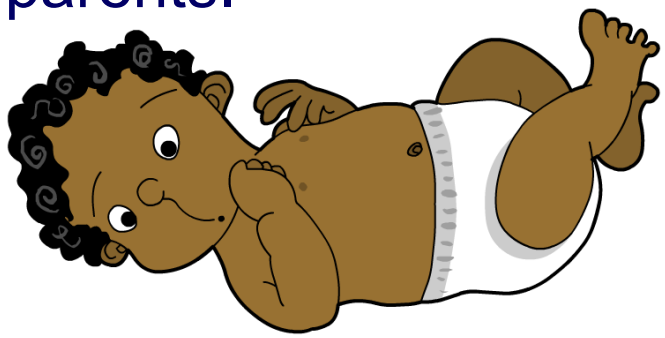
# Genetic Variation

# Uniquely you…

The population of the Earth is more than 6 billion people, and no two individuals (apart from identical twins) are genetically the same. Why?

People are different because they inherit different **characteristics** (or traits) from their parents.

Like all babies, this child carries a unique set of genes; half from his mother and half from his father.



A person's unique characteristics are caused by:

- the set of **genes** they inherited from their parents (nature)
- the **environment** in which they developed (nurture).

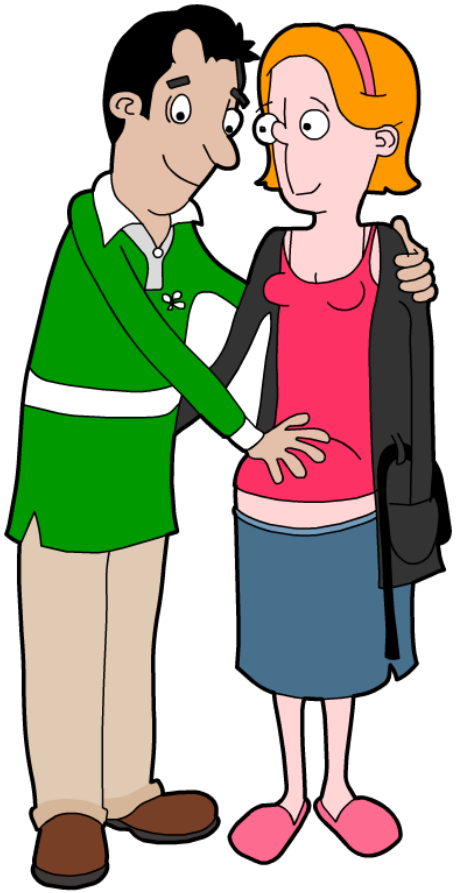
# Genetic causes of variation

Sexual reproduction is the most important cause of genetic variation because it mixes up genetic material.

How does it do this?

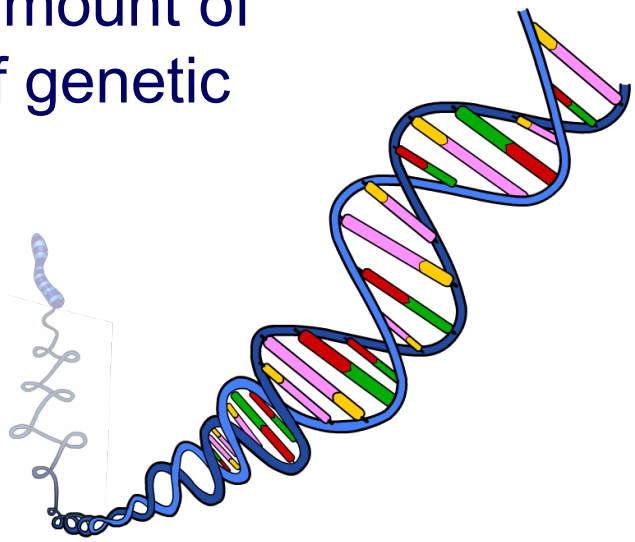
- During meiosis, homologous chromosomes exchange genetic material. They then line up and separate in different ways, producing a large variety of different gametes.
- At fertilization, any male gamete can combine with any female gamete.

All these events occur randomly and create new combinations of genetic material.



# Mutation and genetic variation

Mutation is the change in the type or amount of DNA and is therefore another cause of genetic variation.



Mutations can arise spontaneously; for example, through the incorrect copying of base pairs during DNA replication, or the unequal distribution of chromosomes during cell division.

Mutations can also be caused by environmental factors, such as radiation and certain chemicals. These factors are called **mutagens**.

Some mutations may be beneficial, but many are harmful and increase the risk of diseases such as cancer.

## What is genetic variation?

Genetic variation makes organisms unique.

How much do you know about genetic variation?

Click "**start**" to find out.

start