❖ Symbiotic Relationships

Symbiosis is a close relationship between two species in which at least one species benefits. For the other species, the relationship may be positive, negative, or neutral. There are three basic types of symbiosis: mutualism, commensalism, and parasitism.

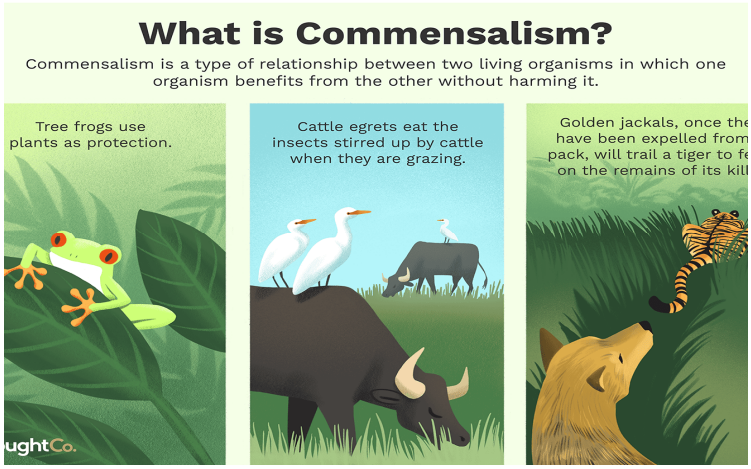
Mutualism

Mutualism is a symbiotic relationship in which both species benefit. An example of mutualism involves goby fish and shrimp (see **Figure** below). The nearly blind shrimp and the fish spend most of their time together. The shrimp maintains a burrow in the sand in which both the fish and shrimp live. When a predator comes near, the fish touches the shrimp with its tail as a warning. Then, both fish and shrimp retreat to the burrow until the predator is gone. From their relationship, the shrimp gets a warning of approaching danger. The fish gets a safe retreat and a place to lay its eggs.

The multicolored shrimp in the front and the green goby fish behind it have a mutualistic relationship.

Commensalism

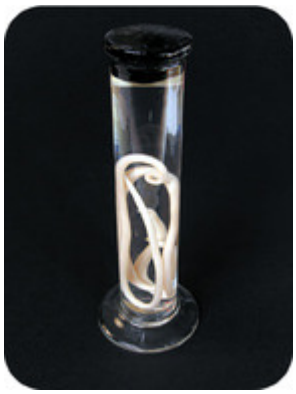
Commensalism is a symbiotic relationship in which one species benefits while the other species is not affected. One species typically uses the other for a purpose other than food. For example, mites attach themselves to larger flying insects to get a "free ride." Hermit crabs use the shells of dead snails for homes.



Parasitism

Parasitism is a symbiotic relationship in which one species (the **parasite**) benefits while the other species (the **host**) is harmed. Many species of animals are parasites, at least during some stage of their life. Most species are also hosts to one or more parasites.

Some parasites live on the surface of their host. Others live inside their host. They may enter the host through a break in the skin or in food or water. For example, roundworms are parasites of mammals, including humans, cats, and dogs (see **Figure** below). The worms produce huge numbers of eggs, which are passed in the host's feces to the environment. Other individuals may be infected by swallowing the eggs in contaminated food or water.



Roundworms like this one might eventually fill a dog's intestine unless it gets medical treatment.

Some parasites kill their host, but most do not. It's easy to see why. If a parasite kills its host, the parasite is also likely to die. Instead, parasites usually cause relatively minor damage to their host.

❖ Non-symbiotic Relationship

Non symbiosis means free living, independent.

It is a type of interaction in which individuals of two different species or two population function in very close association but don't affect one another adversely and beneficially. It is also called neutralism.

For example:

- Birds like robins and squirrels liking on the same tree and neither serves as food for the other nor has any direct interaction.
- leaf eating and sap sucking insects

An example of non-symbiotic obligate mutualism would be of the yucca moth and the yucca. The yucca is plant that lives in the dry and arid climate of the southwestern United States. The

yucca moth is a species that has co-evolved with the yucca in an obligate mutualistic relationship. The yucca flower relies on the moth for pollination, therefore it would not be able toreproduce without the moth. The yucca moth in turn lays its eggs inside the flower of the plant, and the larvae feed exclusively off of the seeds that are produced from the yucca plant. The larvae do not however eat all of the seeds, ensuring both the survival of the plant species and the moth species.

Lichens are another prime example of obligate mutualism. They consist of a relationship between fungus and algae, giving both the ability to survive in conditions where they would not be able to survive on their own. As you can see mutualistic relationships are not even restricted to species within the same kingdom, as there are many of these obligate interactions between plants and animals. Obligate mutualisms can evolve in many different ways. The host of a parasite may eventually become unaffected by the parasite, thus turning the relationship from parasitism into communalism. Then suppose that some form of environmental change causes the infected organisms to be more likely to survive than that of other organisms of the same species that are not infected. These species could then co-evolve in a way that could lead to an obligate mutualism. Mutualism occurs in many species, in one way or another. Obligate mutualism is arguably the most important of the different types of symbiosis, because both species involved would cease to survive without the interaction of the other species. Further research into organisms and their ecological interactions will lead to many more discoveries of species that live inside of these obligate mutualistic relationships.