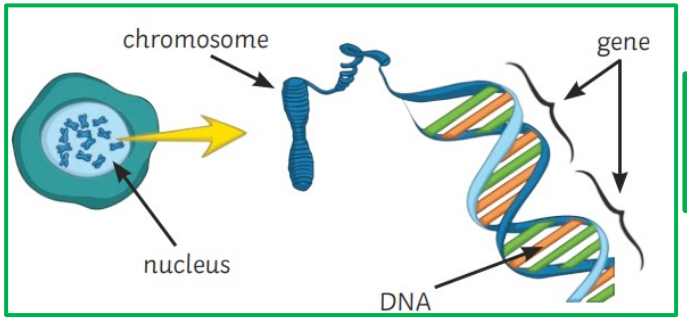
Inheritance & Evolution Knowledge Map

• **DNA** is the genetic code which makes up **genes**, which are responsible for giving an organism a specific characteristic.
• **Watson** and **Crick**, with help from **Franklin** and **Wilkins**, discovered the **double helix** structure of DNA in 1953.
• The sperm and the ovum (egg cell) each carry half of the **DNA** from the parent. These join together during **fertilisation** to form a new organism, with approximately half of the DNA from each parent. So there are almost always two copies of each gene. Pairs of genes for a characteristic are called **alleles**.

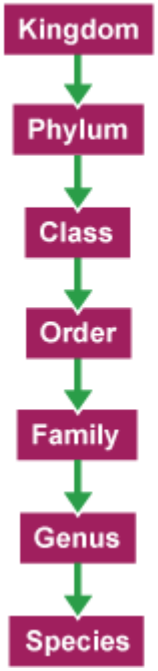


Genetic only	Environmental only	Genetic and environmental
Eye colour	Tattoos	Height
Blood group	Scars	Weight
Attached ear lobes	Language spoken	Human's hair colour - can lighten in summer or can be dyed
Animal's fur colour	Colour of hydrangea flower - blue in acid soil, pink in alkaline	Size of plant

- A **species** is a group of organisms that interbreed to produce fertile offspring.
- We can **classify** species into groups of increasing specificity.

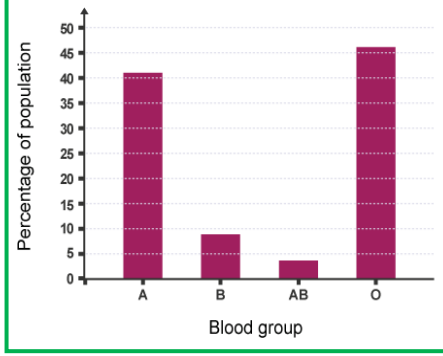
Linnaeus's system of classification

- Scientists things to make it easier to study them. It helps to make sense of the world as well as to understand how different groups of living organisms are related to each other.

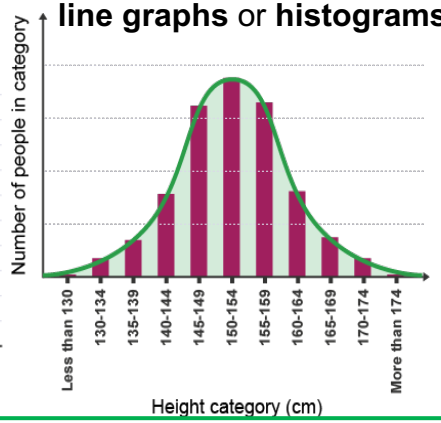


Variation
• The differences in characteristics between individuals of the same is called **variation**.
• Some variation is passed on in DNA from parents. This is **inherited** variation.
• Some variation is the result of differences in the surroundings, or what an individual does. This is called **environmental** variation.
• Surveys into variation give data that are **continuous**, which means to come in a range, or **categoric**, which means to come in groups.

Categoric variation e.g. blood group is displayed in a **bar chart.**



Continuous variation e.g. human height is displayed in **line graphs** or **histograms**



Extinction is where all members of a species have died. Extinction can be caused by different elements including **catastrophic events, disease, predators, climate change, and competition**.

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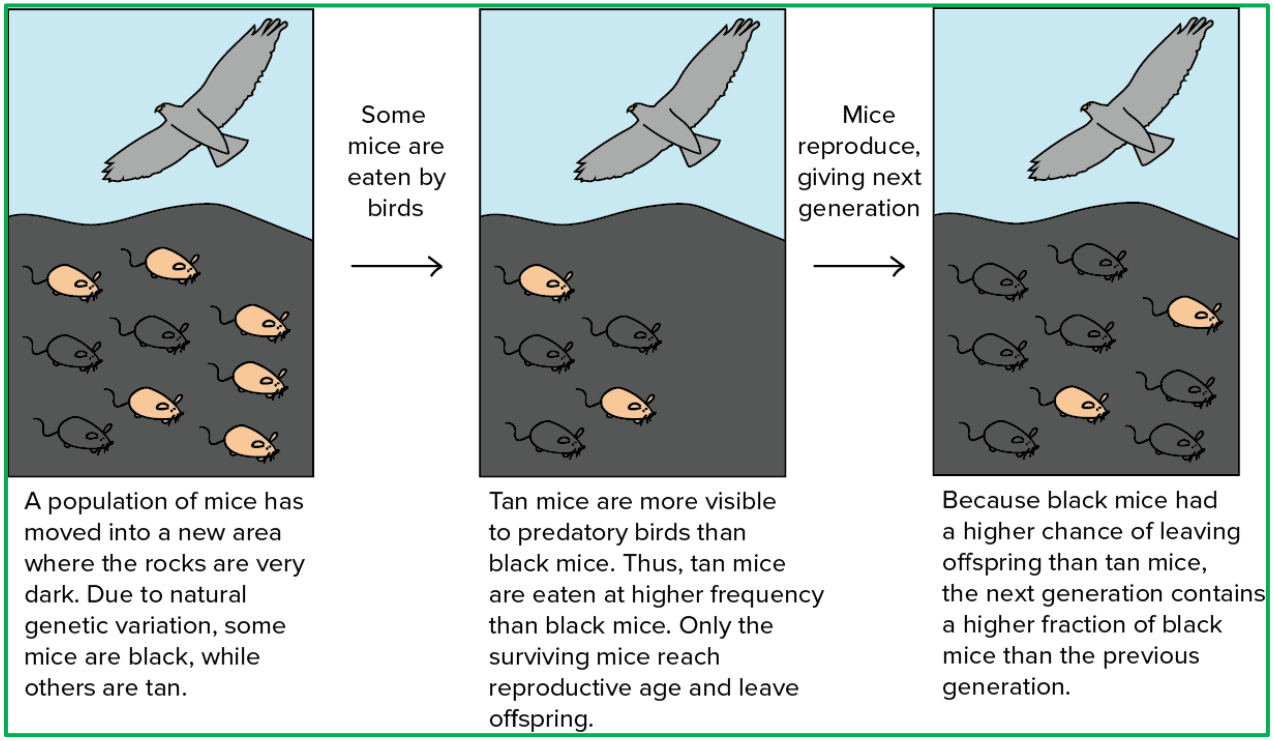
The steps in evolution:

1. In every population there is **variation**, some of which is inherited.
2. Individual organisms with the best **adaptations** are most likely to survive and reproduce. This is **natural selection.**
3. I**nheritance** means these adaptations are likely to be passed to offspring.
4. It also means that less well adapted organisms are less likely to pass on their adaptations.
5. Over **many generations** these small differences add up to the formation of new species by **evolution.**

Variation can be caused by small changes in DNA called **mutations.** Most of these have no effect, some are advantageous and some are disadvantageous.



Biodiversity is a measure of the range of living organisms within a habitat.

A **gene pool** is the range of DNA in a species.

Biodiversity can be maintained by conservation, preservation and gene banks.

n a seed bank on the remote Svalbard Island off the cost of Norway, seeds from around one million different plants are stored at -18°C.

Seed banks are an example of a gene bank. Gene banks are used to preserve genetic material for use in the future.

Some species have become extinct in the wild and now only live in zoos, or their numbers have greatly reduced.