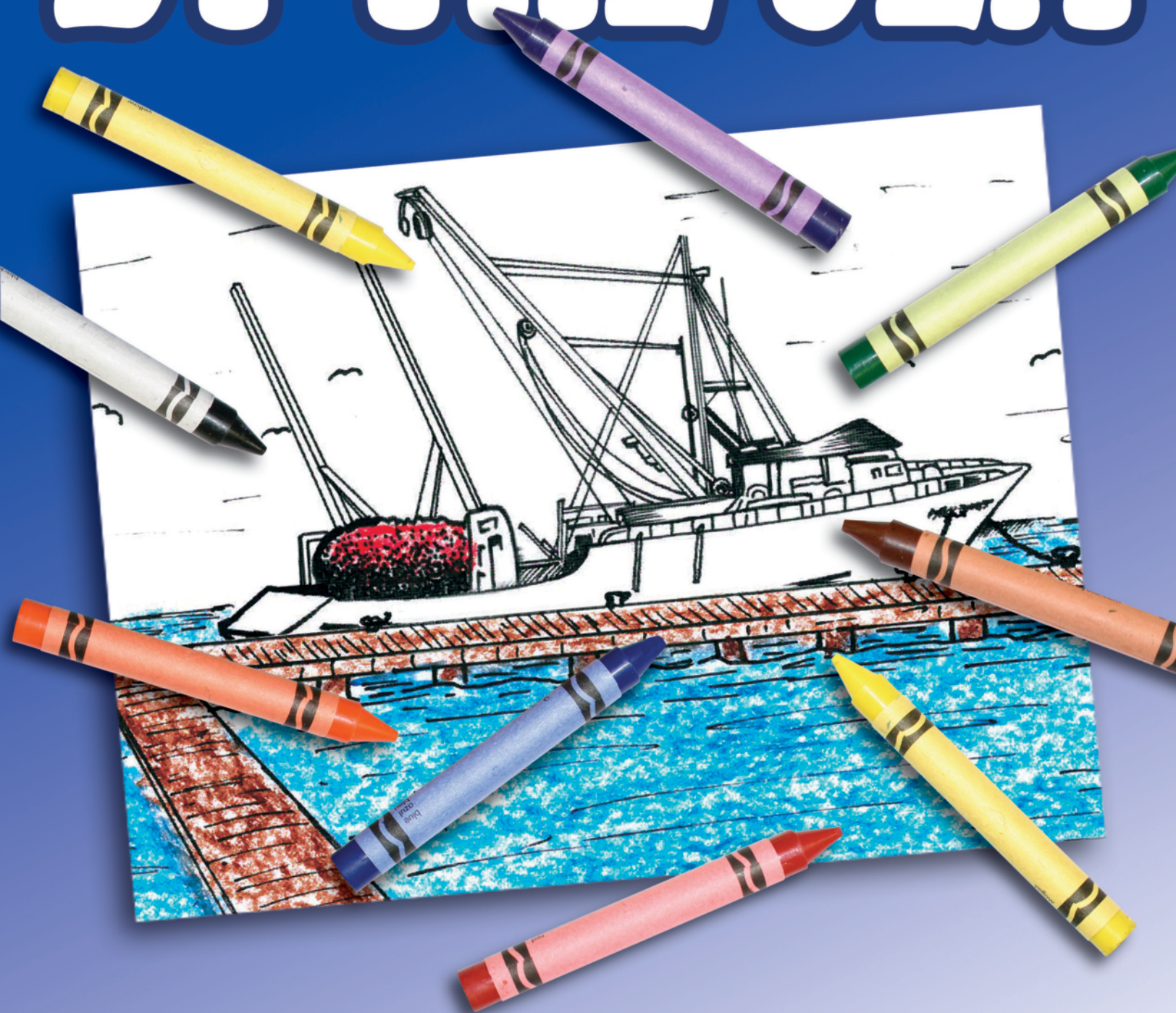


BY THE SEA



**ALL ABOUT FISH AND
FISHING IN NEW JERSEY**

**JERSEY
SEAFOOD**

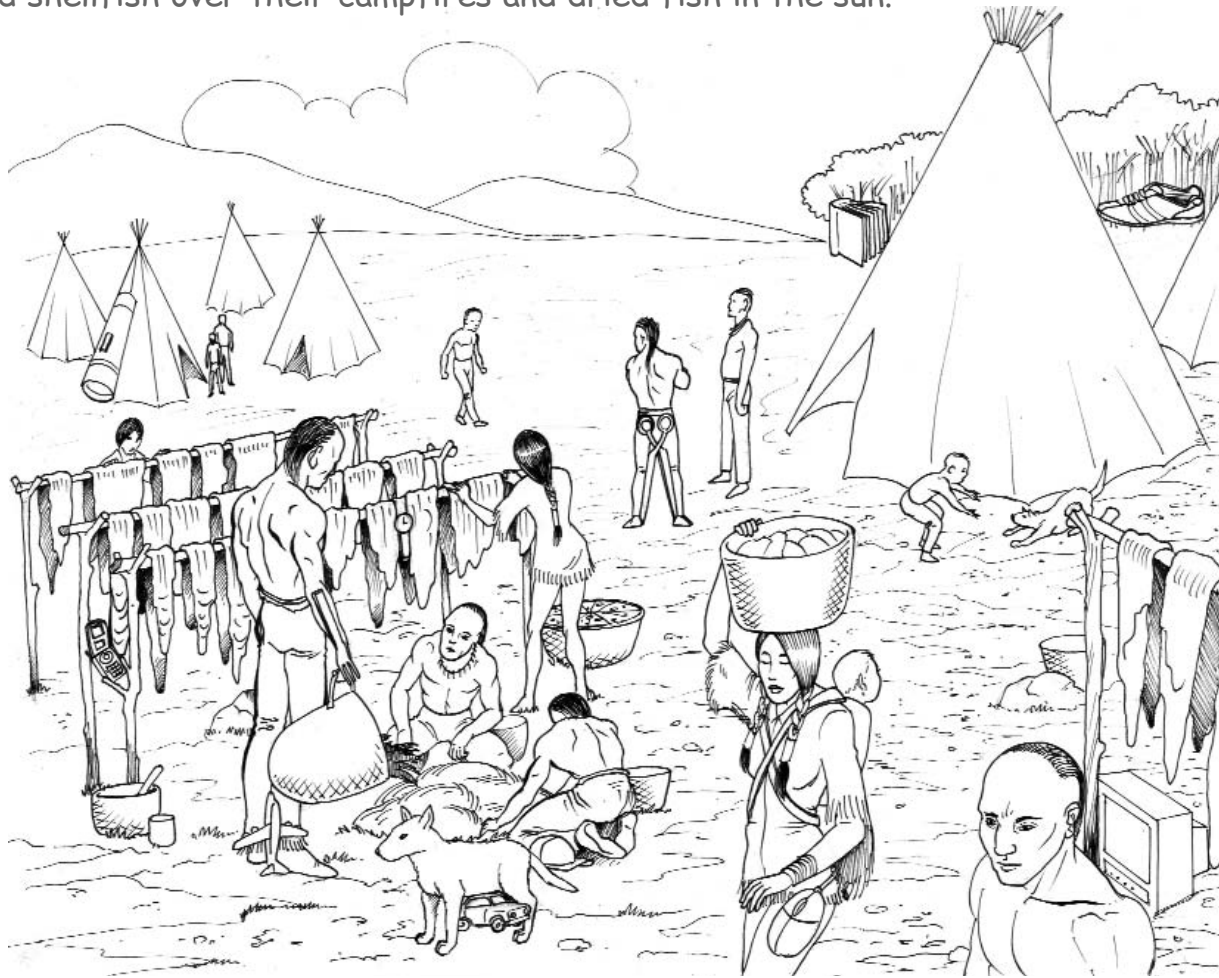
www.jerseyseafood.nj.gov

New Jersey's True People

The Lenni Lenape Indians were the first people to enjoy the wealth of seafood available in New Jersey. Lenni Lenape means "true people" in the language of the Delaware Indians.

The Lenni Lenape traveled with the seasons. In the summer, they went to the shore to feast on fish and shellfish. They used fish traps and nets, a bow and arrow or a club. They also gathered shellfish like clams, oysters and mussels along the coast.

To preserve their catch for the cold winter months, the Lenni Lenape smoked fish and shellfish over their campfires and dried fish in the sun.



Find 13 things in this picture that don't belong.



Flashlight



Cell Phone



Scissors



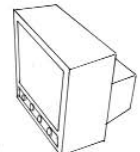
Pizza



Car



Baseball Hat



Television



Fork



Computer Mouse



Watch



Book



Airplane

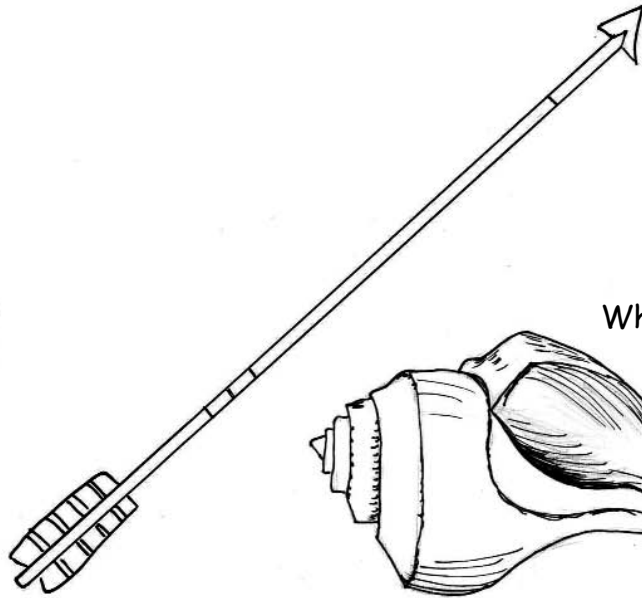


Sneaker

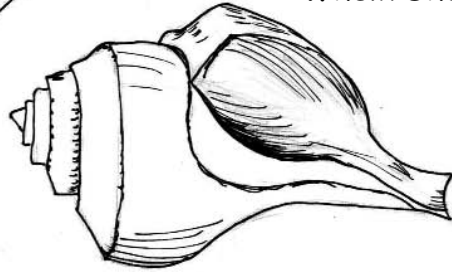
Quahog Shell



Purple

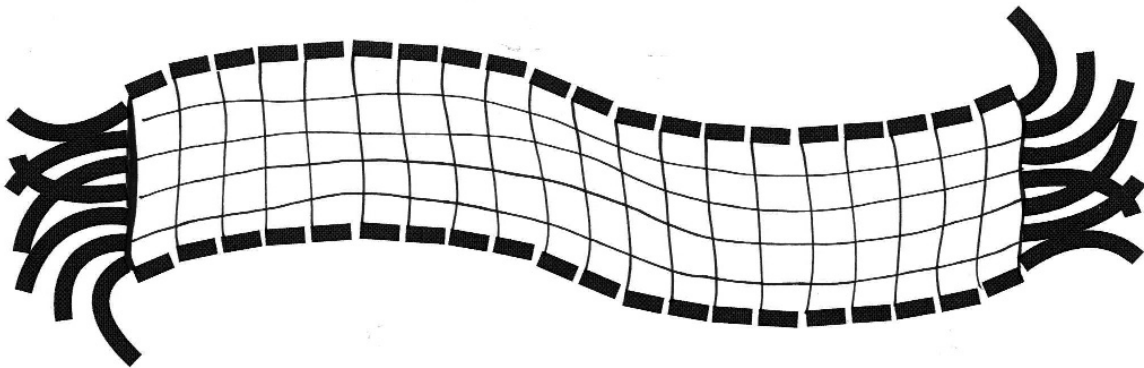


Whelk Shell



The Lenni Lenape also used the shells from quahogs (pronounced co-hogs) and whelks, a type of snail, to make "wampum". Originally, wampum was used to make belts and necklaces that told about important events or people's names. Later, wampum was used as a form of money to trade with the settlers. At one time, you could actually pay for your college education at Harvard with wampum.

The purple wampum made from the shells of the quahog or hard clam was the most valuable type of wampum. White beads were made from the whelk shells.

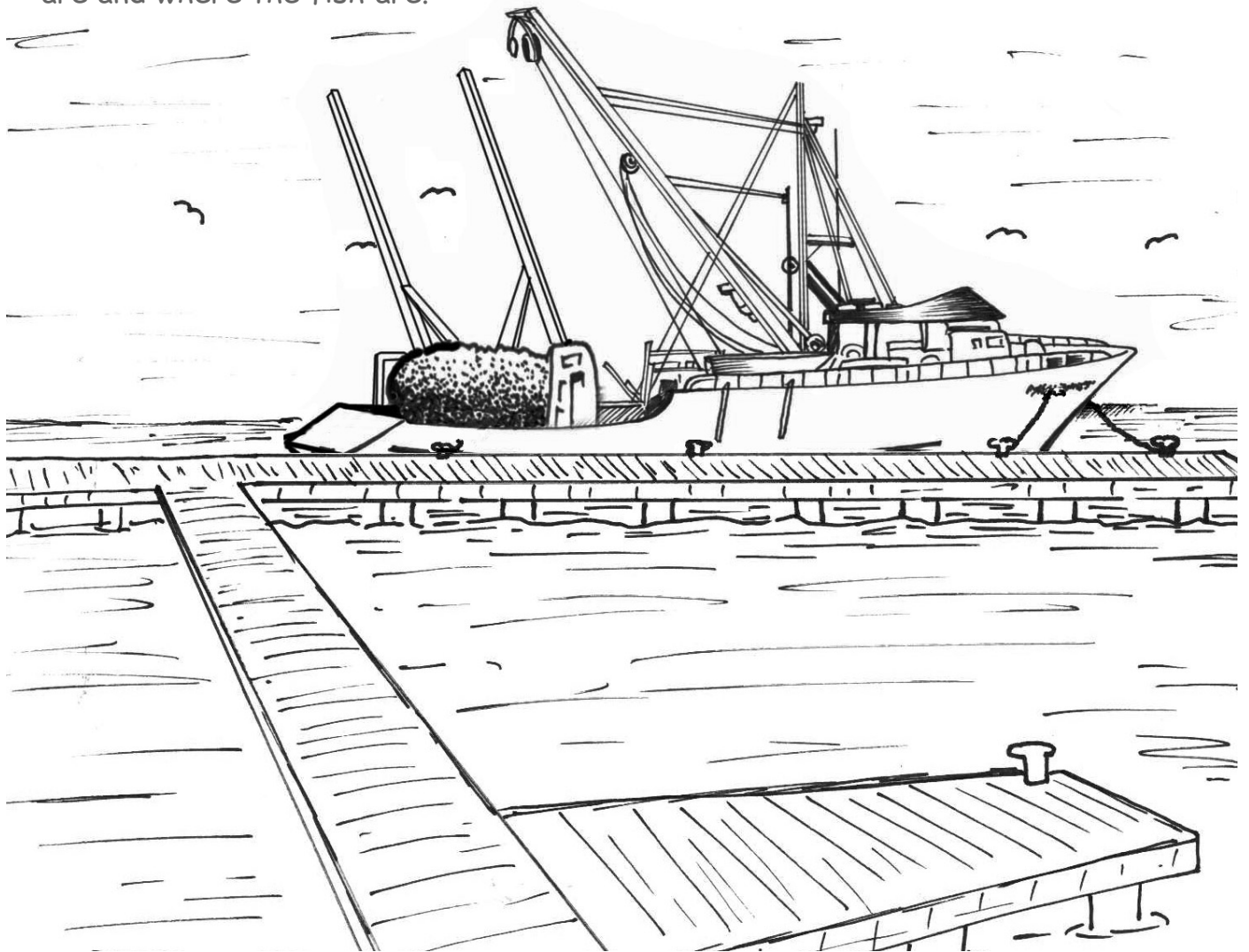


Design your own wampum. Color some of the squares purple to make a design or write your name. Remember, the purple beads are the most valuable!!! Use lots of purple.

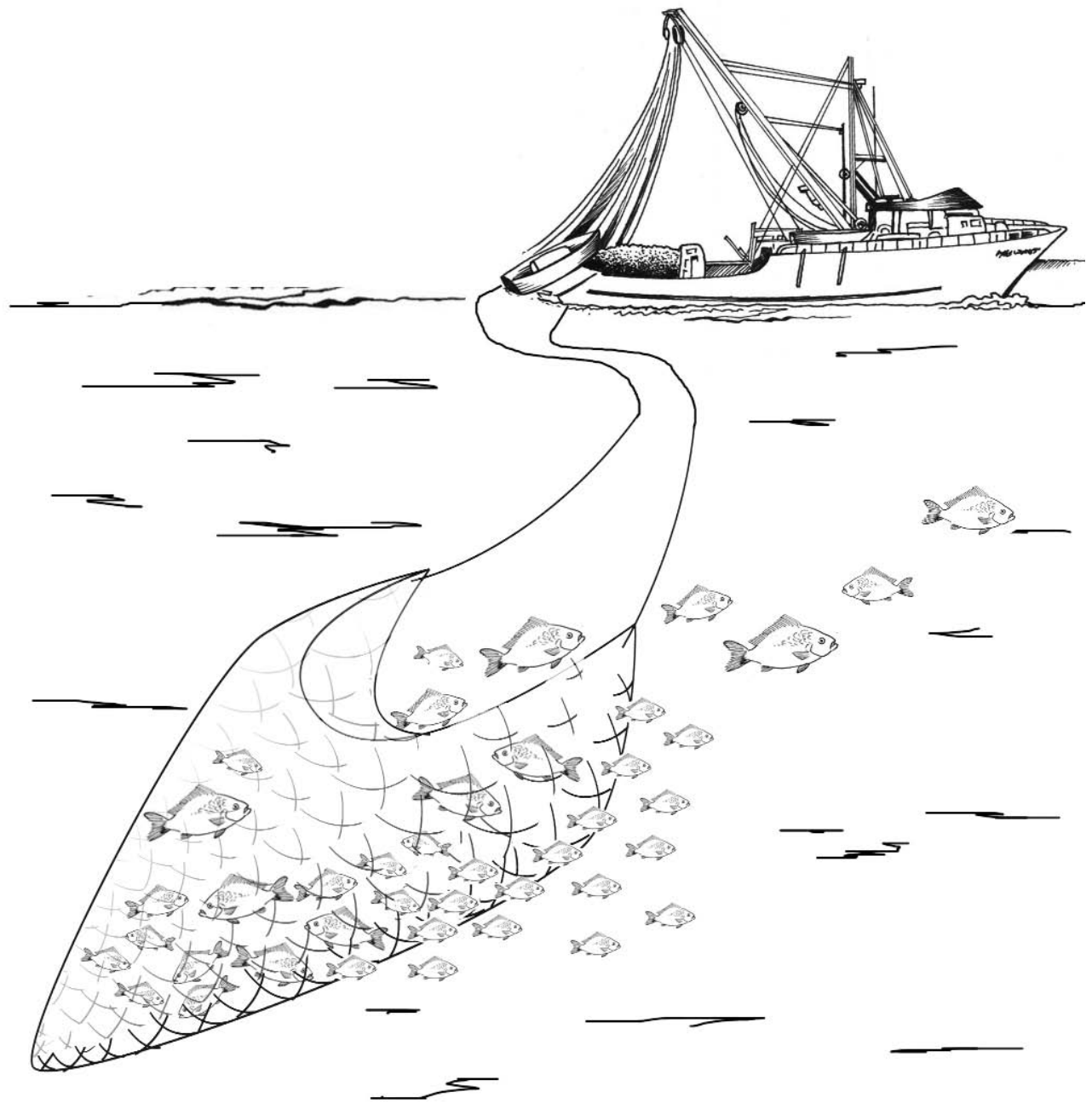
Commercial Fisheries

New Jersey fishermen harvest over a hundred different species of fish and shellfish. How many different kinds of fish and shellfish can you name? Try making a list. If you look in your local supermarket or on the menu next time you eat out, you'll find lots of fish that may have been harvested right here in New Jersey. We enjoy many of those fish here at home, but some are shipped as far away as Japan and China.

Some New Jersey fishing boats travel far offshore and stay at sea for weeks at a time. Sometimes there are fierce storms. It is very important for seafood harvesters to have accurate weather forecasts before and during a trip. Fishermen have to know a lot about electronics like radar and sonar so they know where they are and where the fish are.



"Red sky at night, sailor's delight.
Red sky in morning, sailor's take warning."



New Jersey fishermen work closely with scientists and government officials to develop plans that help to ensure that future generations will enjoy a good harvest of finfish and shellfish. They use information collected by scientists to determine how many fish the fishermen can catch, when they can catch them and what size fish they can catch. They also decide what size nets they should use so that the young fish and types of fish that they don't want can escape.

Fisheries Research

A team of marine biologists from the Rutgers University Marine Lab have just returned from a collecting trip along the New Jersey Coast. They are cataloguing specimens that are important for the commercial fishing industry. Unscramble the word(s) in the middle column to find the names of the species they collected.

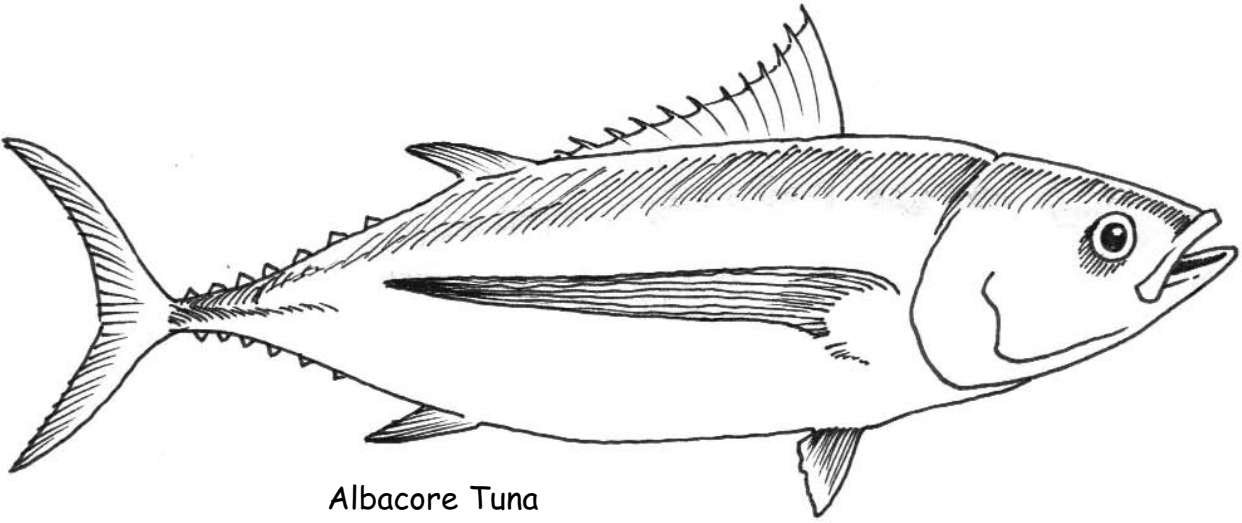
Scientific name	Scramble	Common name
1. <i>Homarus americanus</i>	ncaAemir sreblot	American lobster
2. <i>Scomber scombrus</i>	icAlatnt leremakc	
3. <i>Callinectes sapidus</i>	luBe cabr	
4. <i>Pomatomus saltatrix</i>	ulBeshfi	
5. <i>Mercenaria mercenaria</i>	draH malc	
6. <i>Placepecten magellanicus</i>	eaS lasclpo	
7. <i>Paralichthys dentatusm</i>	Smurme lofundre	
8. <i>Xiphias gladius</i>	fsSwrohdi	
9. <i>Spisula solidissima</i>	fruS lamc	
10. <i>Thunnus alalunga</i>	bAlareco atnu	

Working with commercial fishermen and government agencies, scientists collect information about the number of fish in our waters, changing environmental conditions, size of our harvest, and how different animals interact with each other. Some scientists investigate new drugs, foods and cosmetics that can be made from marine organisms. The next time that you have ice cream, look at the ingredients on the side of the carton. Do you see carageenan listed? Carageenan is a substance that is made from seaweed. It makes the ice cream creamier, thicker, and helps to keep it from melting. Scientists estimate that there are a million new species to be found in the deep oceans. They use very sophisticated equipment to investigate those dark worlds beneath the ocean. In very deep water, there is no light, the pressure is very high and it is very cold. Fish have special adaptations to allow them to live in this hostile world. Some fish even can make light!

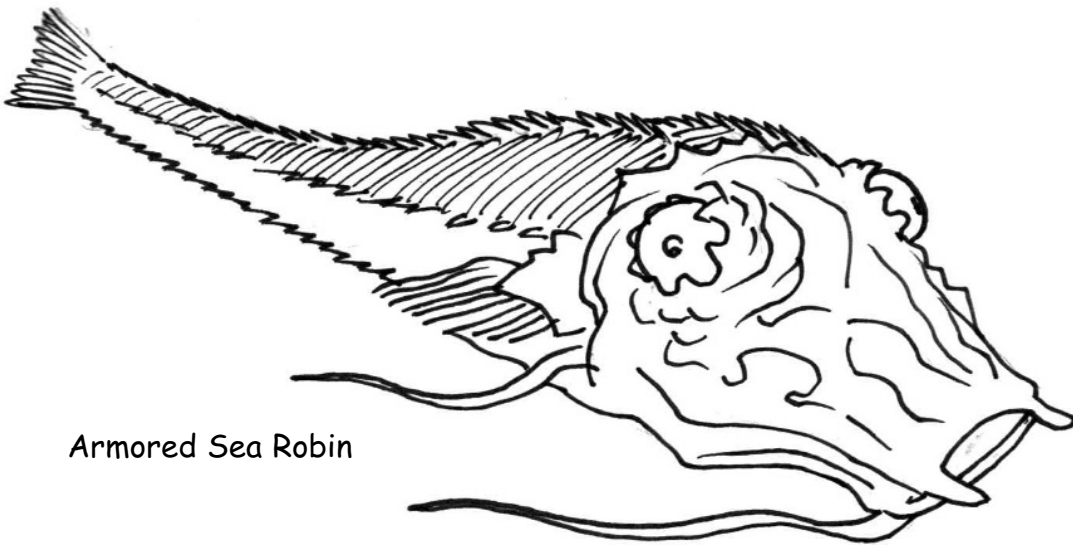
ANSWERS:

1. American lobster 2. Atlantic mackerel 3. Blue crab 4. Bluefish 5. Hard clam
6. Sea scallop 7. Summer flounder 8. Swordfish 9. Surf clam 10. Albacore tuna

Color the Fish Below!



Albacore Tuna



Armored Sea Robin

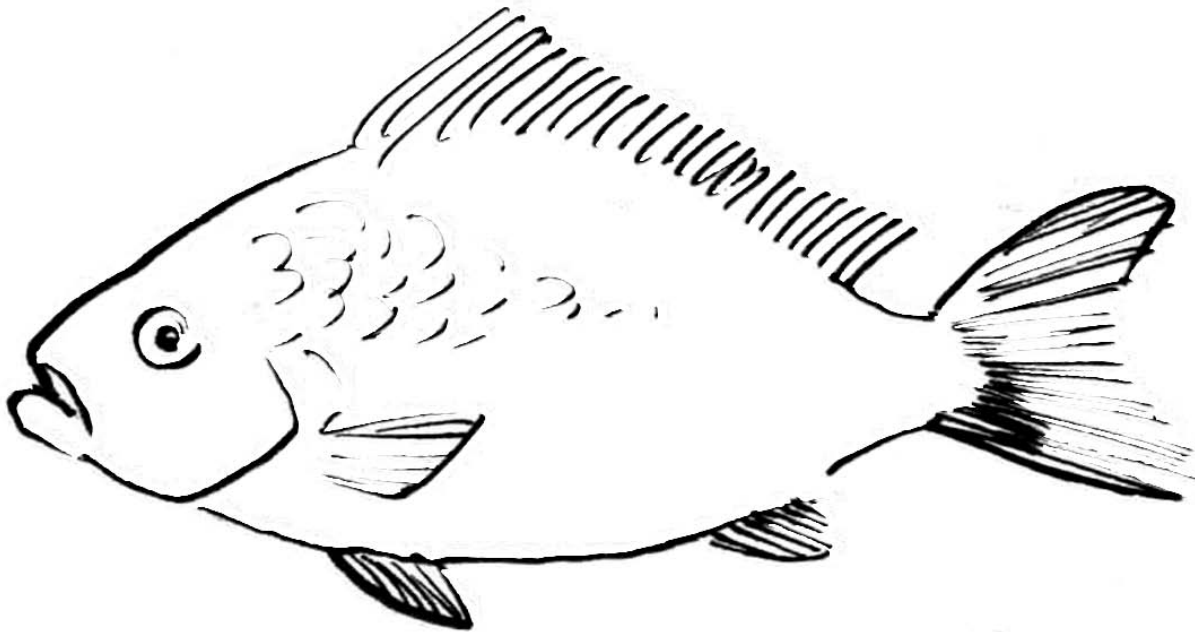
If you'd like to take a trip to the abyss or want to know why the sea is salty, visit the Rutgers University Institute of Marine and Coastal Sciences website at www.coolclassroom.org

Aquaculture

AQUACULTURE or fish farming is the raising of fish and shellfish in special farms. Aquaculture can take place in the open ocean, in bays, in ponds, greenhouses, and even in buildings.

In addition to preserving mummies and building pyramids, the ancient EGYPTIANS were raising fish over 4,000 years ago. The Japanese raise a special type of fish similar to a goldfish that can sell for tens of thousands of dollars. These special fish are called KOI.

Many people raise koi as a hobby and they want certain colors and patterns. The colors can be white, black, red, orange and grey. Sometimes the fish have shiny scales. Sometimes, they have no scales at all.



Koi

Some researchers are experimenting with raising fish in giant cages many miles offshore. The cages are equipped with cameras so that scientists on dry land can see what is happening. If the cages need to be repaired or there are other problems, boats take divers to the site. FLOUNDER and cod are being raised offshore in other states.

New Jersey aquatic farmers raise hard clams, OYSTERS, koi, fish for food and to stock ponds for recreational fishing. SALMON is one of the world's most important aquaculture fish. New Jersey farmers don't raise salmon because the water is too warm at certain times of the year.

Clams, oysters and mussels are important both because they taste good and because they help to keep the water clean. These animals are called FILTER feeders because they strain food out of the water.

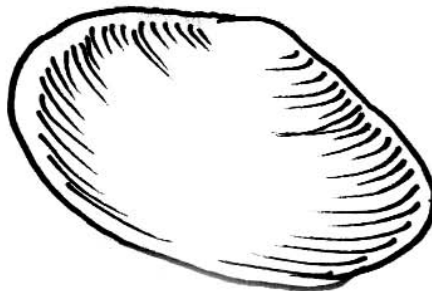
Clam, oyster and mussel farmers plant seeds (baby shellfish) in water just like farmers on land plant corn seeds. The seeds are raised in nurseries on land where they are fed ALGAE (very tiny, microscopic green plants). When they reach a certain size, the seeds are planted on aquatic farms. Farmers in the Delaware Bay produce some of the finest oysters in the world.

In Japan, oysters are farmed to produce cultured PEARLS. A tiny bead is placed in the oyster. The bead bothers the oyster so it produces a smooth shiny substance called NACRE over the bead. The layers of nacre that grow over the bead form the pearl.

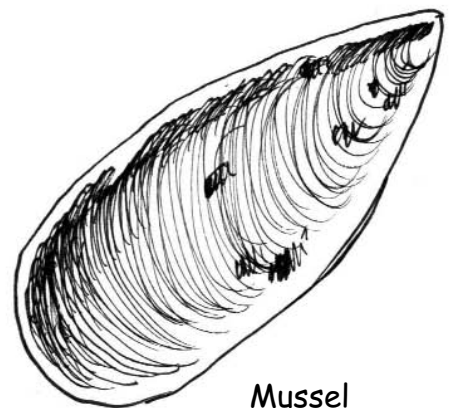
Color These Filter Feeders



Oyster



Soft Shell Clam



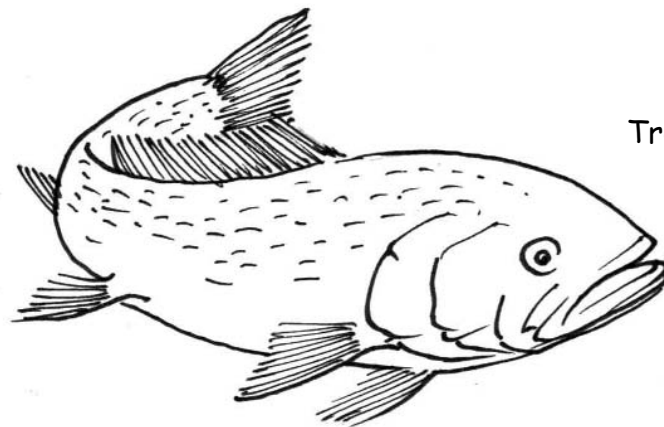
Mussel

Aquaculture is important because it provides good quality food, produces fish, like TROUT, to stock lakes, PONDS and streams for recreational fishing, and some shellfish like clams, oysters and mussels actually clean the water. Have you ever found an oyster shell that has other shells attached to it? Because oysters often grow together, they form habitats for other marine animals. A HABITAT is a place to live.

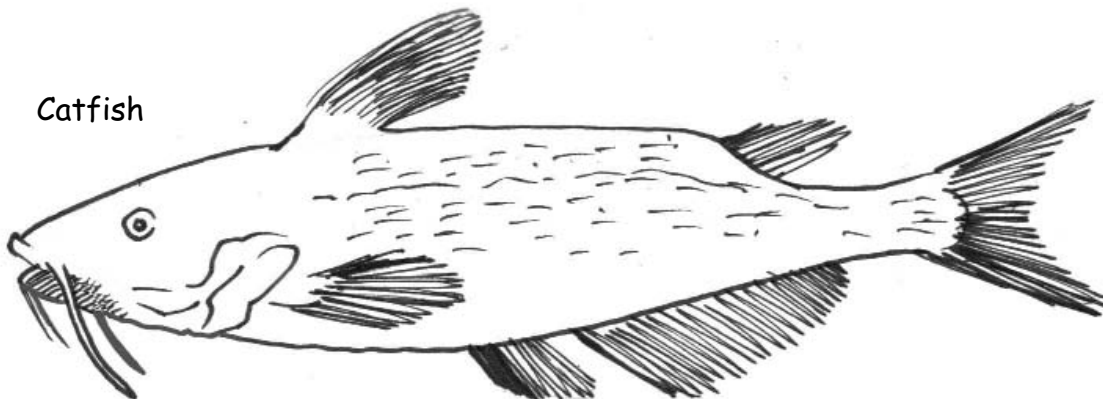
Trout and catfish are both freshwater fish, but they live in very different habitats. Trout like to live in cold, clear, running water that has lots of oxygen. (Remember, fish use their GILLS to take oxygen out of the water so they can breathe.) Trout feed during the day. They eat insects, fish and shellfish.

Catfish live on the bottom and like warm water. Because they often live in murky water, catfish have special "whiskers" called BARBELS that can help them feel around in the dark. That's how they got their name!! Catfish like to feed at night. They eat insects, small fish and plants.

Fish farmers have to recreate those habitats so that their fish will grow. Trout are raised in spring-fed raceways where the water moves quickly through the system. Catfish are raised in ponds. Different types of aquaculture fish are fed different foods just like dogs and cats require different foods. Other kinds of fish and shellfish are raised in indoor systems so that the temperature can be controlled all year round.

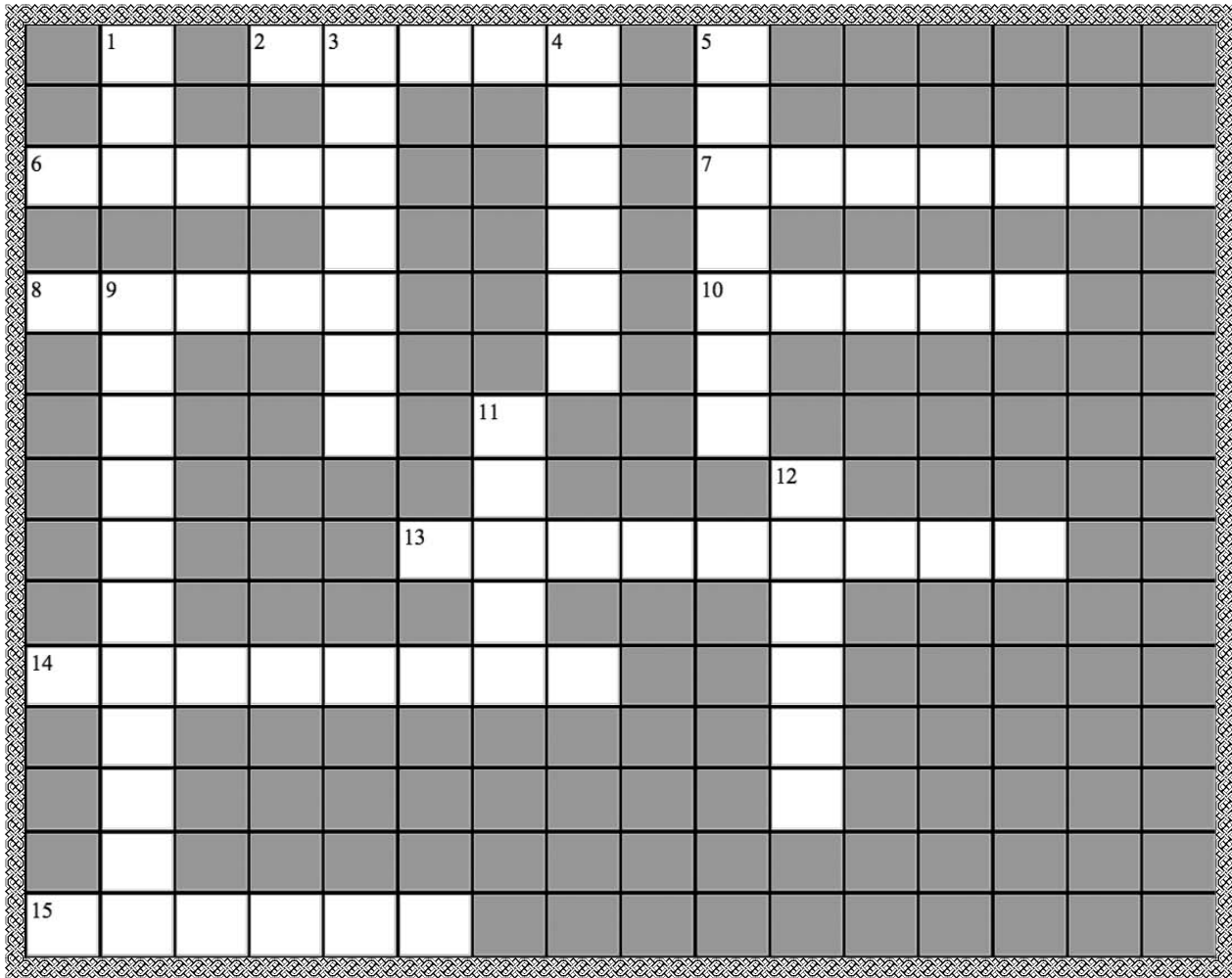


Trout



Catfish

Aquaculture Crossword Puzzle



ACROSS

2. Catfish are raised in _____
6. Fish get oxygen from the water through their _____
7. Catfish use _____ to find their food
8. The material that pearls are made of is called _____
10. A fish that is raised for food and recreational fishing is _____
13. Over 4,000 years ago, fish were raised by the _____
14. A fish that is raised in offshore cages in other states is _____
15. Oysters make these gems

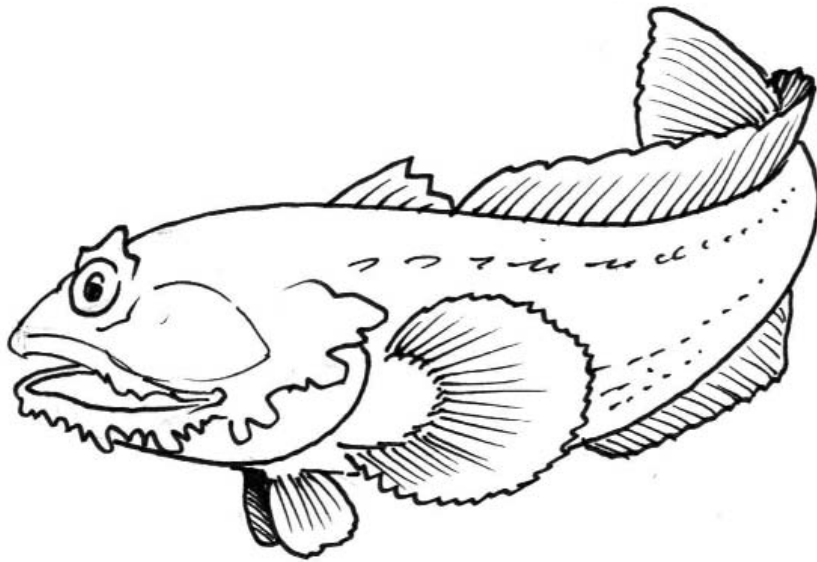
DOWN

1. Very fancy carp are called _____
3. These shellfish are farmed in the Delaware Bay
4. An aquaculture fish that is not raised in New Jersey is _____
5. The specific place where an animal lives is called its _____
9. Another word for fish farming is _____
11. Oysters and clams feed on microscopic plants called _____
12. Oyster and clams _____ food from the water and help keep the water clean

ANSWERS:

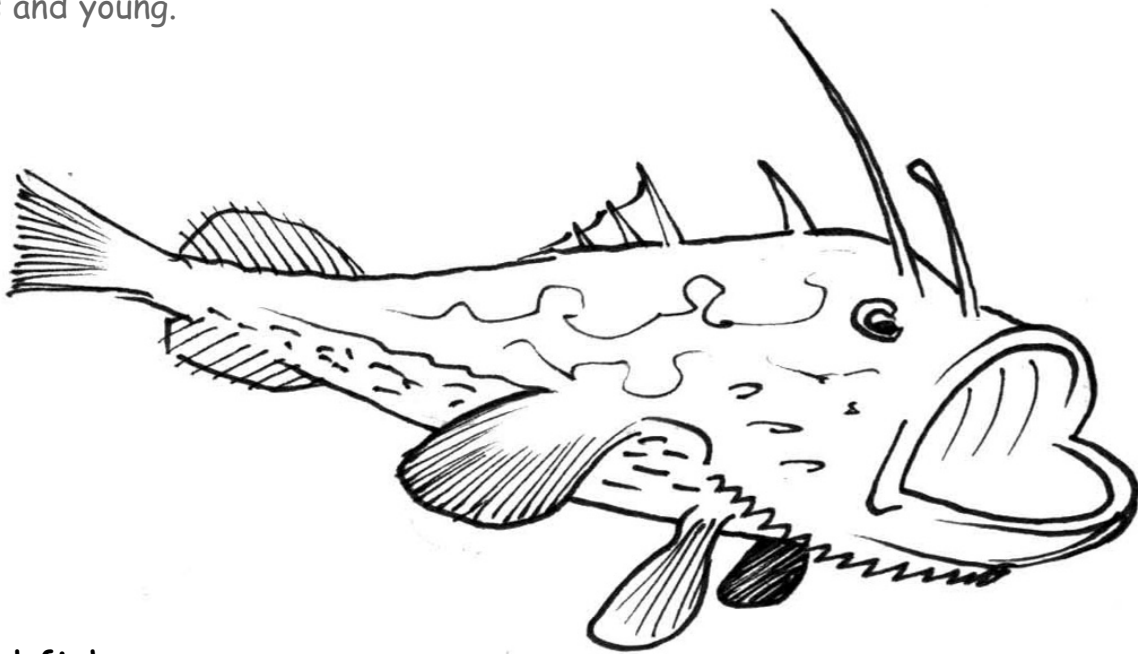
1. Koi 2. Ponds 3. Oysters 4. Salmon 5. Habitat 6. Gills 7. Barbels 8. Nacre 9. Aquaculture 10. Trout 11. Algae 12. Filter 13. Egyptians 14. Flounder 15. Pearls

New Jersey's Strange Denizens of the Deep



Oyster Toadfish (shown above)

The oyster toadfish can have a foul temper and snap at anything in sight. Male toadfish make a sound like a foghorn to attract passing females to the nests. Once the female lays eggs, she simply swims away leaving the male to take care of the eggs and young.



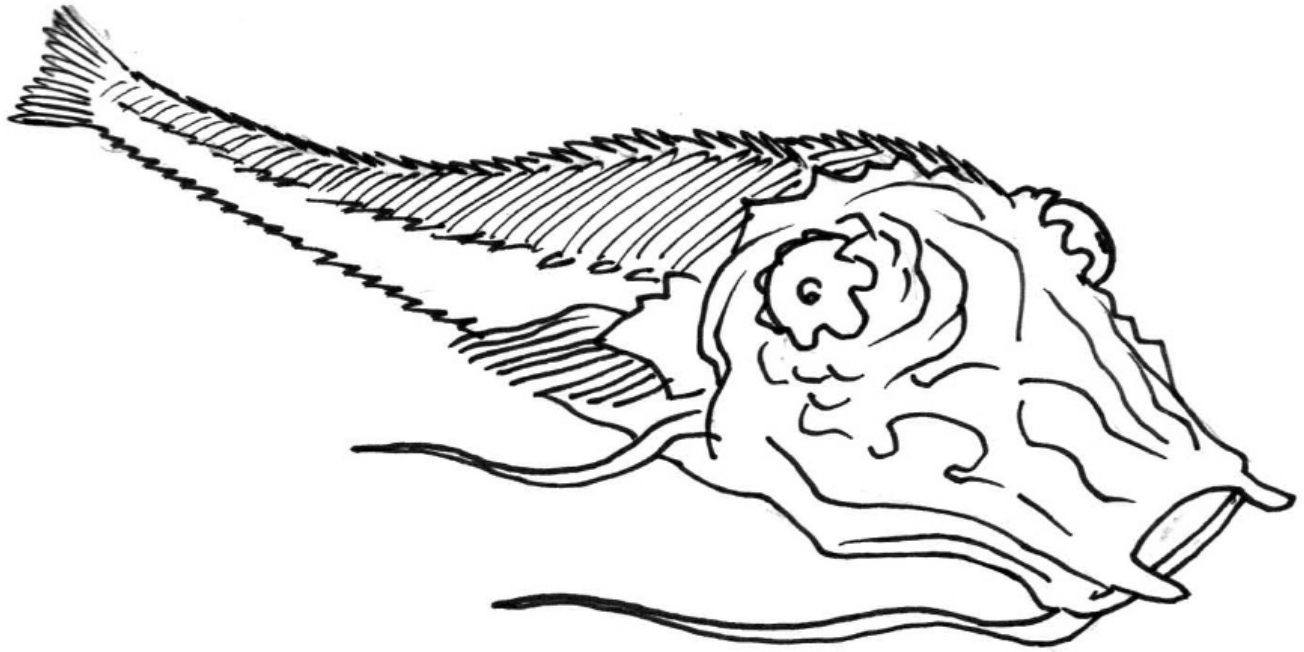
Monkfish (shown above)

Monkfish are sometimes called anglerfish because they have a special built-in fishing pole and bait. Under the fishing pole is a gigantic mouth. The monkfish sits quietly on the bottom and when a little fish swims up to eat the worm, the monkfish has dinner.

New Jersey's Strange Denizens of the Deep

Lumpfish

Lumpfish got their name from their fat body and warty skin. Eggs of the lumpfish are used to make imitation caviar. Baby lumpfish are often found in seaweed clumps where they are protected.



Armored Sea Robin (shown above)

The body of the armored sea robin is covered with bony plates and spines that help protect it from predators.

Sea Raven

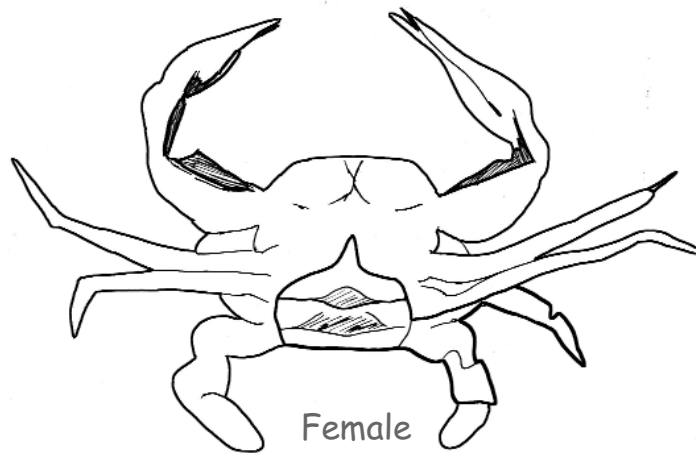
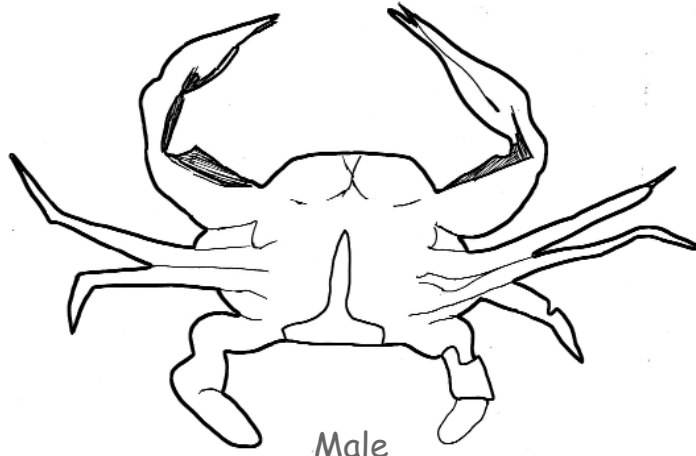
Sea ravens come in many different colors. They can be blood red, reddish purple, chocolate and yellow brown. The sea raven can inflate itself with water.

New Jersey Shellfish

Fisherman in New Jersey harvest more surf clams and ocean quahogs than any other state. If you ever eat clam chowder, spaghetti with clam sauce or fried clams, there's a very good chance that the clams you are eating were harvested right here in New Jersey.

These clams are often called sea clams because they are harvested offshore in deep water. The clams are dredged up from the bottom and packed into cages on the deck of the ship. Sea clamming is a very dangerous job. There are often storms and very large waves. Because the clams are stored in big cages, the boat can become unstable and tip during bad weather.

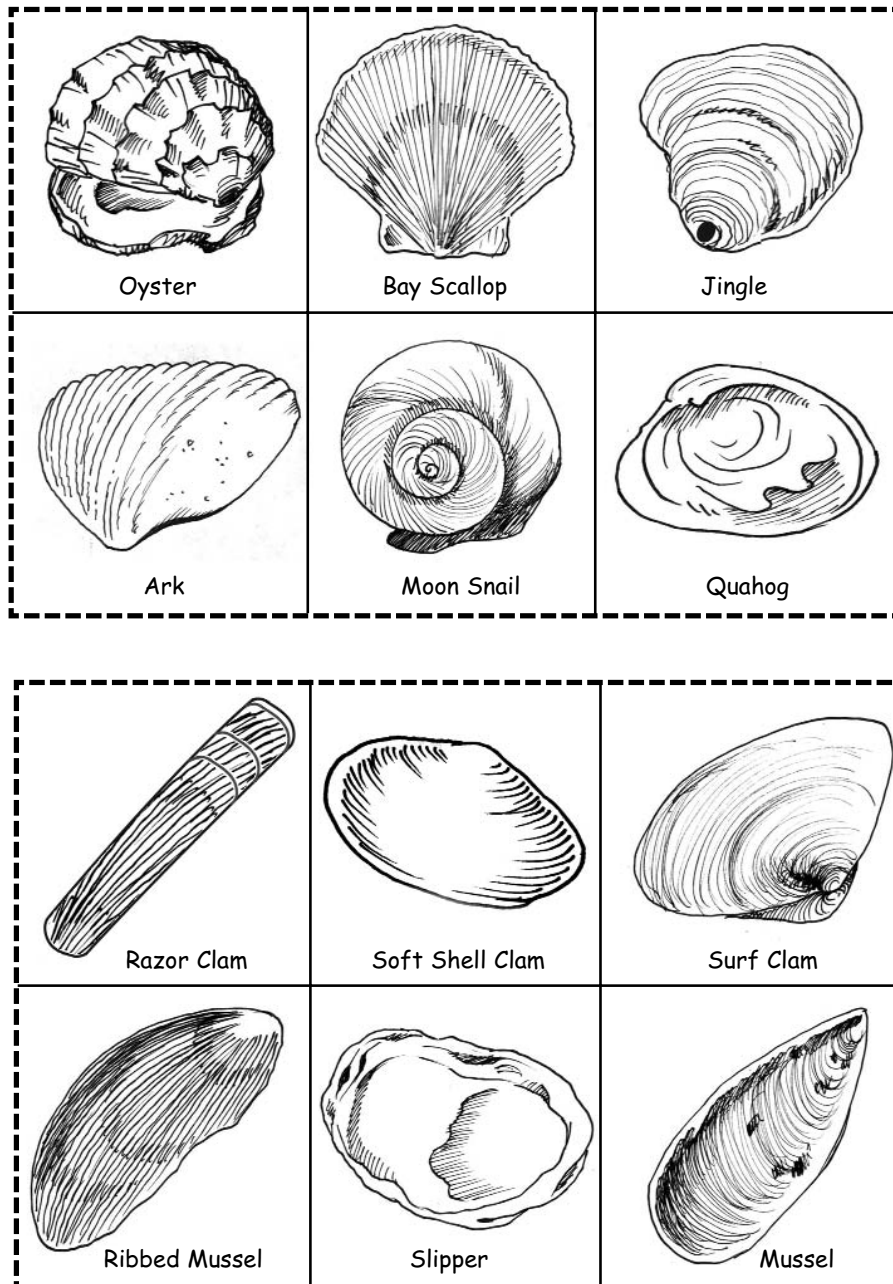
Blue crabs (shown below) are another important New Jersey harvest. Maybe you've even had the opportunity to go crabbing when you visit the shore. The scientific name of the blue crab *Callinectes sapidus* means "beautiful swimmer". Blue crabs are good swimmers because one set of legs is actually shaped like little paddles. As blue crabs grow, they shed their shell, called an exoskeleton. It is called an exoskeleton because it is on the outside of their bodies. Be careful if you find a live blue crab. It can give you a good pinch with its claws.



Have Fun Collecting Shells at the Beach!

DIRECTIONS:

- 1) Cut out the boxes of shells carefully along the dotted lines.
- 2) Paste the boxes side by side on the top cover of an empty egg carton. Next time you're at the beach, take a look around to find examples of each shell and place them in the cups below the picture.

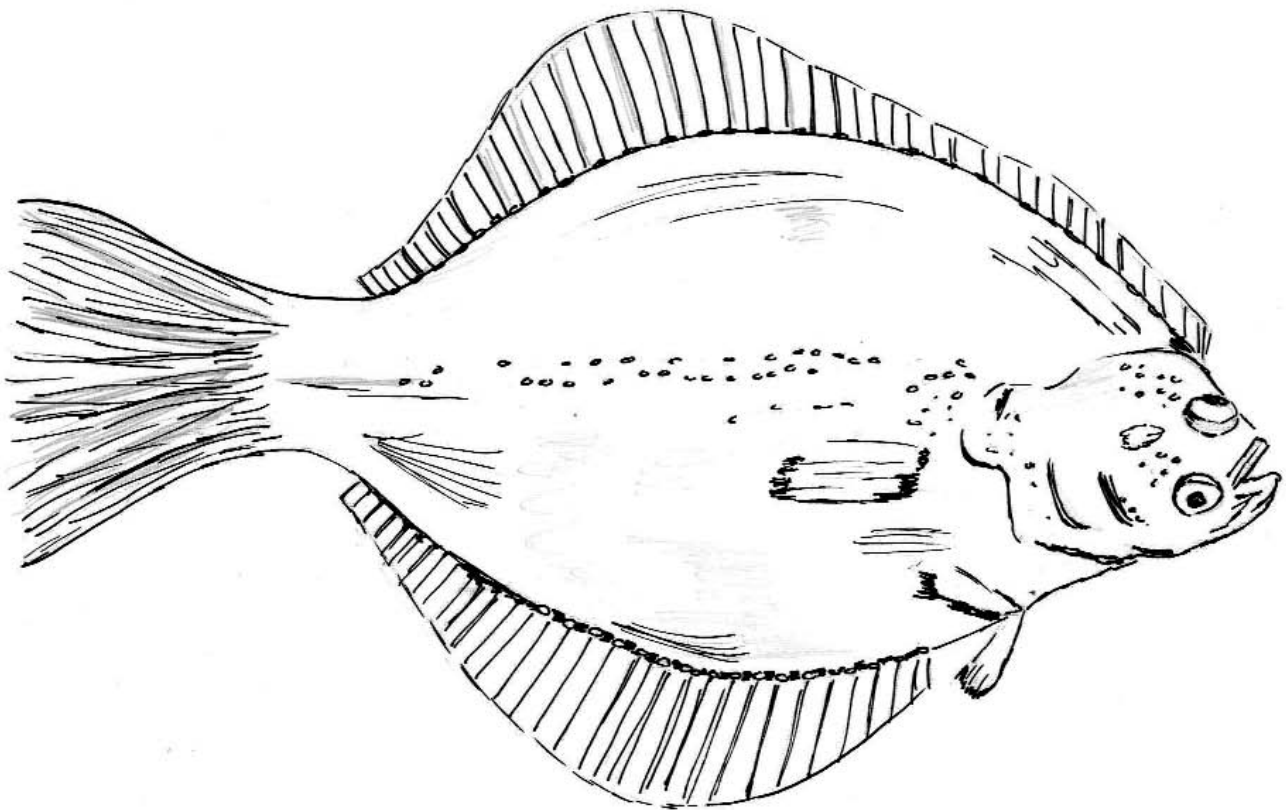


Find the Flounder

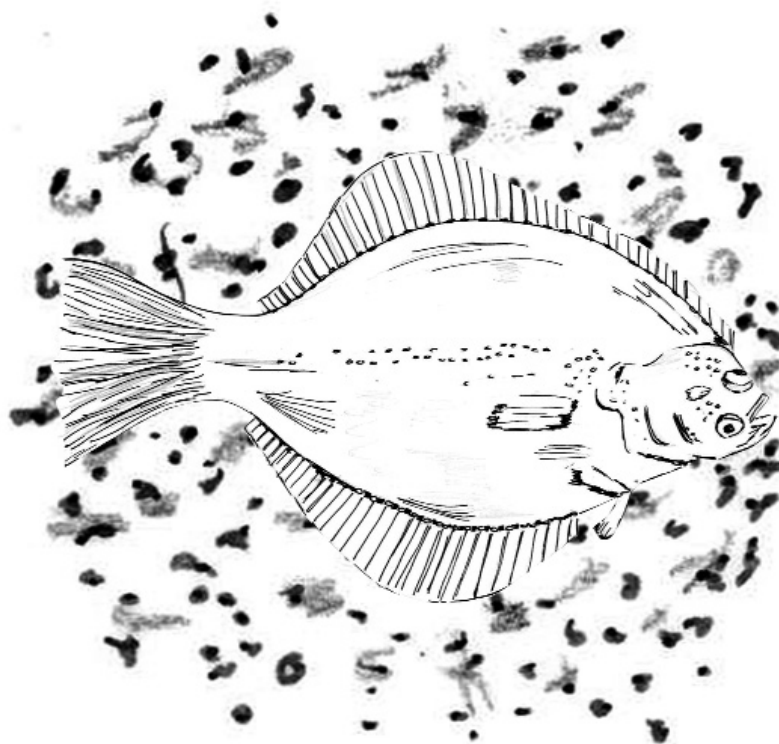
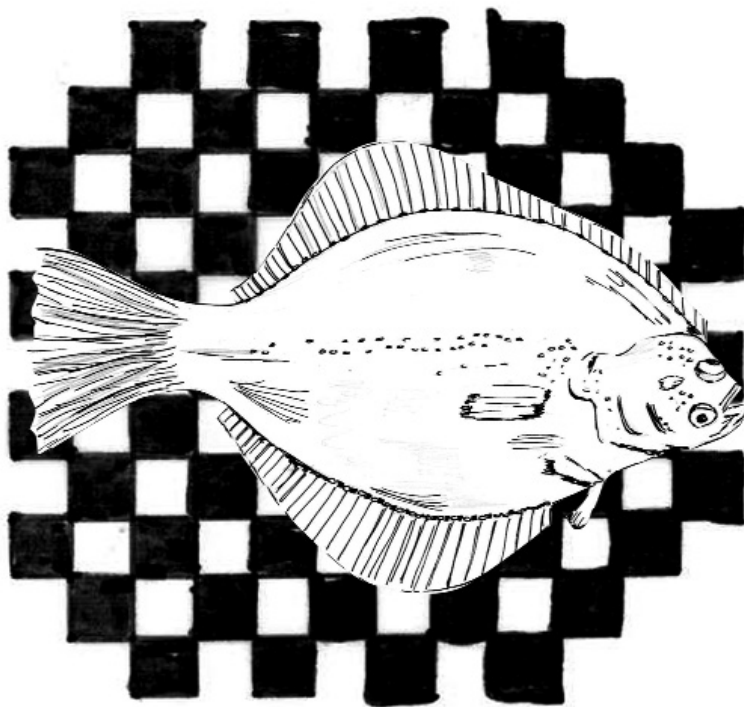
Animals have special characteristics that help them to survive in their environments. These characteristics are called adaptations. Adaptations include shape, size, color, defensive behaviors and feeding habits. Fish are adapted for life in water.

Flounder live on the bottom of the ocean. When a flounder is first born, it looks like a normal fish with one eye on each side of its head. As it grows up, one eye gradually moves over its head to the other side. That way when the flounder is lying on the bottom, it can see with both eyes. Some flounders face to the right and others face to the left.

The bottom side of the flounder is white while the topside is dark. This is a special adaptation called counter shading. It makes it harder for predators (animals that eat other animals) to see the flounder when it is swimming. Flounder can also change color to match the background. This is called camouflage. Flounder have tiny sacks of pigments (colors) in their skin. These sacks are called chromatophores. Making the sacks smaller and larger allows the flounder to change color. Counter shading and camouflage are adaptations.



Color Each Flounder to Match the Background



"I must go down to the seas again, to the lonely sea and the sky
And all I ask is a tall ship and a star to steer her by,
And the wheel's kick and the wind's song and the white sail's shaking,
And a grey mist on the sea's face and a grey dawn breaking."

John Masefield, *Sea Fever*



Developed and Produced by:
New Jersey Department of Agriculture
P.O. Box 330 Trenton, NJ 08625
Phone: 609-984-6757 • Fax: 609-633-7229