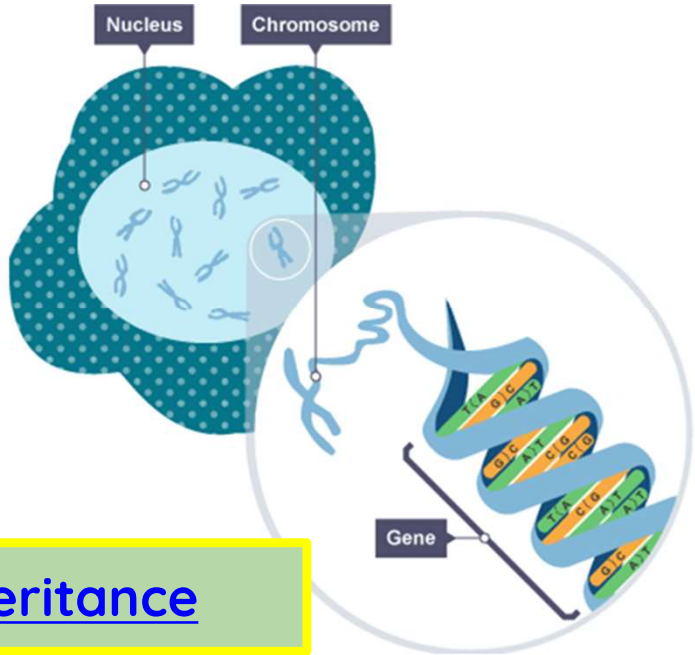
DNA and Inheritance

DNA

DNA is found in the nuclei of cells and organized into chromosomes. This genetic information is passed from one generation to the next. It is called heredity and why we resemble our parents. The genetic information itself is contained in a complex molecule called DNA.

DNA molecules contain two strands. The strands are twisted around each other to form a double helix. These strands are held together by bonds between base pairs.

A DNA molecule showing its base pairs, G–C and A–T



[Inheritance]

Inheritance

Characteristics

Characteristics are inherited from your parents through genetic material stored in the nucleus of cells.

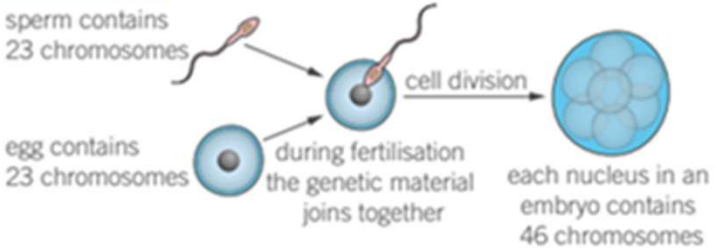
We inherit half of our DNA (deoxyribonucleic acid) from our mother and half from our father.

DNA

- contains all the information needed to make an organism
- is arranged into long strands called **chromosomes**.
- each chromosome is divided into sections of DNA
- sections of DNA that contain the information to produce a characteristic are called **genes**

Scientists Watson, Crick, Franklin, and Wilkins, worked together to produce a model of the structure of DNA.

Inheritance of genetic material:



Variation

Inherited Variation

Variation in characteristics that is a result of genetic information from parents.

Examples include:

- Eye colour
- Hair colour
- Lobed or lobeless ears
- Ability to roll your tongue.

Inheritance can be shown using Punnett squares. These show the probability of alleles in offspring.

The alleles for one parent go into the orange boxes along the top and the alleles for the other go into the purple boxes on the left. The four possible alleles for the offspring are shown in the white boxes.

	C	c
C	CC	Cc
c	Cc	cc

Environmental Variation

Characteristics of animal and plant species can be affected by factors such as climate, diet, accidents, culture and lifestyle.

If you eat too much food then you will become heavier.

Variation caused by the surroundings is called environmental variation. Examples include your language and religion.

Variation

Differences in characteristics are called **variation**.

Inherited variation

Characteristics are passed on from parents to offspring

genetic diseases
eye colour
blood group

Surroundings affects your characteristics

dyed hair
tattoos
accent

Environmental variation

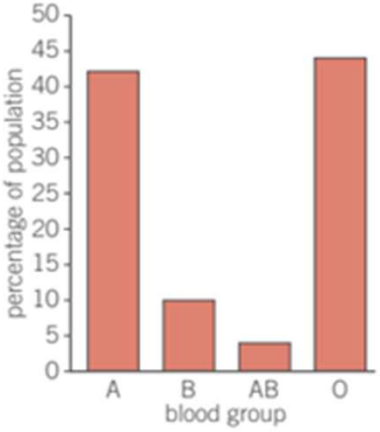
Many characteristics, such as height, are affected by both inherited and environmental variation.

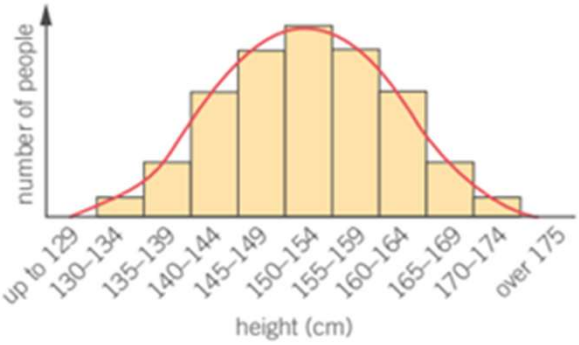
Discontinuous variation

can only result in certain values
(e.g., blood group or eye colour)

Continuous variation

can take any value within a range
(e.g., height or hair length)





Discontinuous variation should be plotted on a bar chart, and continuous variation should be plotted on a histogram.