

## Predator-prey relationships

Can insects hunt for food?

When you think of an animal hunting for its food, large animals such as lions may come to mind. But many tiny animals also hunt for their food. For example, this praying mantis is eating a grasshopper. To eat the grasshopper, the praying mantis first had to catch the grasshopper, which is a form of hunting.



This praying mantis is eating a grasshopper.

For another example of an animal hunting, see the video at the following URL:

<http://shapeoflife.org/hunter>

*Predation* is another mechanism in which species interact with each other. Predation is when a **predator** -(consumer that hunts and kills another consumer)- feeds on another living organism or organisms, known as **prey** -(species consumed by another species).

*Predator-prey relationships* are essential to maintaining the balance of organisms in an ecosystem.

## Symbiosis

**Symbiosis** -(a close and long-term relationship between different species) describes relationships between organisms. At least one species benefits in a symbiotic relationship.

There are three types of symbiotic relationships:

1. **Mutualism** -(a symbiotic relationship in which both species benefit).
2. **Commensalism** -( a symbiotic relationship in which one species benefits while the other is not affected).
3. **Parasitism**-( a symbiotic relationship in which the parasitic species benefits while the host species is harmed).

To find out more about each of these, see the video at this URL:  
<http://bit.ly/1aNJhcb>

An example of **mutualism** is between herbivores (plant-eaters) and the bacteria that live in their intestines. The bacteria get a place to live. Meanwhile, the bacteria help the herbivore digest food. Both species benefit, so this is a mutualistic relationship.

The clownfish and the sea anemones also have a mutualistic relationship. The clownfish protects the anemone from anemone-eating fish, and the stinging tentacles of the anemone protect the clownfish from predators.



**Commensalism** may involve an organism using another for transportation or housing.

For example, spiders build their webs on trees. The spider gets to live in the tree, but the tree is unaffected.

An example of **parasitism** is a hookworm. Hookworms are roundworms that affect the small intestine and lungs of a host organism. They live inside of humans and cause them pain. However, the hookworms must live inside of a host in order to survive. Parasites may even kill the host they live on. Parasites are found in animals, plants, and fungi. Hookworms are common in the moist tropic and subtropical regions.

## Energy Models

Energy must constantly flow through an ecosystem for the system to remain stable. What exactly does this mean? Essentially, it means that organisms must eat other organisms.

**Food chains** - (diagram that shows the flow of energy through one organism to the next) demonstrate the eating patterns in an ecosystem. Food energy flows from one organism to another. Arrows are used to show the flow of energy from one organism to another. The arrow points from the organism being eaten to the organism that eats it. Not all of the energy is passed forward to the next organism; most of the energy is lost as heat and mechanical energy.

For example, an arrow from leaves to a grasshopper shows that energy flows from the leaves to the grasshopper. Next, a frog might prey on the grasshopper, a snake may eat the frog, and then a hawk might eat the snake. The **food chain** would be:

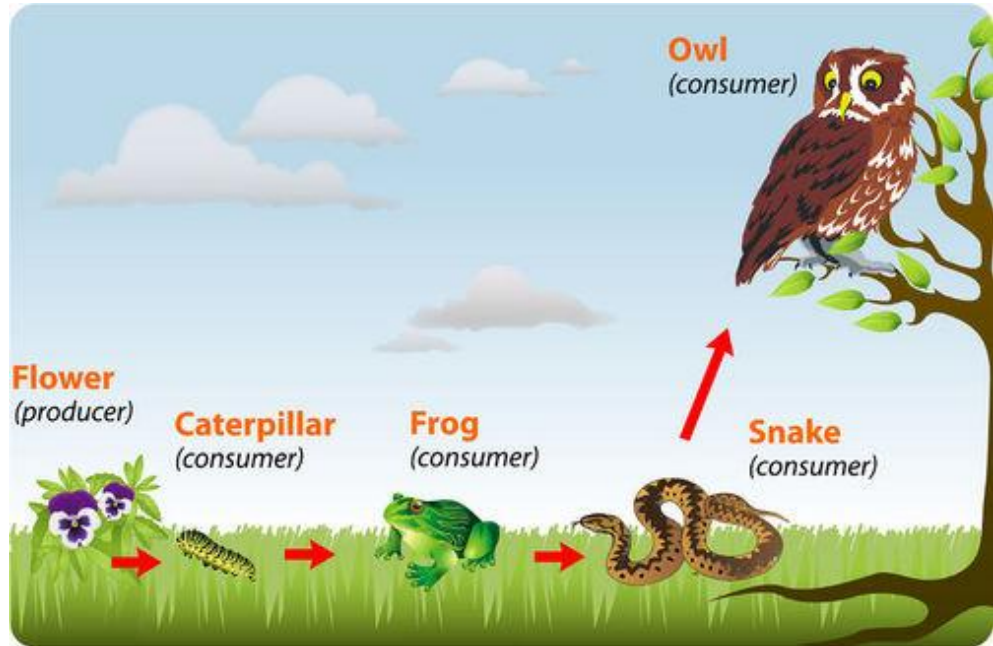
leaves → grasshopper → frog → snake →



### How do the grasshopper and the grass interact?

Grasshoppers don't just hop on the grass. They also eat the grass. Other organisms also eat the grass, and some animals even eat the grasshopper. These interactions can be visualized by drawing a food web.

hawk



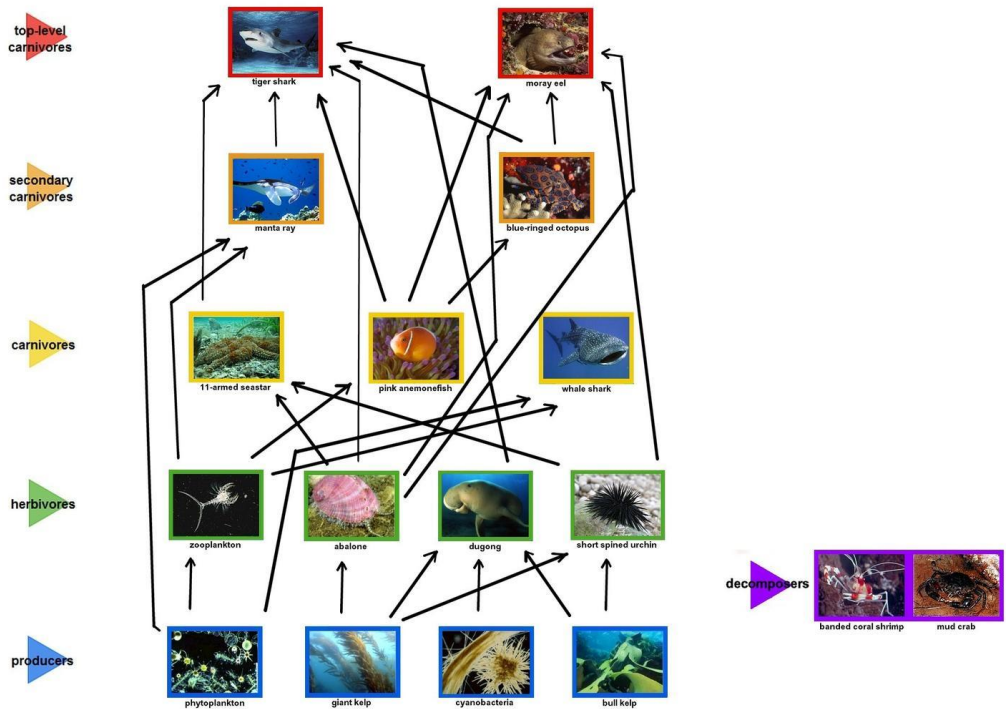
This food chain includes producers and consumers. How could you add decomposers to the food chain?

In an ocean ecosystem, one possible food chain might look like this: phytoplankton → krill → fish → shark. The producers are always at the beginning of the food chain, bringing energy into the ecosystem. Through photosynthesis, the producers create their own food in the form of glucose, but also create the food for the other organisms in the ecosystem.

The herbivores come next, then the carnivores. When these consumers eat other organisms, they use the glucose in those organisms for energy. In this example, phytoplankton are eaten by krill, which are tiny, shrimp-like animals. The krill are eaten by fish, which are then eaten by sharks.

QUESTION: Could decomposers be added to a food chain?

Each organism can eat and be eaten by many different types of organisms; so simple food chains are rare in nature. There are also many different species of fish and sharks. So a food chain cannot end with a shark; it must end with a distinct species of shark. A food chain does not contain the general category of "fish," it will contain specific species of fish. In ecosystems, there are many food chains.



Since feeding relationships are so complicated, we can combine food chains together to create a more accurate flow of energy within an ecosystem. A **food web** -(diagram that shows all of the possible feeding relationships between many organisms through multiple pathways in an ecosystem)- is very complex. If you expand our original example of a food chain, you could add deer that eat clover and foxes that hunt chipmunks. A **food web** shows many more arrows, but still shows the flow of energy. A complete food web may show hundreds of different feeding relationships.

Food web in the Arctic Ocean. <http://great-barrier-reef-biome.wikispaces.com/Reef+Food+Web>

**Practice**

Use the resource below to answer the questions that follow.

Decomposers: <http://bit.ly/1a8CV6h>

1. What is the role of decomposers in an ecosystem? What is the source of matter that is decomposed?
2. How do the actions of earthworms improve soil quality?
3. How does this impact the amount of biomass an ecosystem can support?