Heredity

Evolution

Heredity

The transmission of characters from the parents to their offspring's is called heredity.

Variation

The differences in the characters among the individuals of a species in called variation. The great advantage of variations to a species is that it increases the chance of its survival in a changing environment.

Chromosome

Chromosome is a thread-like structure in the nucleus of a cell formed of DNA which carries the gene.

Gene

A gene is a unit of DNA on a chromosome which governs the synthesis of one protein that controls a specific characteristic of an organism. Genes are actually units of heredity which transfer characteristics from parents of their offspring's during reproduction.

Dominant gene

The gene which decides the appearance of an organism even in the presence of an alternative gene is known as a dominant gene. It dominated the recessive gene for the same characteristic on the other chromosome of the pair.

Recessive gene

The gene which can decide the appearance of an organism only in the presence of another identical gene is called a recessive gene.

Genotype

Genotype is the description of genes present in an organism and a pair of letters TT, Tt or tt.

Phenotype

The characteristic which is visible in an organism is called its phenotype and 'tall' or 'dwarf'.

First filial generation or F_1 generation

When two parents to produce progeny, then their progeny is called first filial generation or F1 generation.

Second filial generation or F_2 generation

When the first generation progeny cross among themselves to produce second progeny, then this progeny is called second filial generation or F2 generation.

Hybrid

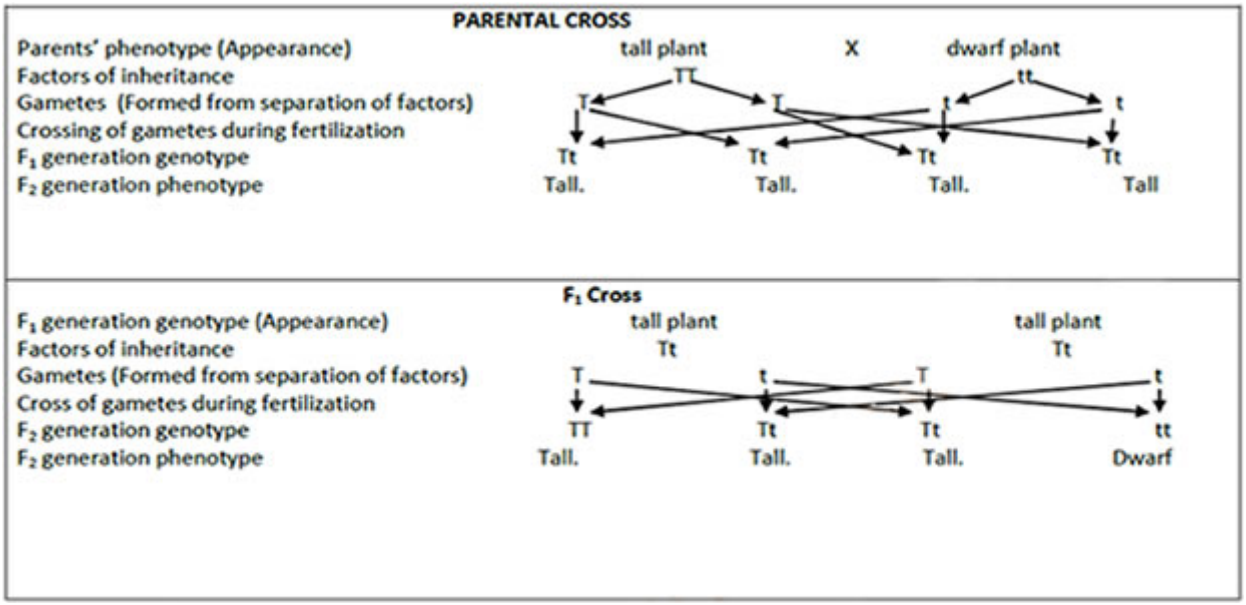
A new form of plant resulting from a cross of different varieties of a plant is known as a hybrid.

Rules for the inheritance of traits: mendel's contribution

Inheritance is the transmission of genetically controlled characteristics from one generation to the next.

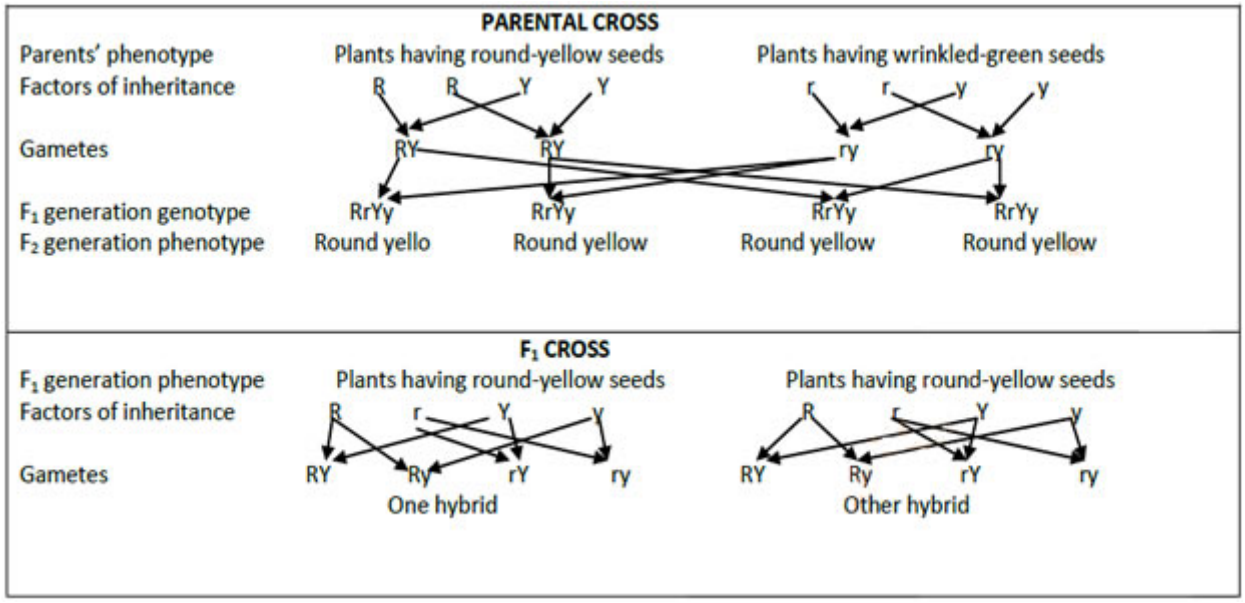
1. Monohybrid inheritance and the law of segregation

According to Mendel's first law of inheritance, "The characteristics of an organism are determined by internal factors which occurs in pairs. Only one of a pair of such factors can be present in a single gamete. The ratio 3:1 is known as the monohybrid ratio.



2. Dihybrid inheritance and the law of independent assortment

According to Mendel's second law of inheritance: In the inheritance of more than one pair of traits in a cross simultaneously, the factors responsible for each pair of traits are distributed independently to the gamete. The ratio of each phenotype of the seeds in the F2 generation is 9: 3: 3: 1. This is known as the dihybrid ratio.



Gametes from one hybrid

Fusion of gametes

	RY	**Ry**	**rY**	**ry**
RY	RRYYRound yellow	RRYy Round yellow	RrYY Round	RrYy Round yellow
Ry	RRYy Round yellow	RRyy Round green	RrYy Round yellow	Rryy Round green
rY	RrYY Round yellow	RrYy Round yellow	rrYY Wrinkled yellow	rrYy Wrinkled yellow
ry	RrYy Round yellow	Rryy Round green	rrYy Wrinkled yellow	rryy Wrinkled green

Heredity and Evolution

How are characteristics transmitted to progeny?

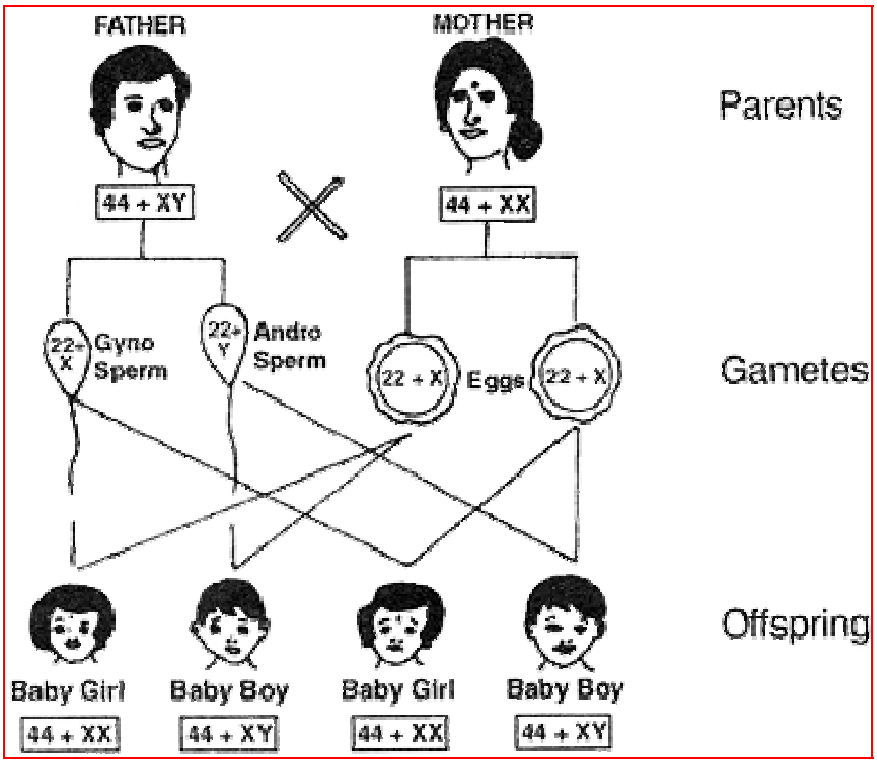
The characteristics of traits of parents are transmitted to their progeny through genes present on their chromosomes during the process of sexual reproduction.

How blood groups are inherited

A person has one of the four blood groups: A, B, AB or O. This blood group system is controlled by a gene which has three different forms denoted by the symbols IA, IB and IO. The genes IA and IB show no dominance over each other, that is, they are co dominant. However, genes IA and IB both are dominant over the gene IO.

Sex determination

A person can have a male sex or a female sex. The process by which the sex of a person is determined is called sex determination. There are two types of sex chromosomes: X and Y chromosomes.



Acquired traits

A trait of an organism which is 'not inherited' but develops in response to the environment is called an acquired trait. Example: If a beetle does not get sufficient food for a considerable time. The acquired traits of organism cannot be passed on to their future generations.

Inherited trait

A trait of an organism which is caused by a change in its genes is called an inherited trait.

Evolution

Evolution is the sequence of gradual changes which take place in the primitive organisms over millions of years in which new species are produced.

Evidences for evolution

1. **Homologous organs provide evidence for evolution**

Those organs which have the same basic structure but different functions are called homologous organs. Example: the forelimbs of a man, a lizard (reptile), a frog (amphibian), a bird and a bat (mammal).

2. **Analogous organs provide evidence for evolution**

Those organs which have different basic structure but have similar appearance and perform similar functions are called analogous organs.

3. **Fossils provide evidence for evolution**

The remains of dead animals or plants that lived in the remote past are known as fossils.

Speciation

The process by which new species develop from the existing species is known as speciation.