

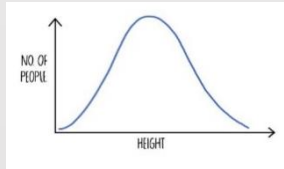
1) Variation

Variation is the differences in characteristics between individuals in a population.

There are two types of variation:

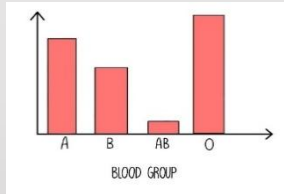
1. **Continuous** variation – characteristics which can take **any numerical value** and needs to be **measured**, e.g. height and wing span.

Continuous variation is presented in line graphs.



2. **Discontinuous** variation – characteristics which have a **limited number of values** and can be put into **groups**, e.g. eye colour and blood group.

Discontinuous variation is presented in bar charts.



2) Causes of Variation

There are two causes of variation:

1. **Genetics** – these are features of an individual that are **inherited from parents**, such as eye colour and blood group.
2. **Environment** – these are features of an individual that are determined by **how we live and the choices we make**, such as scars and tattoos.

Some features are caused by **both genetics and environment**, such as height and weight.

3) Investigating Variation


Key variables:

- **Independent** variable – what you change
- **Dependent** variable – what you measure
- **Control** variables – what you keep the same

4) Competition

In order to **survive** in the wild, **animals and plants** **compete** with each other for the things they need.

Competition occurs because **resources are finite** (limited).

Animals	Plants
 Space (territory) Food Water Mates	Water Light Space Minerals from the soil

5) Extinction

Extinction occurs when **all individuals** of a species **die** out.

Extinction may happen if organisms are not able to successfully compete for resources, destruction of habitat, outbreak of a new disease, new predators or a catastrophic event.

6) Adaptation

Living things are adapted to their **habitats** - they have **special features that help them to survive**.



E.g. camels – flat feet to stop them sinking in sand, fur for warmth at night, closable nostrils for sand storms, long eyelash to protect from sand, humps to store fat.

7) Evolution by Natural Selection

Charles Darwin's theory of evolution states that all living things have evolved from **simple life forms**. Evolution happens by a process called **natural selection** ('survival of the fittest').

Natural Selection:

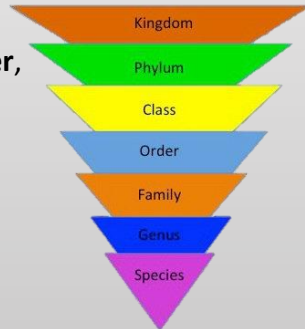
- Individuals in a species show **variation**
- Individuals with features **best suited to their habitat** are **more likely to survive and reproduce**
- The **genes** that allow these individuals to be successful **are passed onto their offspring**
- Over many generations more individuals will have those features

8) Classification

This is how living organisms are **organised** into **groups**.

Carl Linnaeus System:

- Grouping based on similarities in organisms' characteristics and structures
- All living things classified into **Kingdom, Phylum, Class, Order, Family, Genus and Species**.
- These groups start large and general and get smaller and more specific.
- Organisms are named by the **binomial system of genus and species** e.g. *Homo sapiens*



Classification Keys:

A key is a **set of questions** about the characteristics of living things. You can use a key to **identify a living thing** or decide **which group it belongs to** by answering the questions.