, 21

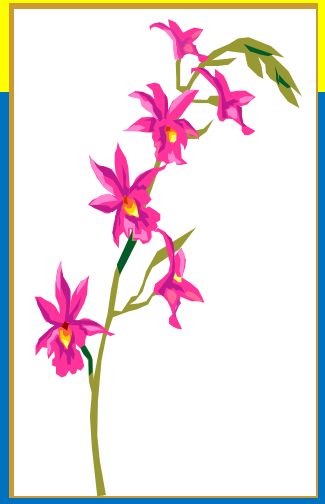
Write examples for these words:

Word	Example
Genes	Pea plants have genes for height; humans have genes for eye color, hair color, freckles….any many others
Alleles	Pea plant alleles for height: tall and short For eye color: brown, green, blue; freckles: freckles or no freckles
Dominant Allele	In pea plants, tall (T) is dominant In humans, freckles (F) are dominant
Recessive Allele	In pea plants, short (t) is recessive In humans, no freckles (f) is recessive
Genotype	Pea plant: TT, Tt, tt Humans: FF, Ff, ff (each organism only has 1 genotype for each gene)
Phenotype	Pea plant: tall or short Humans: has freckles or does not have freckles

Friday, September 16

Write the date & question:

9/16: If a pea plant is tall, what 2 possible genotypes could it have for height (T=tall, t=short)?

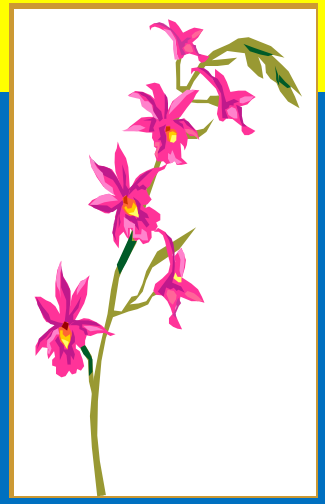


Friday, September 16

Write the date & question:

9/16: If a pea plant is tall, what 2 possible genotypes could it have for height (T=tall, t=short)?

TT or Tt (both would look the same and have the tall trait)



Reminders:

-Progress reports due by Monday

-Spirit day counts

How do we get our traits?

Objective of the day...

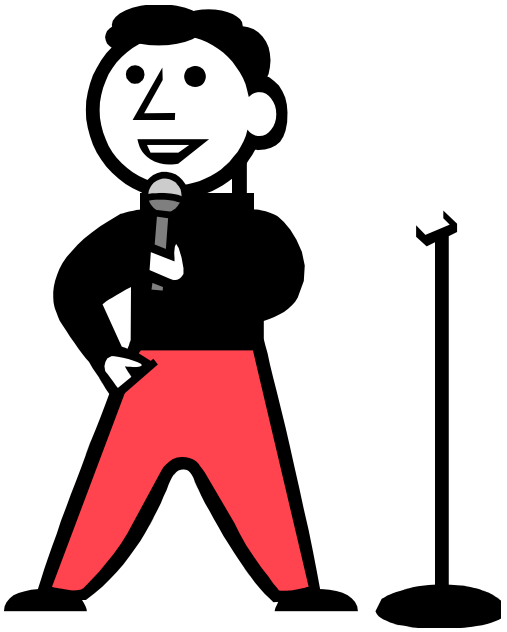
-Explain the basic principles of heredity

-Distinguish between dominant and recessive traits

Mission: We will be **incredible** science students.

There will be a graded exit ticket at the end of the class, so if there is something that you don’t understand as we practice this then please ask questions.

Stand up / Sit down Quiz



True = Stand

False = Sit

GENETICS

Genetics is the scientific study of heredity

In pea plants, the dominant trait skips generations

We have 24,000 alleles for each gene

If you have a dominant and a recessive allele, you will only show the recessive trait

True = Stand **False = Sit**

GENETICS

Mendel's discovery was seen as important as soon as he published his findings

Heredity is the passing of traits from parent to offspring

Genotype is a description of what something looks like

Someone's genotype will determine what someone looks like

True = Stand **False = Sit**

Add to **Table of Contents**

Date	**Title**	**Page #**
9/16	Dominant vs Recessive Alleles	22

Pea Plant Alleles

TRAIT	DOMINANT ALLELE	RECESSIVE ALLELE
Height	Tall (T)	Short (t)
Pod Shape	Smooth (S)	Pinched (s)
Pod Color	Green (G)	Yellow (g)
Seed Shape	Round (R)	Wrinkled (r)
Seed color	Yellow (Y)	Green (y)
Flower color	Purple (P)	White (p)

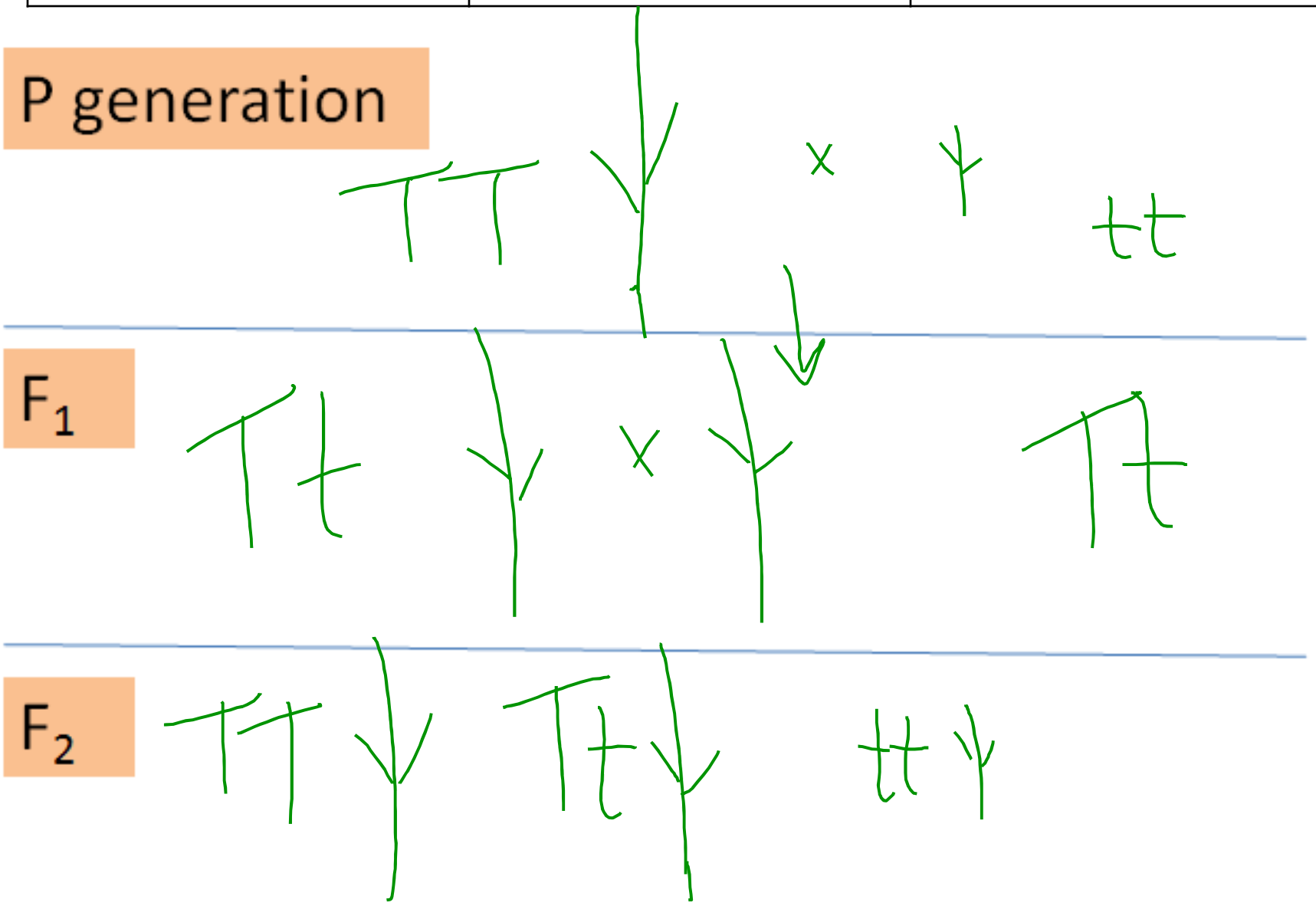
Organisms have 2 alleles for each gene.
They inherit one from each parent.

Pea Plant Alleles

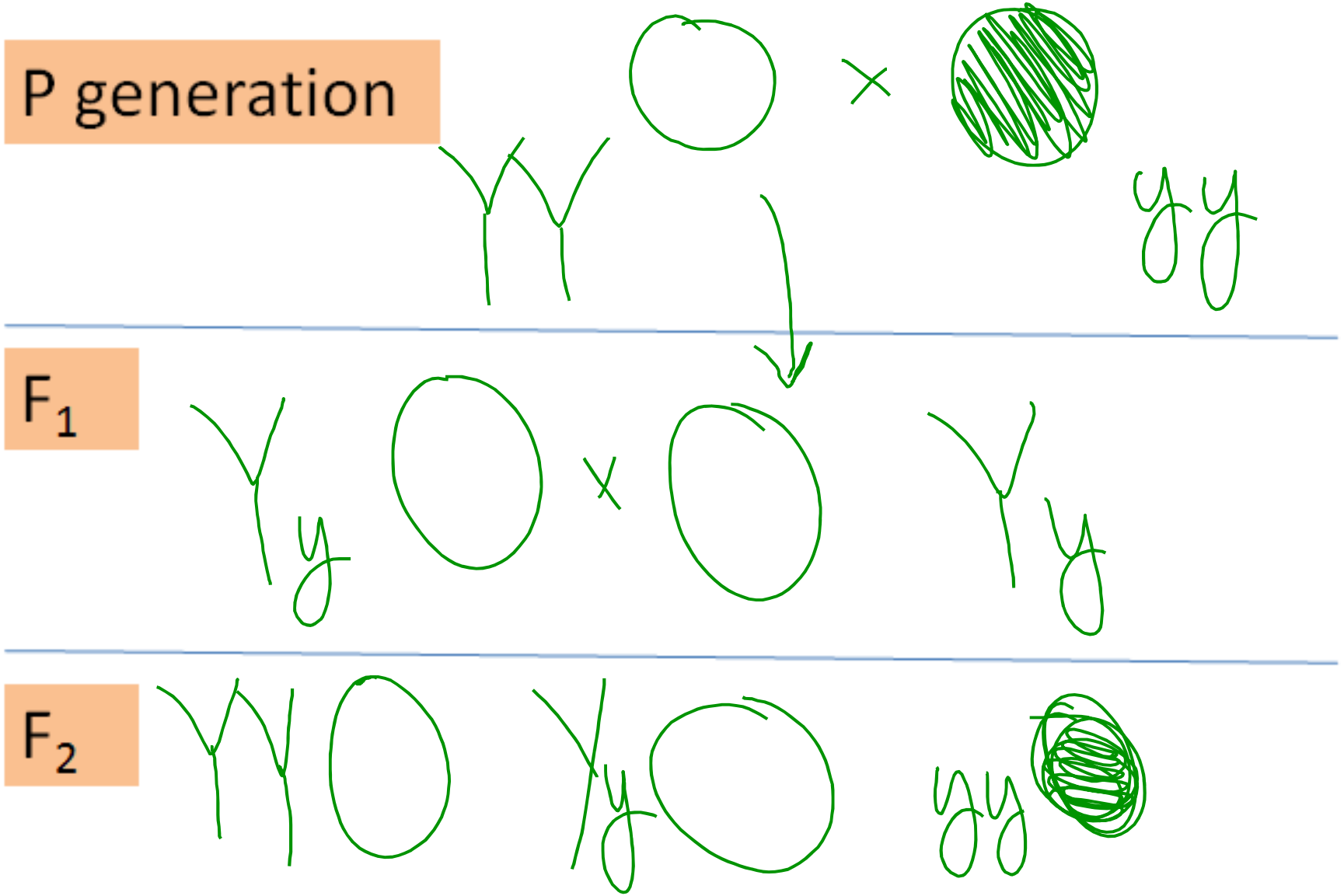
TRAIT	DOMINANT ALLELE	RECESSIVE ALLELE
Height	Tall (T)	Short (t)
Pod Shape	Smooth (S)	Pinched (s)
Pod Color	Green (G)	yellow (g)
Seed Shape	Round (R)	Wrinkled (r)
Seed color	Yellow (Y)	Green (y)
Flower color	Purple (P)	White (p)

In order to show a recessive trait, an organism must have 2 recessive alleles.

TRAIT	DOMINANT ALLELE	RECESSIVE ALLELE
Height	Tall (T)	Short (t)

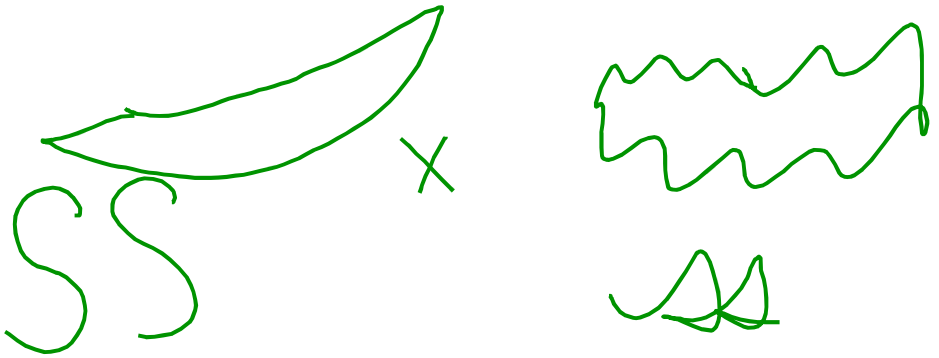


TRAIT	DOMINANT ALLELE	RECESSIVE ALLELE
Seed color	Yellow (Y)	Green (y)

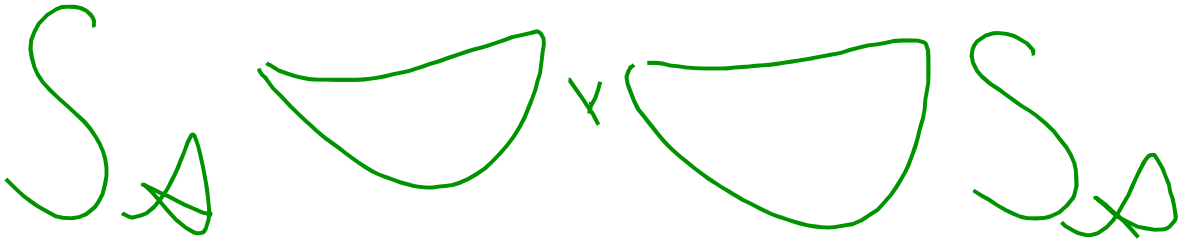


TRAIT	DOMINANT ALLELE	RECESSIVE ALLELE
Pod Shape	Smooth (S)	Pinched (s)

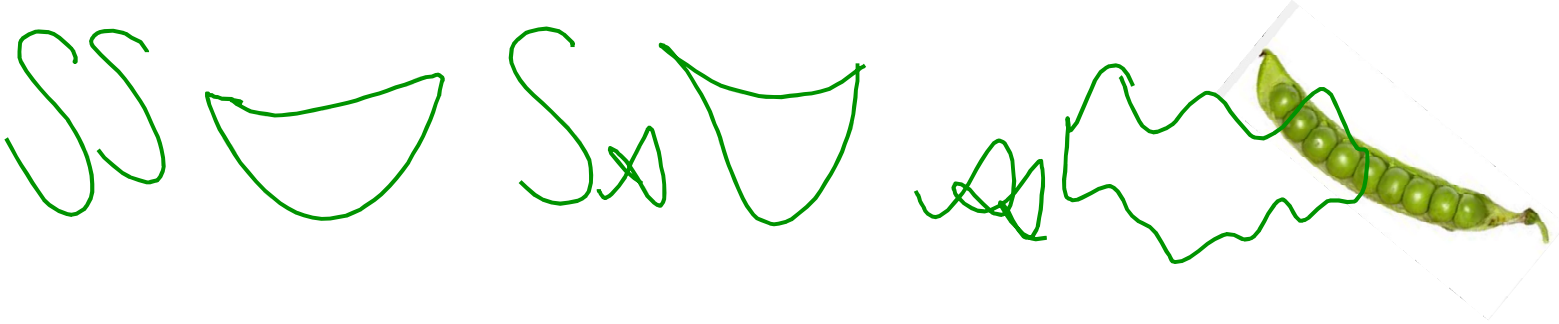
P generation



F_1

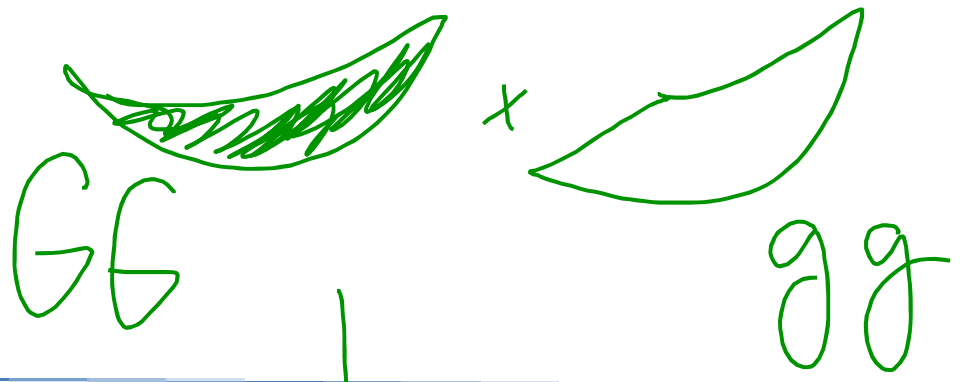


F_2



TRAIT	DOMINANT ALLELE	RECESSIVE ALLELE
Pod Color	Green (G)	Yellow (g)

P generation



F_1

F_2

TRAIT	DOMINANT ALLELE	RECESSIVE ALLELE
Seed Shape	Round (R)	Wrinkled (r)

P generation

F_1

F_2

TRAIT	DOMINANT ALLELE	RECESSIVE ALLELE
Flower color	Purple (P)	White (p)

P generation

F_1

F_2

Please answer these individually on your own paper

Each person should now read their answers to the group. Listen carefully as your teammates read their answers. If you want to change or add to your own answer as you listen to them, then do so.

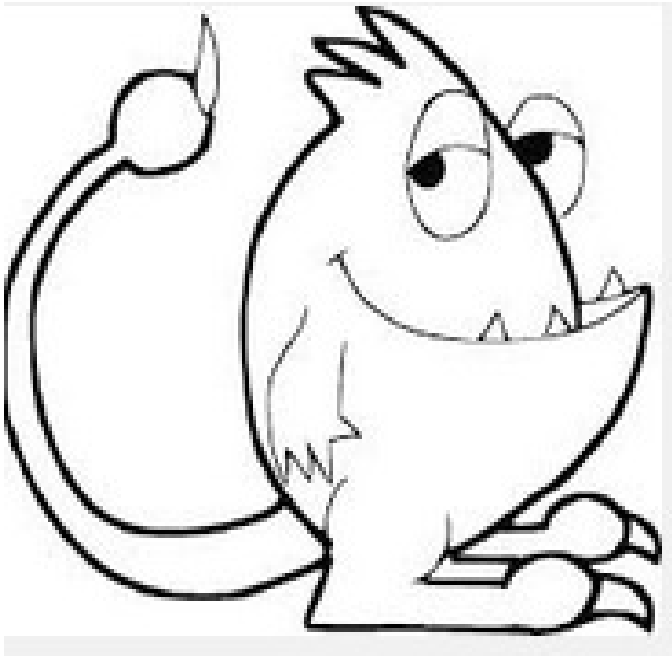
Explain why one trait was able to skip a generation in each of Mendel's crosses:

Traits controlled by recessive alleles were able to skip generations because if a plant had both a dominant and recessive allele then they would show the dominant trait but could still pass down the recessive allele.

What does "purebred" mean with respect to genotype?

A purebred organism has 2 of the same alleles.

The friendly little monster has a long tail. Some of these friendly little monsters have short tails. Describe an experiment that you could do to determine if the trait of having a long tail is a dominant or a recessive allele.



Trait	Dominant Allele	Recessive Allele
Number of teeth	T (three)	t (two)
Eye size	S (same size)	s (different size)
# of toes per foot	F (three)	f (seven)
Ear shape	R (round)	r (pointy)

What is the possible genotype (or genotypes) of this happy monster for each trait:

Number of teeth _____ Eye size _____

# of toes per foot _____ Ear shape _____

Exit Ticket

Use your notes ☺

Make sure to list ALL possible genotypes
and make big letters big and small letters small

Please turn in to the basket on center table when done.

Then, turn in notebook to the crate.