Encyclopedic Entry

food chain

For the complete encyclopedic entry with media resources, visit:
http://education.nationalgeographic.com/encyclopedia/food-chain/

The food chain describes who eats whom in the wild. Every living thing—from one-celled algae to giant blue whales—needs food to survive. Each food chain is a possible pathway that energy and nutrients can follow through the ecosystem.

For example, grass produces its own food from sunlight. A rabbit eats the grass. A fox eats the rabbit. When the fox dies, bacteria break down its body, returning it to the soil where it provides nutrients for plants like grass.

Of course, many different animals eat grass, and rabbits can eat other plants besides grass. Foxes, in turn, can eat many types of animals and plants. Each of these living things can be a part of multiple food chains. All of the interconnected and overlapping food chains in an ecosystem make up a food web.

Trophic Levels

Organisms in food chains are grouped into categories called trophic levels. Roughly speaking, these levels are divided into producers (first trophic level), consumers (second, third, and fourth trophic levels), and decomposers.

Producers, also known as autotrophs, make their own food. They make up the first level of every food chain. Autotrophs are usually plants or one-celled organisms. Nearly all autotrophs use a process called photosynthesis to create “food” (a nutrient called glucose) from sunlight, carbon dioxide, and water.

Plants are the most familiar type of autotroph, but there are many other kinds. Algae, whose larger forms are known as seaweed, are autotrophic. Phytoplankton, tiny organisms that live in the ocean, are also autotrophs. Some types of bacteria are autotrophs. For example, bacteria living in active volcanoes use sulfur compounds to produce their own food. This process is called chemosynthesis.

The second trophic level consists of organisms that eat the producers. These are called primary consumers, or herbivores. Deer, turtles, and many types of birds are herbivores. Secondary consumers eat the herbivores. Tertiary consumers eat the secondary consumers. There may be more levels of consumers before a chain finally reaches its top predator. Top predators, also called apex predators, eat other consumers.

Consumers can be carnivores (animals that eat other animals) or omnivores (animals that eat both plants and animals). Omnivores, like people, consume many types of foods. People eat plants, such as vegetables and fruits. We also eat animals and animal products, such as meat, milk, and eggs. We eat fungi, such as mushrooms. We also eat algae, in edible seaweeds like nori (used to wrap sushi rolls) and sea lettuce (used in salads).

Detritivores and decomposers are the final part of food chains. Detritivores are organisms that eat nonliving plant and animal remains. For example, scavengers such as vultures eat dead animals. Dung beetles eat animal feces.

Decomposers like fungi and bacteria complete the food chain. They turn organic wastes, such as decaying plants, into inorganic materials, such as nutrient-rich soil. Decomposers complete the cycle of life, returning nutrients to the soil or oceans for use by autotrophs. This starts a whole new food chain.

Food Chains

Different habitats and ecosystems provide many possible food chains that make up a food web.

In one marine food chain, single-celled organisms called phytoplankton provide food for tiny shrimp called krill. Krill provide the main food source for the blue whale, an animal on the third trophic level.

In a grassland ecosystem, a grasshopper might eat grass, a producer. The grasshopper might get eaten by a rat, which in turn is consumed by a snake. Finally, a hawk—an apex predator—swoops down and snatches up the snake.

In a pond, the autotroph might be algae. A mosquito larva eats the algae, and then perhaps a dragonfly larva eats the young mosquito. The dragonfly larva becomes food for a fish, which provides a tasty meal for a raccoon.

VOCABULARY

Term	Part of Speech	Definition
algae	*plural noun*	(singular: alga) diverse group of aquatic organisms, the largest of which are seaweeds.
apex predator	*noun*	species at the top of the food chain, with no predators of its own. Also called an alpha predator or top predator.
autotroph	*noun*	organism that can produce its own food and nutrients from chemicals in the atmosphere, usually through photosynthesis or chemosynthesis.
bacteria	*plural noun*	(singular: bacterium) single-celled organisms found in every ecosystem on Earth.
blue whale	*noun*	species of marine mammal that is the largest animal to have ever lived.
carbon dioxide	*noun*	greenhouse gas produced by animals during respiration and used by plants during photosynthesis. Carbon dioxide is also the byproduct of burning fossil fuels.
carnivore	*noun*	organism that eats meat.
chemosynthesis	*noun*	process by which some microbes turn carbon dioxide and water into carbohydrates using energy obtained from inorganic chemical reactions.
consumer	*noun*	organism on the food chain that depends on autotrophs (producers) or other consumers for food, nutrition, and energy.
decay	*verb*	to rot or decompose.
decomposer	*noun*	organism that breaks down dead organic material.
detritivore	*noun*	organism that consumes dead plant material.
ecosystem	*noun*	community and interactions of living and nonliving things in an area.
edible	*adjective*	able to be eaten and digested.
energy	*noun*	capacity to do work.

feces	*noun*	waste material produced by the living body of an organism.
food chain	*noun*	group of organisms linked in order of the food they eat, from producers to consumers, and from prey, predators, scavengers, and decomposers.
food web	*noun*	all related food chains in an ecosystem. Also called a food cycle.
fungi	*plural noun*	(singular: fungus) organisms that survive by decomposing and absorbing nutrients in organic material such as soil or dead organisms.
glucose	*noun*	"simple sugar" chemical produced by many plants during photosynthesis.
grassland	*noun*	ecosystem with large, flat areas of grasses.
herbivore	*noun*	organism that eats mainly plants.
krill	*noun*	small marine crustacean, similar to shrimp.
larva	*noun*	a new or immature insect or other type of invertebrate.
multiple	*adjective*	many.
nori	*noun*	red algae that is often dried and used to wrap sushi.
nutrient	*noun*	substance an organism needs for energy, growth, and life.
omnivore	*noun*	organism that eats a variety of organisms, including plants, animals, and fungi.
photosynthesis	*noun*	process by which plants turn water, sunlight, and carbon dioxide into water, oxygen, and simple sugars.
phytoplankton	*noun*	microscopic organism that lives in the ocean and can produce its own food through photosynthesis.
plant	*noun*	organism that produces its own food through photosynthesis and whose cells have walls.
primary consumer	*noun*	organism that eats plants or other autotrophs.
producer	*noun*	organism on the food chain that can produce its own energy and nutrients. Also called an autotroph.
scavenger	*noun*	organism that eats dead or rotting biomass, such as animal flesh or plant material.
sea lettuce	*noun*	seaweed with large, flat leaves.
seaweed	*noun*	marine algae. Seaweed can be composed of brown, green, or red algae, as well as "blue-green algae," which is actually bacteria.
secondary consumer	*noun*	organism that eats meat.
sulfur	*noun*	chemical element with the symbol S.
survive	*verb*	to live.
sushi	*noun*	bite-sized rolls or balls of sticky rice topped with seafood or vegetables.
tertiary consumer	*noun*	carnivore that mostly eats other carnivores.
top predator	*noun*	species at the top of the food chain, with no predators of its own. Also called an alpha predator or apex predator.

trophic level	*noun*	one of three positions on the food chain: autotrophs (first), herbivores (second), and carnivores and omnivores (third).
volcano	*noun*	an opening in the Earth's crust, through which lava, ash, and gases erupt, and also the cone built by eruptions.

For Further Exploration

Articles & Profiles

- National Geographic News: Shark Ate Amphibian Ate Fish
- National Geographic News: Acid Oceans Threatening Marine Food Chain

Audio & Video

- National Geographic Kids: Krill Video