EVOLUTION OF LIFE

EVOLUTION

- **Biological evolution** is the process by which inherited characteristics of a population are passed on from parent to offspring.

The English naturalist, **Charles Darwin**, is the best-known contributor to several theories of how evolution has resulted in the species known today. **Alfred Wallace**, jointly proposed the theory with Darwin.

1. There are **random variations** in morphology/biological features due to **cross-breeding and mutations.**
2. If the **adaptation that results is advantageous to survival** then it is **passed on to the offspring**.
3. There are physical stresses that an environment puts on organisms. Only those which **are fittest will survive in the environment**. Therefore, organisms with **advantageous adaptations** can **survive to breed and pass on their characteristics**.
4. Over a very long time, the '**survival of the fittest'** mechanism results in so many **small changes that a new species would be acknowledged**.
5. A new species usually forms if a group of organisms is **geographically isolated** for a **long period of time** so the organism in separate environments deals with **different environmental stress**.

A species is an organism which can **interbreed to produced fertile offspring**. If a geographical isolation is removed and the two groups can no longer interbreed to produce a fertile offspring, it indicates the two groups have become different species.
The technical description of this view of evolution is called **phyletic gradualism**.

Evidence from the **fossil record** has been sought to **prove this theory**. The main difficulty is that preservation of organisms as fossils is a **rare circumstance**; thus the **geological record is full of gaps**. Fossils that are found **may not show changes** since the adaptations may not have affected hard parts, only **soft parts which are not preserved.**

THEORIES OF EVOLUTION

- **Gradualism:** is the process of gradual evolutionary change over time, sometimes called the Darwin-Wallace theory involves the creation of new characteristics or genes due to cross-breeding and mutations.
- **Genetic drift:** especially apparent when there are a few selective pressures on the population; the random sampling of parent genetic material in the offspring can eventually lead to the elimination of some characteristics or genes.
- **Gene flow:** the exchange of genes between populations by migration or pollination.
- **Punctuated equilibrium:** describes that for long periods of time there is little change in the population as it expands. At the limits of its environment, the population is forced to adapt and a new species, which is more successful than its parent stock, takes over in a short time.

  There is no need to hypothesise over the missing links and Intermediate stages in gradual evolution since the missing links were never there.