

# Ecology and Ecological Adaptations

There is a bird known as a Sand Grouse that carries water in its feather! Found mostly in deserts the sandgrouse has special feathers on its belly that can soak small quantities of [water](#). It then carries the water back to its nest. This is a classic example of ecological adaptations in animals. Let us find out more about it.

## What are Adaptations?

As students of [biology](#), when you begin to learn about ecology, it gives a holistic perspective of the interdependence all living organisms with their biotic and abiotic components. Ecology delves into the deeper interdisciplinary aspects of sociology, anthropology as well as the environmental issues.

When organisms interact with the various environmental factors, be it the abiotic components or the biotic components, there comes a time when adaptations begin to form, for the better survival of the race.

Any physiological, behavioural or morphological attribute of an organism that enables it to survive and reproduce in its respective habitat is called as an [adaptation](#). Adaptations are very important for

each and every organism. Otherwise, the rate of survival or continuing its progeny becomes diminished.

Many animals and plants have these adaptations in place. This shows their success rate in adapting to the changing dynamics of the environmental conditions. During the course of the evolutionary timeline of organisms, some important adaptations have become genetically fixed.

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## **Ecological Adaptations in Various Organisms**

### **Desert Habitat**

Probably the most familiar ecological adaptation is the adaptation seen in desert plants. Their success in being able to tackle the hot and dry weather conditions is simply amazing. The leaves of the desert plants have been reduced to spines while the stem is fleshy and spongy, with the process of [photosynthesis](#) occurring there. The plant body is also covered with waxy cuticle so as to minimize the rate of transpiration.

The stomata are arranged deep inside, again to restrict the loss of water.

Another example of desert animals that show some classic adaptations are the kangaroo rat seen in the North American deserts and the camel. These animals are able to meet all the water and **energy** requirements through the oxidation of internal fat. During this process, water comes as a byproduct that is used by the animal. These desert animals also have concentrated urine so as to minimize any further water loss from the body.



## Cold Regions

In habitats with high temperatures, it is the loss of water that has to be controlled. Similarly, in colder regions, it is the loss of **heat** that has to be controlled. Animals living in the cold regions have typical adaptations which include an excess layer of fat or even a thick furry

body, so that heat does not escape out. Some animals in the cold regions also go into hibernation so that they can escape the harsh winter conditions.

### Biochemical Adaptations

A few organisms exhibit biochemical adaptations. Deep down in the depths of the oceanic floor, there are many invertebrates and fish thriving successfully. These organisms at these depths live in conditions where the pressure is much less than the normal atmospheric [pressure](#). But, these organisms are able to survive due to their biochemical adaptations.

### Behavioural Response

There are also other animals that show a temporary behavioural response to the environmental conditions so as to tide over the unfavourable conditions.



## Solved Questions For You

Q: What is the adaptation called that does not have any genetic changes? Give an example.

Ans: Phenotypic adaptations are called the non-genetic adaptations. These adaptations are in response to the various **environmental** conditions. For Example, a desert lizard maintains a constant body temperature by moving in and out of the sun or shade depending on the **temperature**.

## Population and Population Interaction

Are you alone in this world? Of course not! You have many human beings surrounding you always! Similarly, if you see the population of other organisms, you will find many organisms living together. None

of the organisms in this world can survive alone. This interaction between populations gives rise to population interaction. Let us learn further.

## Types of Population Interaction

In nature, all organisms and their populations interact with one another to some degree or the other. That is how an [ecosystem](#) works perfectly! This population interaction is generally between two different species populations. These interactions can be beneficial or neutral or detrimental. Accordingly, there are six types of population interaction.

The different ways populations of two different species interact with each other can be summarized under the following headings.

### Mutualism

When the two different population species interact in such a manner that it is beneficial to each other, then this form of interaction is called mutualism. Lichens are a classic example of mutualism in between [fungi](#) and [algae](#). Even plants and animals show good mutualism.

Plants need some agents for pollination and seed dispersal. And these agents are the animals. Animals, in turn, are rewarded with the nectar or the **fruits** of the plants. But, even in mutualism, there are some cheater species, which may not reward the other species. This leads to co-evolution of the species.

## Competition

When the closely related species fight for limited resources, there is a competition between the species. These types of interactions are called competition. This fight for **resources** can occur between diverse groups of the population also.

Competition can occur even when there is an unlimited supply of resources. Here, it depends on the superiority of one species over the other. In the presence of one population species, the other population species may not use the resources effectively. But if the dominant species is removed, then the other species will use the resources to their full capacity.

## Predation

This interaction is a very important one as it ensures that there is stability in the ecosystem. The two main populations interacting in predation are the predators and the prey.

Without the predators, the prey population will go out of control. The species **diversity** in a community is also maintained by the predators. They reduce the intensity of the competition between prey species. The prey species have also evolved several mechanisms to lessen the impact of predation.



## Parasitism

This is an interaction of populations where a parasitic mode of **nutrition** is clearly seen, with one species being completely dependent on the other host species for all its meals/ nutrient requirements.



Parasitism is clearly seen in many taxonomic groups, right from plants to higher vertebrates.



*Parasitism (Encyclopedia Britannica)*

## Commensalism

In this kind of [integration](#), one species population benefits from the other species population. But the other species population does not benefit nor is it harmed in any way. If you have been to rural areas, you have seen many birds perching on cattle. This is a good example of commensalism.

Here the cattle do not benefit anything nor cause any harm. But as the cattle moves, they stir up the small insects hiding in the grass. It is these insects that the birds feed on, thereby benefiting to large extent.

### Amensalism

In this kind of interaction between populations, one population finds itself in harm while the other is unaffected. A good example for amensalism could be a condition where the wider and taller plants inhibit the growth of the nearby smaller plants. A few plants secrete some substances which inhibit the growth of the plants growing nearby. They may also kill them outrightly to remove the competition.



## Solved Examples for You

Q: Give some examples of the different kinds of population interactions

Ans: Examples of commensalism

- Barnacles and Whales
- Emperor Shrimp and Sea Cucumbers

Examples of predation

- African Wild dog and Zebra
- Cheetah and Gazelle

Examples of Parasitism

- Aphids(insects) and [Plants](#)
- Cuscuta and blueberry plants

