



Monarch Butterfly

I am a butterfly that goes on long migrations and needs some nutrients along the way.



Milkweed

I need an insect to help me make beautiful flowers.



Clownfish

I am a brightly colored fish that never goes far from home.



Anemone

My friend helps protect me from predators.



Acacia Tree

I am a tree in Central America with a lot of spikes on me.
I have an insect living inside them.



Ants

I am an insect that needs a home.



Mushroom

I am a fungus that wants to spread all across the forest floor to help with decomposition.



White Pine Tree Roots

I am a tree that is always looking for a way to absorb more water and nutrients from the ground.



Barnacle

I am a crustacean that lives in the ocean and wants a free ride.



Right Whale

I am the state mammal of Georgia. I am a large, slow-moving, aquatic mammal that provides a permanent home.



Spanish Moss

I am an air plant that likes to hang out at the tops of trees to absorb sunlight.



Live Oak

I am the state tree of Georgia. I grow very tall and don't mind helping others reach the sun.



Remoras

I am a fish that is always looking for a free ride or a free meal.



Sharks

I am a voracious predator that is a very messy eater.



Pearl Fish

I am a scared fish that needs a good place to hide during the day.



Sea Cucumber

I am a very quiet, calm, slow-moving creature that lives on the ocean floor.



Mistletoe

I am considered a friend to some, but I am a pest to others.



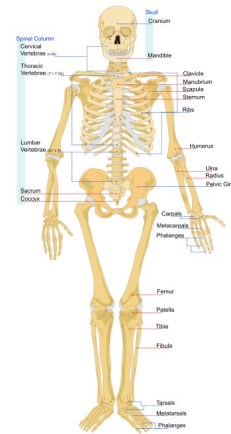
Trees or Shrubs

We have no way of keeping unwanted guests out of our leaves.



Tapeworm

I am a worm that eats by absorbing food. I don't have a mouth or a digestive tract.



Humans

We need to make sure that our food is cooked before we eat it.



Fleas

I am a small, wingless insect that likes to feed on blood.



Dogs

I am man's best friend, who sometimes has the urge to scratch.



Mites

I am a tiny invertebrate related to ticks. I need to feed on blood.



Honey Bees

We work together as a colony to collect pollen from plants and share it with the hive. Sometimes an unwanted creature can make a colony sick.

Explanation of symbiosis

Mutualism

1. Monarch butterfly and milkweed: Milkweeds are an important food source for larval monarch butterflies. In return the monarch is pollinating the milkweed flowers.
2. Clownfish and Sea Anemone: The clownfish has a mucous coating over its scales and is immune to the anemone stings. The clownfish will defend the sea anemone from predators. In return the clownfish is protected by the anemone.
3. Acacia Tree and Acacia Ants: The bullthorn acacias of Central America have hollow thorns which are a home to the acacia ants. The ants receive a home. They also receive food from the sap of the tree. In return, the ants will protect the tree from herbivores and competing plants.
4. Mushroom and White pine tree roots: This relationship is called mycorrhizal symbiosis which means a relationship between a fungus and roots of a plant. Over 90% of plant species are dependent upon a relationship with a fungus. The mushroom is helping the tree increase its absorption of nitrates, phosphates, and water from the soil. In return the tree is giving the mushroom support underground. As well as a source of carbohydrates, which are produced by the plant in photosynthesis.

Commensalism

1. Barnacles and Right whale: Barnacles need a permanent place to settle. It can be a whale, sea turtle, crab, dock or boat to name a few. Barnacles do not harm whatever they cement themselves to; they are only using it for support.
2. Spanish Moss and Live Oak Tree: Spanish moss is an epiphyte. An epiphyte is an organism that grows upon or attached to living plants. Spanish moss attaches to the canopy of live oak trees and uses them only as support. They capture rain water and create their own food by photosynthesis. The Live oak is not helped or harmed in this relationship.
3. Pearl fish and Sea Cucumber: Pearl fish are a small nocturnal fish. During the day they hide in the anus of sea cucumbers, at night they leave to hunt for food. The sea cucumber is neither helped nor harmed in this relationship. An interesting fact about the pearl fish, their anus is at the top of their head. So while in the sea cucumber they only have to stick their head out to go to the bathroom.

4. Sharks and Remoras: The remora is benefiting from this relationship. The fish can attach to its host to receive a free ride. They will also get a free meal by eating scrapes that fall out of the shark's mouth. Remoras will not only attach to sharks, but can also be found on sea turtles, swordfish, tuna, manta rays, and whales.

Parasitism

1. Mistletoe and Trees and Shrubs: Mistletoe is an evergreen that can be found on over 200 different species of trees and shrubs. Mistletoe can reduce the host plants growth and eventually kill them with heavy infestation. Mistletoe will also use its host for water and nutrients.

2. Tapeworm and humans: Tapeworms live in the digestive tract of vertebrates. Adult worms have no need for a mouth or digestive tract because they absorb predigested food from their host. Humans sometimes don't even feel the effects of a tapeworm, but they can cause abdominal discomfort, loss of appetite and diarrhea.

3. Fleas and Dogs: Fleas are external parasites which feeds on the blood of mammals and birds.

4. Mites and Honey Bees: *Varroa destructor* is the species of mite that attacks honey bees *Apis cerana* and *Apis mellifera*. *Varroa destructor* can only replicate in a honey bee colony. It attaches at the body of the bee and weakens the bee by sucking its blood. It will eventually lead to the death of the honey bee colony.