

Feeding Frenzy



**Lab Program Curriculum
Grades 4-5**

Program Description

This 45–60 minute on-site lab program introduces students to food chains and food webs of the Oregon coast. During this program students and their chaperones will travel to four stations and discover who eats who while finding out about feeding adaptations. Students will also have an opportunity to touch some of the marine invertebrates discussed in this program. Participating in this program and using the enclosed activities will help your students meet ODE Science Content Standards and national Ocean Literacy Principles.

Chaperones will be asked to take an active role in the lab program, which is designed so that they read informational cards to the students in their group. It will also be the chaperone's responsibility to monitor the students' behavior during the lab program.

Before your visit:

- Make a **KWL chart**. Have the students write down what they **Know** about their fieldtrip, the Aquarium, the beach, etc. and then have them write down what they **Want** to know. Revisit this chart at the conclusion of your trip with what they **Learned**.
- Use the **Animal Flash Cards** to familiarize students with organisms that will be covered in their Aquarium visit.
- Use the **Web Words** reading and word search activity to familiarize students with the concepts that will be covered in the lab and terminology that might be new to them.

During your visit:

- Provide your students and chaperones with copies of the **Oregon Coast Aquarium Self Guided Materials**. A master copy of the pages needed to create this booklet can be found on the Teacher Resources page at the Aquarium website, www.aquarium.org

After your visit:

- Test the students' skill by creating silent food chains using the ocean plant and animal cards you made. This activity, **Let's Line Up**, is included in this packet.
- With a large circle of students create a giant web of life. Follow the activity, **Ocean Food Web**, included in this packet.
- Ask students what role humans play in some of the food chains they created. Ask your students to research other ways humans use the ocean.
- Ask your students to write a short story of the most interesting animal they found at the Aquarium. Have each student read their story to the class and have the class try to guess what the animal is.

Feeding Frenzy addresses the following:

ODE Science Content Standards:

- 4.1** Structure and Function: Living and non-living things can be classified by their characteristics and properties.
 - 4.1P.1 Describe the properties of forms of energy and how objects vary in the extent to which they absorb, reflect and conduct energy.
- 4.2** Interaction and Change: Living and non-living things undergo changes that involve force and energy.
 - 4.2L.1 Describe the interactions of organisms and the environment where they live.
- 5.1** Structure and Function: Living and non-living things are composed of related parts that function together to form systems.
- 5.2** Force, energy, matter and organisms interact within living and non-living systems.
 - 5.2L.1 Explain the interdependence of plants, animals and environment and how adaptations influences survival.

Ocean Literacy Principles:

Principle 4: The ocean makes Earth habitable.

A: Most of the oxygen in the atmosphere originally came from the activities of photosynthesis organisms in the ocean.

Principle 5: The ocean supports a great diversity of life and ecosystems.

A: Ocean life ranges in size from the smallest virus to the largest animal that has lived on Earth, the blue whale.

D: Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms (symbiosis, predator-prey dynamics and energy transfer) that do not occur on land.

Principle 6: The ocean and humans are inextricably interconnected.

A: The ocean affects every human life. It supplies fresh water (most rain comes from the ocean) and nearly all Earth's oxygen. It moderates the Earth's climate, influences our weather and affects human health.

B: From the ocean we get foods, medicines, and mineral and energy resources. In addition, it provides jobs, supports our nation's economy, serves as a highway for transportation of goods and people and plays a role in national security.

Food Chains and Food Webs Background Information

Most food chains begin with the energy of the sun. Through the process of photosynthesis, plants transform this light energy into chemical energy and store it as a source of food. Because plants can make or produce their own food, they are called **producers**. The energy is then carried up the food chain by **consumers**. Consumers are divided into herbivores (plant eaters), carnivores (meat eaters) and **omnivores** (plant and meat eaters). **Decomposers** break down dead plant and animal material and return nutrients to the cycle. The animals being killed are **prey** and the hunters are the **predators**. Animals that eat meat that is already dead are **scavengers**.

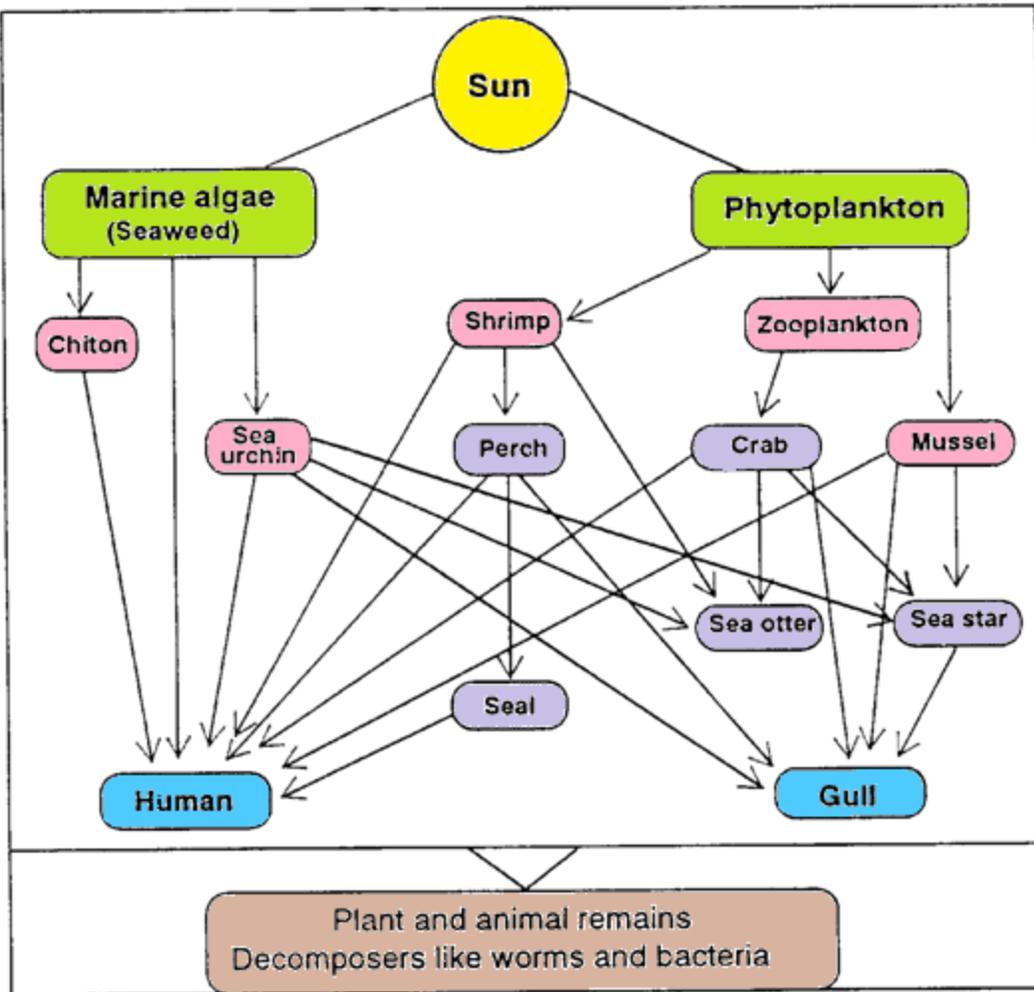
	TERRESTRIAL	OCEAN	OCEAN
SUN	sun	sun	sun
PRODUCERS	grass	marine algae (seaweeds)	phytoplankton (microscopic plants)
CONSUMER HERBIVORE/PREY	rabbit	sea urchin	zooplankton (microscopic animals)
CONSUMER OMNIVORE, CARNIVORE/PREDATOR	fox	sea otter	whale

Food Webs

But energy transfer in any ecosystem is seldom so linear and simple. For example, a fox does not eat only rabbits, a sea urchin does not eat only one type of marine algae and a sea otter eats many things besides sea urchins. Food chains are interwoven into complex food webs.

Food webs are the intricate relationships among producers, consumers, scavengers and decomposers. All of the plants and animals of a food web are interdependent. If one component of the web is removed, all of the components are affected.

An example of an ocean food web:



The arrows on the above diagram indicate the direction of energy transfer.

As it is on land, life in the sea is an eat-or-be-eaten world. Animals must constantly adapt to their complex environment in order to get enough to eat and, at the same time, avoid being eaten.

Food Chains and Food Webs Vocabulary

adaptation (*A-dap-TAY-shun*): a characteristic, such as a body part, color pattern or behavior, that helps an organism survive in its environment.

bivalve (*BIE-valv*): a member of the class Bivalvia (bie-VAL-vee-ah), a group of mollusks with a pair of shells hinged together. Clams mussels and oysters are bivalves.

carnivore: (*CAR-nih-vore*): an organism that eats animals

chlorophyll (*CLOR-uh-fil*): the green, light-absorbing pigment important to the process of photosynthesis

community: the plants and animals that associate together in a habitat. A community is often named for its most prominent feature: pier piling community, rocky intertidal community, etc.

competition: the result of a common demand of two or more organisms on a limited resource such as food, settling space or mates

consumer: an organism that eats other organisms

decomposer (*DEE-kum-POE-zer*): an organism that causes the decay of dead plants and animals. Bacteria and fungi are decomposers.

deposit feeder: an organism that eats detritus or other material on or in the seafloor

detritus (*dih-TRIE-tus*): disintegrated material such as particles of uneaten food, fecal pellets and fragments of dead plants or animals.

echinoderm (*ee-KIE-nuh-derm*): a member of the phylum Echinodermata (*ee-KIE-nuh-dur-MAH-tah*), a group of invertebrates with hard, spiny skeletons, radially symmetrical bodies and a water vascular system. Sea stars, sea urchins, sand dollars and sea cucumbers are echinoderms.

ecosystem (*EE-coe-SIS-tum*): a community of organisms interacting with each other, plus the environment in which they live and with which they interact. An ecosystem includes nonliving components (minerals, soil, etc.), living components, and the climate.

energy transfer: the movement of energy along a food chain

filter feeder: an organism that eats by filtering, or straining, small particles of food from the water

food chain: a sequence in which organisms eat and are eaten, in a transfer of energy along the chain

food web: interconnected food chains

habitat: the place where an animal lives

herbivore (*HER-bih-vore*): an organism that eats plants

interdependence: organisms relying on each other for the basics of life

intertidal zone: the part of the shore between the highest high tides and lowest low tides

invertebrate (*in-VER-tuh-brut*) an animal without a backbone

kelp: any of the large brown seaweeds, such as bull kelp

krill: shrimplike crustaceans that are the primary food of some whales and fishes

nematocyst (*neh-MA-tuh-SIST*): stinging structures that cnidarians use to capture food and protection

omnivore (*AHM-nih-vor*): an organism that eats both plants and animals

organism: a living thing, such as a plant or animal

photosynthesis (*FOE-toe-SIN-theh-sis*): process by which green plants and some algae use the sun's energy to convert water and carbon dioxide into sugar and oxygen

phytoplankton (*FIE-toe-PLANK-tun*): photosynthesizing members of the plankton, mostly plants and algae

plankton (*PLANK-tun*): organisms suspended in water that drift with currents and swim only weakly or not at all

predator (*PREH-duh-ter*): an animal that kills and eats another animal

prey: an animal that is killed and eaten by a predator

producer: an organism that produces its own food through photosynthesis

radula (*RA-dyoo-lah*): the filelike band of teeth that snails, chitons and many other mollusks use to scrape, tear and bore

respiration: the absorption of oxygen from the environment

scavenger: an organism that eats dead plants and animals or their parts

siphon (*SIE-f'n*): the tube or tube-like part of an animal's body through which water, air or food passes

species (*SPEE-sesz*) (singular and plural): a group of organisms that have common physical structures and can interbreed and produce fertile offspring

substrate (*SUB-strate*): the surface (sand, rock, wood or even another animal) on which an animal lives

terrestrial (*teh-RES-tree-ul*) of or pertaining to the land

test: the shell, or covering of animals such as sand dollars and sea urchins

tide: the regular rise and fall of sea level caused by the gravitational pull of the sun and the moon, the rotation of the earth, and other factors

tide pool: a pool of water left on the shore when the tide goes out

tube feet: soft, hollow, movable extensions of some echinoderms' water vascular system, which aid in locomotion, feeding and grasping

vertebrate (*VER-tuh-brut*): a member of the subphylum Vertebrata (*VER-tuh-BRAH-tah*), a group of animals that have a segmented spinal column. Mammals, fishes, birds, reptiles and amphibians are vertebrates.

zooplankton (*zoe-uh-PLANK-tun*): nonphotosynthesizing members of the plankton, mostly animals