

# Neo – Darwinism

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Neo-Darwinism, the modern version of [Charles Darwin](#)'s theory of evolution by [natural selection](#), incorporates the laws of Mendelian genetics and emphasizes the role of [natural selection](#) as the main force of evolutionary change. The term *neo-Darwinism* was first used in the 1880s by [August Weismann](#), a German naturalist, who incorporated his theory of the [germ plasm](#) into Darwin's theory of evolution by natural selection.

## **Definition :**

Neo – Darwinism is a modified version of Darwin's theory which takes into account of mutation, variation, heredity, isolation, and natural selection. All these factors, result in the origin of new species and consequently evolution.

New facts/discoveries about evolution have led to modification in Darwinism. The modern theory is known as Neo – Darwinism and is supported by Wallace, Huxley, Haeckel, Weismann and Mendel. Also known as Modern Synthetic Theory of evolution. It takes into account mutations, variations, heredity, isolation and natural selection – according to Neo-Darwinism these factors separate in the population and results in the origin of new species.

**Variations :** Meiosis causes the random assortment of genes due to synapsis (crossing over) and the rearrangement of maternal and paternal chromosomes during gametogenesis. Reassortment of genes in a large population leads to an appearance of new characters in the organism.

**Mutations :** Alteration in the Chemistry of the gene : gene mutation – can produce drastic changes – most mutations are harmful but not all – most mutants are recessive, thus not able to express in the heterozygous state (where a dominant gene is present) mutations produce variations in offsprings.

**Heredity :** Transmission of characteristics from parents to offsprings is an important mechanism are able to survive – struggle for existence Thus, offsprings are benefitted from such advantageous characteristics of parents.

**Natural Selection :** Organisms more suited to the environmental conditions will survive overpowering the forces of competition. Such organisms with suitable genotypes have better opportunities for survival and reproduction hence, contributing more to the population.

While unsuitable/weaker characteristic individuals give rise to less offsprings and automatically results in the decrease in number in the population.

**Subtitle 1 :** Natural Selection is a Creative Process which uses variations and mutations, as raw materials to produce individuals which are better survivors having combinations of better survival value.

Variations are accumulated in the gene pool of the population and the population becomes diverged from the parental population. If the gene pool achieves stability i.e. no more changes in the genotype occur, the individuals will exhibit the following conditions :

- Mutational equilibrium
- Random mating

**Sub title 2 :** Neo Darwinism also describe Role of Genetic drift and Isolation in Evolution/Origin of New Species.

- Genetic drift : In case of non – random breeding small populations, a reduction in population size is seen due to diseases, famine or isolation. Here, chance plays an important role in the success the population.

Usually, homozygous mutants die whereas heterozygous mutants thrive well. However, these heterozygous pairs tend to become homozygous by selection – leads to accumulation of certain disadvantageous characters in the homozygous state – and ultimately deviation – gradually eliminated from the population.

This is a genetic drift i.e. drift of populations with favorable or unfavorable characters.

- **Isolation** : An important factor responsible for evolution.
- **Geographical isolation** : physical barriers like mountains, rivers, oceans : prevent interbreed between related forms.
- **Physiological barriers** : help in maintaining the individuality of the species, because isolation does not allow interbreeding leading to reproductive isolation.

***This leads to – origin of a new species*** : Different populations accumulate genetic differences due to mutation, genetic differences due to mutation, recombination genetic drifts, and natural selection. Populations are different in :-

- Morphologically
- Genetically
- Reproductively segregated

New species formed as a result of the check of gene flow among populations of different environments.