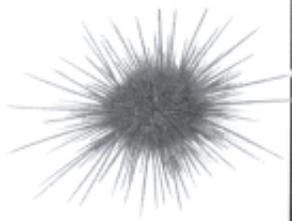
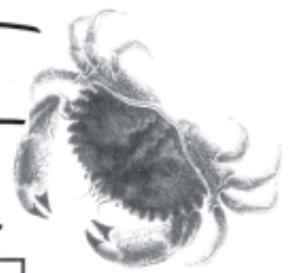


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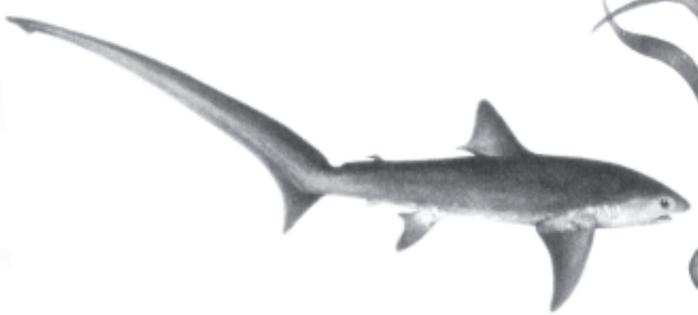
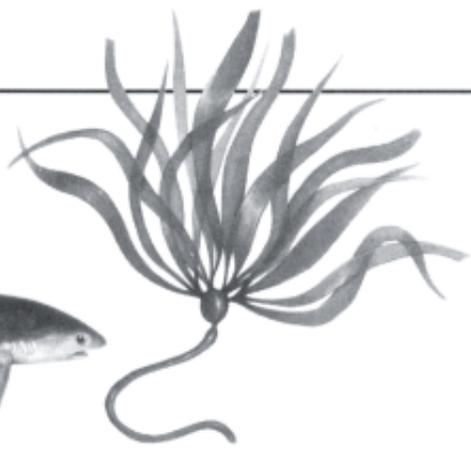
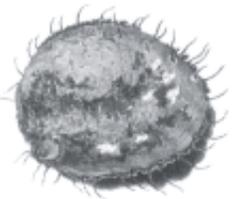
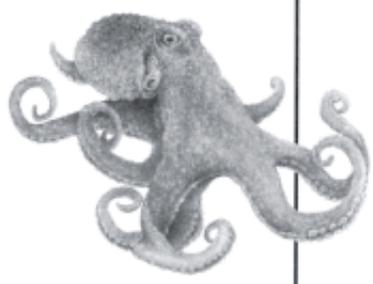
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Food Webs in the Sea

Oceans are vast, complex worlds, teeming with life forms of all shapes, colors and sizes. From tiny plankton to enormous whales, there's a lot to eat and nearly all of it, living and dead, is used as food. Animals have a variety of adaptations to help them find, catch and eat their food.

What and how an animal eats depends on where it lives and the body parts it has. Fast-swimming fishes like tuna can overtake slower ones like herring. Barnacles live securely attached to rocks by their heads and can't chase prey; their waving, feathery feet catch bits of food that drift in the ocean's currents.

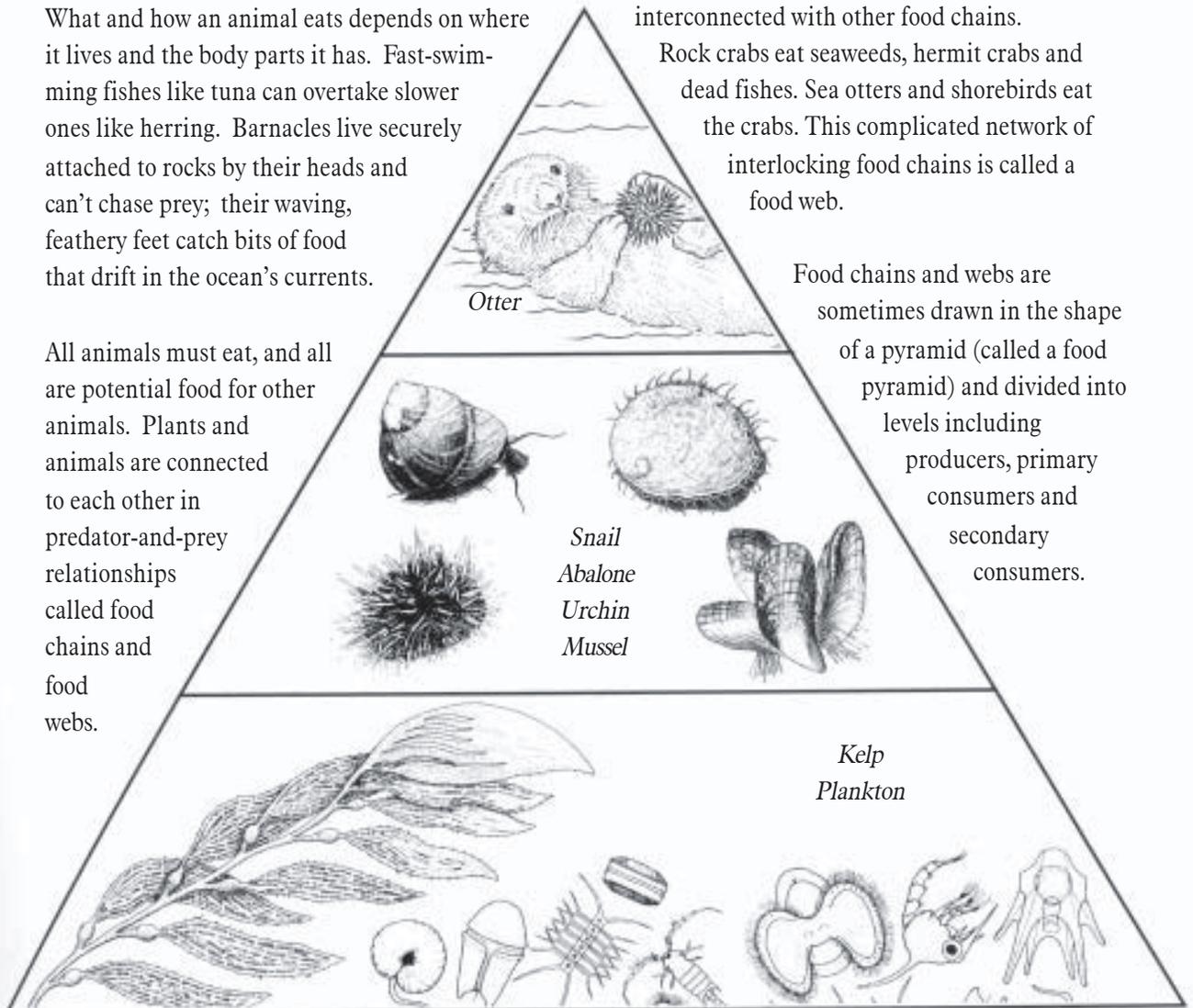
All animals must eat, and all are potential food for other animals. Plants and animals are connected to each other in predator-and-prey relationships called food chains and food webs.

A food chain links predators and prey simply and directly. One food chain in the sea begins with the sun, the energy source for a kelp plant. The kelp plant is eaten by a sea urchin. The sea urchin, in turn, is eaten by a sea otter. The sea otter may be eaten by a shark.

In nature, it's often more complicated. The kelp food chain isn't a single sequence, but is interconnected with other food chains.

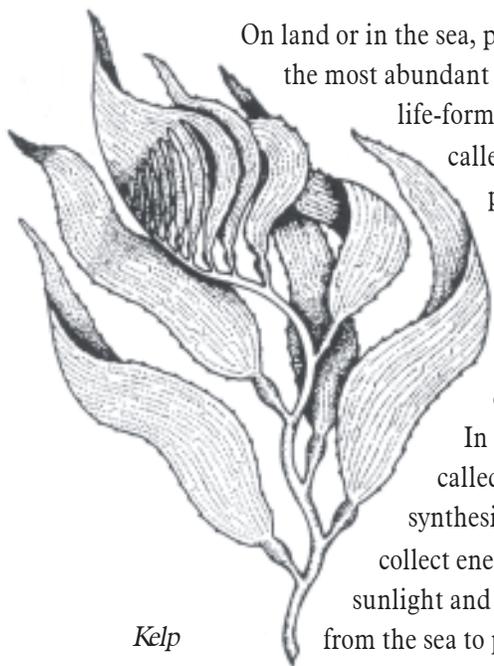
Rock crabs eat seaweeds, hermit crabs and dead fishes. Sea otters and shorebirds eat the crabs. This complicated network of interlocking food chains is called a food web.

Food chains and webs are sometimes drawn in the shape of a pyramid (called a food pyramid) and divided into levels including producers, primary consumers and secondary consumers.



Producers, or plants, are on the first level. They support the rest of the food web. On the next level are the primary consumers, or herbivores (animals that eat plants). The second-level consumers, or carnivores, are the animals that eat other animals. In terms of mass, there are more producers than herbivores, and more herbivores than carnivores.

The sun collectors



Kelp

On land or in the sea, plants are the most abundant of all life-forms. They're called

producers because they make their own food.

In a process called photosynthesis, they collect energy from sunlight and nutrients from the sea to produce carbohydrates and

oxygen. Plants form the base of most food webs, and animals ultimately depend on them for food.

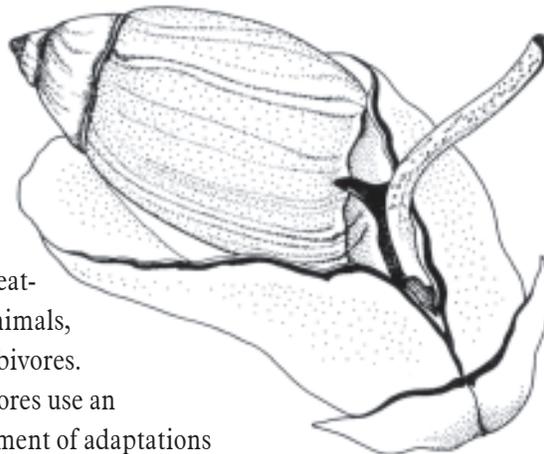
Flowers, trees and ferns are common plants on land. But what are plants like in the sea? The most common marine plants are algae. Algae that drift in the open sea are mostly tiny plants known as phytoplankton. Phytoplankton are the ocean's most abundant producers. Large algae, like the 60-foot-

tall giant kelp, don't drift; they usually live close to the coast and are called seaweeds.

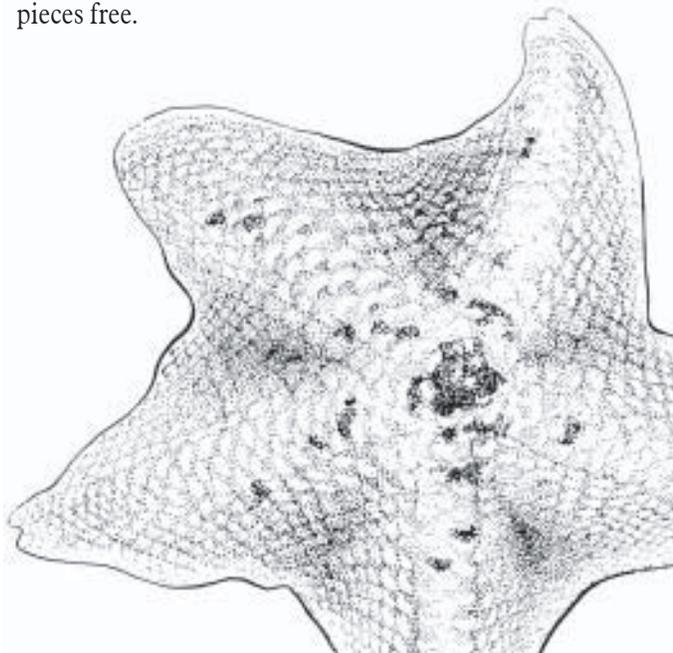
The plant eaters

Next in a food web are the plant-eating animals, or herbivores.

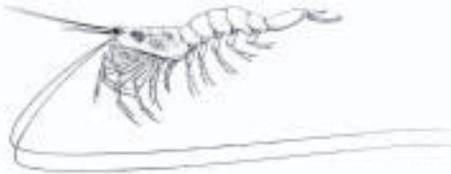
Herbivores use an assortment of adaptations (like teeth and tongues) to browse, nibble, rasp and chew plants. A snail or an abalone has a radula for feeding. The radula is a flexible, filelike tongue with teeth. When the snail licks a plant, the teeth rasp the surface, tearing pieces free.



Olive snail



Some herbivores are more ferocious than others in the way they feed on plants. Tiny crustaceans, protozoans and larvae (known collectively as zooplankton) gulp down tiny phytoplankton.

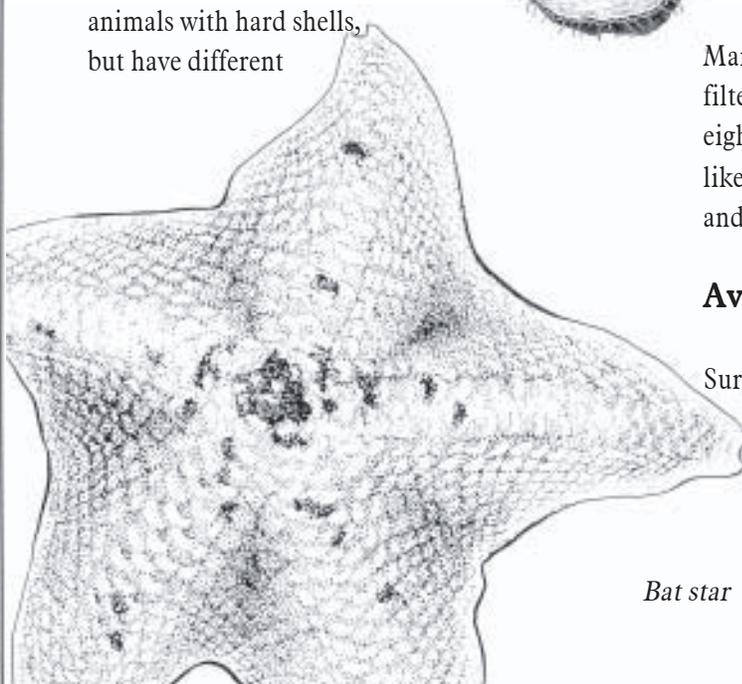


Krill

The carnivores

Predators have various adaptations to catch and eat prey. Fast-swimming sharks use sharp teeth to catch and tear fishes and seals. Other animals, like the blue whale, use baleen plates to filter food from the water. They eat up to four tons of shrimplike krill each day.

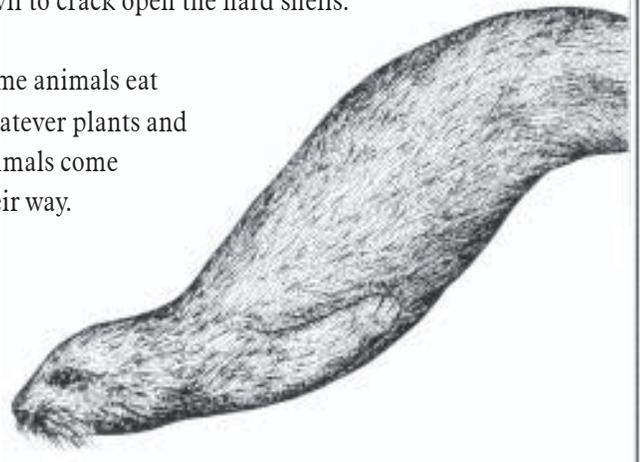
Sea stars and sea otters both eat animals with hard shells, but have different



Bat star

ways to get at the tasty morsels inside. The many-armed sea star uses suction cups to open a clam or mussel. It slips its stomach inside the prey's shell, secretes digestive juices and swallows the souplike food. The sea otter collects a rock while foraging for sea urchins and mussels. At the surface, the otter floats on its back and uses the rock as an anvil to crack open the hard shells.

Some animals eat whatever plants and animals come their way.

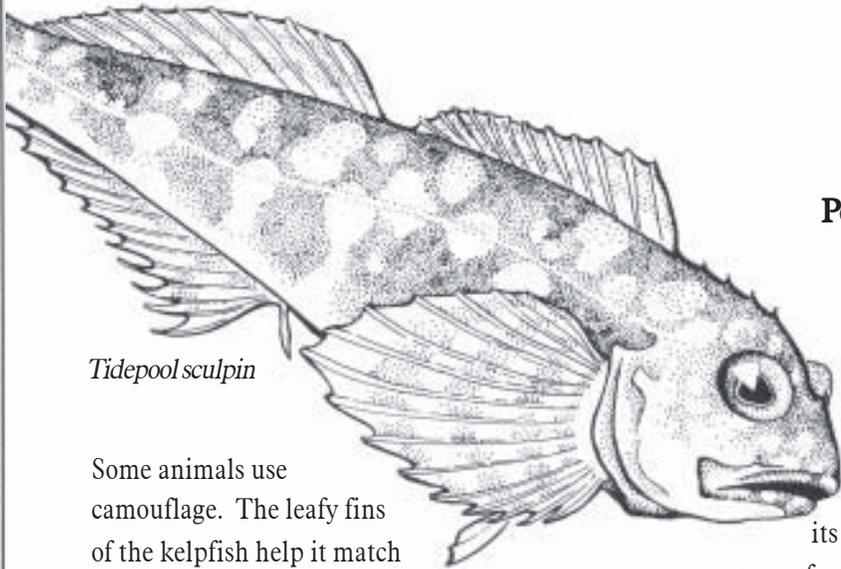


Abalone and sea otter

Many, like mussels, barnacles and oysters, are filter-feeders. An oyster may strain as much as eight gallons of water an hour for food. Others, like crabs, sea stars and bacteria, eat dead plants and animals and are called scavengers.

Avoiding being eaten

Survival is a balance between eating and avoiding being eaten. Animals have adaptations like hiding, fighting and fleeing to outwit their predators.



Tidepool sculpin

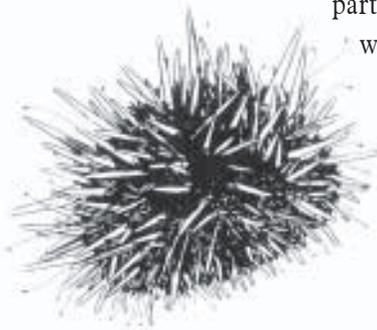
Some animals use camouflage. The leafy fins of the kelpfish help it match the colors, shapes and shadows in its kelp forest home. Tidepool sculpins act like rocks, lying very still until the predator has passed.

A sea urchin's spines and a snail's shell help protect them from predators. Some seaweeds and sea slugs produce chemicals that make them taste bad. They're no longer appetizing to an enemy once it's had a taste.

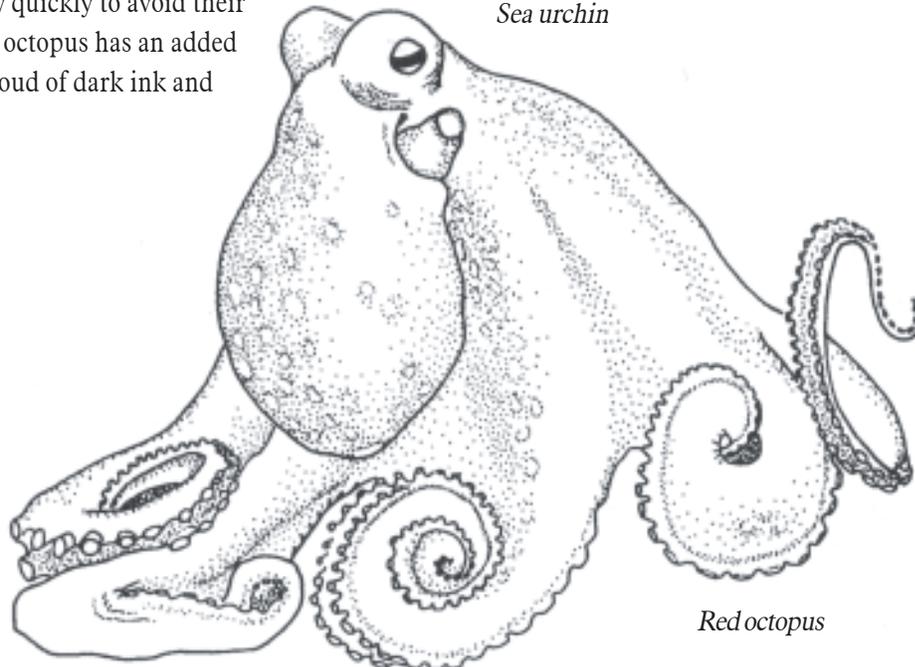
Many fishes swim away quickly to avoid their predators. The fleeing octopus has an added trick; it shoots out a cloud of dark ink and slips away unseen.

People and the food web

Even if you've never visited the ocean, you may be part of an ocean food web. People make ice cream and toothpaste from algae; and they eat fishes, crabs and other invertebrates. Much of our waste eventually finds its way to the sea, where it may get into an ocean food web. Because we share the ocean with plants and animals, we're all part of the same intricate web of life.



Sea urchin



Red octopus

Who Eats Whom?

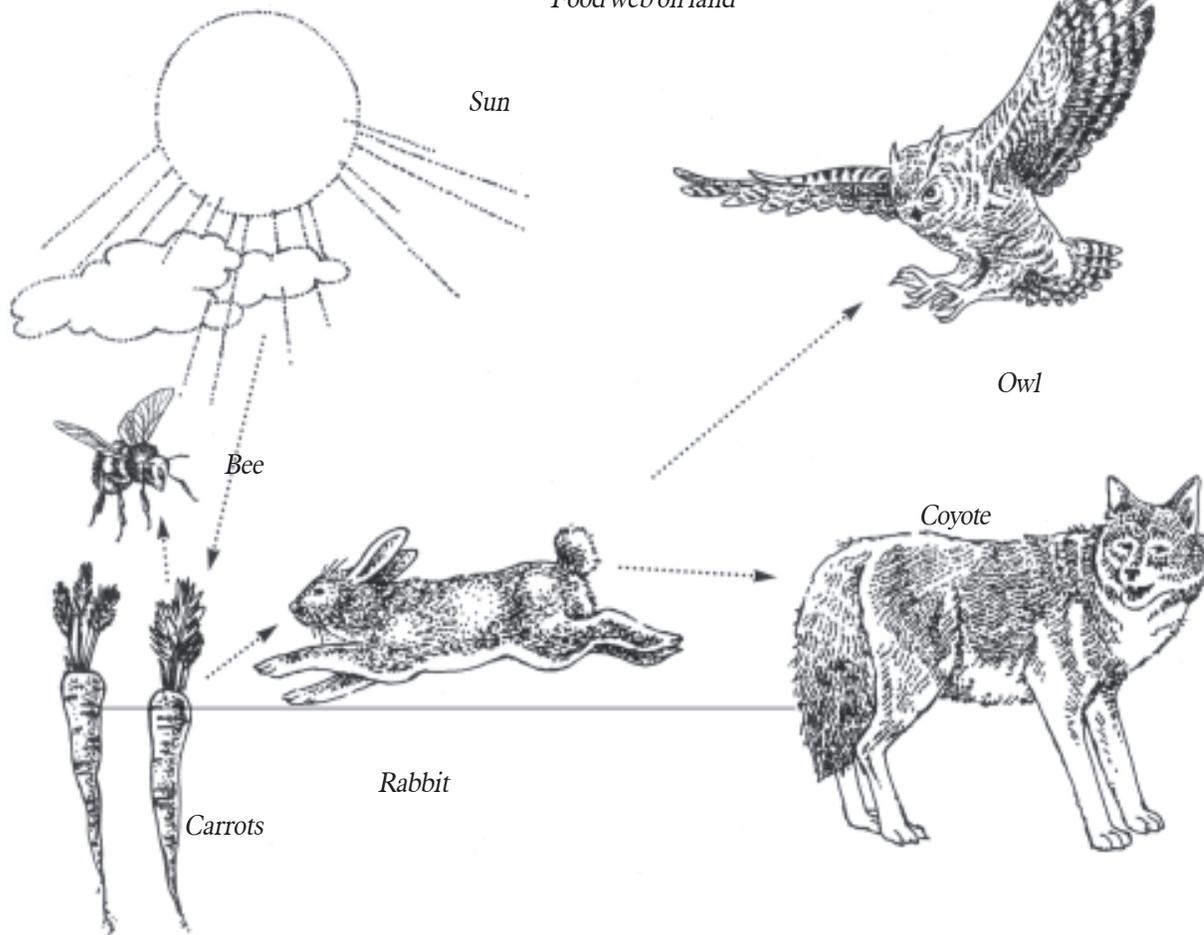
MATERIALS

- Magazines
- Pictures from various Field Guides in this book
- Paper
- Glue

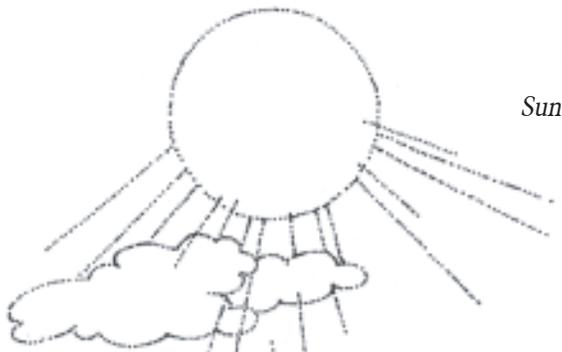
Create a simple food chain of plants and animals on land using pictures from magazines. You might find a picture of cows eating grass and a grassy field in the sunlight. Now create a food

chain of plants and animals in the sea using pictures from the Field Guides in this book. For instance, abalones eat seaweed and seaweed uses sunlight from the sun. Compare your two food chains. How do people fit into these two chains? Can you think of any other members of the food chain (like carnivores, scavengers or decomposers)? What's the difference between a food chain and a food web? (There's more about food chains and webs on pages 175-178). Turn your food chains into webs.

Food web on land



FOOD WEBS
SEARCHING FOR MORE

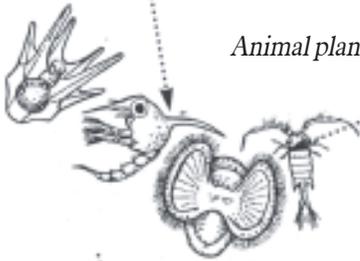


Sun

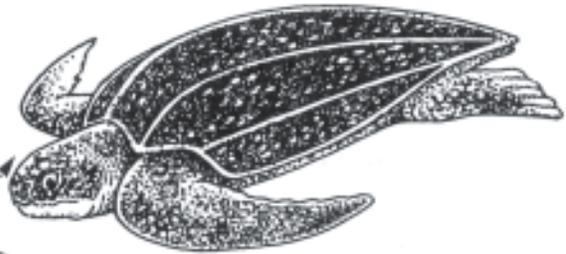
Food web in the sea



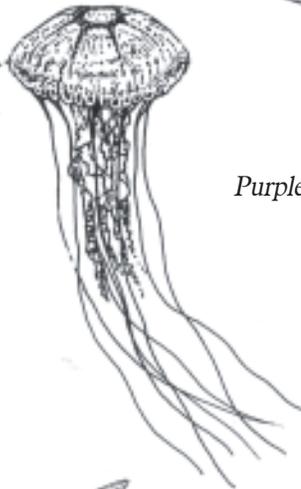
Plant plankton



Animal plankton



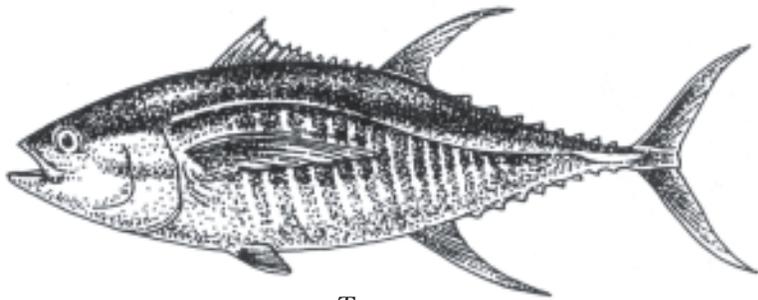
Leatherback sea turtle



Purple-striped jelly



Northern anchovy



Tuna

FOOD WEBS

SEARCHING FOR MORE

Who Am I?



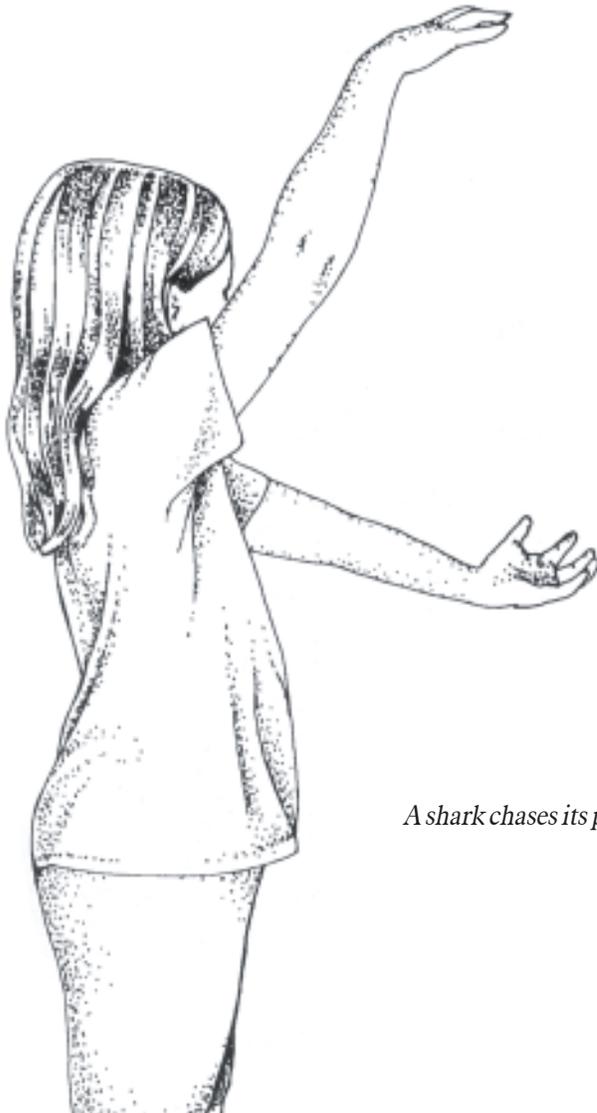
MATERIALS

- Yourself and friends or family!

Play a fun game of charades with your friends or family. Pick an animal from the sea, then act out how it eats. Have the others try to guess who you are. Can you think of an animal that chases its food?

What's an animal that waits for its meal to come close?

What animals strain tiny plants and animals from the sea?



A shark chases its prey.



Sea Celebration



MATERIALS

- Seafood for a meal
- Cooking utensils

Celebrate a “Taste of the Sea Day!”

With an adult, prepare a seafood meal and invite your friends or family to come enjoy it. Find out what the seafood looks like when it’s alive, what part of the ocean it lives in and how it’s caught. Share what you’ve learned as part of your meal!



FOOD WEBS

SEARCHING FOR MORE

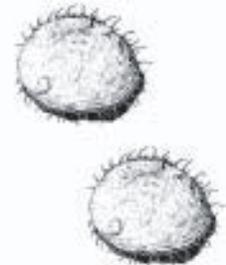
Sweet to Eat



MATERIALS

- Large sheet of paper or plain tablecloth (make sure you can draw or paint on it)
- Paint and paint brushes or colored pencils
- Toothpicks
- Dried fruits
- Gumdrops and other candies
- Fresh vegetables

Create special sea life that you can eat! Cover a table with a large piece of paper. Color or paint a habitat on the paper. Using a variety of edible foods, design “camouflaged” animals that live on your tablecloth habitat. Which animals are camouflaged best? Invite your friends or family to search for hidden animals, then enjoy eating the ones you find.



Abalone

California halibut



King salmon

