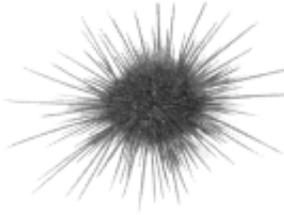


SEARCHING

SEA

HABITATS



A Habitat Is Home



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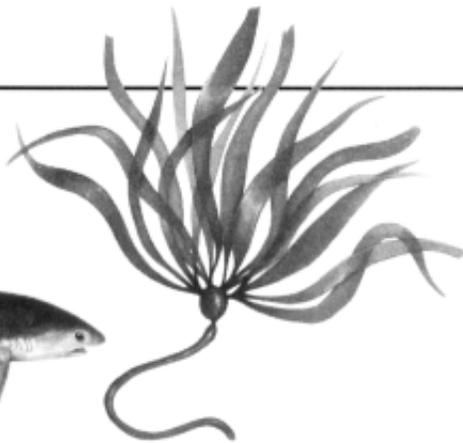
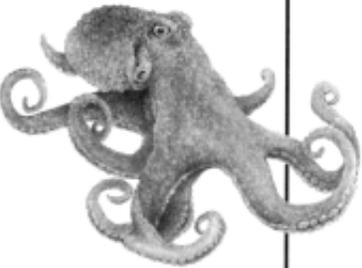
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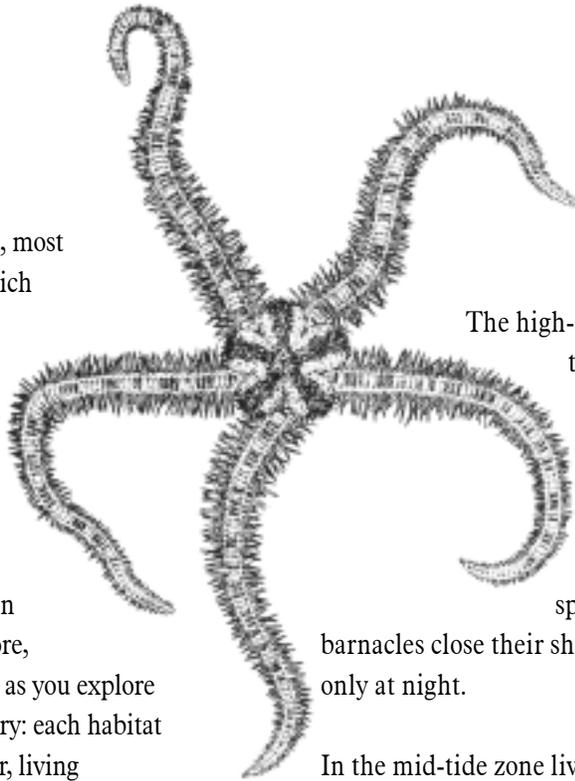
Homes in the Sea

The sea is one of the richest, most diverse areas in the world: rich because it supports an amazing number of plants and animals, diverse because its varied features form a wide array of habitats, or homes. From the two-mile-deep submarine canyon to the wave-swept rocky shore, each habitat is unique. And as you explore them, you'll make a discovery: each habitat has its own special character, living conditions and associated community of plants and animals specially adapted to life there.

In every habitat, plants and animals face the same challenges: they must find food, defend themselves and their homes and live long enough to reproduce—all of these in order to survive as a species. When you investigate the seas' plants and animals, whether at home, at school, along the shore or at an aquarium, you can discover even more about each plant and animal by thinking about its habitat and how well it's suited for life.

The rocky shore

Life is hard between the tide marks on the rocky shore. Crashing waves, drying sun and changing tides set the conditions for life along the shores; here, as on the wharf pilings, plants and animals



aren't randomly distributed but occur in bands or zones.

The high-tide zone is more land than sea; only a few specially adapted plants and animals can survive. The plants and animals that live here receive most of their moisture through wave splash. To avoid drying out, barnacles close their shells and limpets go out only at night.

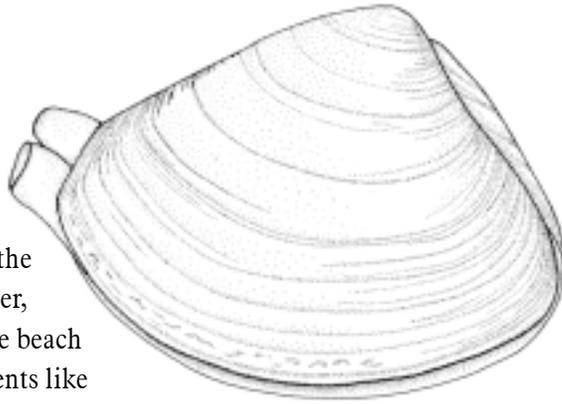
In the mid-tide zone lives a diverse group of animals and plants, including seaweeds, mussels and sea stars. Community members must find ways to stay moist when the tide is out, avoid predators when the tide is in and compete with each other for space.

The low-tide zone is exposed to air only during the lowest of low tides. As they're usually covered by water, the residents are subject to sea stars, fishes and other predators that range into shallow waters.

The sandy shore

Like the sandy seafloor, a sandy shore seems barren. But where straggly dune plants take root, they build and stabilize the dunes, creating places where others can grow.

On “empty” sandy beaches, shorebirds like sandpipers and godwits forage, finding food at the water’s edge, in the tidal debris and on the higher, drier beach. Meanwhile, the beach dwellers—permanent residents like Pismo clams, beach hoppers and sand crabs—burrow into the sand for protection from such predators. Beach animals also face waves and changing tides; those that can’t dig back down fast need to keep moving on.



Pismo clam They also act as nurseries for young fishes like bat rays, leopard sharks, surfperches and flatfishes. Some move on to the sea but some stay here all their lives.

numbers, because of the food produced by pickleweed.

Tidal creeks bring seawater into the salt-marsh and provide habitat for many fishes and invertebrates.

The wetlands

From saltmarshes and tidal creeks to mud flats and slough, wetlands represent a variety of habitats, each with its own set of conditions and community of life.

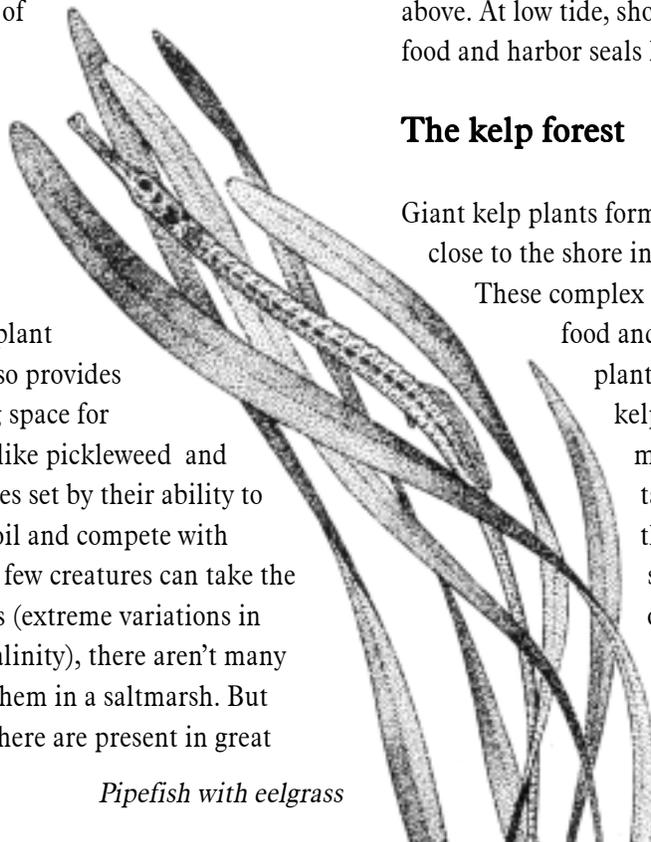
The saltmarsh is a highly productive plant community that also provides nesting and resting space for shorebirds. Plants like pickleweed and eelgrass live in zones set by their ability to tolerate the salty soil and compete with other plants. Since few creatures can take the stressful conditions (extreme variations in temperature and salinity), there aren’t many different kinds of them in a saltmarsh. But creatures that are here are present in great

Little life is apparent on a mud flat; most animals here burrow for cover. Worms and clams are among the best-suited mud dwellers; their burrows or siphons connect them with food and oxygen above. At low tide, shorebirds poke around for food and harbor seals haul out on the flats to bask.

The kelp forest

Giant kelp plants form vast, underwater forest close to the shore in certain parts of the world.

These complex natural communities provide food and shelter for a great variety of plants and animals. Within the kelp forest habitat are many microhabitats, from the tangled rootlike holdfast on the seafloor hiding brittle stars and crabs to the canopy of fronds reaching 20 to 100 feet above (6 to 30.5 meters), sheltering fishes and other creatures.



Pipefish with eelgrass

Some fishes, like blue rockfish, swim in the open water between

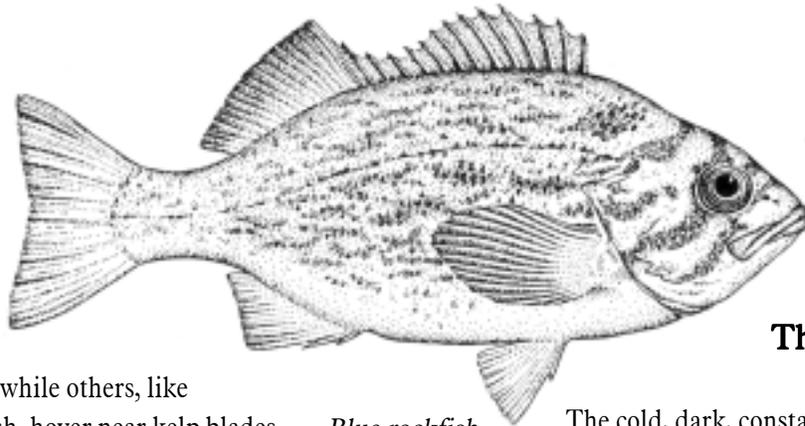
kelp plants, while others, like giant kelpfish, hover near kelp blades, mimicking their color and shape.

In dark places where light-loving seaweeds can't grow, attached animals like sponges and anemones thrive. A turf of attached animals and plants carpets rock faces, offering cover for small fishes and invertebrates.

The open sea

The open sea is a world without walls. It's a place where there's nothing to cling to and nowhere to hide. Currents set the tempo for life, pushing along the plankton: tiny drifting plants and animals that feed all the ocean's creatures. Their transparent bodies help plankton hide in the open, while spines and oil droplets slow their sinking.

The larger, free-swimming animals (called nekton) have different adaptations, often involving camouflage, buoyancy and speed. Nekton include animals like seals, whales and fishes. Most open-water fishes are strong, streamlined swimmers; a number of them stay in schools. Blue sharks, salmon and mackerel glide smoothly through the open water. Many such fishes are countershaded



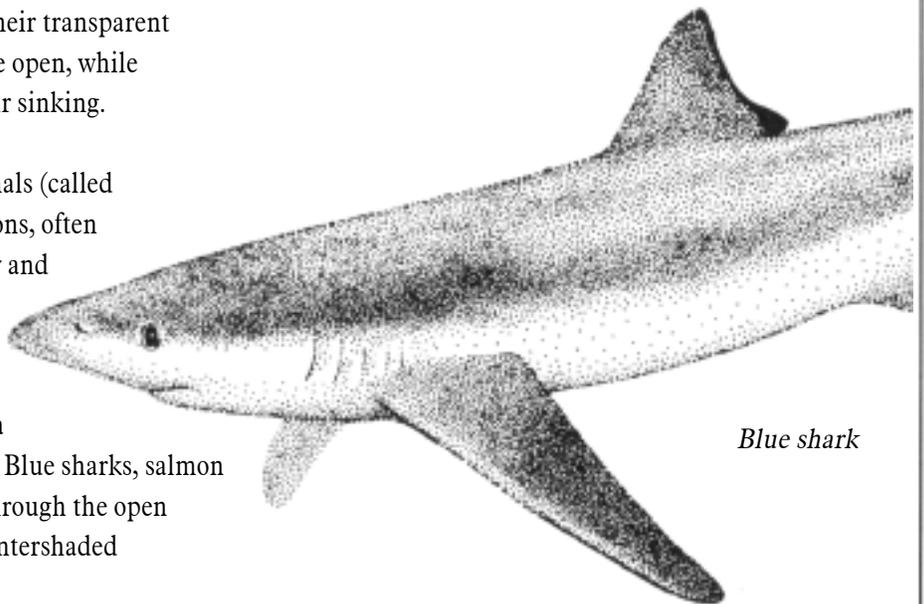
Blue rockfish

(dark backs and light undersides), a common camouflage technique here.

The deep sea

The cold, dark, constant waters of the deep sea shelter a community of little-known animals, often bizarre. Many, like the lanternfish, produce their own light (bioluminescence). Others, like the viperfish, have small bodies and huge fangs. Below 600 feet (183 meters), there's no sunlight; because no plants survive, the animals prey on each other, migrate at night to find food near the surface or feed on organic matter that falls from above (marine snow).

Scientists are studying the deep sea habitat off the Atlantic coast, off the coast of Japan and in Monterey Canyon (just offshore in Monterey Bay, California). The Monterey Canyon is



Blue shark



Finding sea stars in a tide pool

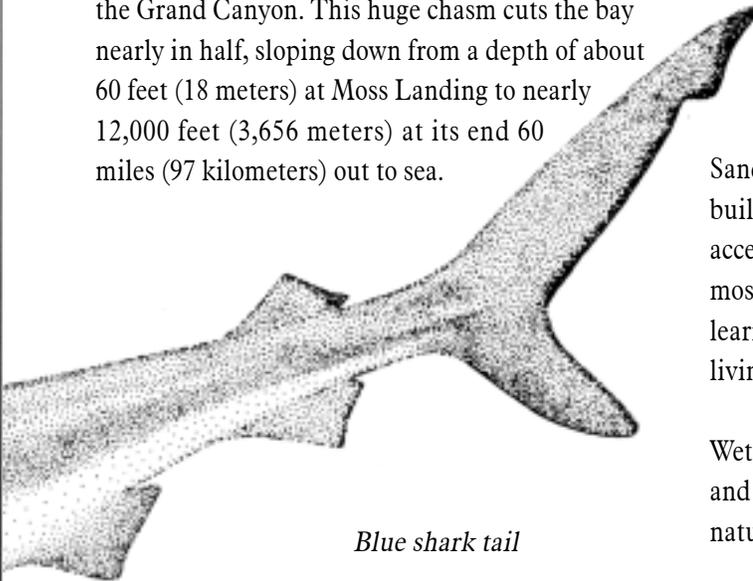
about twice as deep and one-third the length of the Grand Canyon. This huge chasm cuts the bay nearly in half, sloping down from a depth of about 60 feet (18 meters) at Moss Landing to nearly 12,000 feet (3,656 meters) at its end 60 miles (97 kilometers) out to sea.

rocky shore, are so accessible to us their balance can easily be destroyed; others, like the submarine canyon, have only just begun to be explored.

Sandy shore beaches are popular sites for home building and recreation. And because they're so accessible, rocky shores are one of the best-known, most-studied habitats anywhere. Lessons biologists learn in tide pools translate into knowledge about living systems all over the world

Wetlands provide a valuable habitat for wildlife, and they're havens to bird watchers, clam diggers, nature lovers and sport fishermen.

Besides our growing use of products that contain kelp extracts (algin is used in toothpaste, ice cream and paint), kelp forest attract thousands of divers and sport fishermen each year. They're also the focus of bird- and otter-watchers, who enjoy their sport from shore.



Blue shark tail

Ocean habitats and people

Since the days of costal Indians, people have used the oceans in many ways, from fishing and hunting to travel and recreation. Some habitats, like the

A HABITAT IS HOME SEARCHING FOR MORE



What's Your Favorite?



MATERIALS

- Paper
- Pen or pencil
- Your favorite drawing materials

Memories of favorite experiences are an important part of life. They're what make your life special for you. Think about your favorite ocean experience or animal. Write a story or draw a picture about it. Why is it our favorite? Do you remember any smells or sounds? Was anyone else with you? If you'd like, share your story or picture with someone else.



Home Sweet Home

MATERIALS

- Several sheet of drawing paper
- Your favorite drawing materials
- A shoe box or food carton for the base of a model
- Arts and crafts materials for your model

What makes a home a home? Draw a picture or build a model of your own home. What kind of environment is our home in? (Is it near the ocean, in a desert, in a forest?) What is your house made from? What kinds of things do you have in your room that make it special? Where do you get your food? If you could rebuild your house, how would you design it? How could you build it to have the least amount of impact on the environment as possible? What other things do you need to live?

Now draw an ocean animal in its home for instance, a sea otter in a kelp forest. How does the life of this animal differ from your life? How are your lives the same? What does your animal eat and where does it get its food? What kind of shelter does it need in order to survive? What body parts help provide shelter? How does it move? How does it protect itself?

A HABITAT IS HOME SEARCHING FOR MORE

Every Home Is Different



A coyote lives in the uplands.



A great blue heron visits a saltmarsh.

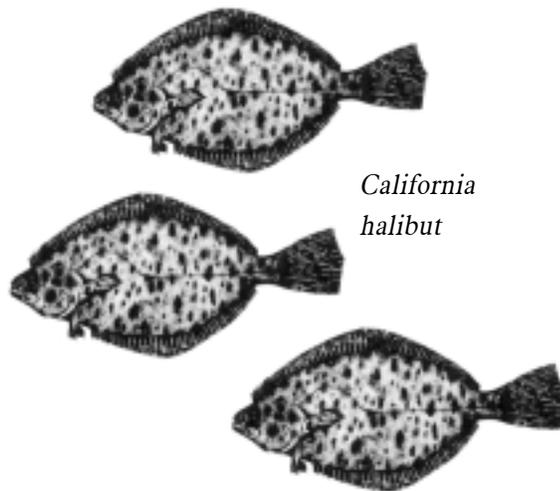


MATERIALS

- Field Guide pictures from various chapters in this book
- Large sheet of paper for a collage or mural
 - Magazines
 - Your favorite drawing materials

an animal that lives in the kelp forest live at the rocky shore? Could it live in the deep sea? Why or why not? Using the Field Guides, pictures from magazines or ones you draw, make a collage or mural of your favorite ocean habitat.

Some people live in cottages by the sea, others live on ranches in the valleys of rolling hills. Just as people live in different kinds of homes, animals live in different kinds of homes, too. A sea otter swims through lush kelp forest, a sand dollar rests on the sandy seafloor and a lanternfish blinks lights in the dark deep sea. After collecting pictures from the Field Guides, sort them according to habitat. Could



California halibut

A HABITAT IS HOME SEARCHING FOR MORE

The Ocean Planet

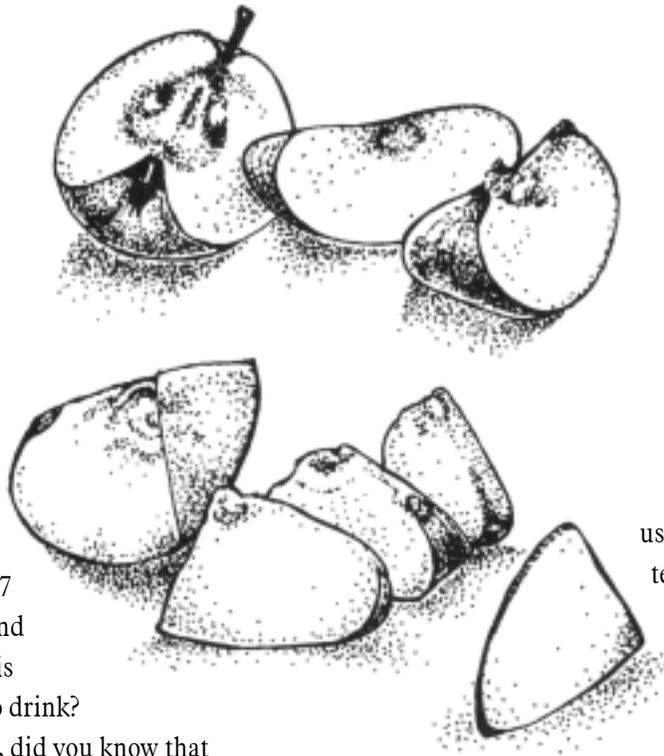
MATERIALS

- An apple
- A knife

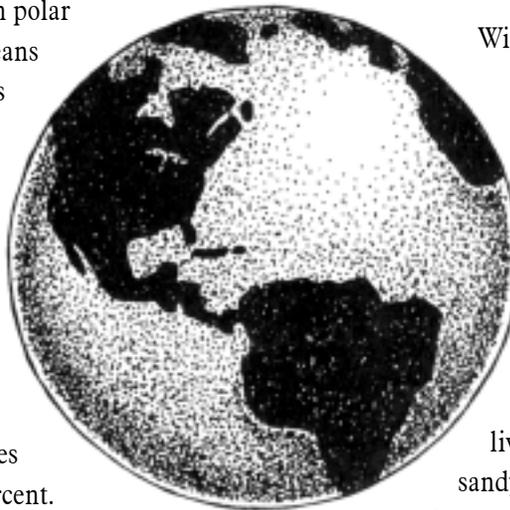
Did you know that of all the water on the planet, 97 percent is in the oceans and only about three percent is available as fresh water to drink?

And of that three percent, did you know that most of it is in the form of ice in polar or mountain glaciers? This means only one percent of the Earth's water is available as fresh water. To compare these amounts, cut an apple into quarters. Take one quarter (25 percent) and cut it in half to represent 12 percent. Now take one of those halves and cut it in half to show six percent. Cut one of those halves in half again to show three percent.

This one slice represents all of the fresh water in the world, while the rest of the apple represents the oceans. The water we have today is the only water we'll ever have on this planet. As a matter of fact, the water we drink today is the same water a dinosaur may have drunk millions of years ago, or the water Christopher Columbus



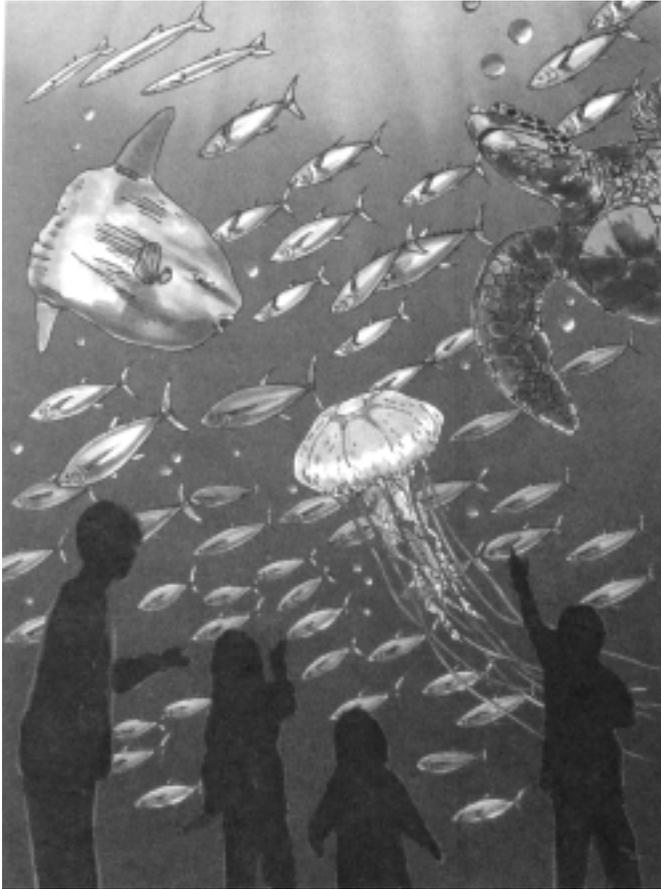
used for brushing his teeth. We must keep today's water clean... it's the only water we have for tomorrow.



Within the world's oceans are many different kinds of habitats: the kelp forest, coral reefs and rocky shores are a few. Research an ocean habitat you've visited or would like to visit, noting its special conditions and the plants and animals that live there. For instance, at the sandy beach you find shifting sand,

crashing waves and changing tides; clams, shorebirds and drift kelp. In the deep sea you find darkness, cold water and high pressure; anglerfish, lanternfish and deep sea squid.)

Design an Underwater World



MATERIALS

- Paper and pencil or other favorite drawing materials
- A shoe box, food carton or other material for the base of your model
- Arts and crafts materials for your model and to make ocean plants and animals

Design an underwater world that people could live in, then draw or build a model of it. What are some of the problems in transferring a land-base community to the sea? What kinds of materials would you use for the buildings? How would people breathe? Where would they get food and fresh water? How would they communicate? How would they dispose of waste? Do you think people should build and live in underwater cities? How would these cities affect the sea's plants and animals?



MAKE YOUR MODEL WITH DOUGH

You'll need:

1 cup salt

1 cup flour

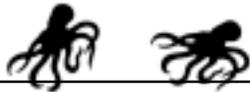
1/2 cup water

Bowl

Paints and paint brush

Mix together the salt, flour and water to make a dough. Then form the dough into a model of your underwater world. Paint your world, then use a variety of arts and crafts materials to create plants and animals for their ocean home.

It's Show Time!



MATERIALS

- Paper
- Pen or Pencil
- A variety of arts and crafts materials

Work with friends or classmates to write and perform our own play or puppet show about ocean habitats and the plants and animals that live there. Use arts and crafts materials to create props, puppets and backdrops. There are patterns and directions in this book to make a Clancy Clam Costume (pages 37-39), a Jelly Dress-Up (page 81), a Snazzy Squid Suit (pages 83-85) and an Ollie Otter Puppet (pages 138-139). Invite your friends, family and neighbors to enjoy the show.

