

Introduction to Genetics

Genetics is the study of genes. Our genes carry information that gets passed from one generation to the next.

For example:

genes are why one child has blonde hair like their mother, while their sibling has brown hair like their father.

Heredity is the transmission of a unique set of characters from parents to their offspring.

Variation is the observation of different characters among individuals in a particular species.

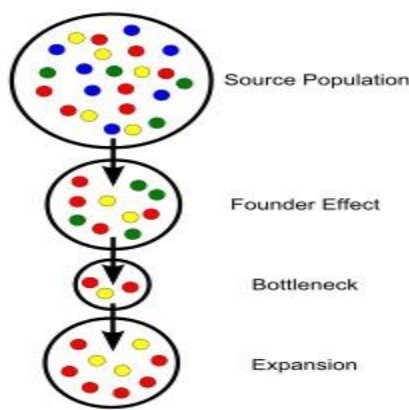
What are modern genetics?

Modern genetics focuses on the chemical substance that genes are made of, called deoxyribonucleic acid, or DNA, and the ways in which it affects the chemical reactions that constitute the living processes within the cell.

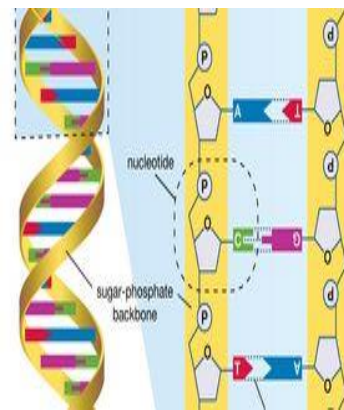
Branch's of modern genetic



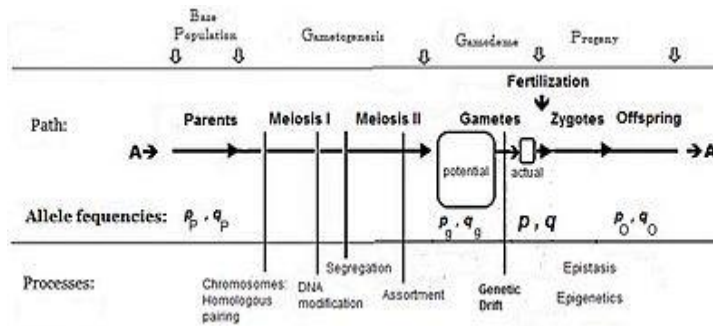
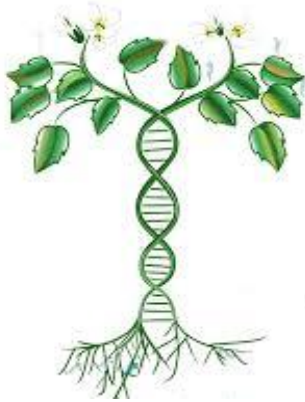
1-Clinical genetics involves the study of disease, finding the root of the disease.



2-Population genetics deals with genetic differences within and between populations, and is a part of evolutionary biology

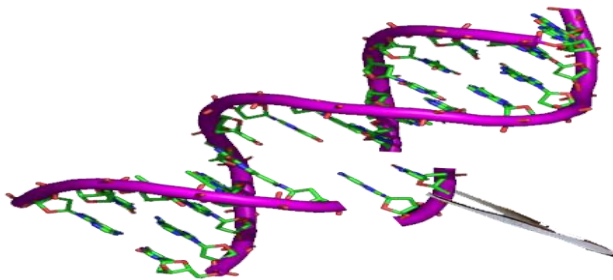


3-Molecular genetics focuses on the structure and function of the genetic units.



4-plants genetics study of genes, genetic variation, and heredity specifically in plants.

5-Quantitative genetics study of genes, genetic variation, and heredity specifically in plants.



6- Genetic engineering also called genetic modification or genetic manipulation, is the modification and manipulation of an organism's genes using technology

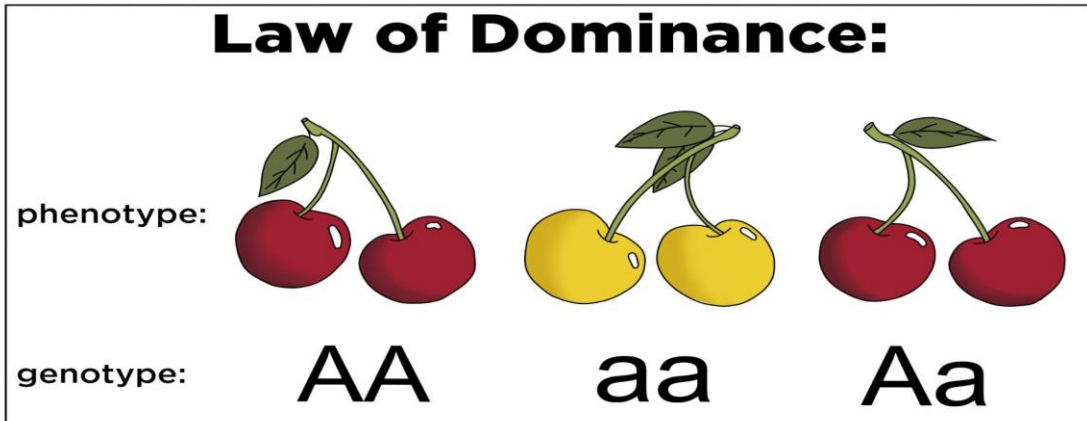
What are the 3 laws of Mendel?

The three laws of inheritance proposed by Mendel include:

- 1- Law of Dominance.
- 2-Law of Segregation.
- 3-Law of Independent Assortment.

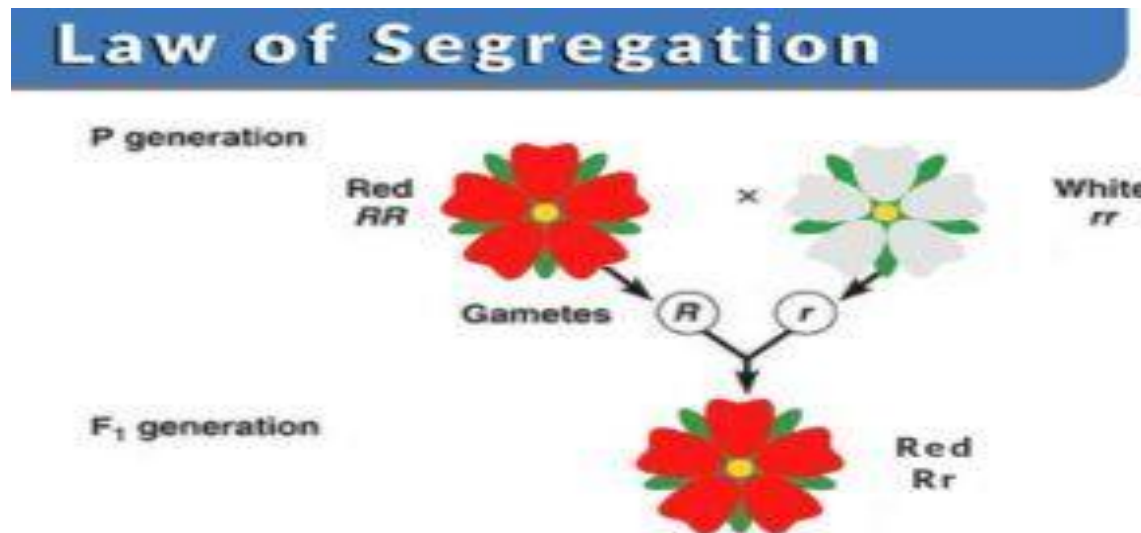
1- Law of Dominance

When parents with pure, contrasting traits are crossed together, only one form of trait appears in the next generation.



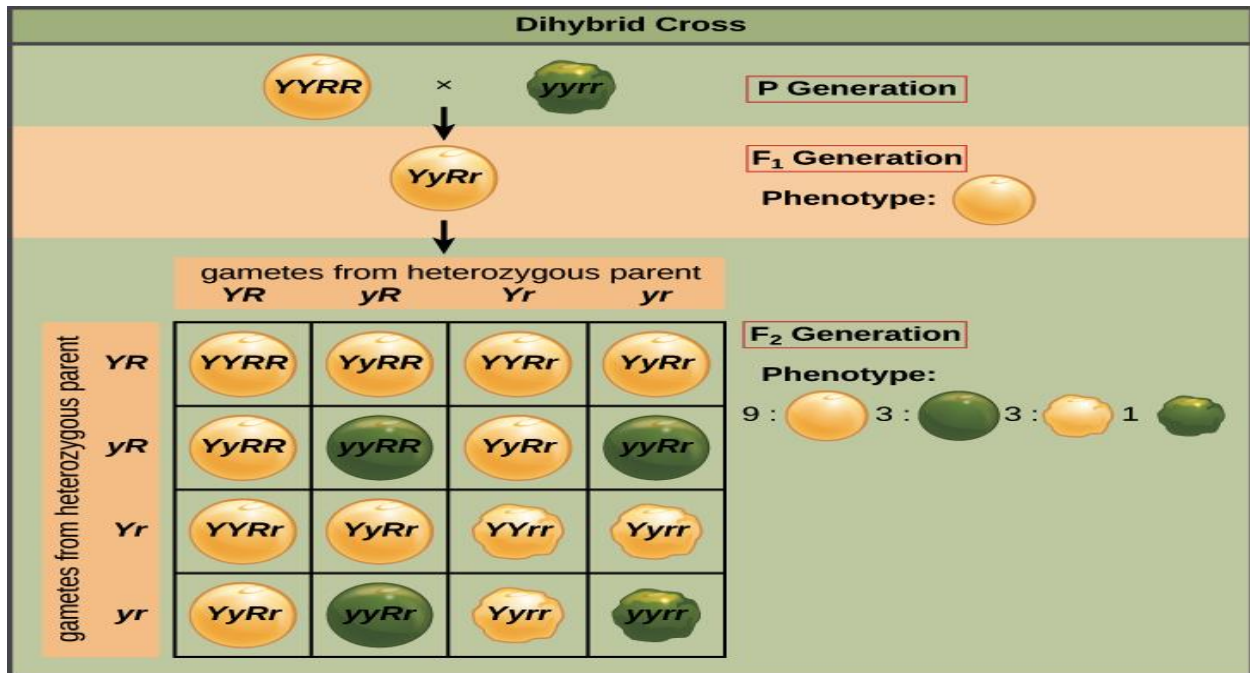
2-Law of Segregation.

each individual that is a diploid has a pair of alleles (copy) for a particular trait.



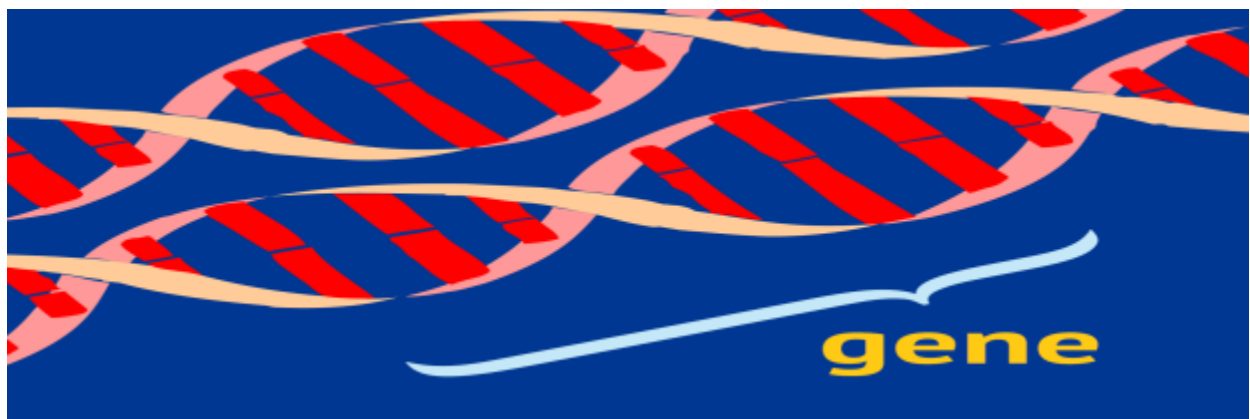
3-Law of Independent Assortment.

the alleles of two (or more) different genes get sorted into gametes independently of one another.



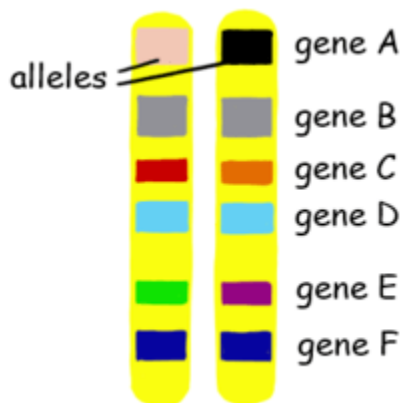
Gene

A gene is the basic physical and functional unit of heredity. Genes are made up of DNA



Allele

An allele is one of two or more versions of DNA sequence (a single base or a segment of bases) at a given genomic location






Genotype

is a scoring of the type of variant present at a given location (i.e., a locus) in the genome

Phenotype

refers to an individual's observable traits, such as height, eye color and blood type. A person's phenotype is determined by both their genomic makeup (genotype) and environmental factors

Genotype vs Phenotype	
GENOTYPE The genotype is an organism's genetic information.	PHENOTYPE The phenotype is the set of observable physical traits.
BB homozygous dominant	purple 
Bb heterozygous	purple 
bb homozygous recessive	white 

What is the difference between dominant and recessive traits?

Dominant traits are always expressed when the connected allele is dominant, even if only one copy of the dominant trait exists.

Recessive traits are expressed only if both the connected alleles are recessive.

Homozygous and **heterozygous** are terms that are used to describe allele pairs. Individuals carrying two identical alleles (RR or rr) are known as homozygous. While individual organisms bearing different alleles (Rr) are known as heterozygous