Insides and Outsides – The Anatomy of a Fish

Important reminders!

- You will be working in teams. Be sure to share tasks with each other.
- Unless you are told otherwise, the fish is to remain in the dissecting tray at all times.
- A dissection is a scientific procedure; you must work carefully and neatly.

Outsides - External anatomy

- Shape and color
    - Describe the general shape of your fish.
    - What does the shape tell about where your fish lives?
    - What color is your fish? What might this tell you about where it lives?
- Skin and scales
    - What does the fish feel like?
        - What is the purpose of the slime?
        - What is the purpose of the scales?
        - Use forceps to remove a scale and look at it under a microscope. What do you think the rings indicate?
    - Most fish have a faint line called the lateral line running from the head to the tail.
        - Does your fish have one?
        - What is its purpose?
- Fins
    - Locate and identify the fins. What is the purpose of each fin?
        - Caudal or tail fin
        - Dorsal fin – These are the fins on the fish's dorsal side (back); there may be one or two dorsal fins.
        - Anal fin – This is the single fin on the ventral side (bottom) of the fish near the caudal peduncle (tail).

        - Pectoral fins – These are the pair of fins on either side of the fish's body posterior (behind) to the operculum.

        - Pelvic fins – This is the pair of fins on the ventral side (bottom) of the fish, nearer the head.

    - What is the purpose of the spines (hard and sharp) or rays (soft) in the fins?

- Locate the nares (nostrils), two tiny holes in front of the eyes. What are they for? Be careful! This is a fish, not a human!

- Eye
    - Does the fish have an eyelid?
    - Notice the size of the eye and pupil. A relatively large eye and pupil often indicates that vision is important to the fish. How important do you think vision is for your fish? Why might it be important?

- Mouth – Pick up your fish and look in its mouth.
    - Does your fish have a tongue?
    - Use your finger to feel carefully inside the mouth.
        - Are there teeth? If so, where?

        - What do they feel like?

    - Based on the location and size of the mouth and the type of teeth, predict how the fish catches food and what the fish might eat.

    - Open your fish's mouth wide and look inside. You should be able to see red things on either side of the throat. What do you think these are?

        - Stick your probe into the fish's mouth. Where does it come out?

        - If a fish took water into its mouth, where would it come out? What about food?

- Gills
    - Place the fish back in the tray and lift the hard flap on the side of the head. This is called the operculum. What do you think it is for?

    - Use your scissors and cut away the operculum.
        - Remove the gills by cutting the upper and lower attachments of the gill arch.
        - The bony things on the inside curve of the gill arches are called gill rakers. What do you think they are for? Hint: think about food.

        - The feathery things are called gill filaments. What do you think they are for?

Insides – Internal anatomy

- Locate the small hole on the bottom of the fish near the tail. This is called the vent. Insert your scissors into the vent and **carefully make a shallow cut** all the way to the operculum along the bottom of the fish. Carefully lift the flap of skin and cut it away so you can see the internal organs. Notice how neatly everything fits together!
- Digestive system
    - Find the beginning of the digestive tract by inserting the probe into the mouth and down the esophagus.
    - The large reddish organ on top of the stomach is the liver. What is its function?

        - The dark greenish tissue in the liver is the gall bladder which produces bile. What does bile do?

    - Stomach
        - The esophagus empties into a J-shaped bag called the cardiac stomach. What happens to food here?

        - The spleen is attached to the lower end of the cardiac stomach. The spleen produces red blood cells.
        - Food next goes into the pyloric stomach with lots of branching projections called ceca. What is the advantage of the ceca?

        - The pancreas surrounds the pyloric stomach and produces digestive enzymes.

- The pyloric stomach empties into the intestine.
  - What is the function of the intestine?

  - Herbivorous fish have a longer intestine than carnivorous fish because plant material is harder to digest. Based on the length of your fish's intestine do you think it is herbivorous or carnivorous?

- Waste products are eliminated through the vent.
- Now use your scissors, cut open the stomach and look at the contents.
  - What did your fish eat last?

  - Does this agree with what you guessed, based on the type of teeth and the length of the intestine?

- Swim bladder
  - The swim bladder is the silvery or clear sack that runs the entire length of your fish's body between the digestive tract and the backbone.
  - What is its function?

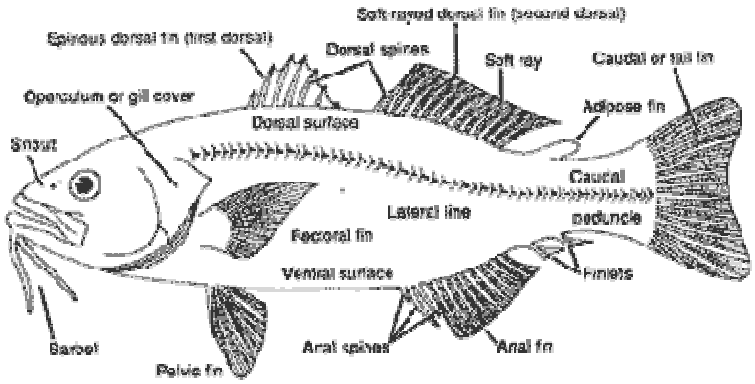
  - Do all fish have a swim bladder? If not, what would that tell you about where the fish lives?

- Kidney
  - The streak of red tissue along the backbone is the kidney.
  - What is its function?

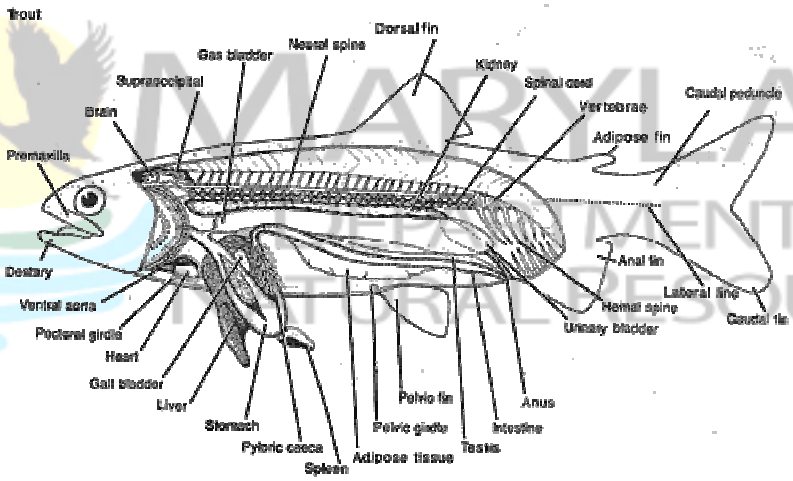
- Heart
  - The heart is the small triangular shaped organ just below the esophagus, near the fish's mouth.
  - How many chambers does it have?

  - Why do you think the heart is located near the gills?

- Does your fish contain a large sack filled with little round yellow, red or black things? If so, your fish is a female carrying eggs or roe.
- Does your fish contain a large creamy-white ribbon? If so, your fish is a male carrying sperm or milt.



External Anatomy



Internal Anatomy