Lesson 3. -- Fish Food

Lesson Objectives:

- Identify relationships organisms have with each other.
- Describe food webs and food chains in the ocean.

Vocabulary words: absorption, osmosis, diffusion, mucous, herbivore, biotic, decomposers, and others pertaining to fish feeding

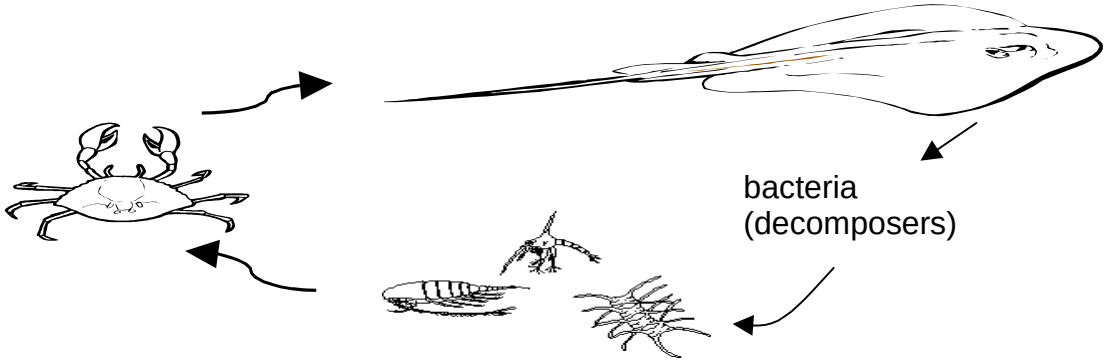
How do Animals Feed in the Ocean?

Animals that live in the ocean use three methods of feeding: absorbing, filtering and grabbing. Plankton commonly obtains food by **absorption**. For example, single-celled diatoms draw nutrients from seawater by simple **diffusion** and **osmosis**. Other organisms, such as scallops and worms, filter the plankton and organic matter out of seawater by pumping it over gills, **mucous** nets or other sieve-like structures. Grabbing is a familiar mechanism that occurs when one animal attacks and eats another. This is an **active response** rather than a relatively passive one, like filtering. The predator may have sensory organs to stalk its prey and teeth, suckers or stingers to capture and eat it. Examples of animals that use this method are sharks, tuna and octopus.

What is a Marine Food Web?

Energy in food is transferred through a community by a food chain. In the ocean, the phytoplankton and other plants (**producers**) change the energy of sunlight into chemical energy that is stored in their bodies. Consumers (**herbivores**) living in the ocean community feed on these plant parts. Other consumers, **predators**, feed on these plant consumers. **Decomposers** break down waste materials and dead plants and animals to get energy. Food chains are a way to describe how the energy in food moves through the **biotic** community.

Diagram 3-1. A simple food chain includes the plankton, the crab and ray.



There are many food chains within a community. A **consumer** often feeds in a variety of food chains. Crabs, snails, and baleen whales are all predators on plankton. Tuna, sharks, and sea anemones eat small fish. All of these organisms feed in several food chains that overlap. A series of overlapping food chains is called a **food web**. The organisms in a food web eat or are eaten by many organisms.

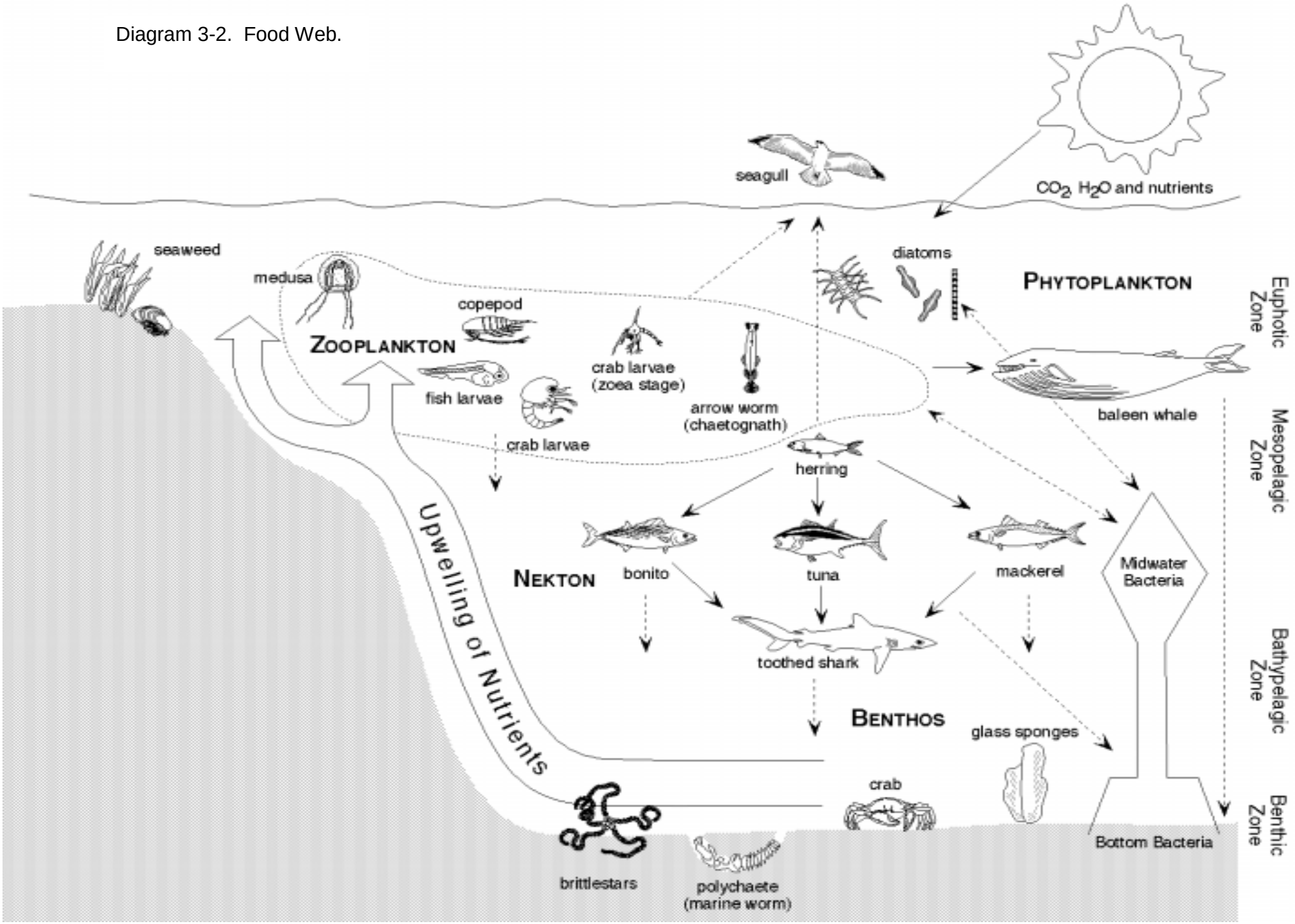
Producers are the first link in any food chain. The producers provide food for themselves and the whole community. Producers are the organisms that convert sunlight, **carbon dioxide**, and water into sugar and oxygen during **photosynthesis**. Plant-eating consumers, the **herbivores**, eat green plants and change some of the food stored in plants to the energy they need for life activities. Herbivores eat plants. The meat-eating consumers, the **carnivores**, eats herbivores. Some carnivores then eat other carnivores. In some food webs, consumers eat both plants and animals. Consumers that eat both plants and animals are **omnivores**.

Other common feeders in the marine community are the **scavengers**. These are crabs, some bottom feeding fish, and other invertebrates. They eat dead plant or animal material.

Final feeders in the marine community are the decomposers. These include marine bacteria and even viruses. This is how recycling of materials (mainly nutrients) is returned to the ocean for phytoplankton to use. This completes a full-circle in the marine food web.

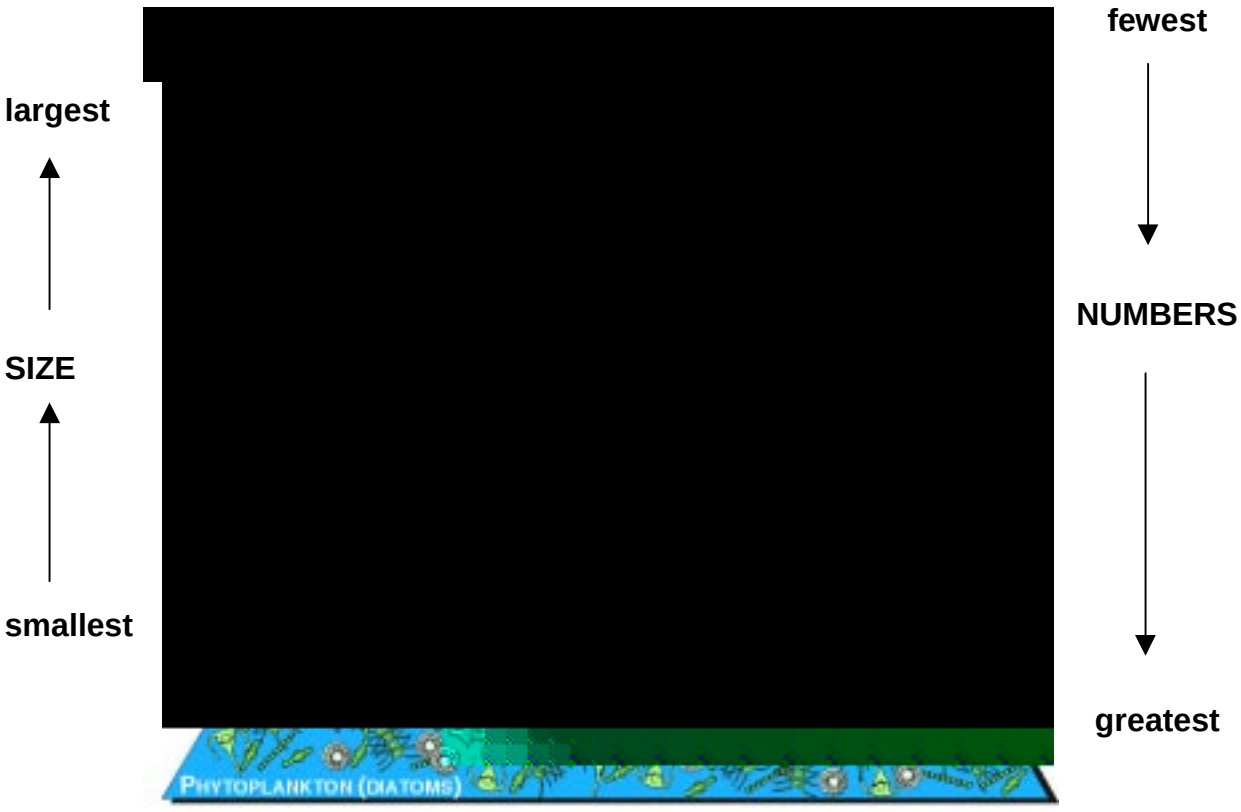
See the food web diagram on the following page.

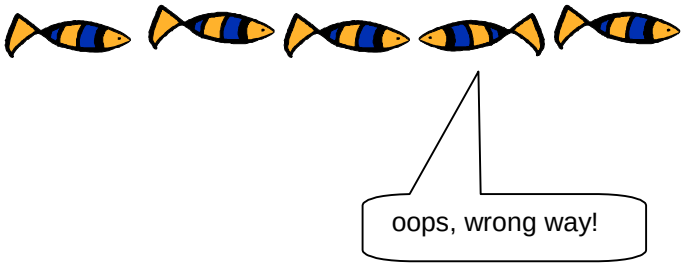
Diagram 3-2. Food Web.



How does Energy Flow in the Ocean?

The flow of energy from plankton to copepods and krill can be seen in a diagram called an **energy pyramid**. Notice there are many more producers than herbivores, and many more herbivores than carnivores. Less energy is available at each level of the pyramid. In fact, only about ten percent of the energy stored in the plankton is available to the crab, and so on.



How critters get food that is hard to find in the ocean because it is not evenly distributed. There are no "marine" supermarkets in the ocean!!

1. maximize the number of encounters with food
2. eat prey of different sizes
3. use food no one else uses (less competition)