

# Prep 19

Science, Biology



**ASSIGN  
BUSTER**

Biology: Genetics Species concepts The morphological species concept refers to the classification of species based on their appearance anatomically. The classification is useful when organisms cannot reproduce sexually.

A phylogeny is the smallest set of organisms that share a genetic ancestor. In phylogenetic species concept, organisms are classified depending on the existence of a common identifiable ancestor. This is arrived at by looking at both the genotypic and phenotypic characteristics.

The biological species concept refers to how members of a population are classified depending on their potential to interbreed in nature and not according to their appearances or similarities. On the other hand, the general species lineage species concept refers to the classification based on the identifiable family tree and not on breeding potential or appearances.

## 2. Speciation

Speciation is the splitting of a lineage to produce two or more separate species. For this to happen, two or more of the members or species are selectively isolated and allowed to interbreed. When a species population extends over a wide geographical area and mating is selective rather than random, the gene pool is said to be sealed. This reduced gene flow causes the development of new species due to interbreeding. The importance of this is the generation of a pure species that repeatedly improve both genetically and phenotypically.

## 3. Allopatric and Sympatric speciation

Speciation involves the separation of an original species and the development of two or more pure species usually by a barrier. Allopatric speciation specifically involves the development of a physical barrier

between separated members of the species to prevent crossbreeding. This results in geographical separation and hence interbreeding within the new geographical area. This is the dominant mode of speciation and once two separate populations are established the process of speciation continues. However speciation can result even without physical. This is known as sympatric speciation. In this type of speciation, a new species arises while living in the same location with the original species. This is believed to happen when a group of organisms from the species begins to occupy a distinct niche in the environment and eventually become adapted to the conditions while still breeding within themselves to produce a new species. Isolation of gene pool without geographical isolation happens when members of a species in the same geographical location occupy different niches in the same environment. In a similar way, social organisms have controlled mating and hence breeding only happens within the selected group.

#### 4. Reproductive Isolation

Species have developed mechanisms to control speciation and breeding. In reproductive isolation, the environment installs external barriers to reproduction among members of closely related species. Two organisms from incipient species are rendered unable to reproduce. This can be achieved pre or post-mating. Pre-mating isolation occurs when the organisms develop different mating location, seasons, and rituals. It also happens when the organisms have unmatched sex organs. This, therefore, means that the organisms will never mate to reproduce. Post mating isolation happens when the two organisms have comparable mating locations, seasons and rituals. Although the members are able to mate,

isolation results from the fact that either the embryo does not develop or the resultant offspring is sterile.

Works cited

Maynard, Smith J. *Evolutionary Genetics*. Oxford Univ. Press, 1998. Print.