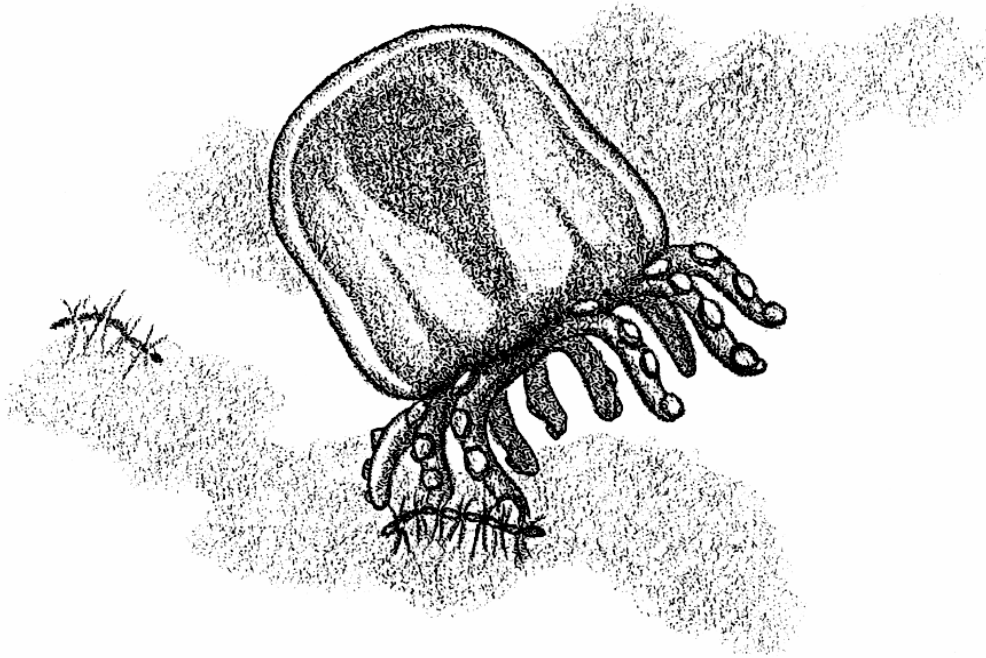


Food Chains and Food Webs

by Kenn Oberrecht



Life on earth, no matter what form it assumes, depends ultimately on sunlight. Whether on land or in the water, green plants use their chlorophyll and energy from the sun to turn carbon dioxide, water, and inorganic

salts into complex organic materials--mainly carbohydrates and proteins. This process, called photosynthesis, also produces oxygen as a by-product.

Humans and other animals benefit directly and indirectly from photosynthesis. Some animals, the plant eaters, feed exclusively on plants and are said to be herbivorous. Meat eaters feed only on other animals and are said to be carnivorous. Many predators, including humans, are opportunistic feeders that consume both plants and animals. They're called omnivorous.

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In one way or another, animals are dependent on plants for nutrition. They also rely on plants for valuable oxygen, essential to the respiration process. As they breathe, animals take in oxygen and give off carbon dioxide. Plants, in turn, use the carbon dioxide in photosynthesis, and the cycle goes on.

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A food chain is a series of organisms that are interrelated and dependent according to their feeding habits, with the smallest or lowest form fed on by a larger one, and that one in turn eaten by a larger one, and so on to the top of the chain.

A food web is more complex than a food chain. It's a network of food chains interrelated by predator-prey and consumer-resource interactions representative of an ecological community or system.

The leaves of land plants are the parts best equipped to carry on photosynthesis. They contain chlorophyll, trap sunlight for energy, and absorb carbon dioxide through hundreds of tiny pores known as stomata.

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In deep water, plants must float in order to stay in sunlight. Such plants are extremely small, but their surface area is large compared to their volume, which helps them float and absorb essential materials from the water around them. Most are microscopic algae called phytoplankton.

Plants need materials other than those essential to photosynthesis--among them, carbon, hydrogen, and nitrogen. Land plants are able to absorb these and other materials through their root systems. Floating plants, however, must absorb them from their surroundings. So where concentrations of these minerals and elements are low, the growth of phytoplankton is diminished.

Plants are able to convert no more than about 20 percent of the light energy they receive into photosynthetic materials. Some are even less efficient because of a lack of essential minerals. For example, low phosphorus levels often inhibit the growth of water plants. Despite apparent inefficiencies, though, the earth's plants still produce 328 trillion pounds of organic matter a year.

Plants are the primary food producers in food chains and food webs. Plant eaters, herbivores, are the primary consumers, which ingest plant material directly. Consumers higher in the chain obtain plant material directly and indirectly--carnivores indirectly, omnivores both directly and indirectly.

Plants depend on sunlight for energy, which is ultimately converted into essential nutrients for all the consumers in food chains and webs.

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