

# EVOLUTION

Evolution is the sequence of gradual changes which take place in the primitive organisms over millions of years in which new species are produced. Since, we are talking about living organisms, so it is known as 'organic evolution'. All the plants and animals which we see today around us have evolved from some or the ancestors that lived on this earth long, long ago.

It will be clearer with the development of 'pterosaur' bird. It is an ancient flying reptile which lived on the earth about 150 million years ago. It began life as a big lizard which could just crawl on land. Over millions of years, small folds of skin developed between its feet which enabled it to glide from tree to tree. Over many, many generations, spread over millions of years, the folds of skin, and the bones and muscles supporting them grew to form wings which could make it fly. In this way, an animal which crawled on ground evolved into a flying animal and led to the formation of new species (of a flying reptile).

The development of 'pterosaur' from a big lizard is an example of evolution.

It is considered that they have evolved from the common ancestor. The more characteristics or features two species have in common, the more closely they will be related. Some of the important sources which provide evidences for evolution are:

(i) Homologous organs

(ii) Analogous organs and

(iii) Fossils.

**(i) Homologous Organs:** Those organs which have the same basic structure (or same basic design) but different functions. For example, the forelimbs of a man, a lizard (reptile), a frog (amphibian), a bird and a bat (mammal) seem to be built from the same basic design of bones, but they form different functions. The forelimbs of a human are used for grasping, the forelimbs of a lizard are used for running, the forelimb of a frog is used to prop up etc.

**(ii) Analogous Organs:** Those organs which have different basic structure (or different basic design) but have similar appearance and perform similar functions. For example, the wings of an insect and a bird have different structures but they perform the same function of flying.

**iii) Fossils:** The remains or impressions of dead animals or plants that lived in the remote past. For example, a fossil bird called Archaeopteryx looks like a bird but it has many other features which are found in reptiles. Because Archaeopteryx has feathered wings like those of birds but teeth and tail like those of reptiles. So, it is a connecting link between the reptiles and the birds and hence suggested that the birds have evolved from the reptiles.

Archaeopteryx is a connecting link between reptiles and birds.

Fossils are formed, when organisms die, their bodies will decompose by the action of micro-organisms in the presence of oxygen, moisture etc. Fossils are also obtained by digging into the earth.

### **Darwin's Theory of Evolution**

Charles Robert Darwin gave the theory of evolution in his famous book 'The Origin of Species'. The theory of evolution proposed by Darwin is known as 'The Theory of Natural Selection'. This theory is called the theory of Natural Selection because it suggests that the best adapted organisms are selected by nature to pass on their characteristics (or traits) to the next generation. It applies to plants as well as animals.

Darwin's Theory postulates:

1. Within any population, there is natural variation. Some individuals have more favourable variations than others.
2. Even though all species produce a large number of offsprings, populations remain fairly constant naturally.
3. This is due to the struggle between members of the same species and different species for food, space and mate.
4. The struggle for survival within populations eliminates the unfit individuals. The fit individuals possessing favourable variations survive and reproduce. This is called natural selection (or survival of fittest).
5. The individuals having favourable variations pass on these variations to their progeny from generation to generation.
6. These variations when accumulated over a long period of time, lead to the origin of a new species.

Though, Darwin's theory was widely accepted, but it was criticised on the ground that it could not explain 'how the variations arise'. With the progress in genetics, the source of variations was explained to be the 'genes'. Genes vary in natural population. Therefore, Genetic material is the raw material of evolution. So, the Darwin's theory was modified accordingly. The most accepted theory of evolution is the **Synthetic Theory of Evolution** in which the origin of species is based on the interaction of 'genetic variation' and 'natural selection'. Also, sometimes a species may completely die out. It may become extinct. Dodo was a large flightless bird which has become extinct. Once a species is extinct, its genes are lost forever. It cannot re-emerge at all.