Warm Up (10/29-10/30)

1. What is a ***recessive trait***? What is a ***dominant trait***?
2. Make a list of different recessive traits in humans. List as many as you can.

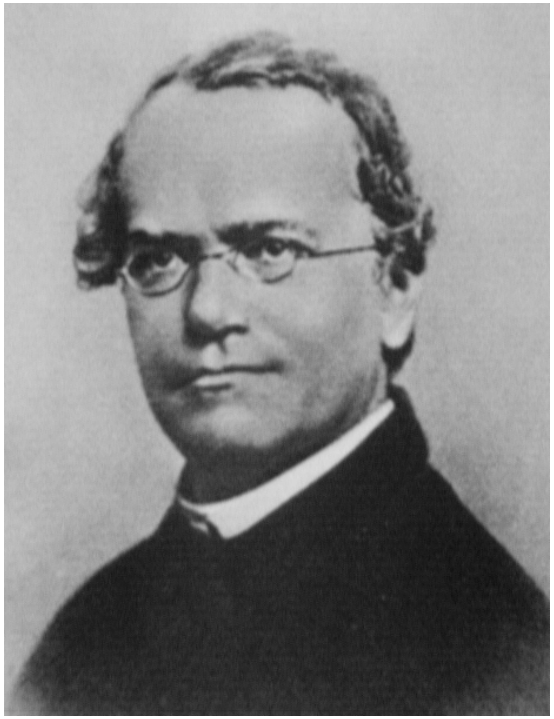
Today's Agenda

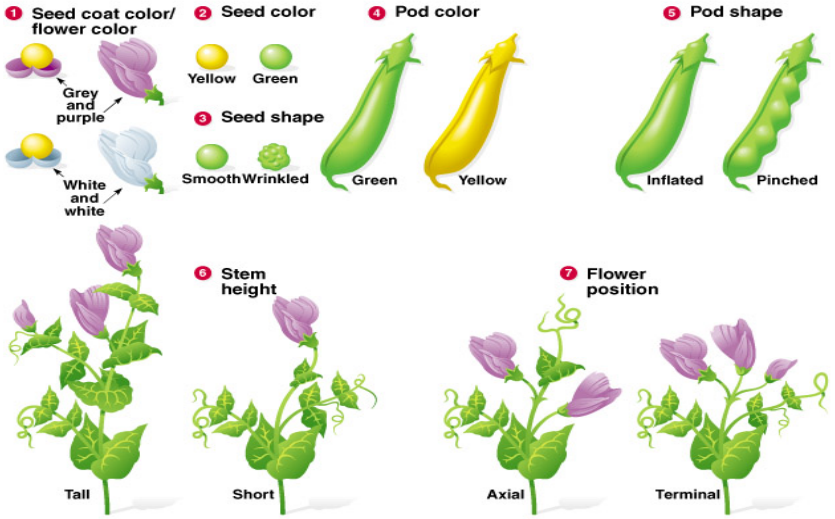
- Warm up
- 10.1 Notes: Mendel's Laws of Heredity
- Inquiry Lab: Demonstrating Independent Assortment By Creating Your Own Karyotype

Homework: Finish karyotype

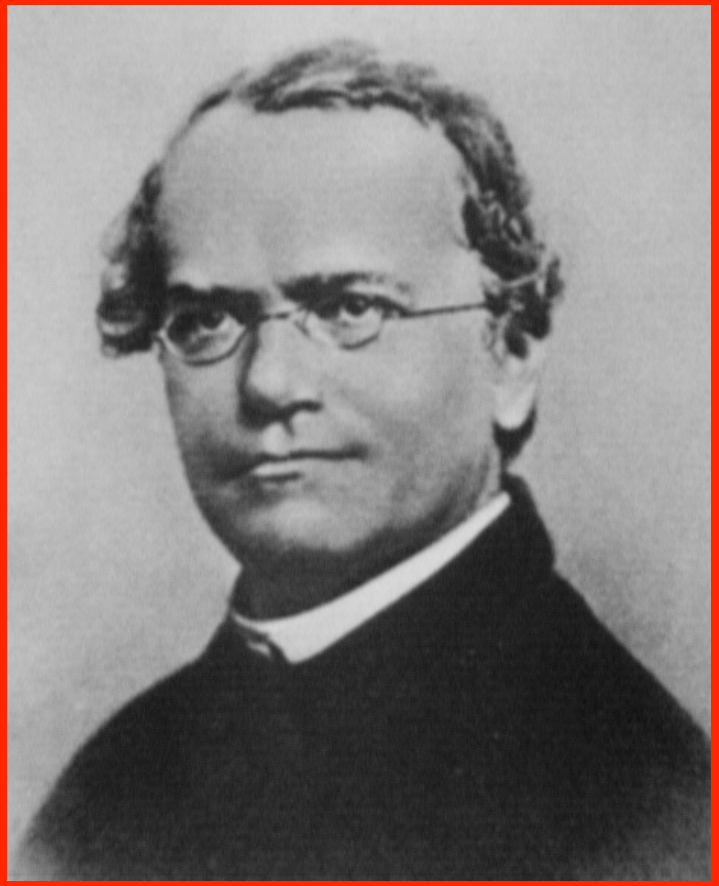
Character Assembly Tuesday- FORMAL DRESS

10.1 Mendel's Laws of Heredity





Gregor Mendel



Monk

Studied garden peas from 1856-63

Published his 'paper' in 1866

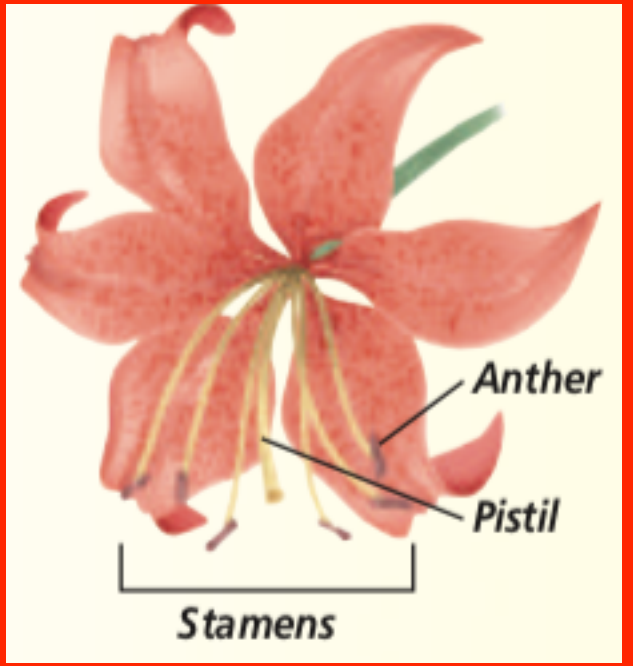
Pretty much ignored until 1900

His experiments were special because:

1) Quantitative
2) carefully documented
3) elegantly designed

Why peas?

- Reproduce sexually (fertilization of gametes to form zygote)
  - Peas can actually self- pollinate
- Can control cross- pollination
- Variety of traits
  - Trait: A specific characteristic that varies from one individual to another.



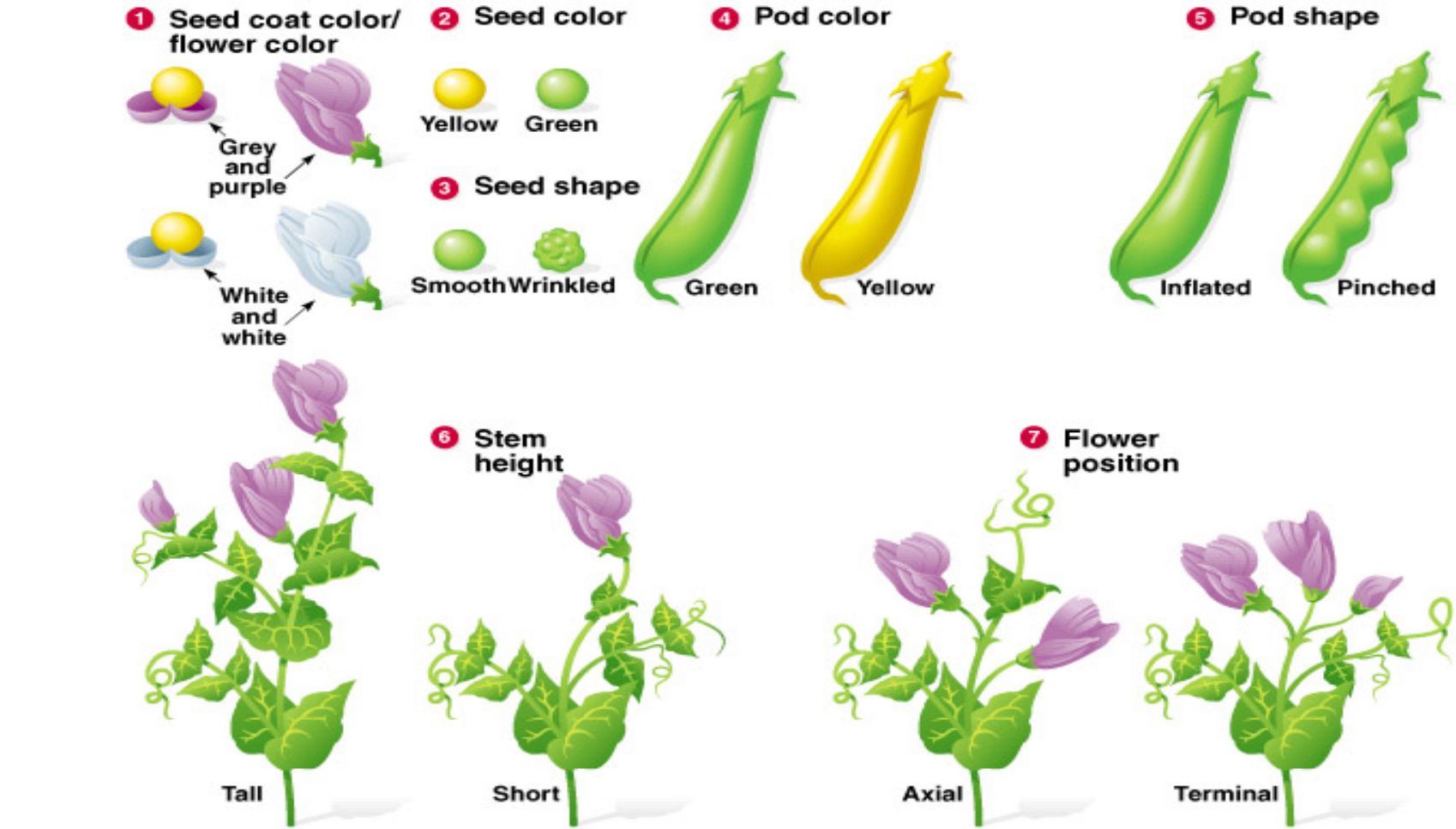


Fig. 10.4, Mendel's 7 garden pea characters.

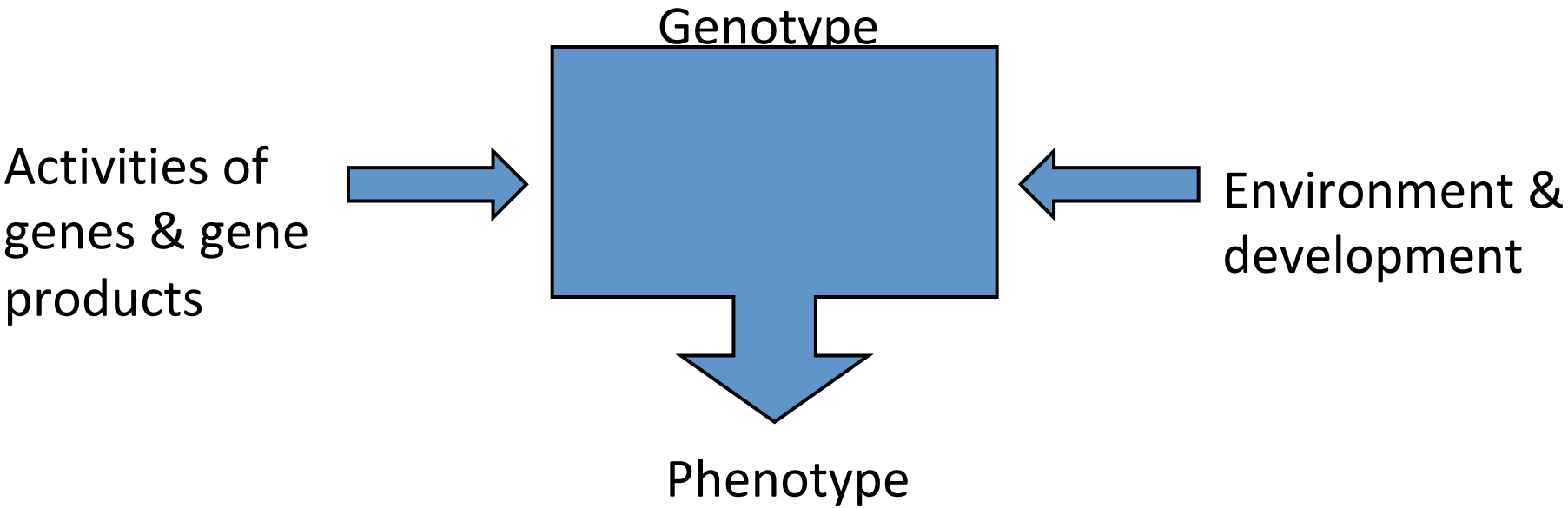
Genotype vs. phenotype

- **Genotype**: the actual genetic makeup/ allele combination of the organism

  -includes genetic items you *can't see*

- **Phenotype**: the observable physical characteristics of an organism

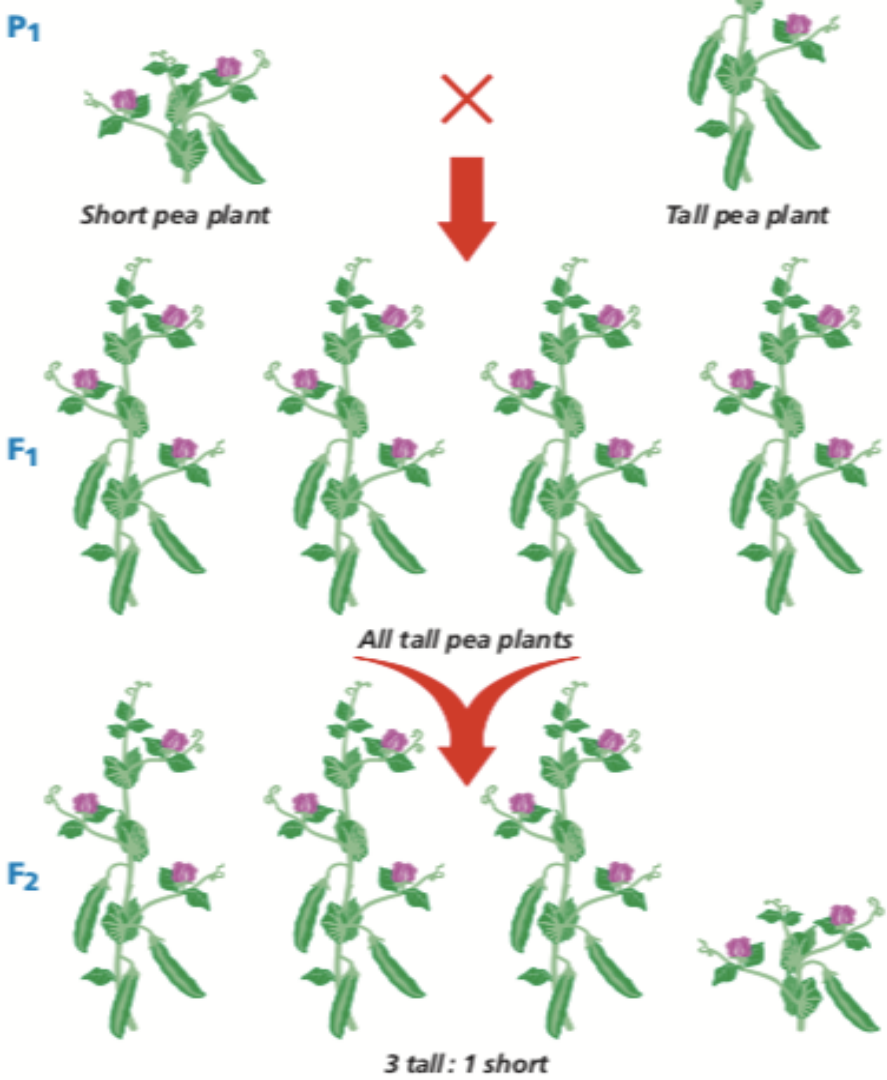
  -the detectable expressions of genotypes



Genotype = collection of genes (and alleles) in an organism

Phenotype = observable properties of an organism

WHAT HAPPENED?



	Seed shape	Seed color	Flower color	Flower position	Pod color	Pod shape	Plant height
Dominant trait	 round	 yellow	 purple	 axial (side)	 green	 inflated	 tall
Recessive trait	 wrinkled	 green	 white	 terminal (tips)	 yellow	 constricted	 short

Gene vs. Allele

- Gene: Segment of DNA that determines traits
- Allele: One of at least two alternative forms of a gene found at the same place on a chromosome.
    - -Represented with letters
    - -Ex: R, r, T, t (letters are arbitrary)

Discuss and Answer

The tall allele, ***T***, is dominant to the short allele, ***t***, in Mendel's pea plants. You examine a pea plant which exhibits a phenotype of tallness.

What is its genotype?

How do you know?

Dominant

Describing a genetic trait that can be expressed in the presence of another, different allele

A capital letter represents a dominant allele

Ex: T or R

Recessive

Describing a genetic trait that is not expressed in heterozygotes ***Also known as hybrids***

Aa

Tt


HETEROZYGOATS

Recessive

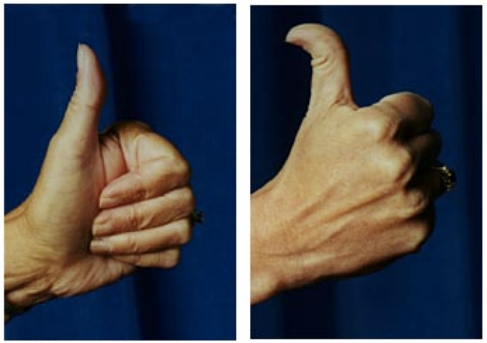
For a recessive allele to be expressed, there must be two copies of the allele, *i.e.*, the individual must be homozygous

aa

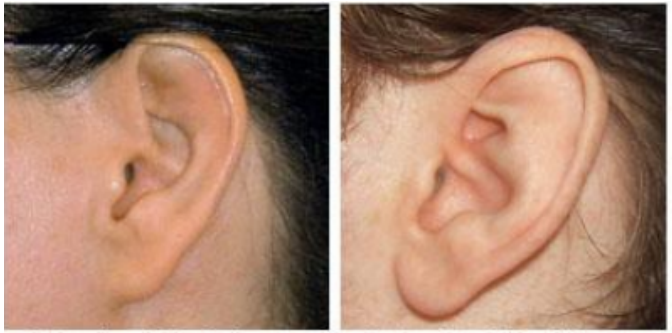
tt

Examples

- Hitchhiker’s thumb



- Attached ear lobes



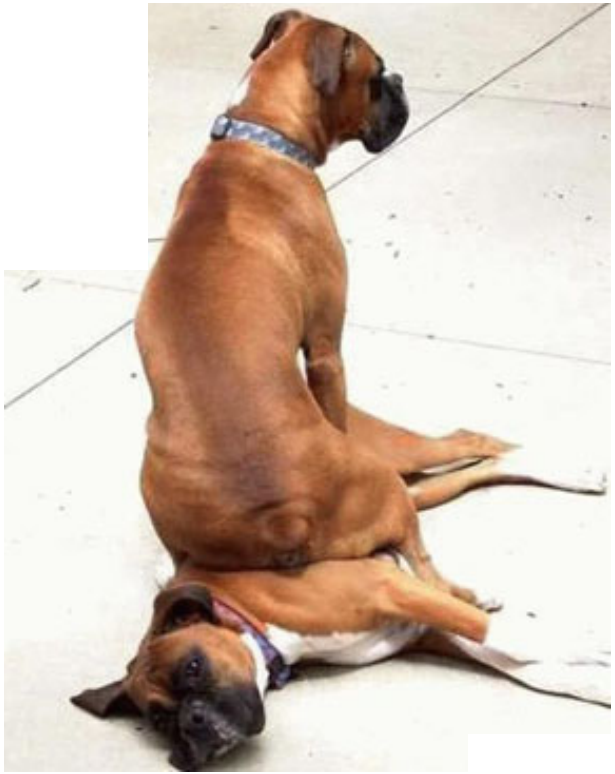
- Eye color

Review

- Principle of Dominance:
  certain genes are dominant over other recessive genes

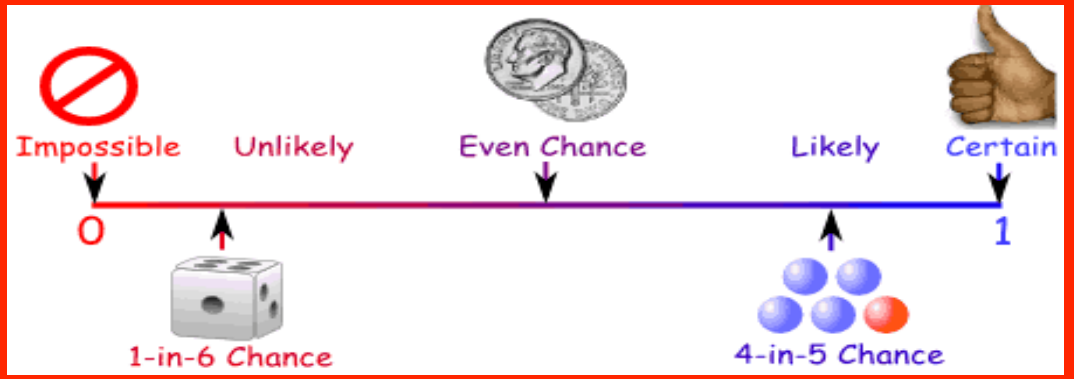
- Dominant: *capital "A"*
  trait expressed in phenotype

- Recessive: *lowercase "a"*
  trait expressed only when there is no dominant gene present



Punnett Squares

Determine probable outcomes



This means that it is highly likely that these outcomes will happen

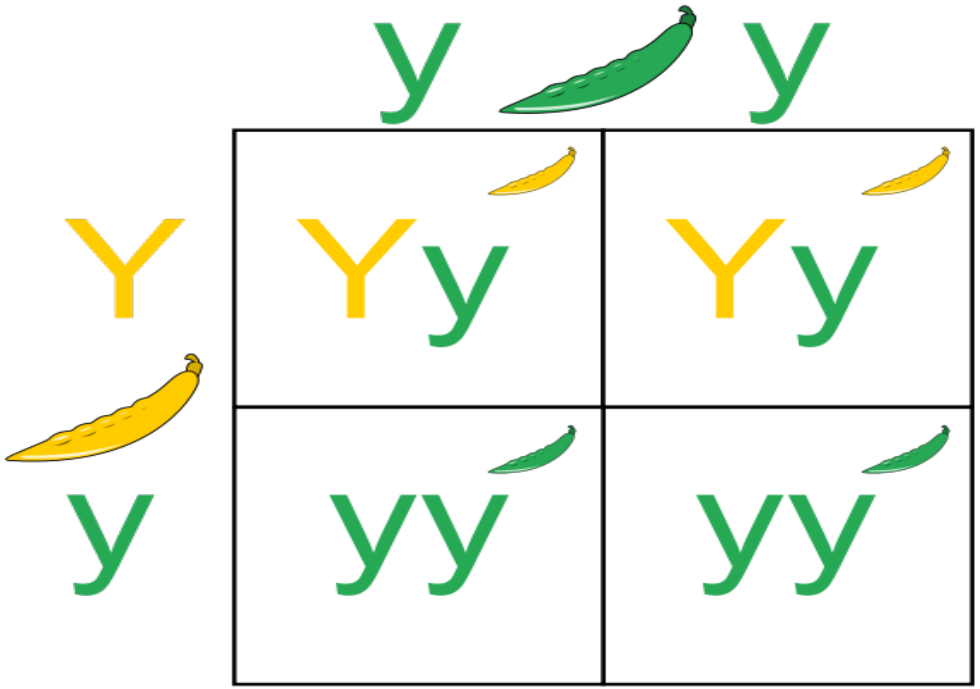
https://youtu.be/prkHKjfUmMs

Punnett Squares

	A	a
A	AA	Aa
a	Aa	aa

Every box is ¼ or 25%

Punnett Squares

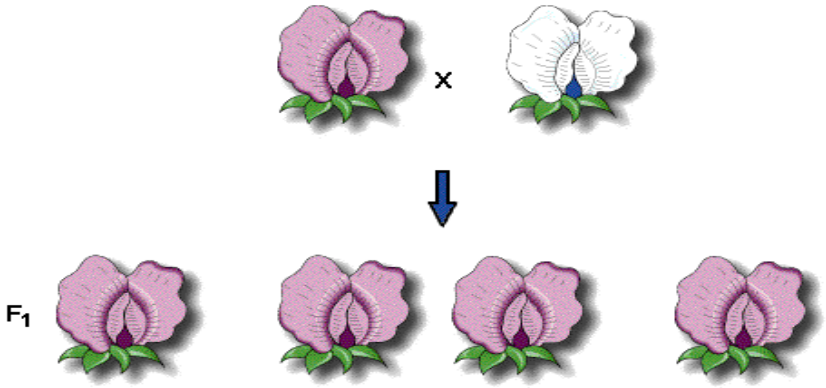


Punnett Square Practice

- Right handedness is a dominant gene. Let's call it "R"
- Left handedness is a recessive gene. Let's call it "r"

- Suppose a mother is right handed (RR) and a father is right handed (Rr). What is the probability that they will have a left handed child?

Review



Which color flower is dominant?

- You try! Draw the Punnett square for this experiment:

Mendel's Laws

- **Law of Segregation**:
  - Everyone has 2 alleles (versions) of a gene
  - Each gamete (sex cell) receives one of these alleles
- **Law of Independent Assortment**:
  - Genes for different traits are inherited independently if on separate chromosomes
  - Ex: blonde hair & blue eyes (if you get one, you won't necessarily get the other)

Figure 10.5
Mendel's law of segregation explains the results of his cross between F_1 tall plants. He concluded that the two alleles for each trait must separate when gametes are formed. A parent, therefore, passes on at random only one allele for each trait to each offspring.