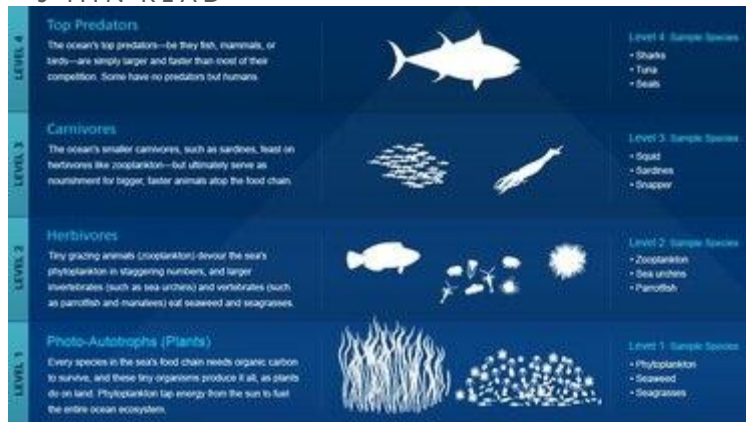


Marine Food Chain

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• REFERENCE

It's a Fish-Eat-Fish World

Some 300,000 marine species are known to science—about 15 percent of all the species identified on the planet. But the sea is so vast that a million or more as yet unknown species may live in its waters. Most of these aquatic species are tied together through the food web.

Level One: Photoautotrophs

The foundation of the sea's food chain is largely invisible. Countless billions of one-celled organisms, called phytoplankton, saturate sunlit upper-ocean waters worldwide. These tiny plants and bacteria capture the sun's energy and, through photosynthesis, convert nutrients and carbon dioxide into organic compounds. On the coast, seaweed and seagrasses do the same thing.

Together, these humble plants play a large role: They are the primary producers of the organic carbon that all animals in the ocean food web need to survive. They also produce more than half of the oxygen that we breathe on Earth.

Level Two: Herbivores

The next level of the marine food chain is made up of animals that feast on the sea's abundant plant life. On the ocean's surface waters, microscopic animals—zooplankton, which include jellyfish and the larval stages of some fish, barnacles, and mollusks—drift across the sea, grazing opportunistically. Larger herbivores include surgeonfish, parrotfish, green turtles, and manatees.

Despite their differences in size, herbivores share a voracious appetite for ocean vegetation. Many of them also share the same fate—which is to become food for the carnivorous animals of the food chain's top two levels.

Level Three: Carnivores

The zooplankton of level two sustain a large and diverse group of small carnivores, such as sardines, herring, and menhaden. This level of the food chain also includes larger animals, such as octopuses (which feed on crabs and lobsters) and many fish (which feed on small invertebrates that live near shore). Though these animals are very successful hunters, they often fall prey to a simple fact of ocean life: big fish eat smaller fish.

Level Four: Top Predators

The large predators that sit atop the marine food chain are a diverse group that includes finned (sharks, tuna, dolphins), feathered (pelicans, penguins), and flippered (seals, walruses) animals. These apex predators tend to be large, fast, and very good at catching prey. They are also long-lived and usually reproduce slowly.

But the marine food chain's top predators are common prey for the most deadly hunters of all—humans. When top predator species are depleted, their numbers are often slow to rebound, and their loss can send shock waves through the entire food web.

Alternative Food Chains

The primary marine food web, which is based on plant productivity, includes many of the sea's species—but not all of them. There are other deep-ocean ecosystems that are entirely

independent of the sunlight energy that kick-starts the main marine ecosystem. At their roots, these unique ecosystems are fuelled by chemical energy, which enters the ocean from sources like seafloor hydrothermal vents.