

Name:

Date:

Class:

Fish questions for readings...answer on another sheet of paper and staple everything together

Fish Intro:

1. What is a fish?
2. How many species are there?
3. Which is larger: Chondrichthyes or Osteichthyes?
4. Give 2 examples of cartilaginous fish and 2 of bony fish?
5. Most fish: external or internal fertilization?
6. Why does the female lay so many eggs?
7. How are sharks different in reproduction?
8. What nourishes the larval fish?
9. Where is the yolk?
10. What do the fish feed on after yolk?
11. How long does it take fish to mature? How about to mature to sexual maturity?
12. Color the fertilized egg yellow, the fish larva (newly hatched) red, the larva blue, the young (fry) orange, and the adult green.

The Cod and Summer Flounder

13. What is cod's scientific name?
14. What is scrod?
15. What is the typical size of cod caught by fishermen?
16. Where do they live? (vertically speaking)
17. Are they picky when it comes to meals?
18. Name 5 things they eat.
19. Are flatfish flat? What is better terminology?
20. What happens to the eye of a flatfish as they mature?
21. Color the summer flounder white w/ gray and brown spots. Color the cod violet.

Remoras and Sea Horses

22. What is another name for remoras?
23. What is the sucking disk?
24. Besides sharks, what are 3 other organisms they may attach themselves to?
25. Where do you normally find remora?
26. Is a remora permanently attached once it latches on?
27. Are they parasites? Why or why not?
28. Do remoras share their hosts' food?
29. How does a seahorse swim?
30. How well does it deal with strong currents?
31. How do they hold on to seagrasses and seaweed?
32. How do they eat?
33. Describe the skin/scales of a seahorse.
34. Who carries the developing babies?
35. Where can you find seahorses?
36. Color the remora orange, the shark sucker blue and the seahorse brown.

Name:

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Goosefish, Lumpfish and Batfish

37. Where are these bizarre fish found?
38. What has happened to the dorsal fin of the goosefish?
39. What is its purpose?
40. How do batfish crawl?
41. What does the lumpfish hold onto on the bottom of the ocean?
42. What do lumpfish feed on?
43. Color the goosefish green, the batfish red and the lumpfish yellow.

Minnows

44. What is the scientific name of the common minnow?
45. What are some other common names for it? (3)
46. Where are you likely to find these?
47. Are they flexible in their habitats?
48. What is one thing the common mummichog eats?
49. What is "feisty" about the sheepshead minnow?
50. How does a striped killifish get back into water if washed ashore?
51. What is a school? Who do the school members follow?
52. What happens when a school turns?
53. What good is the lateral line?
54. Why do fish school?
55. Color the common mummichog blue, the sheepshead minnow violet, the striped mummichog orange, and the silverside gray.

Puffer and Burrfish

56. What do these fish do to thwart their enemies?
57. How is it possible they do this without breaking their skin?
58. What do they inflate with?
59. What do they lack and what structures are reduced?
60. Why might you say a puffer fish is bucktoothed?
61. What is the scientific name for the pufferfish?
62. What happens after the puffer inflates?
63. What is its belly covered with? What purpose do they serve?
64. What do puffers eat?
65. Why wouldn't you eat at a sushi restaurant serving puffer viscera (guts)?
66. What is the scientific name of the burrfish?
67. What do these look like when deflated?
68. Where might you find one of these?
69. Are they poisonous?

70. What is the most interesting thing you learned through these readings?

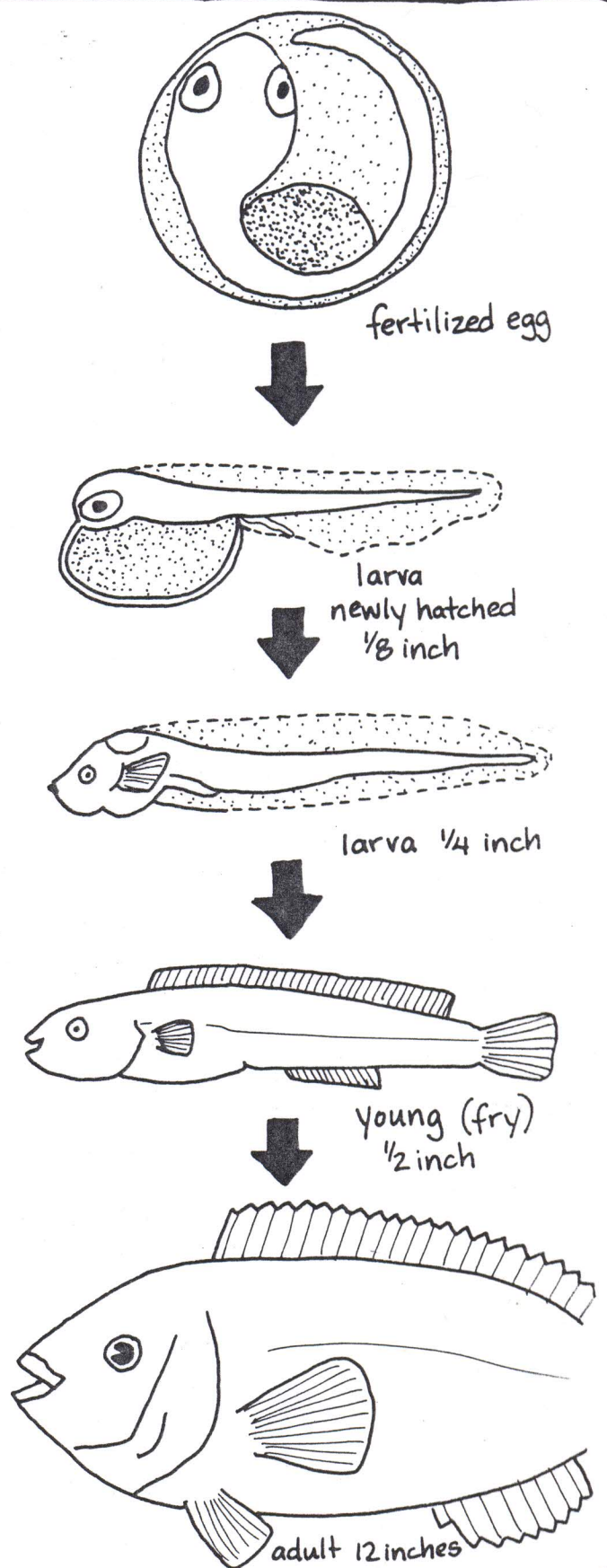
14 Fish

Fish are aquatic, cold-blooded vertebrates that breathe with gills and have fins instead of limbs. Nearly half of the 40,000 known species of vertebrates are fish. Ninety percent of these fish species belong to the class Osteichthyes, the bony fish. Most of the other 10 percent belong to the class Chondrichthyes, the cartilaginous fish. Bony fish have a skeleton made of bone; cartilaginous fishes have a skeleton made of cartilage. Sharks, rays, and skates are cartilaginous fish, whereas almost all other fish, such as cod, tuna, and salmon, are bony fish.

Fish differ greatly in breeding habits. Most fish species reproduce through external fertilization. Some fish merely swim next to each other while releasing eggs and sperm into the water. In this case, with egg and sperm randomly discharged into the water, there is a good chance that many eggs will never be fertilized. To compensate for this, the female produces thousands, even millions, of eggs, thus ensuring that sperm cannot help but bump into some of them. A few species, especially the sharks, display internal fertilization. Male sharks actually place sperm into the reproductive tract of the female.

Although some fish attach their fertilized eggs to the bottom and others build nests, most species of bony fish start life as tiny planktonic eggs, adrift in the sea. The eggs float (some contain a drop of oil to increase their buoyancy) and disperse from the breeding ground.

Larvae develop inside the eggs, nourished by the yolk. Depending on the species, they hatch out days or weeks later. Fish larvae have large eyes, a short trunk, a long tail, and a transparent fin extending from head to tail. Between their head and anus is a glob of yolk that sustains the young fish until its muscles and jaws are well enough developed so it can fend for itself. When the yolk is depleted, the larvae feed on plankton. Eventually the fish larvae develop into fry (young fish), and then into adults. Some fish mature in weeks, while others take years to reach sexual maturity. Naturally, only a small percentage of fish larvae live to adulthood.



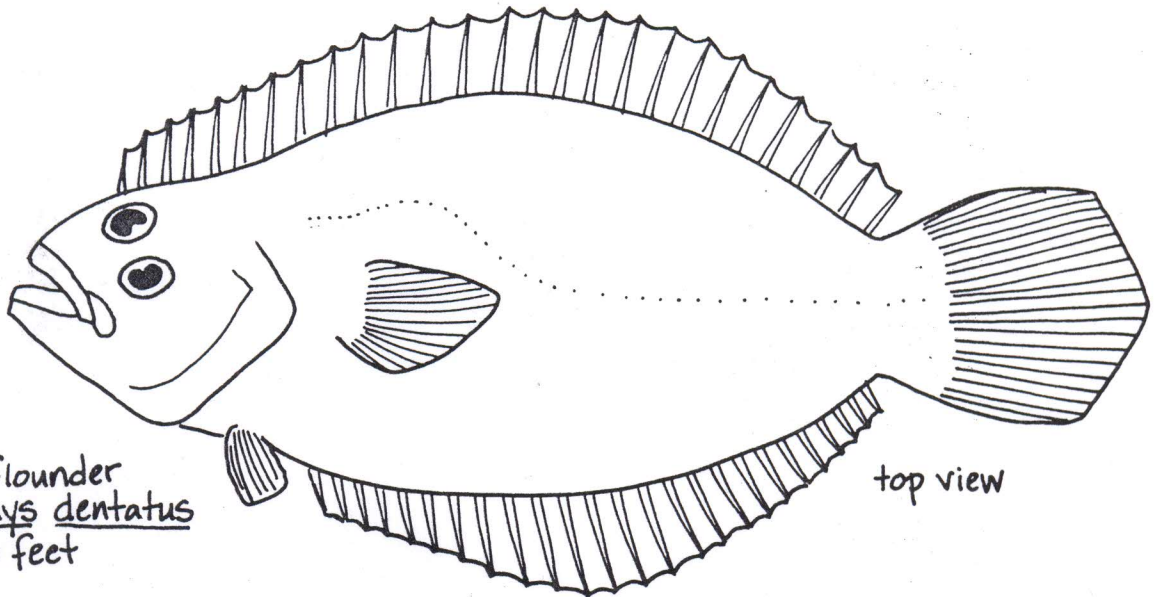
The Cod and the Summer Flounder

Cod, *Gadus callarias*, are one of the most plentiful and important food fish in the North Atlantic. (Young cod are sold as scrod.) A cod weighing 211 pounds was caught off the Massachusetts coast in 1895, but the more typical size is twelve to thirty-five pounds.

Cod are bottom-dwelling fish, usually found within six feet of the bottom. There are small teeth in both jaws. Although they prefer large mollusks (which they swallow whole, shell and all), Cod are not finicky eaters. They feed on a variety of sea creatures including crabs, sea stars, sea cucumbers, sea urchins, worms, tunicates, skates, hydroids, squid, sea horses, and algae. Chunks of leather and rubber have also been found in their stomach. In turn, Cod

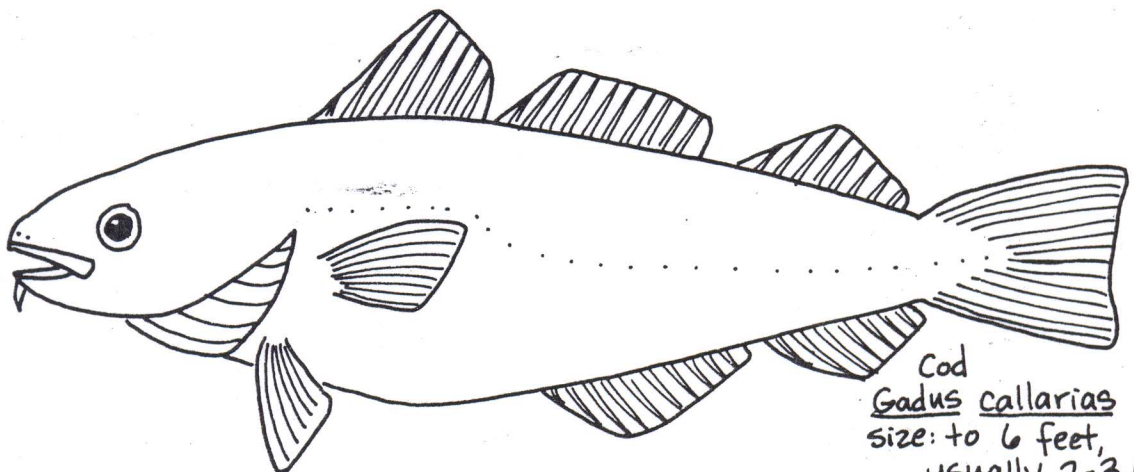
are eaten by sharks and pollock, among other things. Adult Cod prefer water temperatures of 32–55°F and are found from Maine to New Jersey.

Flatfish, such as Yellowtail, Halibut, Hogchoker, and the flounders, are not really flat. It is more accurate to say that they swim on their side. As young fry, flatfish look like any other fish, but as they mature one eye migrates around their head and ends up next to the other eye. Adult flatfish are bottom dwellers, living with their eyeless side against the bottom. The edible Summer flounder, *Paralichthys dentatus*, is found from Maine to South Carolina. It can change colors to blend in with the bottom.



Summer flounder
Paralichthys dentatus
size: to 3 feet

top view



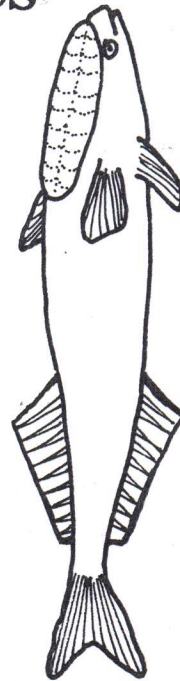
Cod
Gadus callarias
size: to 6 feet,
usually 2-3 feet

Remoras and Sea Horses

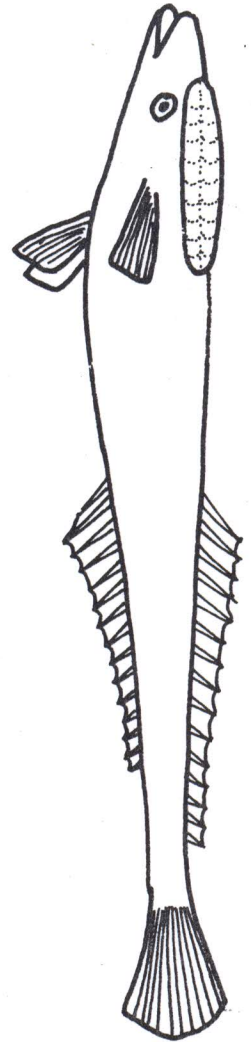
Remoras, also called Shark suckers, have a highly modified first dorsal fin that acts as a sucking disc. Typically, Remoras are found hitching a ride on sharks, but they also attach themselves to dolphins, swordfish, ships, turtles and skin divers. Although a few Remoras have wandered or been carried as far north as the Gulf of Maine, they are primarily tropical and subtropical.

The sucking disc on the Remora's head is flat, with cartilaginous cross plates and raised edges. Once the Remora attaches itself to its host, it can release itself at any time merely by swimming forward. Forward motion of the host, however, will not dislodge the Remora. Remoras usually cling to the side of their host, but they have also been found in the gill cavity and mouth of large fish.

Remoras are not parasites. They do not harm the shark. In fact, they may help it by eating parasites on its skin. It was originally thought that Remoras shared the food of their host, but more than likely they are just hitching a ride and will detach themselves to swim after food themselves.



Remora
Remora remora
size: to 18 inches



Shark sucker
Echeneis naucrates
size: to 3 feet



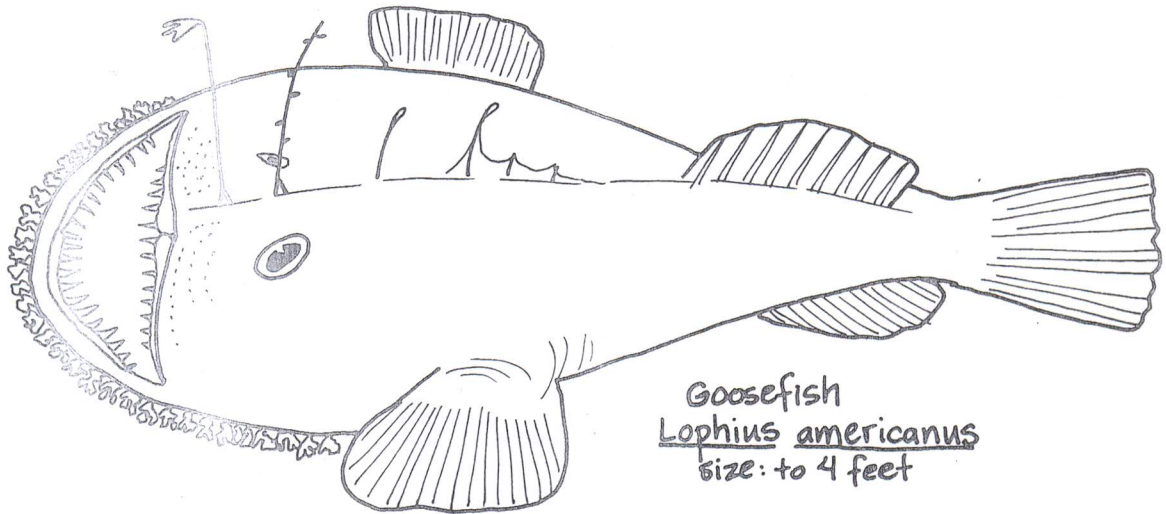
Seahorse
Hippocampus
size: to 6 inches

Swimming is not the strong suit of the sea horse. Lacking pelvic and caudal fins, a sea horse swims upright, using its ear-like pectoral fins with its dorsal fin for propulsion. This technique is fine for gliding, but not for contending with strong currents. Because they are such weak swimmers, sea horses spend much of their time with their prehensile tail wrapped around seaweed and seagrass. When small creatures go past, sea horses suck them into their mouths.

The scales of sea horses are fused together, forming interlocking armored plates that give the sea horse that spiny, ridgy, knobby look.

The male sea horse deposits sperm on the eggs as the female expels them. Then the female deposits the fertilized eggs in a pouch on the male's abdomen. The eggs are brooded there until they hatch. Sea horses are found from New Hampshire to Florida.

Goosefish, Lumpfish, and Batfish



Goosefish
Lophius americanus
size: to 4 feet

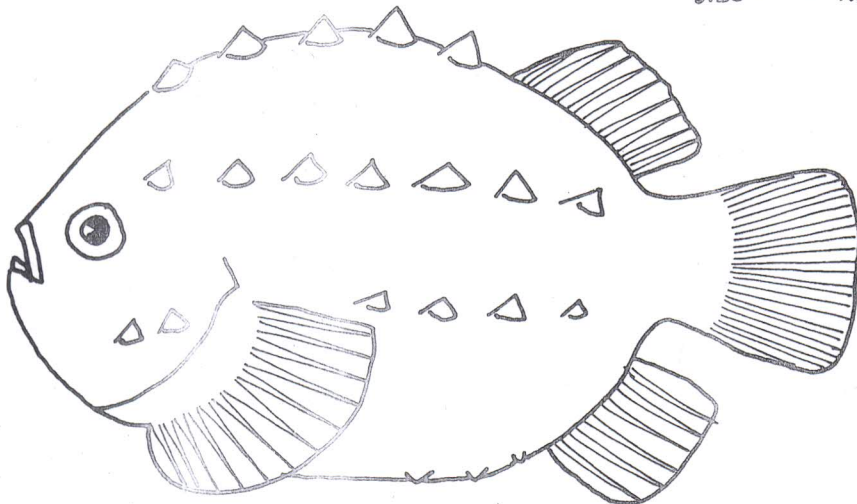
One need not travel to abyssal depths to see odd creatures. Many bizarre fish can be found very close to shore. The Goosefish, *Lophius americanus*, found from Maine to Florida, has its first dorsal fin modified as a spine with a fleshy tip. This "lure" dangles over the Goosefish's cavernous mouth and attracts unsuspecting prey, which are then sucked in and swallowed.

Another "angler" fish is the batfish, *Ogocephalus*, of southern Florida. Both the Goosefish and batfish have fleshy pectoral fins

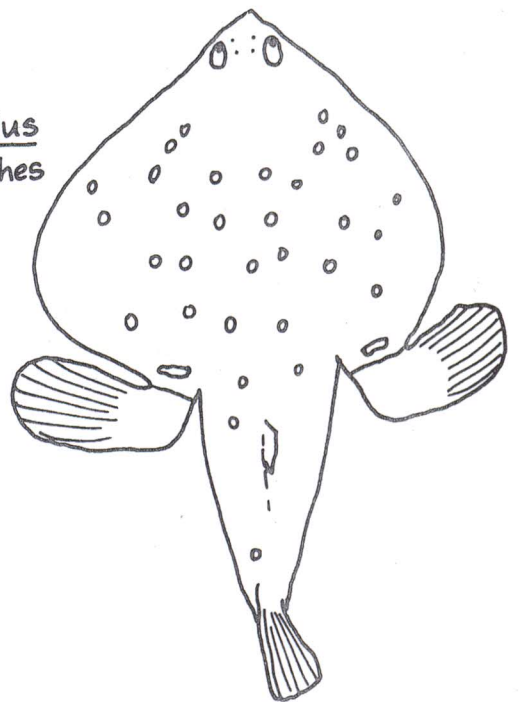
at the end of bony joints. Batfish can crawl over the bottom on these fins, although they usually lie motionless on the bottom, angling their lure to attract prey to their mouth.

The Lumpfish, *Cyclopterus lumpus*, is found from Newfoundland to New Jersey. With its lumpy body, tiny mouth and sucking disc on its chest, the Lumpfish is a very odd creature. It is a bottom dweller and holds onto rocks with its sucker. Occasionally it drifts with rafts of rockweed. Lumpfish feed on small invertebrates.

Lumpfish
Cyclopterus lumpus
size: to 16 inches



Batfish
Ogocephalus
size: to 15 inches



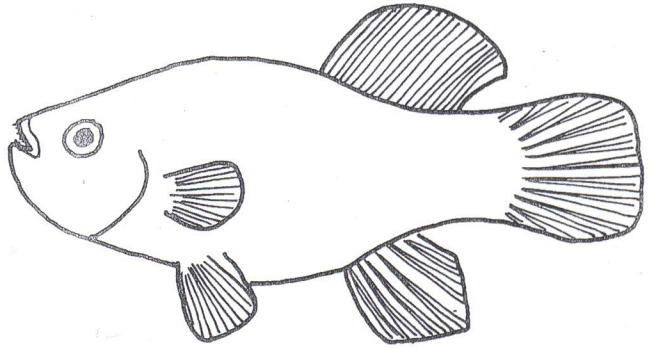
Minnows

The Common mummichog, *Fundulus heteroclitis*, is variously known as the chub, killifish or salt water minnow. It is found from Maine to Florida, and sticks close to shore, preferring harbors, tidal creeks, tidepools and estuaries. This is a very adaptable fish, with a high tolerance for changes in oxygen availability, salinity, and temperature. The Common mummichog is omnivorous. It eats living and dead plants and animals and has an affinity for mosquito larvae.

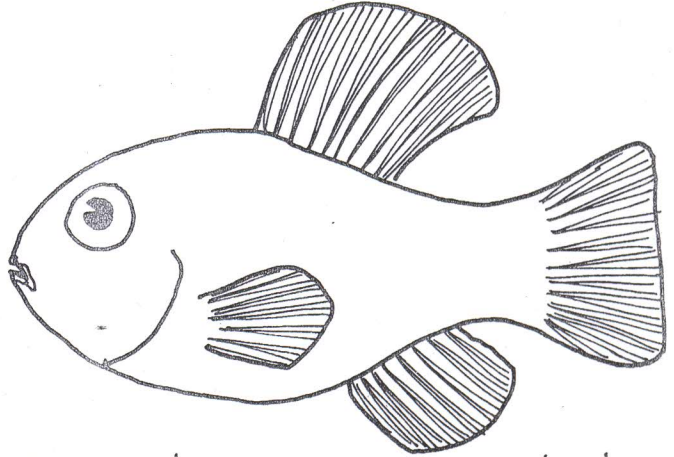
Another fish tolerant of changing oxygen levels, temperature, and salinity is the Sheepshead minnow, *Cyprinodon variegatus*, found from Cape Cod to Florida. This feisty fish has formidable teeth and is known to eat fish larger than itself. It is often used as bait.

The Striped killifish (or Striped mummichog), *Fundulus majalis*, is also omnivorous. It lives in shallow water from Cape Cod to Florida and is most common along open beaches rather than in tidal creeks or harbors. If stranded by the receding tide, this acrobatic fish can flop its way back into the water.

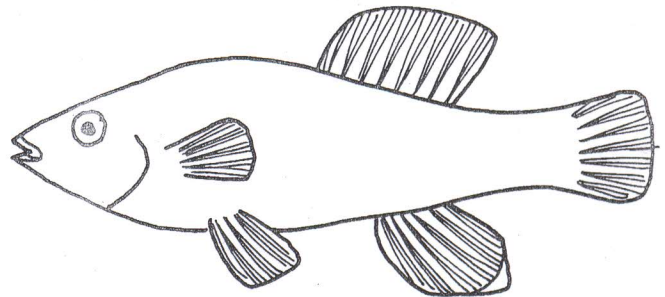
The Atlantic silverside, *Menidia menidia*, is a slender fish covered with large scales. Silversides are found from Nova Scotia to Florida and are eaten by many food fish, including bluefish, bass, and mackerel. They live close to shore and often congregate in large schools. Schools are made up of one kind of fish, all of which are about the same size. Members of the school do the same thing at the same time, following the leader. When the group turns, whoever is in front leads. Good eyesight is crucial in keeping the school together, although other sensory receptors, such as the lateral line, are also important. Schooling is safer than swimming alone, and makes it easier to find food and scare predators.



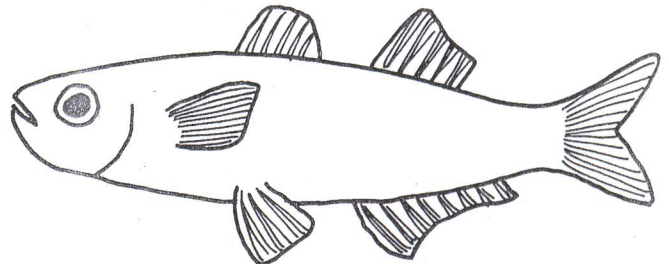
Common mummichog *Fundulus heteroclitis*
size: to 4 inches



Sheepshead minnow *Cyprinodon variegatus*
size: to 3 inches



Striped mummichog *Fundulus majalis*
size: to 6 inches



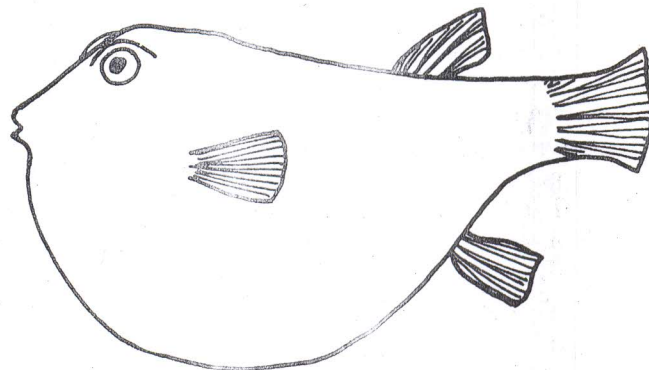
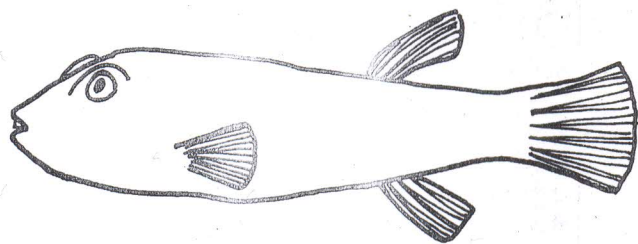
Silverside *Menidia menidia* to:
size: to 4 inches

Puffer and Burrfish

Fish have many ways to thwart their enemies. Puffers and Burrfish use an innovative method. When annoyed, they inflate their bellies like a balloon, making them appear large and hard to swallow. This is possible because Puffers and Burrfish do not have scales and their skin is very elastic. They inflate their belly with water or air, or both.

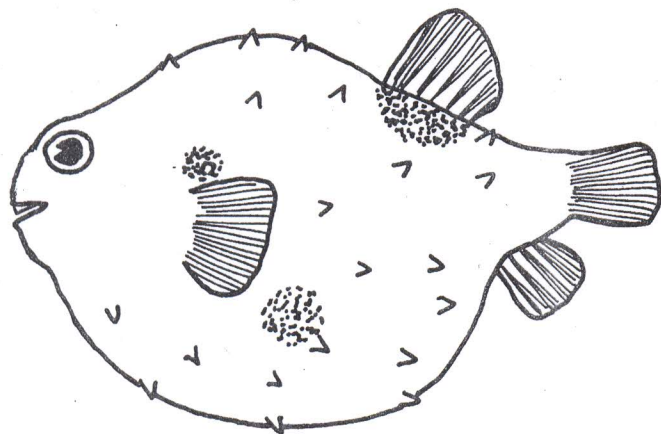
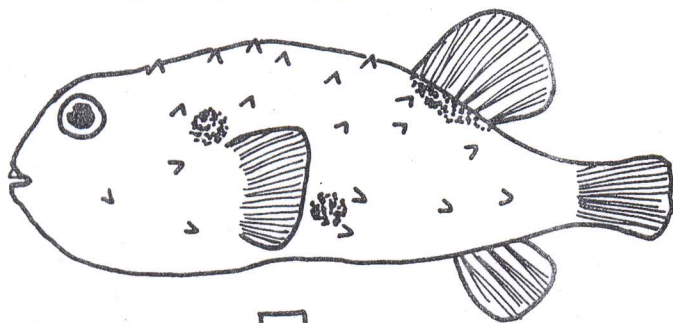
Puffers and Burrfish have other unique anatomical features. They lack pelvic fins, and their gill openings are reduced to small slits. Their teeth are fused together to form plates. Puffers appear to be "buck-toothed" because their jaw plates are divided down the middle. Burrfish have a solid plate (like one big tooth) across their top jaw and one across their bottom jaw.

The Puffer, *Sphaeroides maculatus*, is a slender, normal-looking fish when not inflated. Once it inflates, the Puffer floats belly up at the surface. As soon as it deflates its belly, it swims away underwater. The Puffer's skin is covered



Puffer *Sphaeroides maculatus*
size: to 10 inches

Burrfish *Chilomycterus schoepfii*
size: to 10 inches



with tiny prickles. The combined effect of the spines and the inflated belly ward off many predators.

Puffers use their teeth to crush and devour mollusks and crustaceans. They can be excellent food, but their viscera (guts) are poisonous, and if improperly prepared, Puffers can be extremely toxic. They are common in shallow water from Cape Cod to Florida.

Burrfish, *Chilomycterus schoepfii*, are covered with large triangular spines. When not inflated, Burrfish resemble loaves of bread. They have a large head and stocky body. Burrfish usually hide in protected spots, such as caves, crevices, and reefs. Like the Puffer, the Burrfish crushes crustaceans and mollusks with its teeth. Their flesh may be poisonous. Burrfish live in inshore waters from Cape Cod to Florida.