

Earth's marine life has its own food chain

By National Geographic Society, adapted by Newsela staff on 03.13.19

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Image 1. A tiger shark (*Galeocerdo cuvier*) eating tuna in Fuvahmulah, Maldives, in 2018. Photo: Andrey Nekrasov/Barcroft Media via Getty Images

There are around 300,000 known marine, or ocean, species. A species is a particular kind of plant or animal. Together, these different species make up about 15 percent of the planet's plants and animals.



Most marine species are tied together through the food web. A food web is a system of interconnected food chains. A food chain is a top-to-bottom set of animals and plants. They are linked to each other because those on top eat those below.

Level One: Photoautotrophs

The bottom level of the ocean's food chain is made up of one-celled organisms called phytoplankton. These tiny organisms are microscopic. They are so small they cannot be seen without a microscope.

Billions of phytoplankton live in the upper part of the ocean. They take in the sun's light. Through photosynthesis, they turn the sun's light energy into chemical energy. This chemical energy allows them to survive and grow.

Together, these tiny organisms play a large role. They are the main producers of the carbon all ocean animals need to survive. They also produce more than half of the oxygen we breathe on Earth.

Level Two: Herbivores

The next level of the marine food chain is made up of plant-eaters, or herbivores. Many are microscopic animals known as zooplankton. They drift across the ocean's surface. As they drift, they graze on whatever plants they come across.

Many herbivores are big enough for us to see. They come in a huge range of sizes, though. There are smaller ones such as surgeonfish and parrotfish, and bigger ones like green turtles and manatees.



Together, herbivores eat up a huge amount of plant life. However, many of them are eaten in turn. They become food for the carnivorous, or flesh-eating, animals. Carnivores make up the food chain's top two levels.

Level Three: Carnivores

The third level of the food chain consists of a large group of small carnivores. It includes fish like sardines, herring and menhaden. Such smaller fish eat a great amount of zooplankton. However, they themselves are often eaten.

There is one simple fact of ocean life. Big fish eat smaller fish.

Level Four: Top Predators

Large predators sit at the top of the marine food chain. They are a varied group. Some are finned animals, such as sharks, tuna and dolphins. Others are feathered animals, like pelicans and penguins. Yet other are animals with flippers, like seals and walruses.

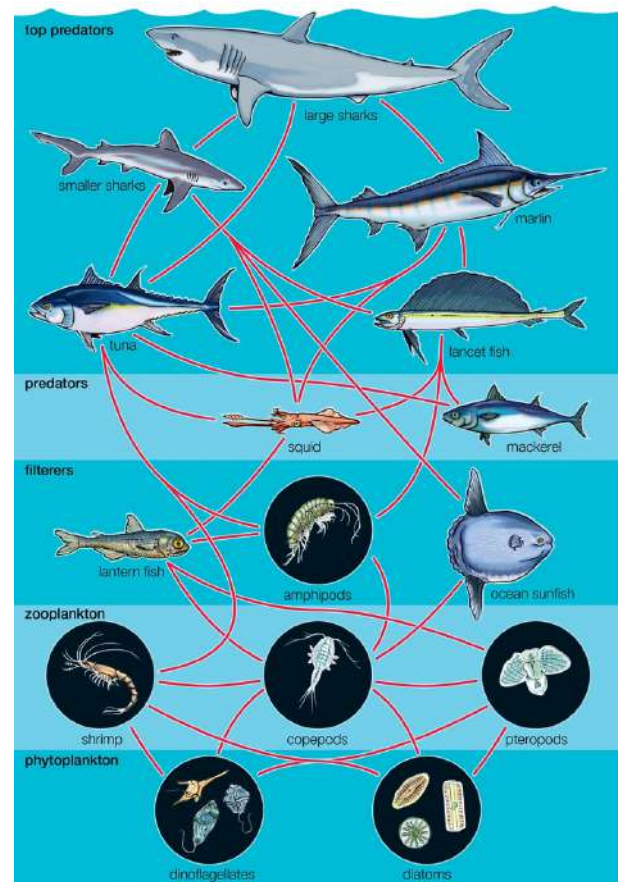
Most top predators are large, fast and very good hunters. They also have longer lifespans. Usually, they reproduce slowly. Females do not give birth that often.

Many of the marine food chain's top predators are eaten too. They are hunted by humans, the most deadly of all hunters. Overfishing by humans can greatly shrink top predator populations. Because such animals reproduce slowly, it can take years for their populations to recover.

The loss of top predator species can create serious problems. These problems ripple through the entire food web. For example, populations of smaller animals that top predators normally feed on can become too large. These smaller animals might then nearly wipe out populations of even smaller animals. Or, they might eat too much plant life. Then, animals that live on plants no longer have enough food.

Alternative Food Chains

The main marine food web is based on sunlight and plants. It includes many of the ocean's species. However, it does not include all of them. There are other, separate deep-ocean ecosystems. These are fueled by chemical energy. This energy enters the ocean through hydrothermal vents. Hydrothermal vents are openings in the ocean floor. They release heated minerals from deep within the Earth into the ocean.



Quiz

1 What is true about food webs in the ocean?

- (A) Food webs consist of many food chains connected together.
- (B) Food webs consist of a single photoautotroph, herbivore, carnivore, and top predator.
- (C) Food webs consist of only a single level such as all herbivores in the ocean.
- (D) Food webs do not show how animals and plants are all connected together.

2 Read the following selection from the section "Level One: Photoautotrophs."

They are the main producers of the carbon all ocean animals need to survive. They also produce more than half of the oxygen we breathe on Earth.

Based on this selection, choose the statement that is TRUE.

- (A) Phytoplankton need the carbon that is produced by ocean animals.
- (B) Phytoplankton need a lot of oxygen to survive.
- (C) Phytoplankton are important for both marine animals and humans.
- (D) Phytoplankton are a major food group for people.

3 What would most likely happen if all the phytoplankton in the ocean disappeared?

- (A) There would probably not be a change in the food web.
- (B) The majority of ocean animals would not be able to survive.
- (C) The carnivores would become herbivores.
- (D) The amount of food available for marine species would increase.

4 Read the paragraph below from the section "Level Four: Top Predators."

The loss of top predator species can create serious problems. These problems ripple through the entire food web. For example, populations of smaller animals that top predators normally feed on can become too large. These smaller animals might then nearly wipe out populations of even smaller animals. Or, they might eat too much plant life. Then, animals that live on plants no longer have enough food.

What conclusion can the reader make based on this paragraph?

- (A) Top predators are only dangerous to the food chain level directly below them.
- (B) Top predators help keep all levels of the food chain functioning properly.
- (C) Top predators rise from the lowest level of the food chain to the highest.
- (D) Top predators hunt organisms from all four of the levels of the food chain.

5 An unknown organism is found in the ocean. This organism eats zooplankton but also has some larger predators. Which level of the food chain would this organism most likely belong to?

- (A) level one
- (B) level two
- (C) level three
- (D) level four

- 6 Which selection from the article uses cause and effect in its structure?
- (A) There are around 300,000 known marine, or ocean, species. A species is a particular kind of plant or animal. Together, these different species make up about 15 percent of the planet's plants and animals.
 - (B) The bottom level of the ocean's food chain is made up of one-celled organisms called phytoplankton. These tiny organisms are microscopic. They are so small they cannot be seen without a microscope.
 - (C) Many of the marine food chain's top predators are eaten too. They are hunted by humans, the most deadly of all hunters. Overfishing by humans can greatly shrink top predator populations. Because such animals reproduce slowly, it can take years for their populations to recover.
 - (D) The main marine food web is based on sunlight and plants. It includes many of the ocean's species. However, it does not include all of them. There are other, separate deep-ocean ecosystems. These are fueled by chemical energy.
- 7 Why are top predators in the ocean important?
- (A) Top predators are important because they consume most of the waste in the ocean.
 - (B) Top predators are important because they have the greatest population in the ocean.
 - (C) Top predators are important because they help keep the population of smaller animals in balance.
 - (D) Top predators are important because they consume the most food in the ocean.
- 8 The article is MOSTLY organized to show steps in a process.
- Which of the following summarizes the steps in the process?
- (A) The article contrasts the different types of energy in the food chain.
 - (B) The article explains how species find their place in the food chain.
 - (C) The article ranks the importance of species in the food chain.
 - (D) The article describes how energy moves through the food chain.