

## THE WORK OF GREGOR MENDEL

### Objectives:

- Describe Mendel's studies and conclusions about inheritance
- Describe what happens during segregation

**Key Terms:** genetics, Fertilization, trait, hybrids, genes, alleles, principle of dominance, segregation, gametes















## Mendel Used Pea Plants

### Why is it helpful?

- "model system" to help understand function of other organisms

### Why Pea plants?

- Small and easy to grow
- A single pea plant can make hundreds of offspring
- Easily identifiable traits
- Easy to control fertilization (pollen and carpels— male and female parts)

Traits	Shape of Seeds	Color of Seeds	Color of Pods	Shape of Pods	Plant Height	Position of Flowers	Flower Color
Dominant trait	Round 	Yellow 	Green 	Full 	Tall 	At leaf junctions 	Purple 
Recessive trait	Wrinkled 	Green 	Yellow 	Flat, constricted 	short 	At tips of branches 	White 

## Fertilization

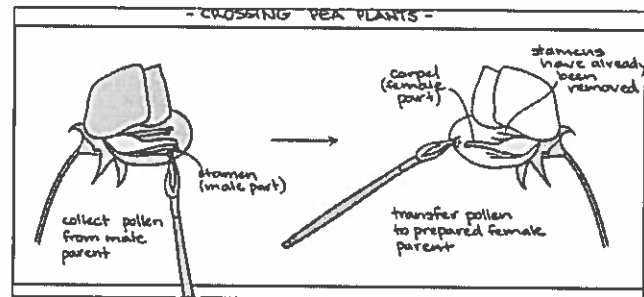
- Only in sexual reproduction (not asexual reproduction)
- Male and female reproductive cells join together and form a new cell
- In peas, pollen and the egg join together and form a small plant embryo encased within a seed.

### Self-pollination in plants

- Both male and female cells come from the same plant.
- Offspring genetically identical

### Cross-pollination in plants

- Pollen transferred to other plant
  - Natural pollinators
  - Humans
- Offspring genetically different



## Genes and their alleles

An individual's characteristics are determined by factors that are passed from one parental generation to the next






















- **genes:** what we call these factors of inheritance
  - We now know they are in the molecule DNA
- **Allele:** the different forms of a gene.

**EXAMPLE:** The gene for blood type can have three different alleles: A Type, B Type, and O Type.

## Principle of dominance

- Some alleles are dominant and others recessive
- At least one dominant allele, and the organism will exhibit the dominant trait
- Recessive traits will only be exhibited when dominant trait is not present (all two copies are recessive)

Do you think dominant traits are more common?

	Seed Shape	Seed Color	Seed Coat Color	Pod Shape	Pod Color	Flower Position	Plant Height
P	Round  X 	Yellow  X 	Gray  X 	Smooth  X 	Green  X 	Axial  X 	Tall  X 
	Wrinkled	Green	White	Constricted	Yellow	Terminal	Short
F <sub>1</sub>	 Round	 Yellow	 Gray	 Smooth	 Green	 Axial	 Tall

- P: parental generation
- F1: The offspring of the parental generation
- F2: The offspring of the F1 generation

Dominant: capital letters

Recessive: lowercase letters

Inheritance: You get one allele from each parent.

## Segregation

- When the alleles separate from each other in the formation of gametes
  - **Gametes:** sex cells (humans sperm and egg, peas, pollen and ovum)

During gamete formation, the alleles for each gene segregate from each other so that each gamete carries only one allele for each gene.

**EXAMPLE:** My mom has one allele for Type O blood and one Allele for Type A blood. She gave only one allele to each of her kids. The other allele we got from our dad.