


Reflect

Think about the last meal you ate. Where did the food come from? Maybe it came from the grocery store or a restaurant. Maybe it even came from your backyard. Now think of a lion living on the plains in Africa. Where do you think his last meal came from? Definitely not the grocery store! Lions have to hunt for their food.

Most humans do not hunt for their food. But humans and lions have something in common. Both eat other living things. In this way, humans and lions have a similar relationship to their

ecosystem: a community of living and nonliving things in their natural environment

organism: a living thing

energy: what is needed to do work or cause change

ecosystem. In fact, scientists group living things based on how they get food. By studying how **organisms** get food, scientists understand how **energy** moves through an ecosystem. This flow of energy from one organism to the next forms a *food chain*. What are some types of food in a food chain? What happens if some of these food sources change or disappear?



What are producers? What do they need to make their food?

Some living things make their own food. These organisms are called *producers*. Plants are producers. They use sunlight, water, and a gas called carbon dioxide to make sugars. The plants use these sugars for energy to grow and survive.

Producers are always the first organism in a food chain. They provide energy for other living things in the food chain. Even though not all animals eat producers, all animals rely on producers to change sunlight into usable energy.



Most bears are omnivores. They eat plants like grasses and berries. They also eat meat such as fish.

What are consumers? Where do they get their food?

Many living things cannot make their own food. These organisms are called consumers. If they don't make their own food, where do you think it comes from? *Consumers* get energy by eating other organisms. There are several different types of consumers. Some consumers are herbivores. *Herbivores* eat only plants or other plant-like producers called algae. Other consumers, called *carnivores*, eat only other animals. Some consumers eat both plants and other animals. These consumers are called *omnivores*.

**What do
you think?**

People are consumers, not producers, because they eat other organisms. Think of the things people eat. What type of consumers are we? Are people carnivores, herbivores, or omnivores? Do you think some people might be in different categories? Why?

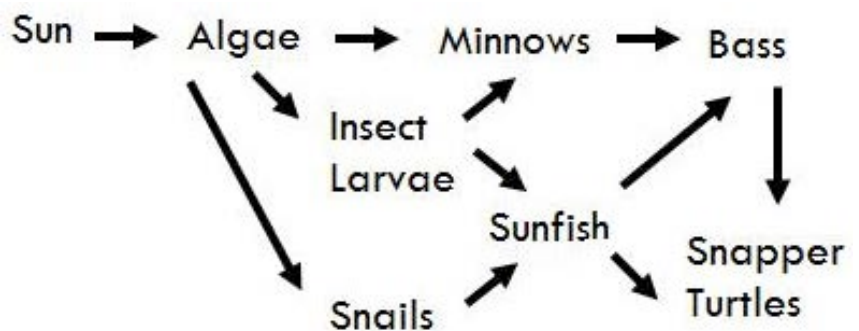
Where does the energy come from that starts a food chain?

As one organism eats another, energy moves through a food chain. But where does the energy first come from? The energy that starts a food chain comes from the Sun. Producers use sunlight to make energy for other organisms that they can use. Can we make our own food from sitting in the Sun? Not at all! When a consumer like you eats plants, the energy that first came from the Sun gets passed on to the consumer. When another consumer eats the plant-eater, the energy passes on again.

**What is a food web?**

In a food chain, the energy seems to flow in a straight line from one organism to the next. In reality though, energy in an ecosystem flows in many directions. This is because most consumers rely on more than one type of food. For this reason, a food web is a better way to show these relationships. A *food web* is a connection of food chains with many food energy paths in an ecosystem. Just as in a food chain, the energy that starts a food web comes from the Sun.

In the food web shown at the right, the Sun's energy flows to algae. The algae make their own food using sunlight, water, and carbon dioxide.



Next, the energy flows to organisms that eat algae, such as minnows, insect **larvae**, and snails. Then the energy flows to larger consumers, such as bass, sunfish, and snapper turtles.

larvae: the young, newly hatched form of certain insects

Look out!

The arrows in a food web diagram show the flow of energy. The first arrow always starts at the Sun, which is the source of energy. The arrows point to the next organism that uses that energy. That means arrows point from the source of energy to whatever consumes that energy. For example, the arrow that points from snails to sunfish shows that snails provide energy to sunfish. In other words, sunfish eat snails.

TRY NOW

Do different food chains have similar structures? Find out with this activity.

- To complete this activity, you will need the following materials:
 - construction paper: yellow, green, blue, purple, and red
 - scissors
 - tape
 - a marker
 - a ruler
- Cut the construction paper into strips about two inches wide.
- Look at the food web above. Choose one food chain from this food web.
- Write each part of the food chain on a different strip of paper. Use different colored strips according to the role of each thing in the food chain. If you don't have different colored paper, just use different colored markers. Use this color code: original energy source = yellow, producer = green, herbivore = blue, omnivore = purple, carnivore = red.
- Make a paper chain that connects each strip in order. Do this by taping together the ends of the first strip. It should make a loop. Next, put the second strip through the loop. Tape the ends together to make a second loop. Continue with the rest of the strips.
- Repeat Steps 3–5 with two more food chains from the food web.
- Look at your three paper food chains. Do you notice any patterns in the colors? What color is at the beginning of the chains? What color is at the end of the chains? How do the colors show the flow of energy?

How do changes in an ecosystem affect a food web in an ecosystem?

Changes to an ecosystem can affect the flow of energy in food webs. For example, a forest fire may destroy tall trees and logs in an ecosystem. As a result, small animals that live in the trees either move or die. So the number of small animals, such as bats and squirrels, in that ecosystem gets smaller.

There are more changes that can happen. If there are fewer small animals, the food supply decreases for the carnivores that eat them. As a result, fewer of these carnivores can survive in the ecosystem. A single change affects all the living things in a food web.



Looking to the Future: The Golden-Cheeked Warbler in Danger

In many cases, human actions change ecosystems. For example, humans cut down juniper and oak trees in central Texas. These trees are home to a type of bird called the golden-cheeked warbler. Now the birds are in danger because they are losing their living spaces. Today, there are only about 2,100 golden-cheeked warblers. If the bird becomes **extinct**, the ecosystem will change even more.

extinct: having no living members

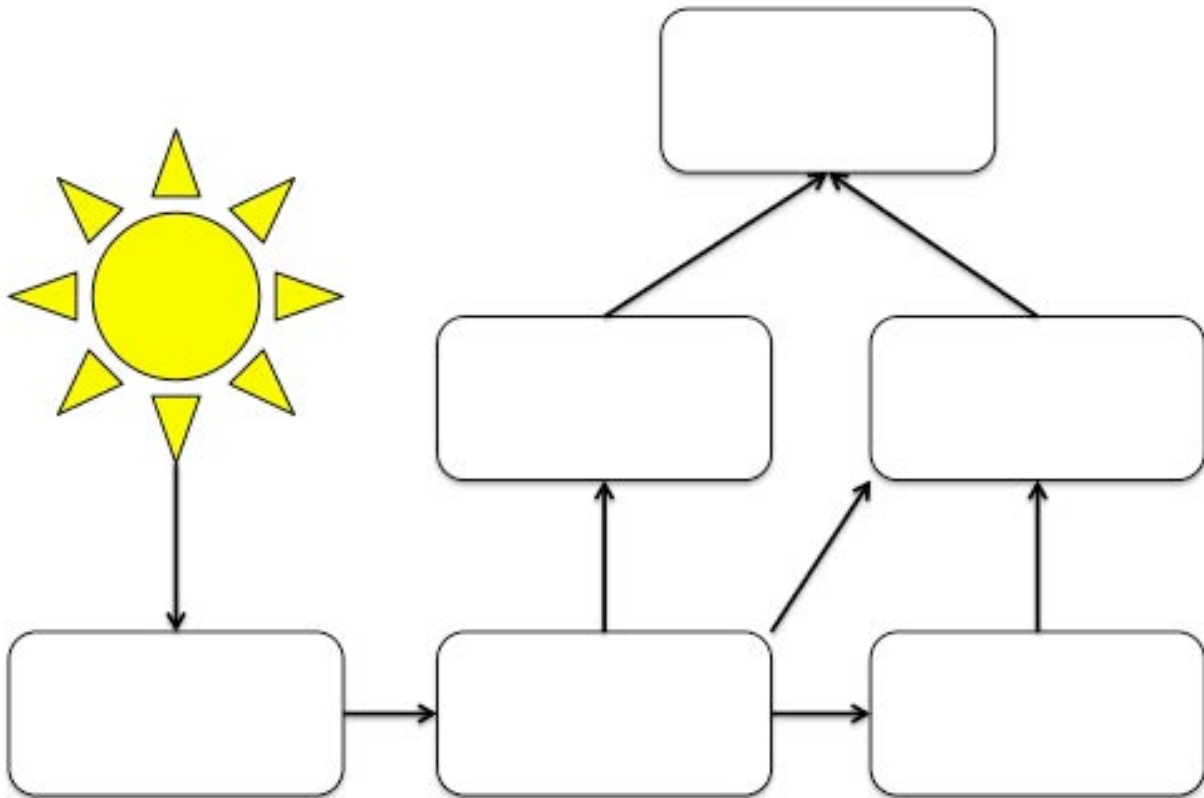
Golden-cheeked warblers eat insects like caterpillars and beetles. This helps to control the insect population. If the warbler population decreases, the number of insects will grow. Think about how having more insects would change the plants in the forest! Caterpillars and beetles eat the leaves of many different plants. If too many insects live in an area, they will eat way more of the plants.

Fortunately, many people are working to protect the golden-cheeked warbler. The warblers now have a protected national wildlife area in Texas. This protection helps keep some balance in the warbler's food web.

What Do You Know?

Read about the parts of a grassland food web in the chart below. Use the information from the chart to complete the food web diagram. Fill in each box with the correct organism. Then label each organism in the food web diagram as a producer or a consumer.

Grassland Food Web	
Organism	How it gets energy
snake	eats grasshoppers
hawk	eats snakes and sparrows
sparrow	eats grasshoppers and spiders
grasshopper	eats grass
grass	makes its own food
spider	eats grasshoppers



**Connecting
with your child****What's in Our Food Web?**

To help students learn more about food webs, prepare a meal with them. Try to use a recipe that includes mainly unprocessed ingredients, as it will be easier to find the origin of natural products. As you prepare the meal, discuss with students the origin of each ingredient. Have them identify whether the source of each ingredient is a producer or a consumer. Examples of common producer ingredients include fruits, nuts, and vegetables. Examples of common consumer ingredients include dairy products and meats. If you are unsure about the origin of an ingredient, write it down and research it online with students later.

After the meal, make a food web with students. The food web should include the ingredients you worked with to prepare the meal. Look online to find other animals that eat the ingredients, and include the animals in the food web. Help students draw arrows between the parts of the food web to show the flow of energy. (An arrow should begin at the food being eaten and point to the consumer of the food.) Make sure students include the Sun in the food web. The Sun provides energy for the plants in the food web, so draw arrows from the Sun to each plant. Students can draw each component of the food web, or they can cut out pictures and paste them on the poster board. Have students label each component as a producer or consumer.

Here are some questions to discuss with students:

- What are the producers in the food web you created? What are the consumers?
- Where does energy start in the food web?
- What are some different paths in this food web that connect the Sun's energy to us?