

Fish & Fishing

illustrations by Peter Grosshauser



SOMETHING
FISHY

FISHING
FOR FACTS

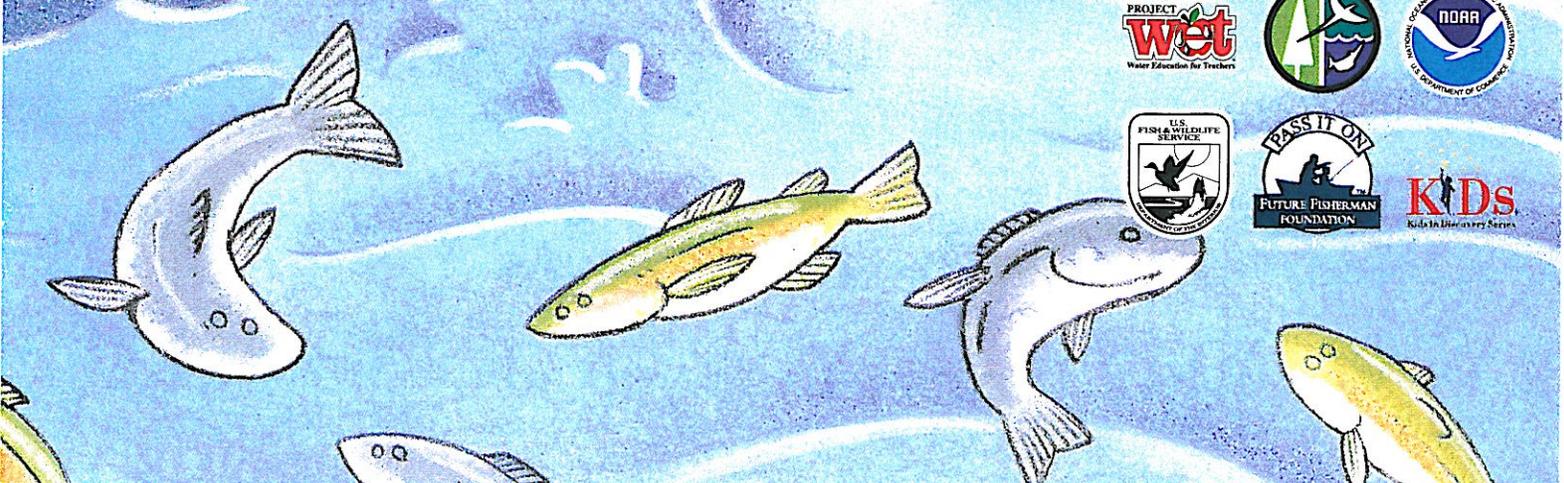
FISH STORIES & NO BONES
ABOUT IT

HOOK LINE &
SINKER

COUNT
THE WAYS

FINE KETTLE
OF FISH

HOME SWEET
HOME



Something

Fish live in water, either fresh, salty, or *brackish* (a little of both).

Although fish come in many shapes and sizes, they share some things:

Some fish may be able to slightly change their body temperature, but most are *cold-blooded*. That means that their body temperature goes down in cold water and

up in warm water. (Your body temperature, on the other hand, stays near 98.6 degrees unless you are sick.)

All fish have a backbone.

Fish have *gills* with which they get oxygen from water. Gills, which are just behind the head, are protected by a flap called the gill cover or *operculum* (o-PUR-kew-lum).

Some fish have an air-filled *swim bladder*, sort of like a balloon, inside their bodies. By letting air in or out of their swim bladder, fish stay at any water level they choose. (Humans can't do this. As you may have discovered in a swimming pool, you float to the top unless you hang onto something under the water.)

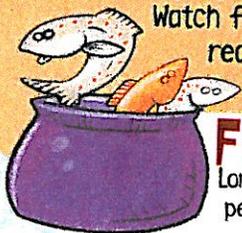
PARTS MAKE THE WHOLE

Look at the drawings of the fish and fish parts. Draw each of the fish parts in the correct place on the fish body. (You might want to make a copy of the fish body and draw on your copy instead of in the booklet.)

See correct drawing on the last page of this booklet if you need help.

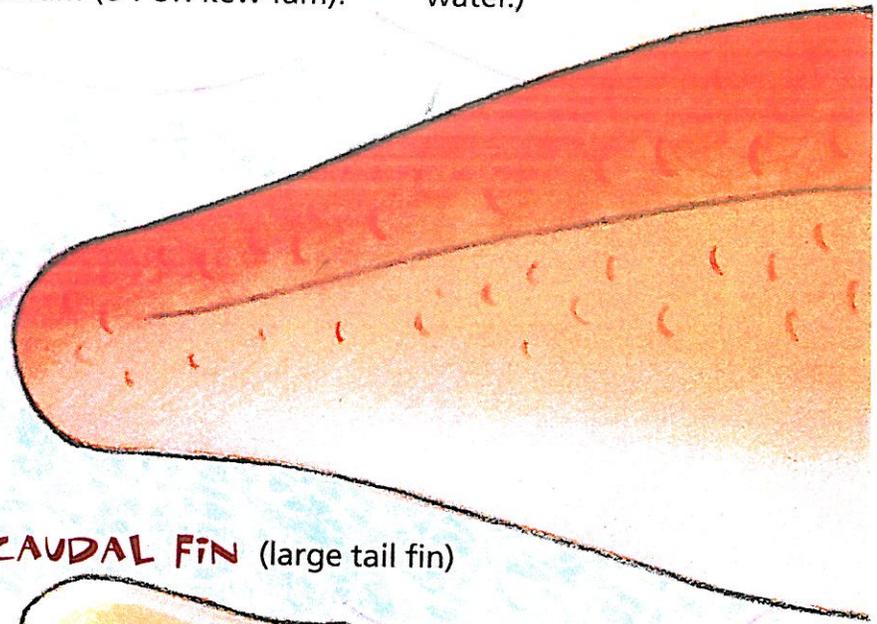
FISH TALK

"Fish out of water"...
"filled to the gills"...these are examples of "fish talk" that people use in everyday speech. Watch for more "fish talk" as you read the following pages.

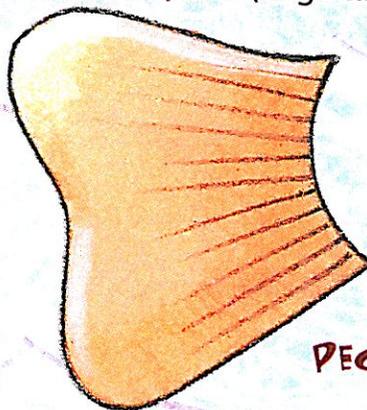


FINE KETTLE OF FISH

Long ago in England, villages held fishing festivals. Lots of fish, people, and confusion made for "a fine kettle of fish."



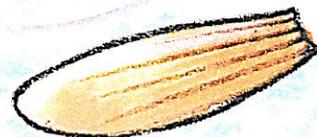
CAUDAL FIN (large tail fin)



VENTRAL FINS (below pectoral fins and caudal fin)



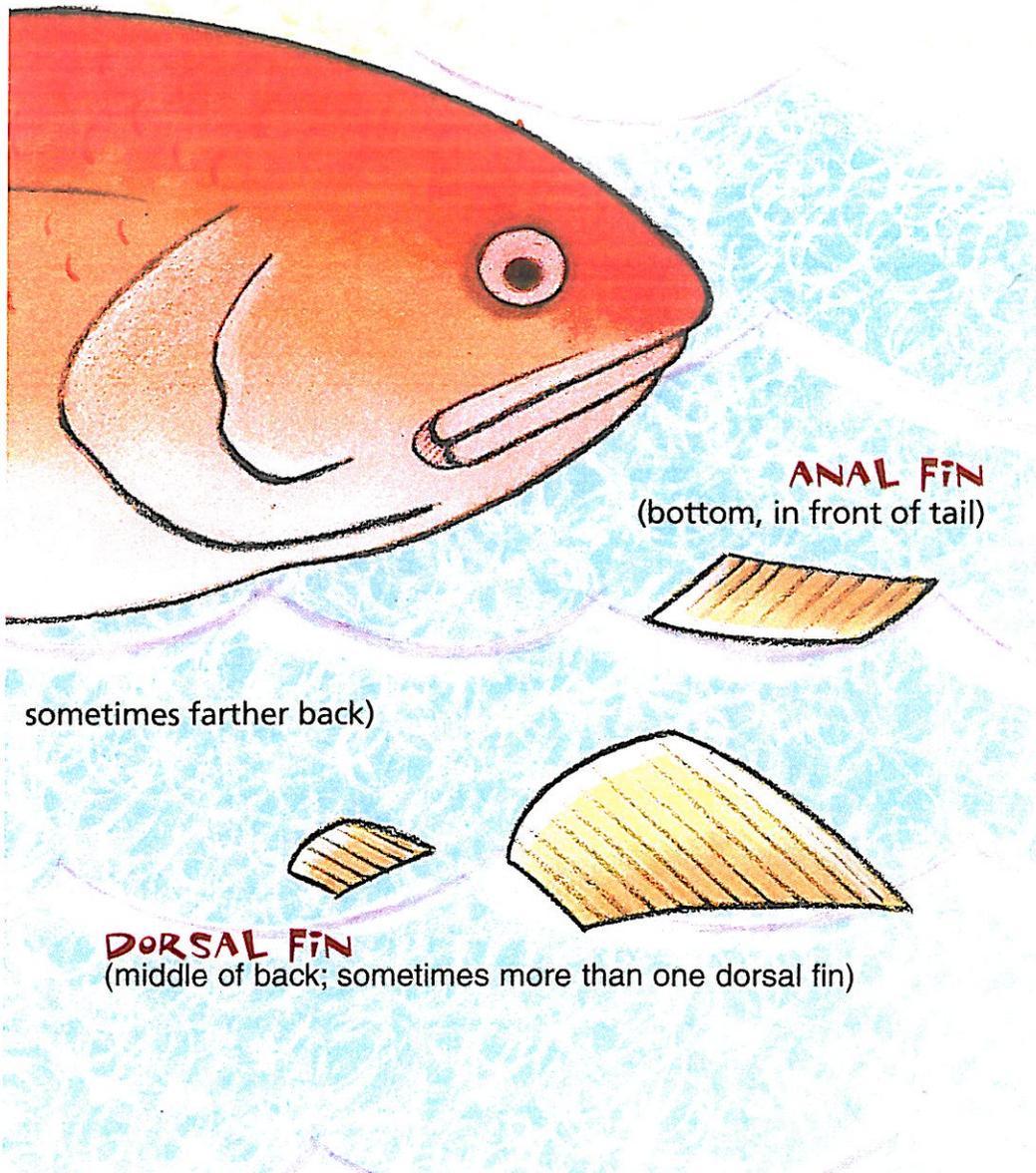
PECTORAL FINS (behind gills)



Fishy

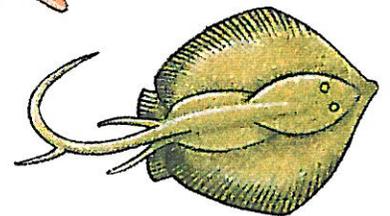
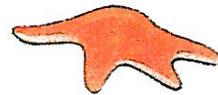
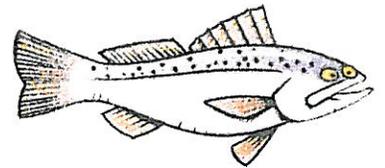
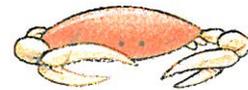
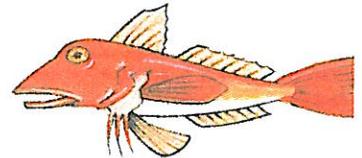
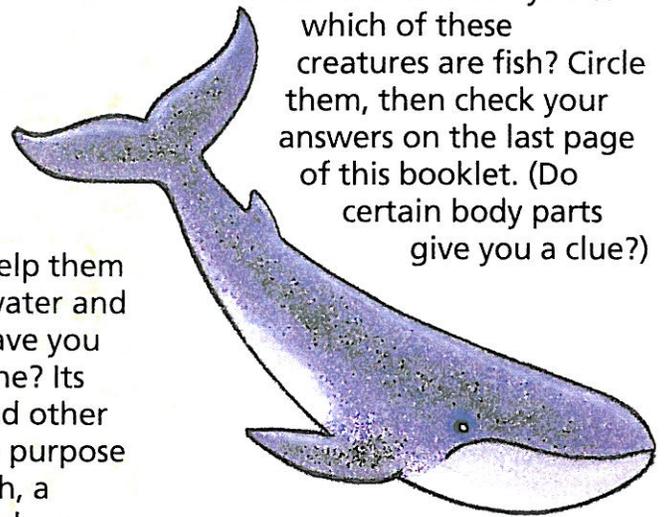
Many fish have special lines along both sides of their bodies that help them feel vibrations from other animals and objects in the water. These lines are called *lateral lines*.

Fish have *fins* that help them move through the water and change direction. Have you ever seen a submarine? Its propeller, rudder, and other parts serve the same purpose as fish fins. Like a fish, a "sub" can go forward, up, down, left, right, and even backward.



FISH OR NOT?

Not all animals that live in water are fish. Can you tell which of these creatures are fish? Circle them, then check your answers on the last page of this booklet. (Do certain body parts give you a clue?)



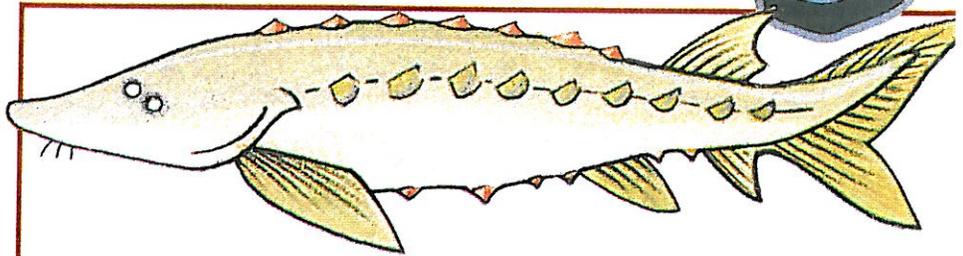
DID YOU KNOW?
Not all fish have scales! Some, including sharks, paddlefish, and catfish, just have skin.

WORD SCRAMBLE

Fishing

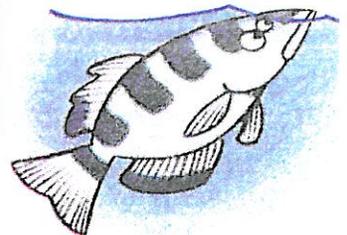
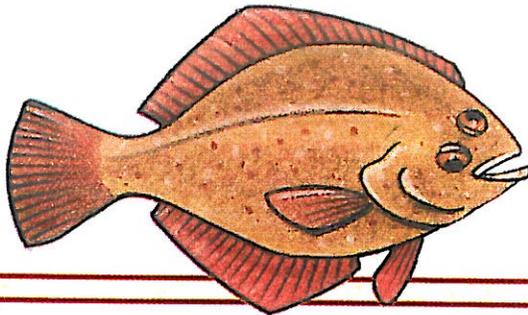
Unscramble the words below to complete the sentences. Check these two pages for clues.

1. The eyes of the _____ (reolunfd) move independently.
2. The first fish with _____ (oensabck) appeared about 500 million years ago in prehistoric seas.
3. The _____ (fpurfe) blows up its body like a balloon by swallowing air or water to avoid predators.
4. _____ (erpishtoirc akhrss) grew more than 60 feet long.
5. An ancient fishhook called a _____ (oggre) is thought to be 30,000 years old and was found in a French bog.

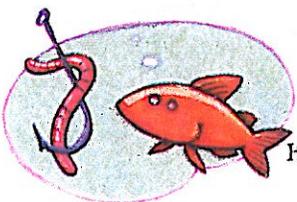
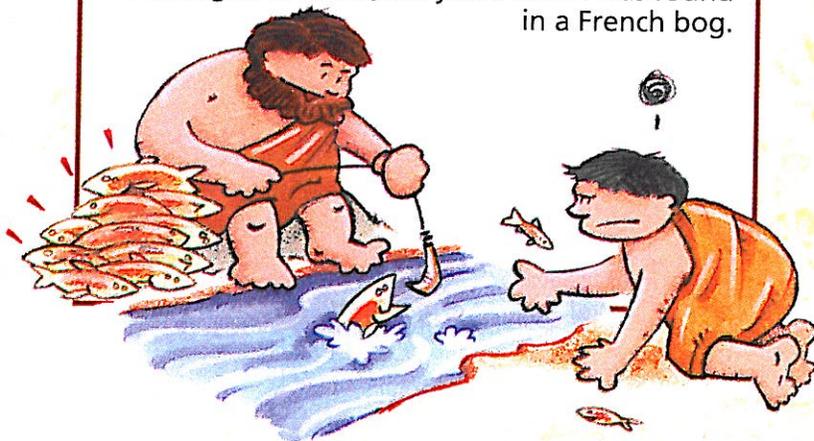


Isinglass (EYE-zin-glass) is a see-through, jelly-like material made from the swim bladders of sturgeons. In the old days, it was used to make windows for horse-drawn carriages and automobiles.

Most fish eyes move together, like people's eyes, but a flounder's eyes move independently.



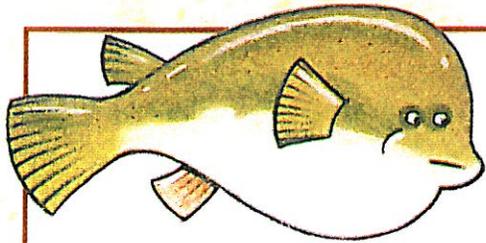
The earliest anglers caught fish with their bare hands, but an ancient fishhook called a *gorge* is thought to be 30,000 years old. It was found in a French bog.



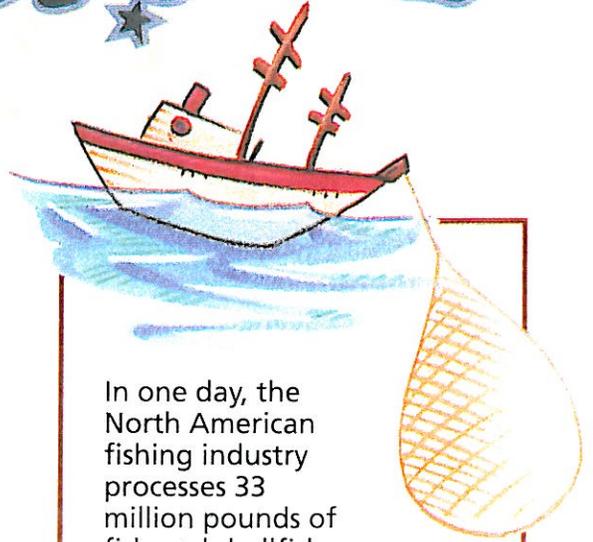
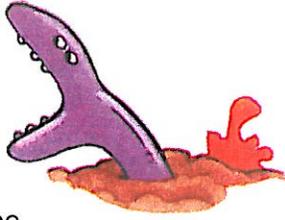
FISHING FOR COMPLIMENTS

If you call attention to yourself, the way an angler baits a fish, you may be "fishing for compliments."

for Facts

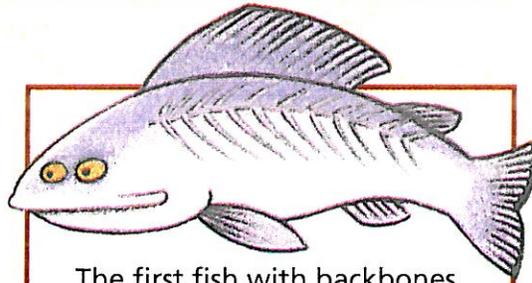


To avoid predators, the puffer, or globe fish, blows up its body like a balloon by swallowing water or air. The puffer is also poisonous if swallowed.

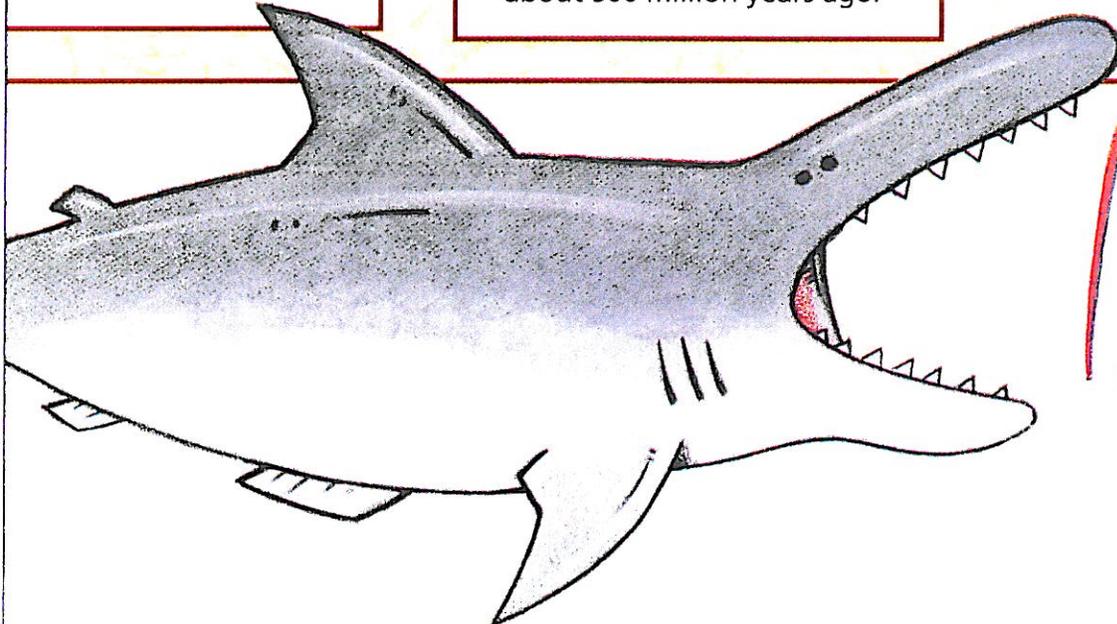


In one day, the North American fishing industry processes 33 million pounds of fish and shellfish. Twenty-two million pounds are used for human food; a million pounds are fed to animals. The rest is used to make chemicals, fertilizers, and paint.

India's Archer-fish watches for flies hovering just above the water or settled on leaves. The fish squirts a drop of water from its mouth, knocking the victim into the water where it is eaten.



The first fish with backbones appeared in prehistoric seas about 500 million years ago.

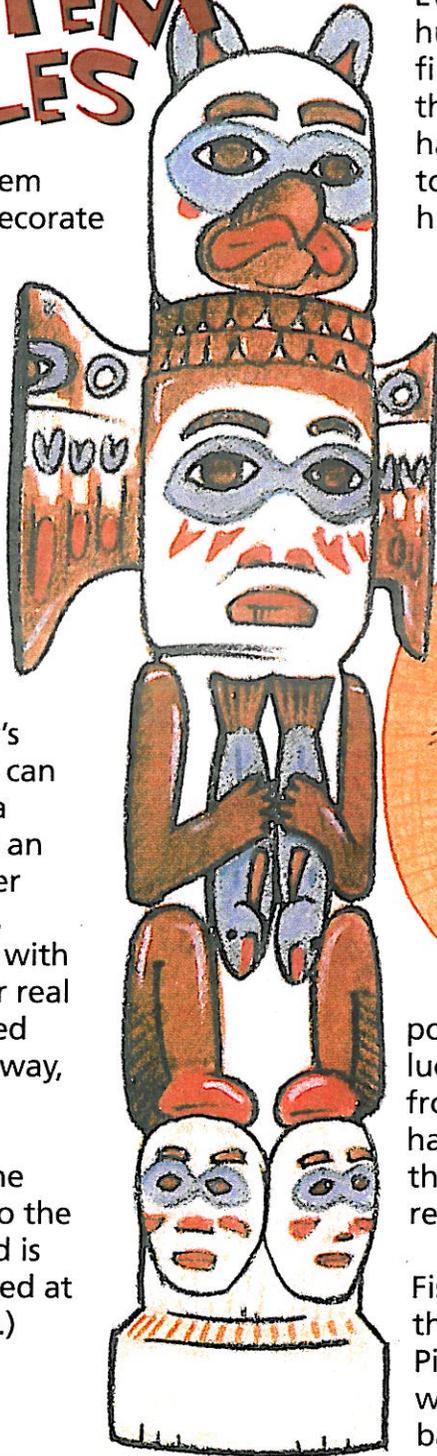


Prehistoric sharks grew more than 60 feet long. A person six feet tall could have stood in the shark's open mouth! Would you want to do that?

Fish Stories

TOTEM TALES

Draw a totem pole and decorate it with drawings of people, pets, and other things important to your family's history. Write a story about your family's totem. You can also make a totem with an empty paper towel tube. Decorate it with drawings or real objects glued on. (By the way, the most important figure on the totem is also the biggest, and is usually placed at the bottom.)

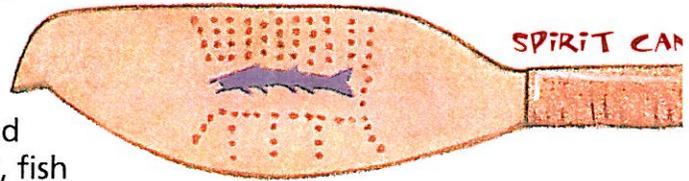


Ever since humans first walked the planet, fish have been important to us. Throughout history, we have eaten them and used their oil. Cave men painted and carved them on cave walls. Believing that fish had special



powers to bring good luck and protection from harm, people have honored fish in their daily lives and religion.

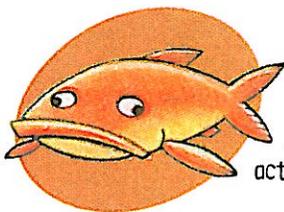
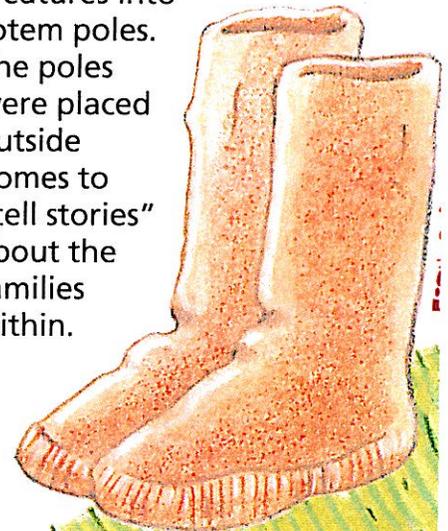
Fish art dates back thousands of years. Pictures have been woven into ancient baskets and etched onto pottery; carved



into wooden totem poles, masks, and bowls; painted on drums; woven into fabric; printed on paper; shaped into kites.

Probably, no other fish has been more important to people of the Pacific Rim than the salmon. Salmon bones have been found among villages that date back 11,000 years. Ancient tribes along the Pacific Coast of Russia, the Ainu people of Japan, Native American tribes of the Pacific Northwest—all have depended on salmon for food.

Native Americans of the Pacific Northwest carved images of salmon, killer whales, and other sea creatures into totem poles. The poles were placed outside homes to "tell stories" about the families within.



SOMETHING FISHY

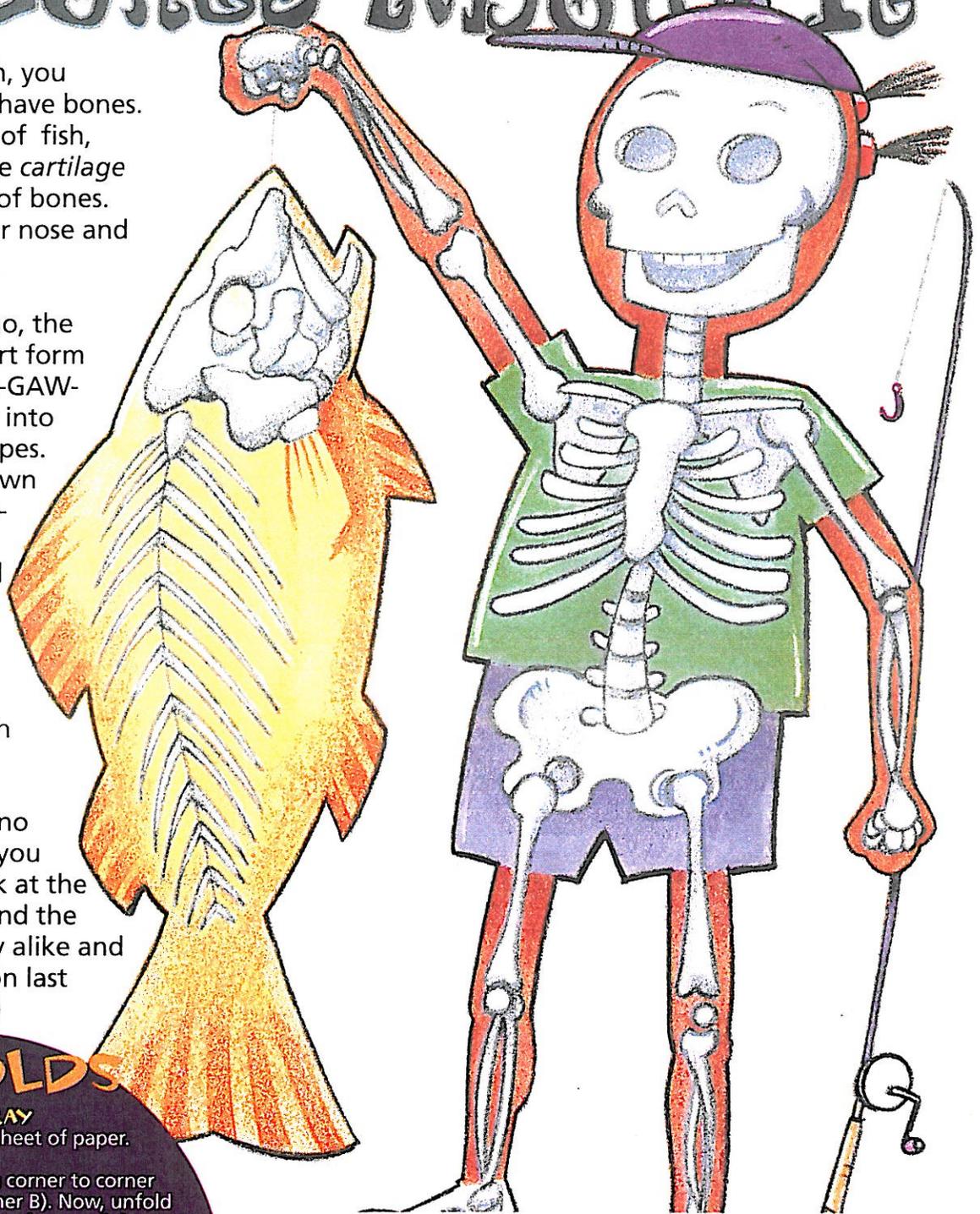
Some fish are slippery and hard to grasp. If someone acts sneaky, you might think "Hmmm, that seems fishy."

No Bones About It

If you have eaten fish, you probably know they have bones. However, one group of fish, including sharks, have *cartilage* (CAR-tuh-lij) instead of bones. Cartilage is what your nose and ears are made of.

Hundreds of years ago, the Japanese began an art form called *origami* (or-uh-GAW-mee)—folding paper into animal and plant shapes. You can make your own fish! Follow the directions shown below. Then color it and add eyes and other parts. Using colored paper, fold several fish and display them in an aquarium (or jar) with rocks and plants.

Your paper fish has “no bones about it,” but you and real fish do! Look at the skeleton of the fish and the human. How are they alike and different? (Answers on last page of this booklet.)



FISH FOLDS

MANTA RAY

1. Start with a square sheet of paper.

2. Fold paper in half from corner to corner (corner A should touch corner B). Now, unfold your paper. Add a “tail fin,” as shown. Color two eyes. There you have it! Your own manta ray.

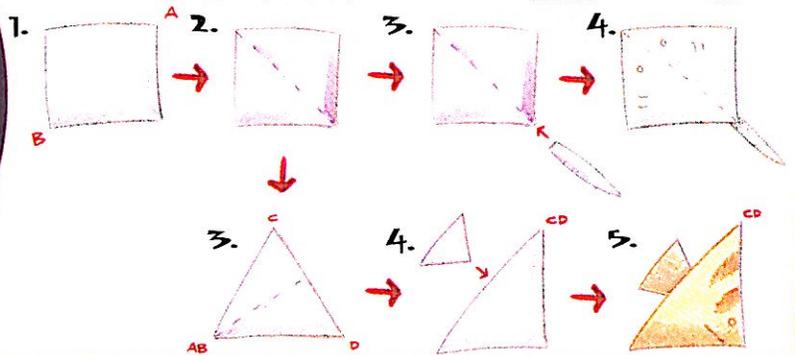
ANGELFISH

1. Start with a square sheet of paper.

2. Fold paper in half from corner to corner (corner A should touch corner B).

3. Now fold it in half again (corner C should touch corner D).

4. Hold your fish by its “nose.” Draw eyes, mouth, gills. Add tail and color.



EQUIPMENT:



FLY ROD
for catching fish in cold fresh-water lakes and streams in the mountains



SPINNING ROD
for catching fish in warm fresh-water lakes, streams, and rivers



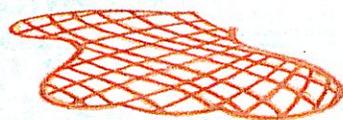
SURF ROD
for casting into ocean surf while standing on beach



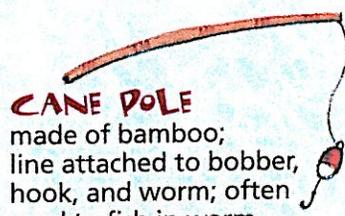
BOTTOM-FISHING ROD
used from docks and boats to lift heavy saltwater fish straight up from near the ocean bottom



SPEAR GUN
used by scuba divers to fish near ocean reefs



NETS
used in oceans by those who catch fish for a living; different nets for different fish



CANE POLE
made of bamboo; line attached to bobber, hook, and worm; often used to fish in warm freshwater lakes and ponds

Hook, Line



SALMON BAY, WA



TROUT CREEK, MT



BLUEFISH COVE, CA

BLUEGILL POINT, KS



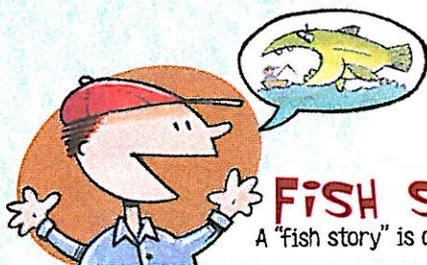
TUNA HARBOR, CA

Fish are among the most common animals on the planet. They live in many different *habitats* (homes), including deep seas, high mountains, dark caves, and scorching deserts.

People harvest fish for recreation, food, medicine, and to make a living. People fish from shore, from boats, or underwater. Usually, you must have a fishing license, and you must fish only in approved places. There are limits

on the number of fish you can catch.

Of course, to catch fish, you need the right *tackle* (fishing equipment). Today, the most common tackle includes a rod, line, and reel; plus a baited hook, shiny metal *lure*, or fake fly tie to the line. Some people use other equipment and trap, net, and spear fish.



FISH STORY

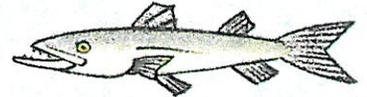
A "fish story" is a tall tale that's hard to believe.

and Sinkers

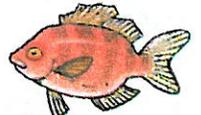
FISH:



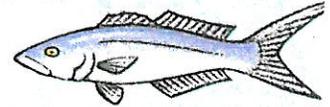
CUTTHROAT TROUT
lives in cold freshwater
mountain lakes and streams



GREAT BARRACUDA
lives in saltwater near ocean reefs



BLUEGILL
lives in warm freshwater lakes
and ponds throughout U.S.;
caught with a cane pole



BLUEFISH
lives in warm ocean surf



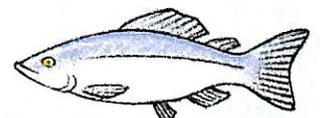
SPOTTED BASS
lives in warm freshwater lakes,
streams, and slow-moving rivers



TUNA
lives in warm, deep ocean waters
off Atlantic and Pacific coasts;
caught with rod and reel using
lures and with nets by people
who fish for a living



ATLANTIC COD
lives on ocean bottom



PACIFIC SALMON
lives part of life in saltwater;
migrates to freshwater to spawn;
caught in nets

COD HARBOR, VA



BASSES CREEK, TN



BARRACUDA ISLAND, FL



WHERE FISH LIVE AND HOW TO CATCH THEM

Next to the map, read about different kinds of fish. Find the places on the map you think these fish might live. (Remember, the map shows only *one* place where each fish lives. The fish might also live in many other places!)

Now, look at the other side of the map. Read about how fishing

equipment is used. Look for clues to tell you which equipment is used to catch each kind of fish. Use a blue crayon to match each fish with its habitat and the equipment used to catch it. The blue line is to remind you that WATER is the common link. (Check your answers on the last page of this booklet.)

For this activity, fish distribution and fishing equipment usage have been simplified.

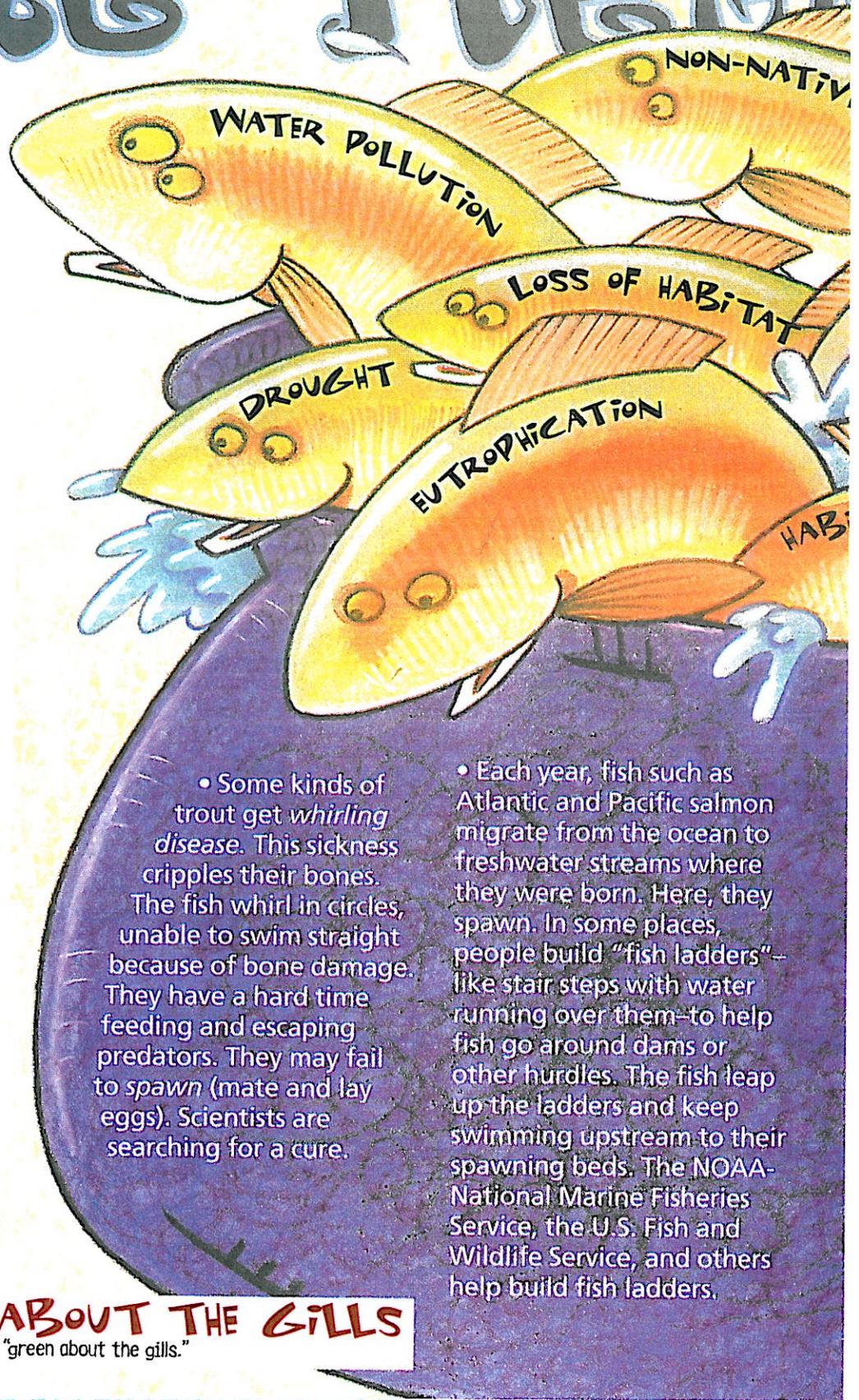
★ Fine Ketch

Fish get sick, hurt, and stressed out from habitat disturbances. How do fish get sick? They get infections from other fish and from plants and animals that share their habitat, just as you catch a cold from another person.

Sometimes, sickness shows. The fish might have discolored gills, strange lumps or sores on the skin, a swollen or crippled body.

Sometimes, the problem does not show. If a lot of fish die suddenly, the cause might be water pollution, competition for food and habitat, or changes in water (such as temperature, oxygen levels, cleanliness).

Here are just a few of the troubles fish face:



- Some kinds of trout get *whirling disease*. This sickness cripples their bones. The fish whirl in circles, unable to swim straight because of bone damage. They have a hard time feeding and escaping predators. They may fail to *spawn* (mate and lay eggs). Scientists are searching for a cure.

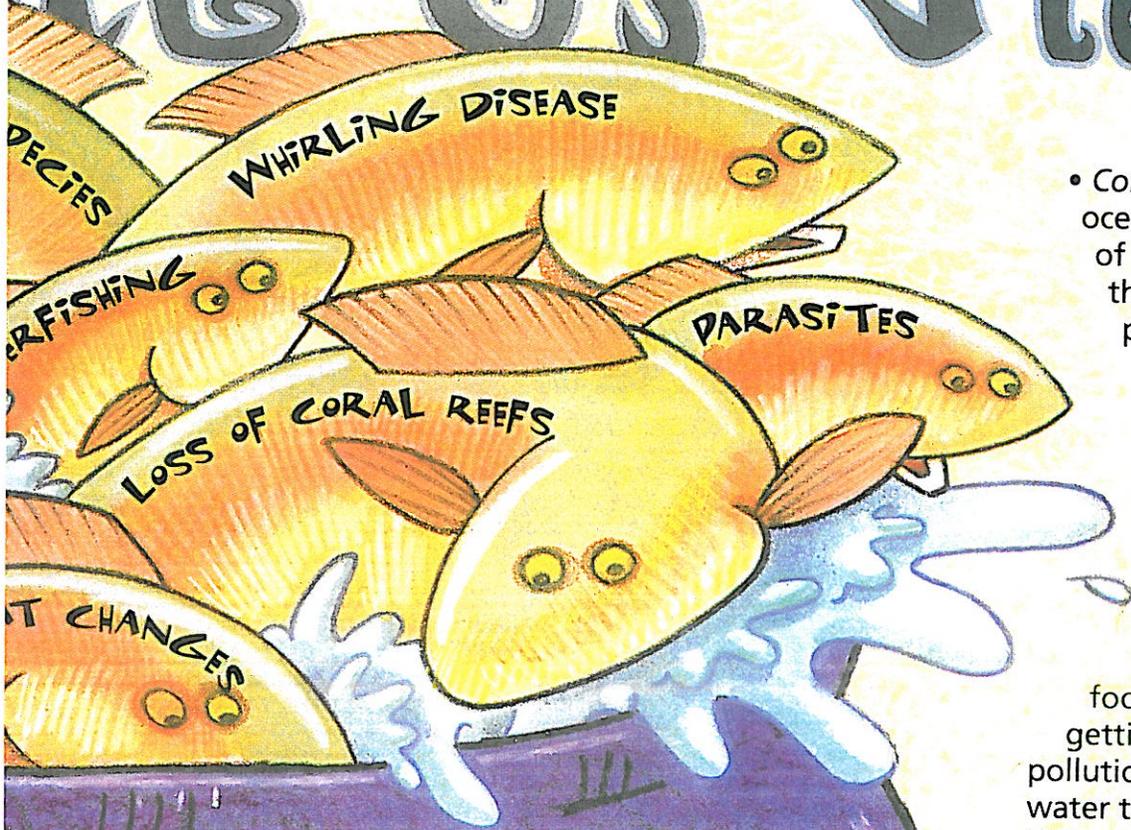
- Each year, fish such as Atlantic and Pacific salmon migrate from the ocean to freshwater streams where they were born. Here, they spawn. In some places, people build "fish ladders"—like stair steps with water running over them—to help fish go around dams or other hurdles. The fish leap up the ladders and keep swimming upstream to their spawning beds. The NOAA—National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and others help build fish ladders.



GREEN ABOUT THE GILLS

A person who is ill is "green about the gills."

ile of Fish



• Sometimes, streams get too shallow for fish to survive, and sometimes, streams dry up completely. These things can happen when people take too much water for their own uses, or during *drought* (DROWT), when little or no rain falls for a long time. Keeping water for fish and wildlife in streams and rivers is sometimes called "instream flow." States are responsible for making sure there is enough water in streams and rivers for fish and wildlife. Fish need healthy habitat to survive.

• When *aquatic* (water) plants grow fast, they can "take over" a pond or lake. When the plants die, they sink to the bottom and rot. The rotting process uses so much oxygen that there is not enough for the fish, so they die. When oxygen is used up this way in water, the word is *eutrophication* (you-tro-fi-KAY-shun). One way to solve this problem is to get rid of plants not natural to the area. These are called *non-native* plants.

• *Coral reefs* form in oceans. They are colonies of tiny creatures and their skeletons, which pile up in ridges beneath the sea. Coral reefs can take 4,000 to 7,000 years to form! Many tropical fish depend on coral reefs for survival. On the reefs, they find shelter and food. Many reefs are getting smaller. Erosion, pollution, and changes in water temperature are killing them. People collect too much coral, damaging the reefs, and ships bump into them, too. When a coral reef is destroyed, the fish that depend on it are harmed.

• Fish and shellfish on the Atlantic Coast and Gulf Coast get sick from *pfies-teria*, a tiny, swimming cell that sometimes makes people sick, too. Scientists are trying to learn more about it.

Home Sweet Home

All living things need a place to live. Living space is called habitat. Healthy habitat includes food, water, shelter, and space—enough of each and easily usable. Learn more about fish and their habitat needs as you play the game, "Home Sweet Home."

THE GAME PLAN

- Pretend you are a fish. Find your way "home" by moving counter-clockwise around the board, collecting what you need in your habitat to survive. Along the way, problems may slow your trip. After you gather your habitat needs, enter your "home sweet home."

- One to four people can play. Use buttons, bottle caps, etc. as tokens. Number four slips of paper 1, 2, 3, 4. Place in bowl. Take turns drawing a number to decide which fish you'll be and who starts first. Read aloud about your fish and habitat.

- Starting at your fish's corner, draw to see how many squares to move.

- Collect one item of your habitat between each habitat entrance. You must land on correct square and cannot move past it. (For example, if you need a 2 to land on the correct square but draw a 3, skip turns until you draw a 2.)

- If you land on a "hazard," move back one space.

- When you land on a square, read aloud what it says.

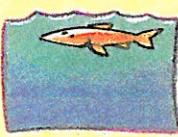
- When you have circled board and gathered your four habitat needs, you must land on square where you started in order to enter your habitat!

BONEFISH

- shallow warm water
- low salt
- soft muddy bottom
- clams, snails, shrimp, squid, small fish



sand and gravel bottom



shallow cold water



crayfish, snails, and plants



warm freshwater

BROWN BULLHEAD

- warm freshwater
- still surface
- muddy weed-covered bottom
- insects, crayfish, snails, plants



medium-deep water

exotic species (competitive)

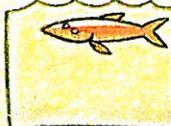
BRACKISH
freshwater salt



WARM FRESHWATER
pond in warm area

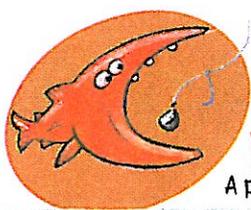


loss of food source



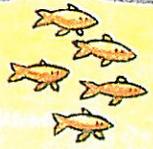
shallow warm water

low salt



HOOK, LINE AND SINKER
A person who is easily fooled "swallows" a story "hook, line and sinker."

Bet Home



1

WATER
water mix where
ever meets sea

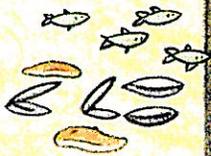
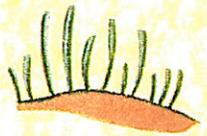


WATER

SALT WATER
ocean

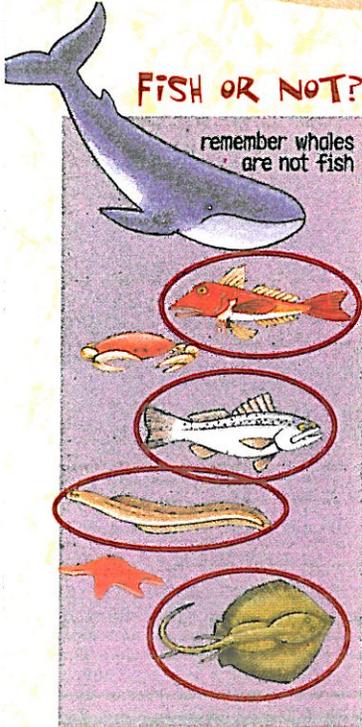
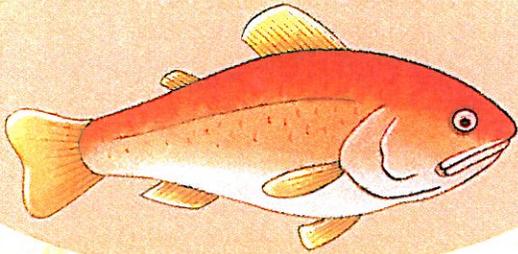


COLD FRESHWATER
mountain stream



3

PARTS MAKE THE WHOLE



FISH OR NOT?

remember whales are not fish

WORD SCRAMBLE

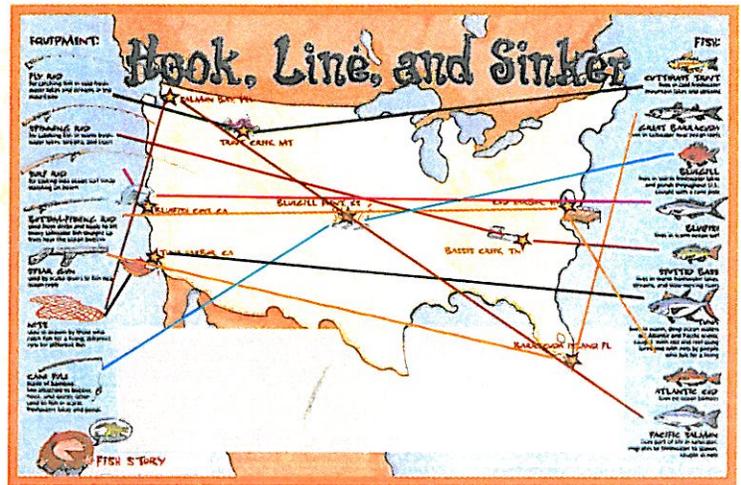
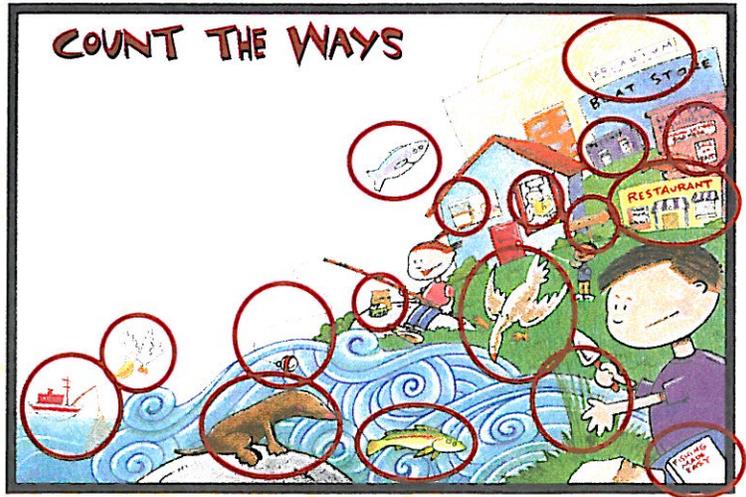
1. flounder
2. backbones
3. puffer
4. prehistoric sharks
5. gorge

NO BONES ABOUT IT

differences-
Fish have no arms or legs, so no shoulder blades or pelvis.

how they're alike-
Both fish and humans have backbones and ribs.

COUNT THE WAYS



Fish & Fishing



U.S. Department of Commerce, NOAA-National Marine Fisheries Service, Office of Habitat Conservation
Mission: To rebuild and maintain sustainable fisheries; promote the recovery of protected species; and to protect and maintain the health of coastal marine habitats.
(www.nmfs.noaa.gov/habitat/index.html)



Nebraska Game and Parks Commission
Mission: Stewardship of the state's fish, wildlife, parks, and outdoor recreation resources in the best long-term interests of the people and those resources. (www.ngpc.state.ne)



Project WET International
Mission: To reach children, parents, educators, and communities of the world with water education.
(www.projectwet.org)



U.S. Fish and Wildlife Service
Mission: To conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. (www.fws.gov/)



Future Fisherman Foundation, Youth Education Office of American Sportfishing Association
Mission: To promote curriculum-based conservation education and environmental stewardship, and to encourage recreational fishing among American youth. (www.asafishing.org)



Kids in Discovery Series
Mission: To help kids discover the scientific, natural, cultural, and historical wonders of their world. (www.projectwet.org)

To find out more about fishing in your state, call 1 800 ASK FISH.

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