

Food Webs

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CHAPTER 1

Food Webs

- Distinguish a food chain from a food web.
- Be able to draw and interpret a food web.
- Summarize the roles of producers, herbivores, and carnivores in a food web.



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.

Food Webs

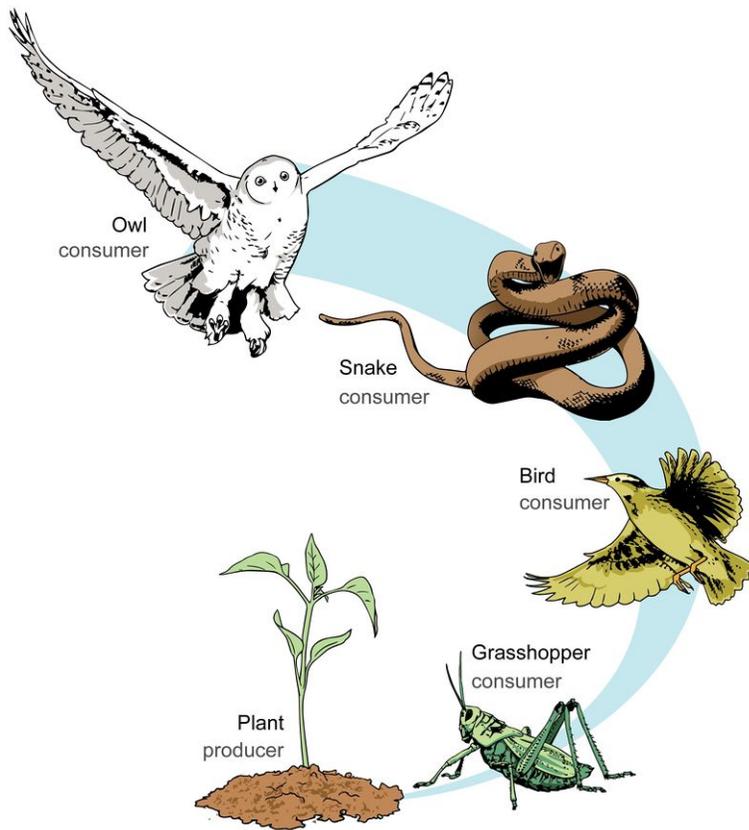
Energy must constantly flow through an ecosystem for the system to remain stable. What exactly does this mean? Essentially, it means that organisms must eat other organisms. **Food chains** (**Figure 1.1**) show the eating patterns in an ecosystem. Food energy flows from one organism to another. Arrows are used to show the feeding relationship between the animals. The arrow points from the organism being eaten to the organism that eats it. For example, an arrow from a plant to a grasshopper shows that the grasshopper eats the leaves. Energy and nutrients are moving from the plant to the grasshopper. Next, a bird might prey on the grasshopper, a snake may eat the bird, and then an owl might eat the snake. The food chain would be:

plant → grasshopper → bird → snake → owl.

A food chain cannot continue to go on and on. For example the food chain could not be:

plant → grasshopper → spider → frog → lizard → fox → hawk.

Food chains only have 4 or 5 total levels. Therefore, a chain has only 3 or 4 levels for energy transfer.

**FIGURE 1.1**

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. 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** (**Figure 1.2**) shows the feeding relationships between many organisms in an ecosystem. 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.

Summary

- A food chain is a diagram that shows feeding interactions in an ecosystem through a single pathway.
- A food web is a diagram that shows feeding interactions between many organisms in an ecosystem through multiple intersecting pathways.

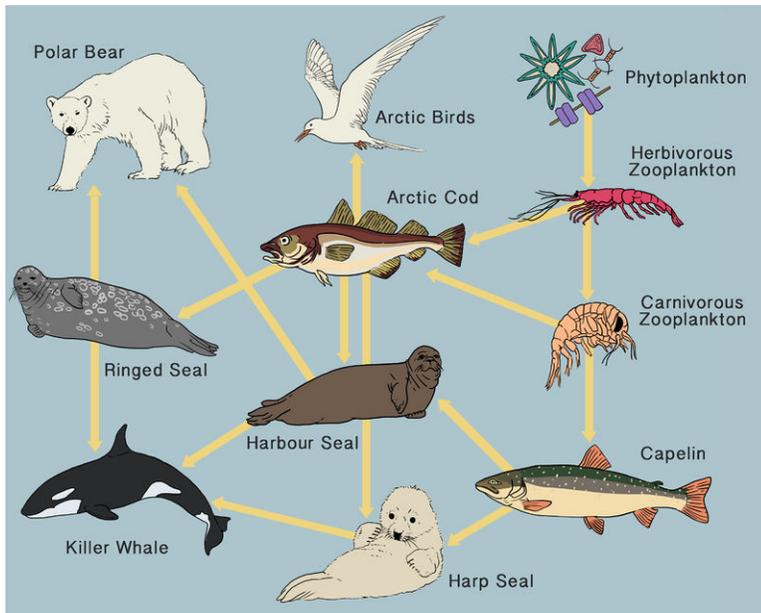


FIGURE 1.2

Food web in the Arctic Ocean.

Explore More

Use the resource below to answer the questions that follow.

- **Build A Food Web** at http://www.sciencesource2.ca/resources/SS_active_art/active_art/SEinteractive_gr09_ch01_pg31/index.html

1. What do the Loons and Arctic Tern have in common in the food web?
2. What do the Beluga and the sea duck have in common in the food web?
3. What species in the food web feed on zooplankton (animal plankton)?
4. When you build your own food web what must it contain to be healthy? How many healthy food webs could you build?

Review

1. What is the difference between a food chain and a food web?
2. Food chains always begin with what type of organism? Why?
3. What is the herbivore in the following food chain: algae → fish → herons?

References

1. Mariana Ruiz Villarreal (LadyofHats) for CK-12 Foundation. [This food chain includes both producers and consumers, but not decomposers](#) . CC BY-NC 3.0
2. Laura Guerin. [This food web displays some feeding relationships found in the Arctic Ocean](#) . CC BY-NC 3.0

Confused about the difference between food chains and food webs? Don't worry, you're not alone. But we can help you sort it out. A food chain follows the path of energy as it is transferred from species to species within an ecosystem. All food chains begin with the energy produced by the sun. From there they move in a straight line as the energy is moved from one living thing to the next. Here's an example of a very simple food chain: Sun----->Grass----->Zebra---->Lion.