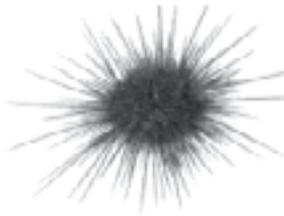


SEARCHING
FOR
SEA LIFE



Suited for
the Sea



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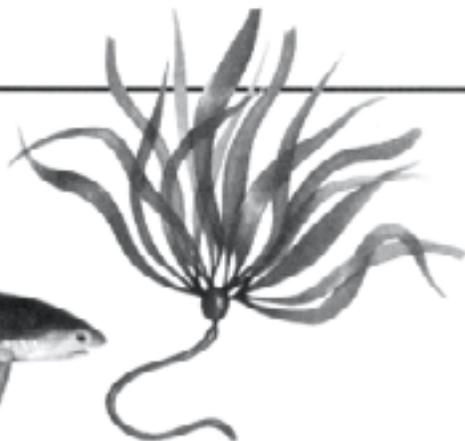
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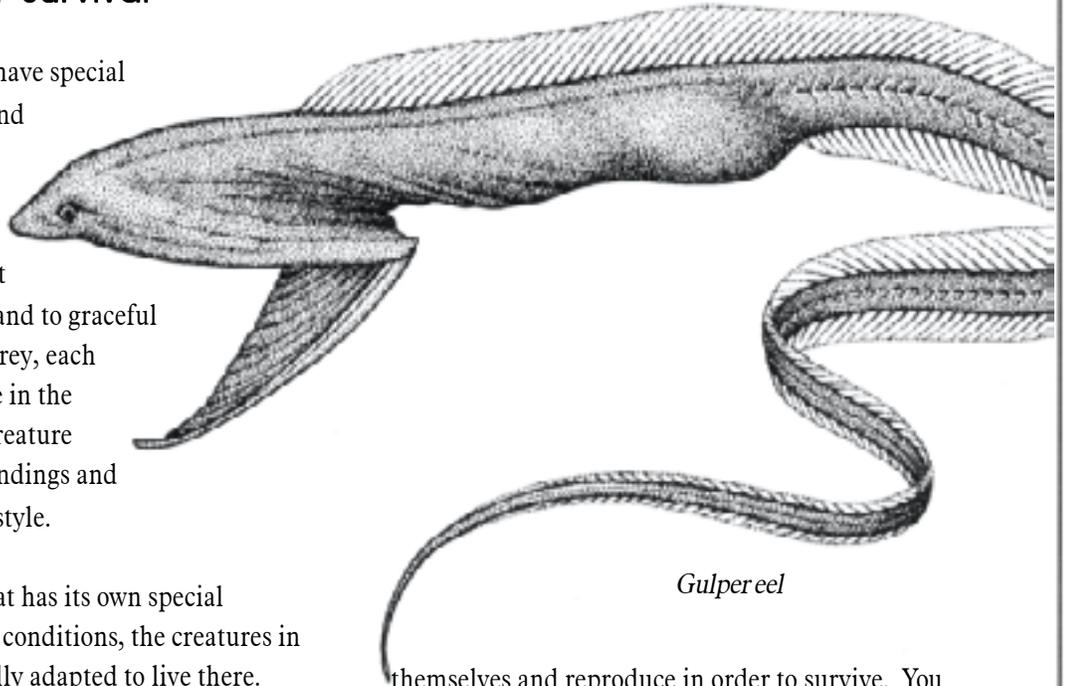
Strategies for Survival

Plants and animals have special body parts, shapes and behaviors that help them survive in their habitats.

From paddlelike feet that burrow in the sand to graceful tentacles that stun prey, each adaptation is unique in the way that it helps a creature cope with its surroundings and live a particular lifestyle.

Because every habitat has its own special character and living conditions, the creatures in each must be specially adapted to live there. Deep sea fishes, living in a world of darkness, blink lights to attract food and mates. At the rocky shore where waves batter the rocks, adaptations like a barnacle's feathery feet let some animals strain food from the water while they hold on tight. Some adaptations seem unbelievable: a young flatfish (larva) swims through the water, one eye on each side of its head, like a typical fish. But an adult flatfish lives on the seafloor and has both eyes on the same side of its head. The adult's body is flattened side to side (unlike a bat ray's that's flattened top to bottom) and it always lies on one side of its body. As the young flatfish grows, its body gets flatter and one eye migrates to join the other on the upward-facing side of its head.

On land or in the sea, plants and animals face the same challenges: they must find nutrients, protect



Gulper eel

themselves and reproduce in order to survive. You can learn about a plant or animal's adaptive features by taking note of its living conditions and looking for ways its behavior, body parts and shape help it survive those conditions.

Feeding strategies

An animal's adaptations to find, catch and eat prey depend on what and where the animal eats. Some animals chase their prey; most open sea fishes (like tuna, salmon and some sharks), with their strong, sleek bodies, can swim faster over greater distances than herring, squid and other prey.

Other animals, like barnacles and mussels, spend their adult lives attached to one spot. Not able to chase their prey, these animals filter tiny drifting plants and animals from the water.

SUITED FOR THE SEA
FIELD NOTES

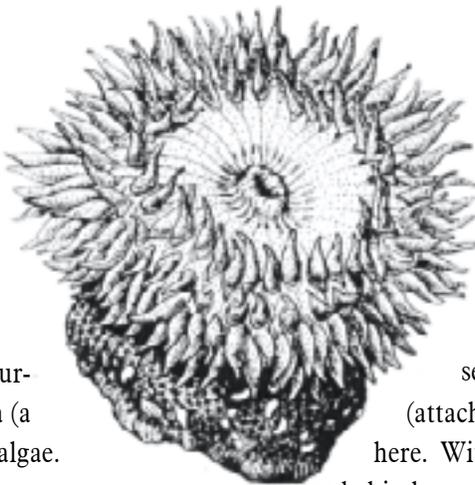
In the deep sea where food is scarce, some fishes have special adaptations to lure prey: the anglerfish's dorsal fin dangles in front of its large mouth like a fishing line with bait. Some plant eaters, like the turban snail and most chiton, use a radula (a filelike tongue) to rasp kelp and other algae.

Sometimes one animal's feeding needs benefit another animal. A fish like the señorita has small, protruding teeth to pick parasites off other fishes.

Protection

For a plant or animal to survive, it must avoid being eaten by predators and cope with its habitat's physical conditions. Sometimes the same adaptations that protect an animal from its living conditions also protect it from predators.

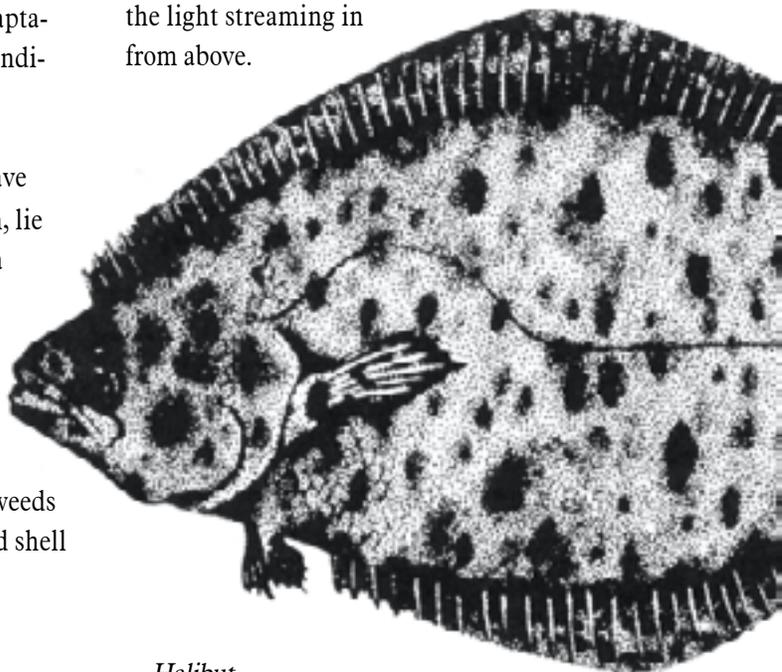
On the wave-battered rocky shore, animals have body parts and shapes that help them hold on, lie flat, bend with the waves or hide. A snail or a chiton has a strong, muscular foot to hold on tight; sea stars have thousands of tiny tube feet with suction-cup ends. The Chinese-hat shape of limpets and barnacles and the flat shape of chitons and abalone offer little resistance to the water rushing past. Flexible seaweeds bend rather than break, and a crab's flattened shell lets it crawl into narrow rock crevices.



Sea anemone

The sandy seafloor's shifting sand offers nothing firm for plants and animals to hang on to, so large sea plants and sessile (attached) animals can't live here. With nothing to hide behind, most animals, like olive snails and some anemones, escape predators by burrowing in the sand.

Other sandy seafloor animals, like sanddabs and halibut, change color and pattern to match their speckled brown-and-white surroundings. Most open sea fishes have camouflaged coloration, too. Light on their bellies and dark on top, they blend in with the darker depths below and the light streaming in from above.



Halibut

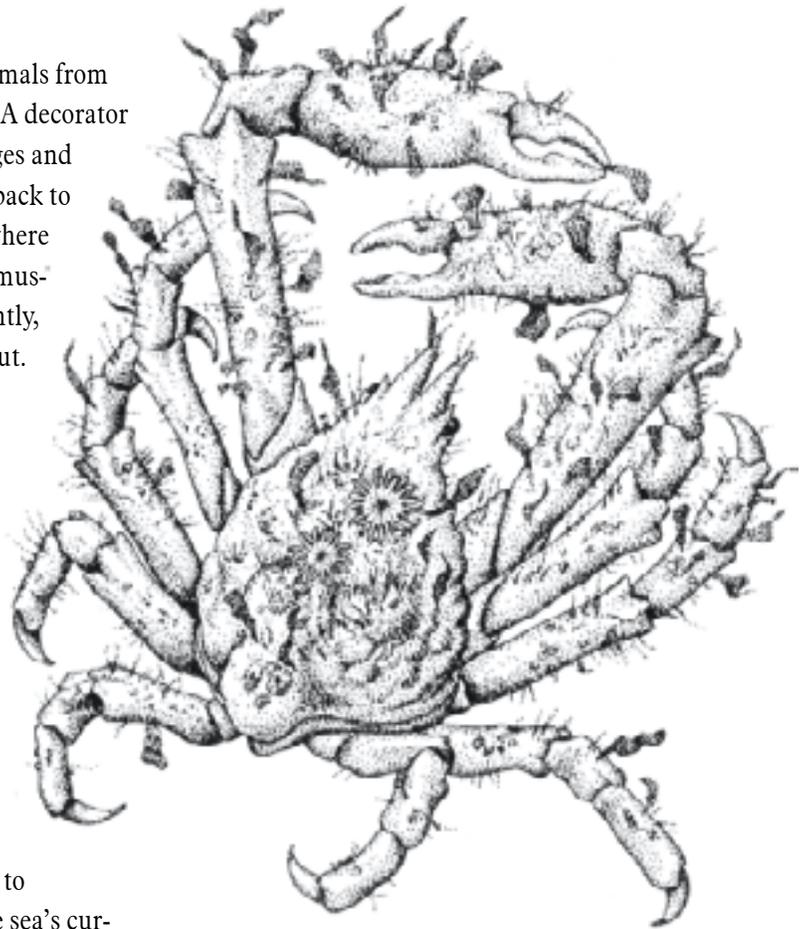
Behavioral adaptations also protect animals from predators and harsh living conditions. A decorator crab plants a garden of seaweeds, sponges and other sessile plants and animals on its back to escape detection. On the rocky shore where low tide leaves some animals exposed, mussels and barnacles close their shells tightly, trapping water inside to avoid drying out.

Reproduction

Though an animal may successfully find food and protect itself, it must also reproduce to keep its population healthy. To find mates, animals display an array of colors, shapes, lights, smells and behaviors. Adaptations for reproduction are just as diverse. Most invertebrates (like sea urchins and chitons) and most fishes broadcast thousands of eggs and sperm to

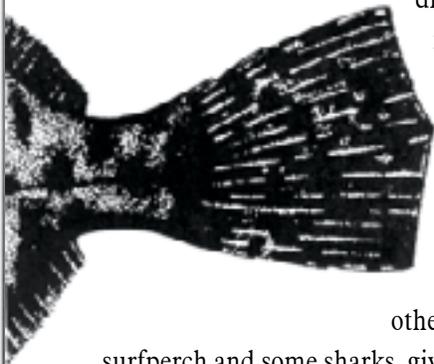
drift in the sea's current, but only a few will survive to reproduce. Some fishes, like the lingcod, guard a nest of eggs on the seafloor, while

others, like the surfperch and some sharks, give birth to live young. Marine mammals bear and nurse one or two live young, like we do.



Decorator crab

Next time you're on a walk or at an aquarium, take a look at the plants and animals around you. How do they find and catch food? How do they protect themselves from being eaten? The plants and animals we see are the ones that can survive their habitat's conditions, reproduce and pass their adaptations on to future generations.



At Home in the Sea



MATERIALS

- Paper
- Pencil
- Magazines
- Glue

On a piece of paper, draw a line down the middle from top to bottom, dividing it in half. Pick an animal from the sea. On the left side, make a list of all the basic things your animal needs to survive.

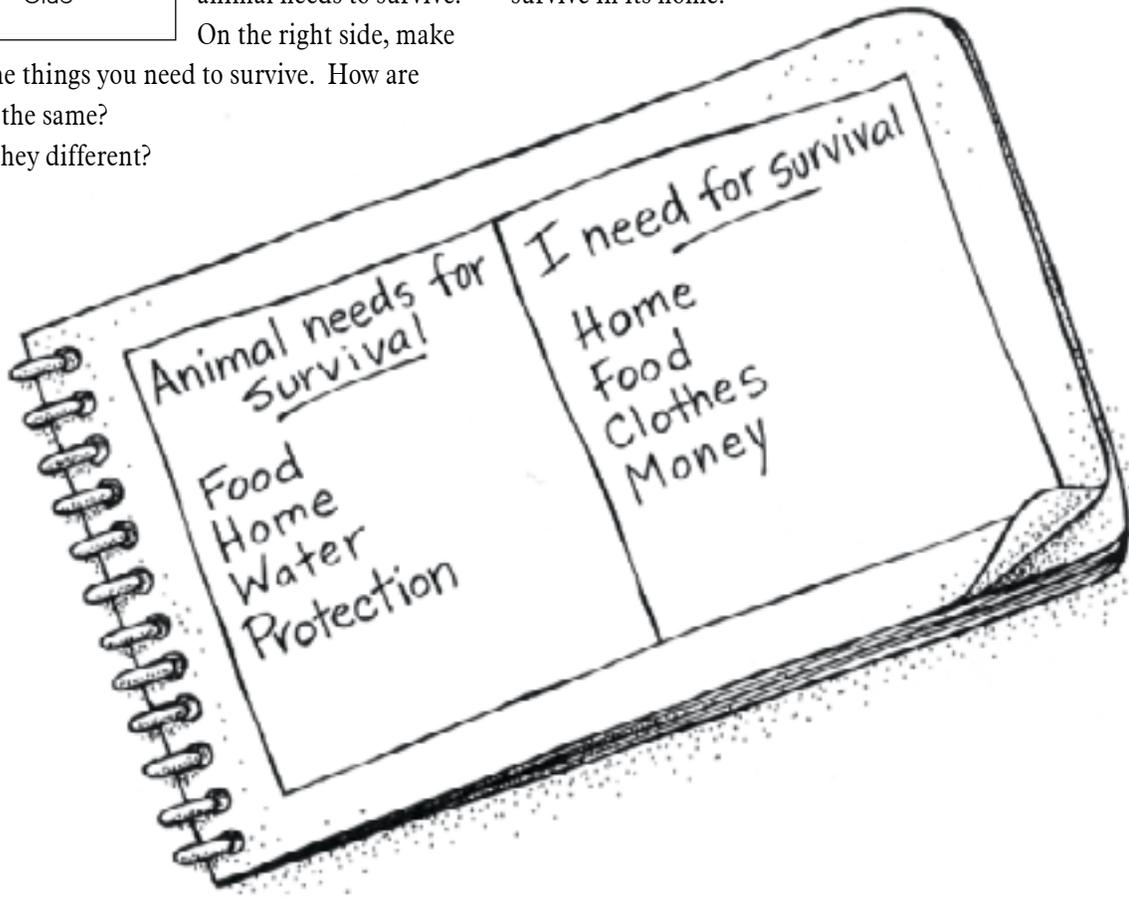
On the right side, make

a list of the things you need to survive. How are your lists the same?

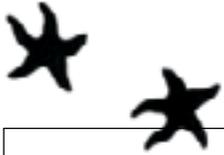
How are they different?

On the back of the paper, draw a picture of your animal. What body parts help it get the things it needs to survive? What behaviors help it survive?

Draw pictures of your home, including what you need to live (water, food and a place to sleep). Cut out a magazine picture of a sea animal, then glue the picture on a blank piece of paper and draw in the animal's home around it. How do the animal's body parts and behaviors help it survive in its home?



A Book about Sea Life

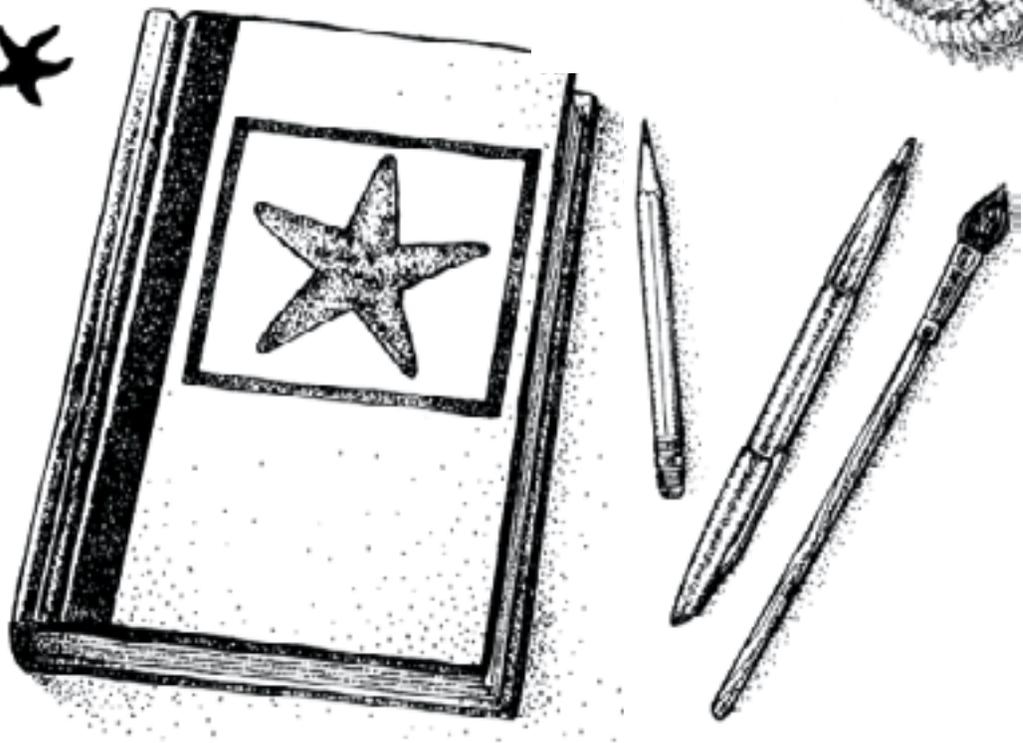
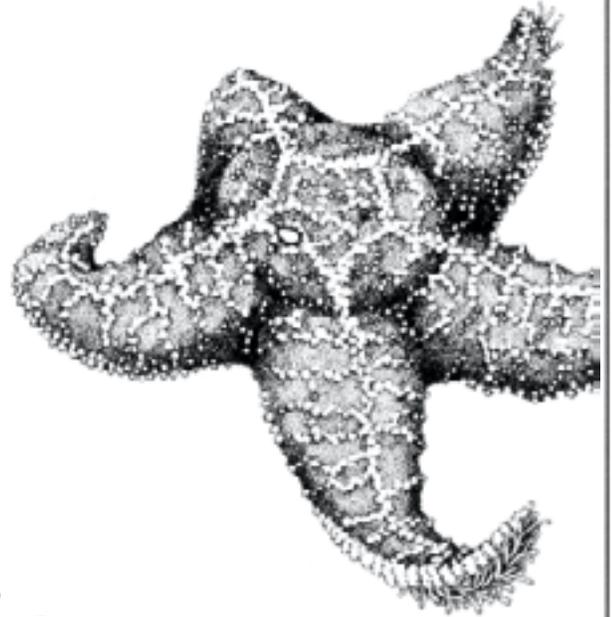


MATERIALS

- Paper
- Your favorite drawing materials

Make a book about sea life. Show how plants and animals of the sea are adapted to their homes. How do seaweeds along the shore survive crashing waves?

How do animals move? How do they breathe? How do they eat and protect themselves?



Clothes That Hide

MATERIALS

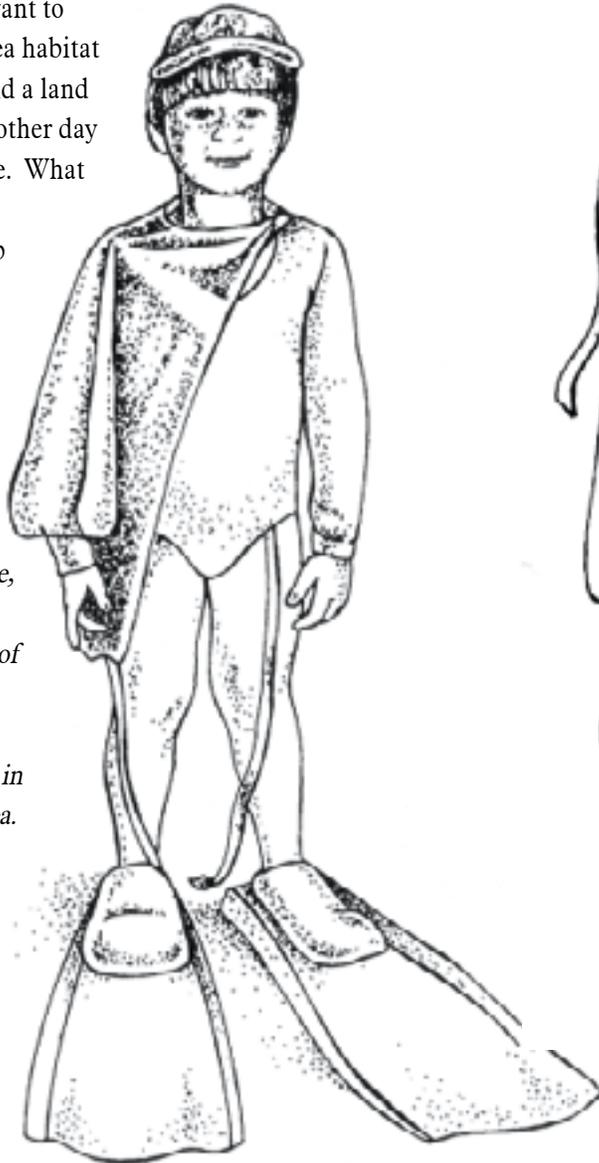
- Clothes

Plan a Camouflage Day. Choose a habitat, either on land or in the sea, and wear clothes that would camouflage you in that habitat.

An outfit of green ribbons with a green cape would be difficult to spot in a bed of eelgrass.

You may want to choose a sea habitat one day and a land habitat another day to compare. What behaviors would help you hide?

A blue cape, hat, and a pair of flippers provide camouflage in the open sea.



Hide and Seek



**A great activity to do
at a party or at school!**

MATERIALS

- Cutouts of blank paper birds - one for each child
- Crayons or other drawing materials

Give each child a blank paper bird. Divide the group of children into two equal parts and let each half explore a 10-by-10-foot area outside. (To make the game more exciting, choose areas with different kinds of vegetation.) Have the children pick places to hide their birds, then have them color their birds to blend in with their hiding spots. Now the children are ready to hide their birds. Explain that the birds should be hidden in plain sight, not covered up.



When all the birds are hidden, have each team try to find the other team's birds. Discuss which birds were hardest to find, which were easiest and why. Pick up the paper birds for the children to take home and hang on their walls.



Suited for Survival



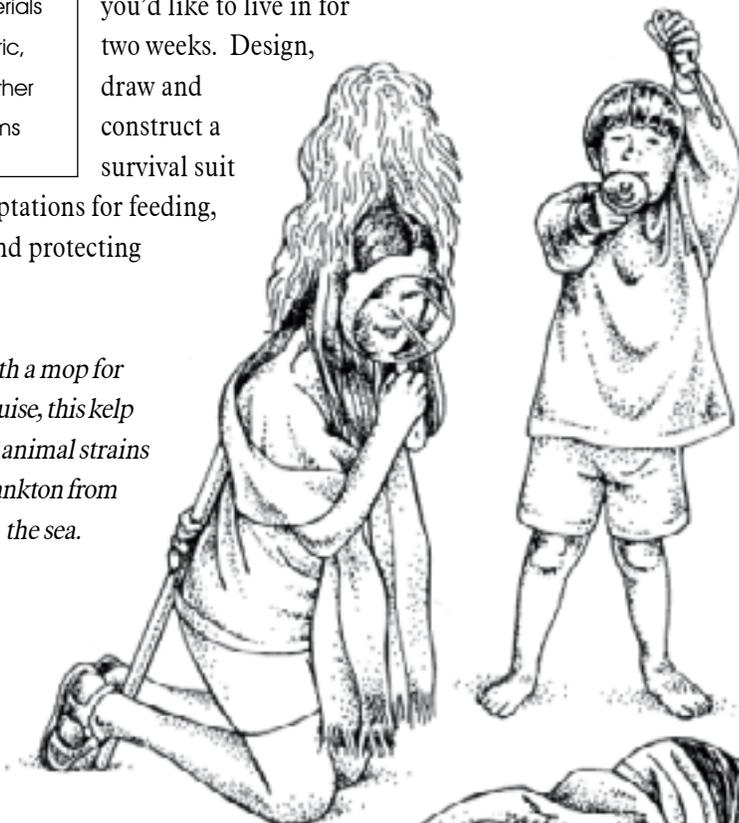
MATERIALS

- Paper
- Drawing materials
- Clothes fabric, scarves and other wearable items

Pick a habitat (like the rocky shore, kelp forest or sandy seafloor) that you'd like to live in for two weeks. Design, draw and construct a survival suit

that includes adaptations for feeding, moving, hiding and protecting yourself.

With a mop for disguise, this kelp forest animal strains plankton from the sea.



A flashlight blinks on and off in the deep sea - perhaps to attract prey.



A plunger helps this rocky shore animal hold on tight when waves crash.

Critter Cards - Suited for the Sea

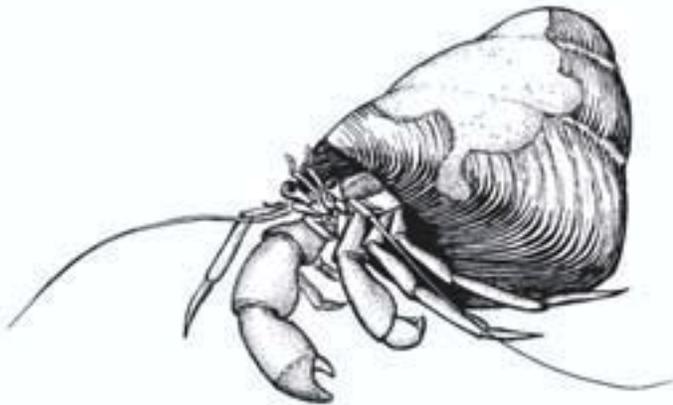


California halibut

California halibut

Paralichthys californicus [size: to 5 ft. (152 cm)]

A halibut has both eyes on the same side of its head. It lives on the sandy seafloor, always lying on one side of its body. The halibut wriggles its flat body into the sand; its two eyes stick out above the sand to watch for approaching predators and prey.



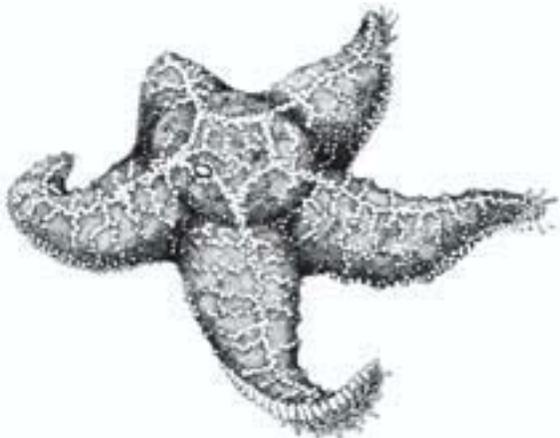
Hermit crab

Hermit crab

Pagurus samuelis [size: to 1 in. (2.5 cm)]

A hermit crab wears an empty snail shell to protect its soft body. The back legs hold the shell on tight. As the crab grows, it needs bigger shells. One hermit crab will even steal a good shell from another crab.

Though a hermit crab threatens and fights with its large claws, it's not a hunter. This crab eats seaweeds and dead animals.



Ochre star

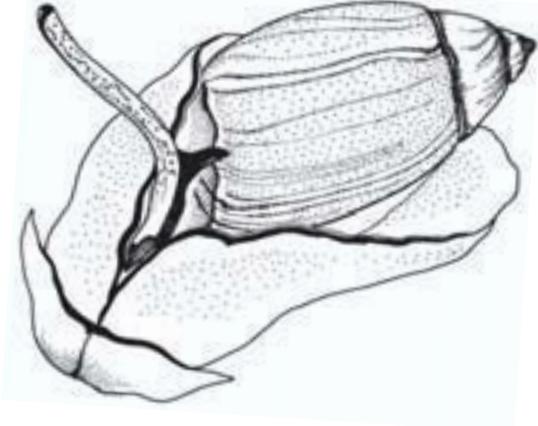
Ochre star

Pisaster ochraceus [size: to 1 ft. (30 cm)]

This sea star has hundreds of tiny suction-cup feet under each arm that help it stick to rocks. The sea star is a real loafer; it clings motionless on a rock for weeks.

Even a hungry sea star isn't hasty. Slow and steady, its feet can pry apart a mussel. When the mussel's two shells open, the sea star slides its stomach between the shells to digest the animal inside.

Critter Cards - Suited for the Sea



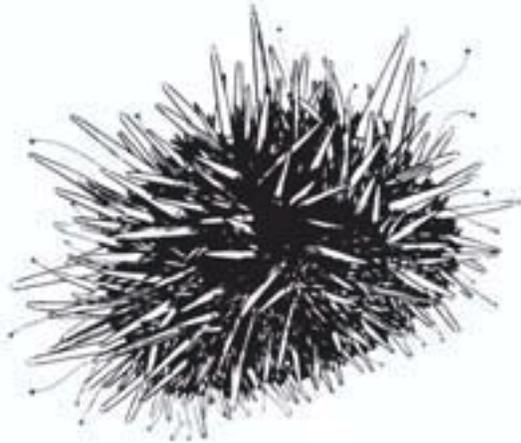
Olive snail

Olive snail

Olivella biplicata [size: to 1 in. (2.5 cm)]

The olive snail plows through the sand just below the surface, leaving a furrow behind. Its smooth, streamlined shell helps it slip through the sand. To breathe, the snail sends a tube above the sand.

The olive snail eats dead animals and plants. It may also gather tiny food bits from the sand.



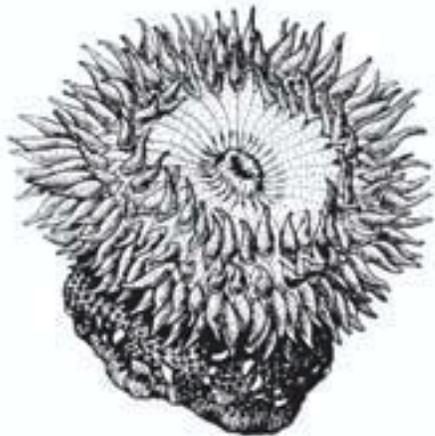
Purple sea urchin

Purple sea urchin

Strongylocentrotus purpuratus [size: to 4 in. (10 cm)]

Using their spines and teeth, urchins burrow slowly into solid rock. Because they grow as they dig, some end up trapped in holes, too big to leave.

Between the hard spines, an urchin has hundreds of tube feet. Its soft tube feet are always busy: some hold the urchin onto the rock; others move kelp to the urchin's greedy mouth.



Sea anemone

Sea anemone

Anthopleura elegantissima [size: to 10 in. (25 cm)]

The sea anemone looks like a flower on a thick, bumpy stalk, but it's really an animal. The flowery parts are tentacles with stingers. The stingers zap small animals that get too close; then the anemone swallows them whole.

At low tide, the anemone closes up. Bits of shell stuck to the bumpy flesh help keep the sea anemone from drying out.