

GENETICS

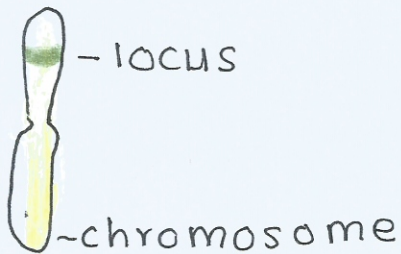
3.1 GENES

Gene: It is a sequence of DNA that encodes a specific trait.

WHERE ARE GENES LOCATED?

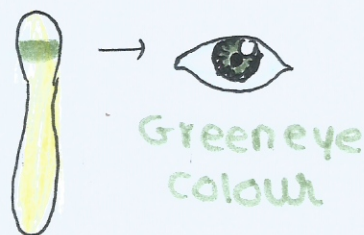
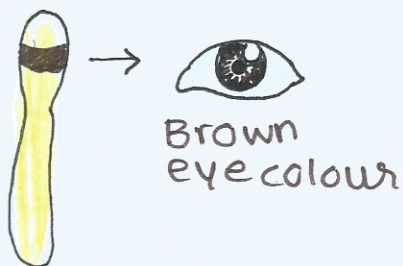
- A gene occupies a specific position on one type of chromosome.

This specific position is called the **locus**.



WHAT ARE ALLELES?

- Alleles are alternative forms of a gene that code for different variations of a specific trait.
- They differ from each other by one or a few bases only.
- As alleles are alternative forms of the same gene, they occupy the same position on the chromosome.



↑ Alleles →

MUTATION

A gene mutation is a change in the nucleotide sequence of a section of DNA coding for a specific trait.

- New alleles are formed by mutations.

→ Mutations are either neutral or harmful.

Example: sickle cell anemia

WHAT IS A GENOME?

Genome is the totality of genetic information of a cell, organism or an organelle.

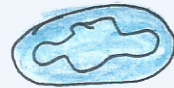
Humans:

- 46 molecules that form chromosomes in the nucleus
- DNA molecule in the mitochondrion.



Plants:

- DNA molecules of chromosomes in the nucleus
- DNA molecules in the mitochondrion
- DNA molecules in the chloroplasts.



Prokaryotes:

- DNA in the circular chromosome
- Plasmids



HUMAN GENOME PROJECT

The outcomes of the human genome project:

- Mapping:

The number, location, size and sequence of human genes is established.

- **Screening:**

This allowed the production of specific gene probes to detect sufferers and carriers of genetic diseases.

- **Medicine:**

Discovery of new proteins have led to improved treatments.

- **Ancestry:**

Comparisons with other genomes have provided insight into the origins, evolution and migratory patterns of man.