

Heredity

by Sophia



WHAT'S COVERED

In this lesson, you will learn about the basics of heredity. Specifically, this lesson will cover:

1. Heredity

Heredity is the passing of traits from parents to offspring. **Gregor Mendel** is considered the father of genetics because of his work with heredity. He examined how information is passed through generations from parent to offspring. To this day, research is still ongoing as to what traits are inherited and what traits are the result of environmental factors.

➔ **EXAMPLE** It appears that certain nucleotide sequences (which are inherited) make a person more likely to contract Type I diabetes, but whether they develop diabetes is also influenced by what pathogens they encounter.

Mendelian **inheritance** is a term that was coined due to Mendel's research on pea plants. His first discovery was that traits aren't infinitely mixable. For instance, if you breed a yellow pea plant with a green pea plant, you don't get a chartreuse pea: You get a yellow pea. This led to the discovery of genes: Indivisible, heritable units. **Genes** are found on chromosomes and are passed from parents to offspring. They contain information about specific traits. Some different types of inheritance include:

- Autosomal dominant
- Autosomal recessive
- X-linked inheritance
- X-linked dominant

Homologous chromosomes are pairs of chromosomes found within your cells that contain variations of the same information and are the same size and shape. A person inherits one homolog of each chromosome from their mother and one homolog from their father. A human has 46 total chromosomes in their body, 23 from each parent. Each chromosome is a long stretch of DNA with hundreds of genes coded along its length. A locus is the physical location of a gene along the chromosome's length. For instance, one of the genes for hemoglobin is located along the middle of chromosome 11.

Alleles are different versions of a gene; you have two alleles for each trait, one on each homologous chromosome. The combination of alleles that you inherit will determine the outcome of that trait.

➔ **EXAMPLE** A trait a person's genes decides is their hairline. A person can have a straight hairline, or they can have a widow's peak. This person has a pair of alleles at a specific **locus**, and each allele

(straight or widow's peak) is a version of the gene for hairline.



TERMS TO KNOW

Heredity

The passing of traits from parents to offspring.

Gregor Mendel

Dubbed the "father of modern genetics" and arguably modern biology, Mendel was an Austrian monk who studied heredity and inheritance in plants.

Inheritance

Receiving genetic characteristics from parents, the manner in which genes are passed down to offspring.

Gene

A genetic unit of heredity; a specific section of DNA that codes for a specific protein.

Allele

Variation in a gene, an example would be eye color; there is a gene for eye color, but there are different versions of genes that allow for different eye colors (blue, green, hazel, brown).

Locus

The term used to describe the specific location of a gene/DNA sequence on a chromosome; variations of these genes are referred to as alleles.

2. Dominant & Recessive Traits

Traits can be either dominant or recessive. Recessive traits are only expressed when a **dominant allele** is not present. If a **recessive allele** is in the presence of a dominant allele, the dominant allele will always rule. There are three ways the mix of dominant and recessive alleles can present:

- **Homozygous dominant:** When there are two dominant alleles together
- **Homozygous recessive:** When there are two recessive alleles together
- **Heterozygous:** When a recessive and dominant allele are together



DID YOU KNOW

The prefix 'homo' means "the same" and the prefix 'hetero' means "different".




In genetics, letters are used to represent the combinations of alleles. A capital letter is used to represent an allele that is dominant, and a lowercase letter to represent a recessive allele.

IN CONTEXT

The gene for having a widow's peak is dominant. Suppose there are two parents that both have heterozygous alleles for a widow's peak. This means that each parent has one dominant allele (W) and one recessive allele (w) to make a heterozygous allele (Ww).

What are the possible **phenotypes**, or the physical manifestation of the genes you inherit, for each

genotype going to be?

Widow's Peak or Straight Hairline? W = dominant, w = recessive			
Genotype	WW <i>Homozygous dominant</i>	Ww <i>Heterozygous</i>	ww <i>Homozygous recessive</i>
Phenotype	Widow's Peak 	Widow's Peak 	Straight Hairline 

If you have two parents that are both heterozygous, they could have children that are homozygous dominant, heterozygous or homozygous recessive.



TERMS TO KNOW

Dominant Alleles

When one allele masks the expression of another on the same locus; this is seen at the phenotype level.

Recessive Allele

An allele that is masked by a dominant allele, recessive alleles are only expressed when they are found in homozygous pairs.

Homozygous

An organism with two identical alleles of a gene.

Heterozygous

An organism with two different alleles of a gene.

Phenotype

An observable characteristic of someone's genotype, examples: Eye color, skin color, height, gender, etc.

Genotype

A trait or characteristic expressed at the genetic level, that is, the genetic makeup of an organism.



SUMMARY

Heredity is the passing of traits from parents to offspring. Genes are the genetic information on chromosomes that pass from parent to child, and alleles are the different versions of a gene. You inherited one allele of each gene from your mom, and one from your dad. Alleles can cause either **dominant or recessive traits** to be expressed. A dominant trait will always show if a person has the dominant allele. If a person is homozygous recessive, then the recessive trait will determine a person's phenotype.

Keep up the learning and have a great day!



ATTRIBUTIONS

- [Face](#) | Author: Wikipedia | License: Public Domain



TERMS TO KNOW

Allele

Variation in a gene. An example would be eye color; there is a gene for eye color, but there are different versions of genes that allow for different eye colors.

Dominant Allele

When one allele masks the expression of another allele of the same gene. This is seen at the phenotype level.

Gene

A genetic unit of heredity; a specific section of DNA that codes for a specific protein.

Genotype

A trait or characteristic expressed at the genetic level, that is, the genetic makeup of an organism.

Gregor Mendel

Dubbed the "father of modern genetics" and arguably modern biology, Mendel was an Austrian monk who studied heredity and inheritance in plants.

Heredity

The passing of traits from parents to offspring.

Heterozygous

An organism with two different alleles of a gene.

Homozygous

An organism with two identical alleles of a gene.

Inheritance

Receiving genetic characteristics from parents, the manner in which genes are passed down to offspring.

Locus

The term used to describe the specific location of a gene/DNA sequence on a chromosome; variations of these genes are referred to as alleles.

Phenotype

An observable characteristic of someone's traits, examples: eye color, skin color, height, gender etc.

Recessive Allele

An allele that is masked by a dominant allele, recessive alleles are only expressed when they are found in homozygous pairs.

