

Q1. Adaption is the process through which organisms adjust to change in the environment. Through natural selection, traits are passed to the offspring which allows organisms to adapt to various environments. Examples for this can be Sherpa who are the native people of the Himalayas. They have an increased amount of hemoglobin in their blood to account for the shortage of oxygen in the atmosphere. This is a physiological adaptation. An example of behavioral adaptation can be, bears hibernating through the winters to escape the cold.

Q2. Evolution is the change in the characteristics of a species over several generations and relies on the process of natural selection. Without genetic variation, a population cannot evolve because evolution is heavily dependent on mutations on a population scale which would provide an edge to the population and hence can be termed as evolution. Natural Selection, Genetic Drift, and Gene Flow are important factors for evolution to occur. In natural selection, mutations occur and genes are passed on to the offspring. This makes the species unique and evolution occurs.

Q3. Fitness is the measure of reproductive success and the adaptation of the species to the environment. It does not mean survival or lifespan but how much individuals of a specific genotype are able to contribute to the gene pool of the next generation. Fitter individuals will contribute more towards the next generation hence the term “survival of the fittest” came to life. An example of this can be in many species of birds, the female will prefer to mate with males with bright colored feathers. In an evolutionary perspective, males with bright colored feathers will reproduce more and their genes will be transferred to the offspring. Hence, bright-colored birds would be fitter than others.

Q4. Yes, evolution can occur without natural selection. An example of this can be a species of a bird that migrates to an island and stays there. So the population gets split into two halves. Now, both populations which have different mutations and different genes get evolved because both populations adapt to different environments. After a long time, both these populations might be different enough to be termed as different species.

Q5. After the drought year, the mean beak size in the Galapagos medium ground finches increased because of the decline in small, soft seeds, the part of the population which could survive on the large, hard seeds was able to reproduce and survive. Hence, after the drought year, the average beak size increased.