

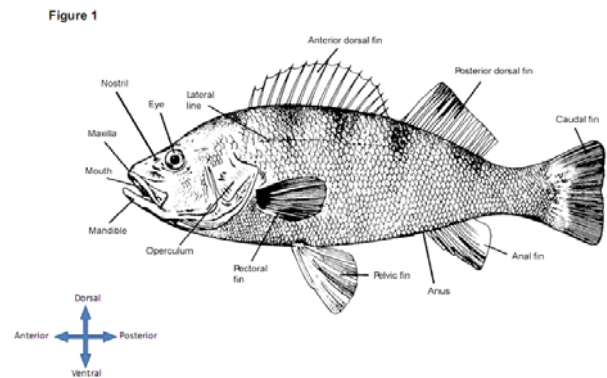
LAB – Fish Dissection

Background Information

Fish are the largest group of vertebrates found in fresh and salt water. In fact, over 25,000 species of fish comprise about 50% of the vertebrate population. Part of the reason for the large number of fish is due to how well adapted they are to life in an aquatic environment. In this lab you will observe the external and internal structures of a typical bony fish. You will see how its structures make it ideally suited to living in an aquatic environment.

Procedure

1. Obtain a fish, gloves, and dissecting tools. Most of these should already be set out at the lab tables.
2. Look at your fish and orient yourself with the positioning of the fish (e.g. anterior, posterior, dorsal, ventral). Also become familiar with the external structures of the fish.



2. Open and close the fish's mouth to observe the actions of the mandible and maxilla.

- a. Describe the movement.

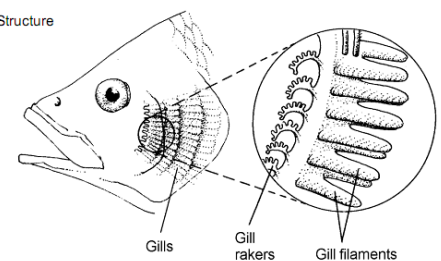
- b. Does this fish have any teeth?

3. Place a probe in the fish's mouth and gently push it through the operculum. You should notice several gill arches, as shown in the enlarged circle of Figure 2.

- a. What is the function of the operculum?

- b. Explain what is going on at the gill filaments.

Figure 2: Gill Structure



4. Remove the gill arches by cutting its dorsal and ventral attachment (See Figure 1 for orientation). Examine it under a dissecting scope. Write observations below.

5. Locate the gill rakes on each gill arch. These projections separate the gill arches from each other and create spaces between each of the gill arches. Notice how the gill rakers project inside the fish's mouth.

6. Remove a fish scale. Place the scale on a slide and add a drop of water. Then place a coverslip on top. Finally look at the scale under the microscope and draw what you see in the box to the right.



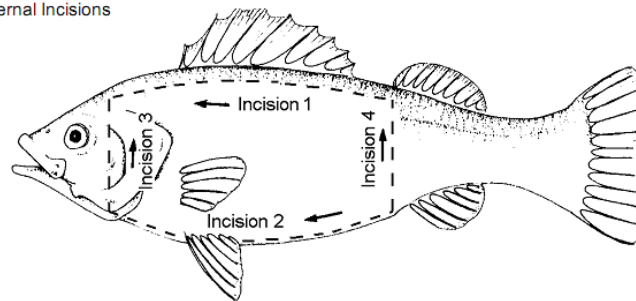
7. Using Figure 3 as a guide, begin making an incision along the dorsal side of the fish no high than the lateral line. Most of the organs reside in the ventral half of the fish's body. Be careful not to cut too deeply, you might destroy some of the internal organs.

8. Use your scissors and make the incision toward the head, as show in the diagram.

9. Incision 2 should begin on the ventral surface just forward of the anus. When you reach the gills, cut upward behind the gills. This will complete Incision 3.

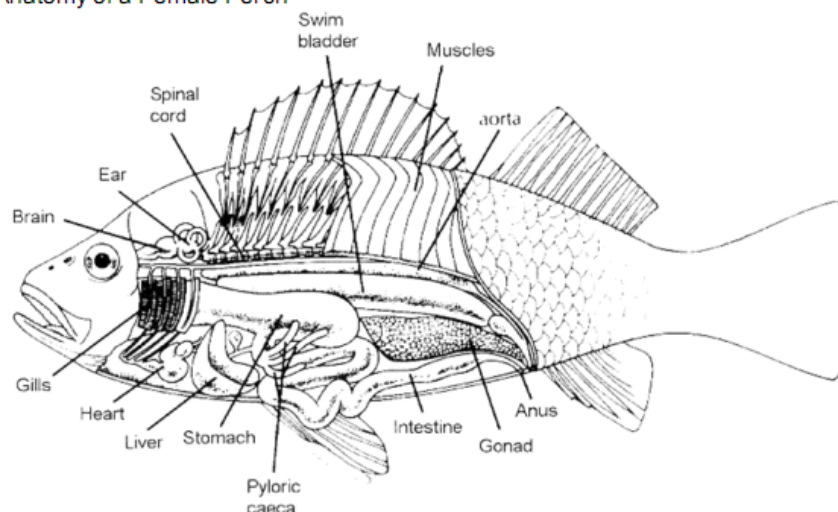
10. Lastly, finish this process by making incision 4 as show in Figure 3. Very carefully, lift away the cut section of the body wall. Use your scissors to remove any membranes that adhere to the body wall. If the body organs are covered with fat, you may use the forceps to remove this material.

Figure 3: External Incisions



11. Use Figure 4 to help identify the various fish internal organs.

Figure 4: Internal Anatomy of a Female Perch



12. Digestive System: Find the tan-colored liver with the gallbladder attached to and underneath the liver. Cut the liver free from the body to expose the esophagus and stomach. Then, trace the route a piece of food would travel as it passes through the fish's digestive system. Find the mouth, pharynx, esophagus, pyloric caeca (blind ended sacs), stomach, intestines, and anus. To aid in locating other organs, remove the entire digestive canal by cutting it free at the anus and at the mouth.

13. Reproductive System: Determine if your fish is a male or a fish by locating either a pair of testes, small pale yellow masses on the ventral side or a single, large yellow ovary filled with eggs. The testes and ovaries are connected by tubes to the urogenital opening found posterior to the anus. Check around the classroom with other groups to ensure you observe both male and female fish.

14. Respiratory and Excretory System: Locate and remove the bright white, gas-filled swim bladder in the dorsal portion of the fish. On the dorsal wall of the body cavity locate the kidneys. The kidneys are connected by urinary ducts to a urinary bladder from which wastes pass out of the body through the urogenital opening.

15. Circulatory System: Cut through the fish's body all anterior to the where the liver was located. Doing this exposes a cavity where the heart is suspended. Find the one thin-walled atrium and the one thicker-walled muscular ventricle. You may be able to locate the one enlarged vein (sinus venosus) where blood enters the heart and the one enlarged artery (bulbus arteriosus) where the blood leaves the heart. The blood leaving the heart goes to the gills where it flows through capillaries in the gills and throughout the body in various veins and capillaries and arteries and finally returns to the heart to be pumped throughout the body again.

16. You may remove the eye of the fish and analyze the internal structure. Draw the structures in the space below.

Summary Questions

1. List 3 body systems that both humans and fish have in common.

2. Compare human and fish structures by filling in the table below:

Human	Fish
Lungs	=
	= Lateral Line
Skin	=
	= Pectoral Fins
Legs	=

(CONTINUE ON BACK)

3. Match the following organs/structures with the correct functions.

- | | |
|-------------------|---|
| ___ Gills | A. Protects fish from parasites and bacteria in water |
| ___ Lateral line | B. Filters toxins from fish's blood and creates waste |
| ___ Pyloric caeca | C. Filled with gas that helps fish move up and down in water column |
| ___ Slime layer | D. Helps with digestive processes |
| ___ Liver | E. Allows fish to hear and feel vibrations |
| ___ Swim bladder | F. Secretes bile to aid in digestion |
| ___ Kidney | G. Allows fish to breath under water |

4. In the diagram below, identify the following parts: **Mouth, Lateral Line, Eye, Operculum, Anal Fin, Dorsal Fin(s), Pectoral Fin, Caudal Fin, Pelvic Fin, Anus, Nostril**

