

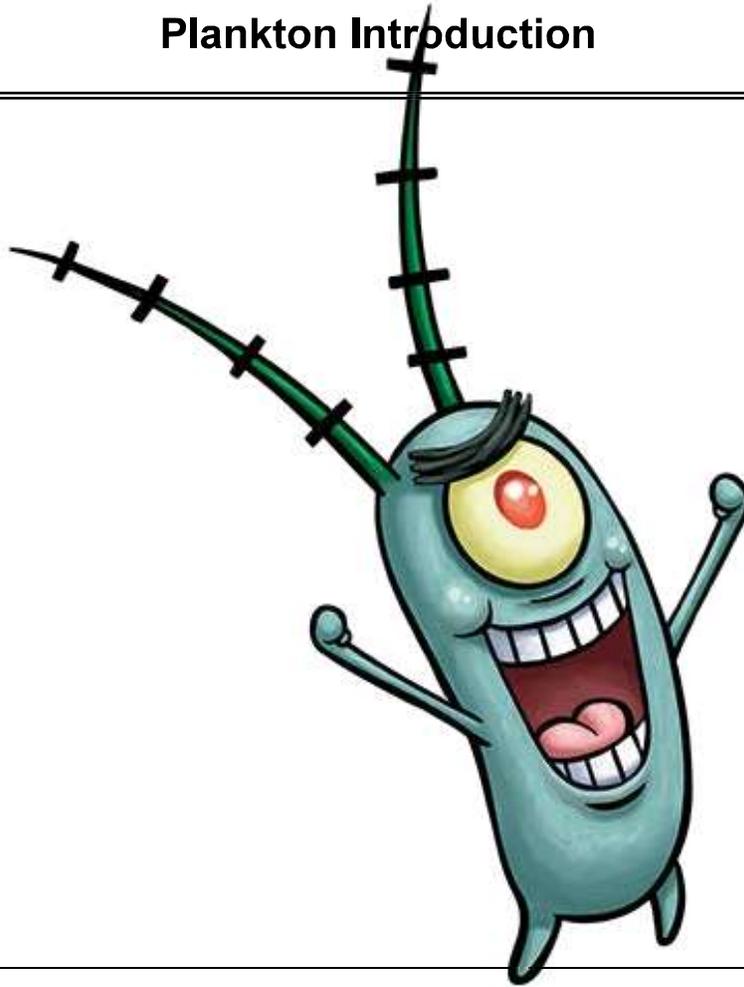
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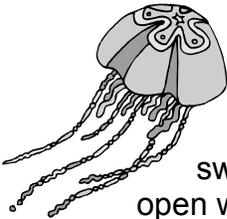
## Plankton Introduction

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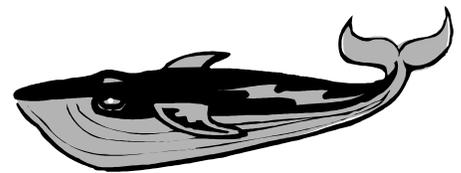


**“Plankton”** is from a Greek word for “wanderer.” It is a collective term for the various organisms that drift or swim weakly in the open water of the sea or freshwater lakes and ponds. These weak swimmers, carried about by currents, range in size from the tiniest microscopic organisms to much larger animals such as jellyfish.



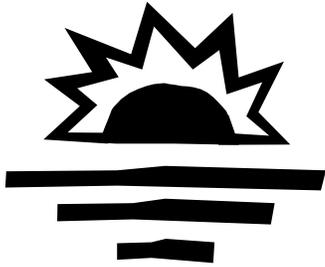
Plankton can be divided into two large groups: planktonic plants and planktonic animals. The plant plankton or **phytoplankton** are the producers of ocean and freshwater

food chains. They are **autotrophs**, making their own food, using the process of **photosynthesis**. The animal plankton or **zooplankton** eat food for energy. These **heterotrophs** feed on the microscopic world of the sea and transfer energy up the food pyramid to fishes, marine mammals, and humans.



Scientists are interested in studying plankton, because they are the basis for food webs in both marine and freshwater ecosystems.

## Phytoplankton



Planktonic plants are a kind of algae called **phytoplankton**. These tiny plants live near the surface because, like all plants, they need sunlight for photosynthesis. The **density** of water helps phytoplankton float, but phytoplankton still must fight against the force of gravity. Phytoplankton have special adaptations to stop them from sinking to the bottom to die. Because phytoplankton are tiny, they don't weigh very much and they have a large surface area relative to their volume, which helps them float. Adaptations such as spines increase the surface area even more and prevent phytoplankton from sinking too fast. Phytoplankton also remain near the surface because warm surface waters of the sea and of



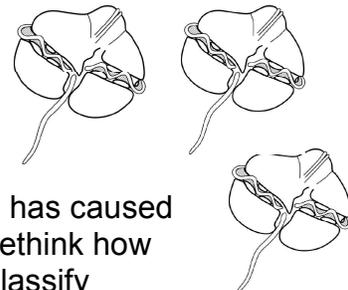
lakes are regularly mixed each day by the wind down to a depth of about 30 meters (about 100 feet). Phytoplankton sink so slowly that this daily mixing of surface waters carries them back toward the surface before they sink too deep to survive.

Scientists can further classify phytoplankton according to their structural appearance and composition. The two main types of

phytoplankton include the **diatoms** and the **dinoflagellates**. The diatoms are golden-brown **algae** that can be identified by their two-part shell of silica called **frustules**. These shells fit together creating geometric glasslike box shapes. The delicate markings on the shells are used to identify the species. These organisms existing as single cells or growing in chains or colonies leave behind their siliceous shells when they die. Diatom shells form a crumbly substance called **diatomaceous earth** that is used in the manufacture of paint, silver polish, and other materials.



The dinoflagellates are identified by their two **flagella** or whip like projections used for locomotion. They do not have silica in their shells but may have shells made of **cellulose**. Dinoflagellates have some characteristics in common with both plants and animals. For instance, they can produce their own food through photosynthesis like plants, but they can also eat other plankton and move through the water using their flagella just like animals. This has caused scientists to rethink how they should classify dinoflagellates.

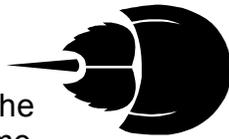


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## Zooplankton

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Planktonic animals are called zooplankton. Unlike phytoplankton, which must have sunlight to live, zooplankton can live at all depths of the ocean. Zooplankton are either **holoplankton** (permanent plankton) or **meroplankton** (temporary plankton). Holoplankton live up in the water all of their lives. Meroplankton are mostly larval stages of larger **pelagic** and **benthic** organisms, such as fish, crabs, worms, etc. These animals spend only part of their life cycle in the water column, and when meroplanktonic larvae become adults that live on the bottom, they become part of the benthic food web.



During daylight hours many microscopic zooplankton that eat phytoplankton can be found near the surface. Individually, these organisms are very difficult to see because of their small size, but if they are collected in a plankton net and concentrated into a jar, they can

be observed. Other kinds of zooplankton, soft bodied and delicate, with the consistency of jello, also occur at the surface of the sea during the day. These zooplankton, such as jellyfish and snails, are difficult for predators to see, even though they are large, because their bodies are transparent.



Some larger **herbivorous** and **carnivorous** zooplankton live deeper in the ocean during the day and migrate at night to the surface waters to feed. They move long distances vertically propelling themselves with legs, antennae, **cilia**, or tails. Other zooplankton always stay in deeper water, never rising to the surface. None of these are herbivores, because they live at depths that sunshine cannot reach. Many of these animals are black or red, colors that are invisible in perpetual dark.

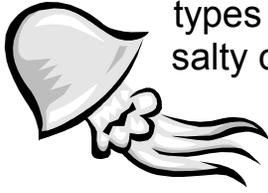
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**Student Information: Plankton**

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**Plankton** can be found in all types of water from salty oceans to freshwater lakes and ponds. These weakly swimming organisms rely on currents to move them from place to place. These interesting creatures range in size from the very smallest organisms that can only be seen through a microscope to much larger organisms such as jellyfish.

Plankton can be divided into two large groups: plant plankton or animal plankton. Plant plankton called **phytoplankton** are the producers in most aquatic food chains. They use energy from sunlight to make their own food during the process of **photosynthesis**. They must stay near the water's surface where sunlight penetrates in order to survive. The animal plankton or **zooplankton** eat other organisms including the phytoplankton. They migrate up and down through the water column as they look for food.



They can live in deeper water, because they do not depend on sunlight for survival.

Scientists study plankton because they are important components of ocean and freshwater food webs. A wide variety of animals depend on the plankton as a food source. For instance, even some large animals eat plankton. Some whales strain seawater through their **baleen**. The baleen acting as a sieve removes the seawater leaving the whale with a plankton lunch. These enormous animals need large amounts of plankton in order to survive. It has been estimated that it takes several hundred billion microscopic phytoplankton to feed one humpback whale for several hours.



We can see that it is important for us to take care of our oceans and not pollute them; so healthy plankton can continue to be the basis of many aquatic food webs.