

Name \_\_\_\_\_  
Date \_\_\_\_\_ Period \_\_\_\_\_

## **Dogfish Shark Dissection**

### **Fun Facts:**

- The teeth of sharks are modified scales embedded in the skin of its mouth
- Sharks have pits on their face used to detect electric fields
- Sharks have paired fins that are homologous to your arms and legs
- The skeleton of a **shark** is made entirely of cartilage
- Sharks have gills located in pouches along the sides of their heads
- A shark's heart pumps blood directly through its gills before the blood flows to the rest of its body
- The liver of a **shark** is its largest internal organ and is very oily

### **Materials:**

- A dissecting pan/plastic layered with newspaper
- Dissecting tools (scalpel, scissors, probes, forceps)
- Shark diagrams
- Lab notebook

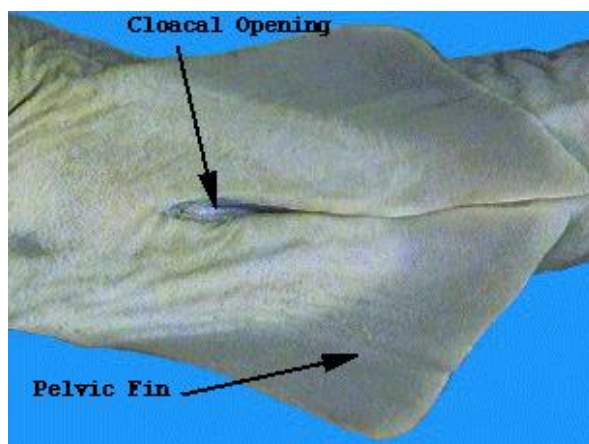
### **The External Anatomy:**

1. **Make a side view sketch of your dogfish and label it "Side View". Measure and record the length of your shark (cm).**
2. The **shark** has a graceful and streamlined body shape. **Given this body shape, what would you expect its lifestyle to be?**
3. The body is divided into the head, trunk, and tail. **Label each of these sections.**
4. **Touch the shark! Pick it up, squeeze it, feel it.** Does it feel like the shark has bones similar to the bones humans have? Does the shark's skeleton feel harder or softer than the bones in your arm? Does the shark's skeleton feel more like your rib bones or the top of your ear? Feel your shark's **skin** in both directions. **List 2 words describing the texture of the shark.**

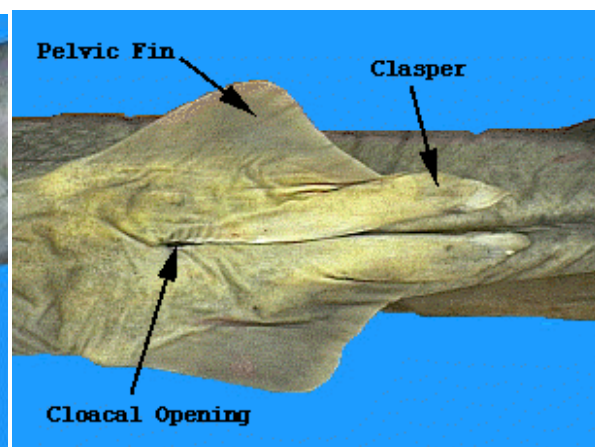
5. Underneath your sketch **make some specific observations (at least 3)** about the **shark's** appearance and color. **What is the purpose of the shark's coloration? What is the name for this type of coloration?**
  
6. **Label the lateral line** on your sketch. **What is it and what function does it perform for the shark?**
  
7. **Label the anterior dorsal fin and posterior dorsal fin.** **What do you think the dorsal fins do? How do they compare?**
  
8. Note the **spines** that are located directly in front of the fins. These spines carry a poison secreted by glands at their base. **Label these on your sketch.**
  
9. Locate the **caudal fin** on your **shark**. It is divided into two lobes: a larger dorsal lobe and a smaller ventral lobe. This type of tail is known as a heterocercal tail. **Label the caudal fin on your sketch. What is its purpose?**
  
10. The **rostrum** is the pointed snout at the anterior end. **Label it on your sketch. What purpose might its pointy-ness serve?**
  
11. The **eyes** are prominent in sharks and are very similar to the eyes of man. A transparent cornea covers and protects the eye. A darkly pigmented iris can be seen below the cornea with the pupil at its center. Upper and lower eyelids protect the eye. Just inside the lower lid is a membrane that extends over the surface of the eye to cover the cornea. **Label your eye.**
  
12. Find the two large openings that are posterior and dorsal to the eyes. These are called the **spiracles**. The spiracle is an incurrent water passageway leading into the mouth for respiration. **Label this on your sketch.**
  
13. Locate your **shark's gill slits**. **How many slits are there?** Record this number on your sheet of paper and make sure that sketch accurately represents this. **Label the gill slits.** Water taken in by the mouth and spiracles is passed over the internal gills and forced out by way of the gill slits.

14. **Make a sketch of your shark's ventral side and label it "Ventral View". Draw and label the pectoral and pelvic fins. What purpose do these fins serve the shark?**
15. Locate the shark's mouth. Shark's mouths are always located on their underside (ventrally). Look inside the mouth and **write down your observations about the teeth orientation, appearance, and number.**
16. The **nares** or external **nostrils** are located on the underside (ventral surface) of the rostrum anterior to the jaws. **Label them on your sketch.** A nasal flap separates the incurrent from the excurrent opening. Water passes into and out of the olfactory sac, permitting the shark to detect the odors of the water.
17. The patches of pores on the head in the areas of the eyes, snout, and nostrils are the openings of the **ampullae of Lorenzini**. These sense organs are sensitive to changes in temperature, water pressure, electrical fields, and salinity. **Label them on your sketch.**
18. Fertilization in the dogfish shark is internal. During copulation, one of the male's claspers is inserted into the oviduct orifice of the female. The sperm proceed from the cloaca of the male along the groove on the dorsal surface of the clasper into the female.

Using the pictures provided **determine whether you have a male or female shark and record this under your sketch.** Also, **label the proper sex organs on your shark.**



Female



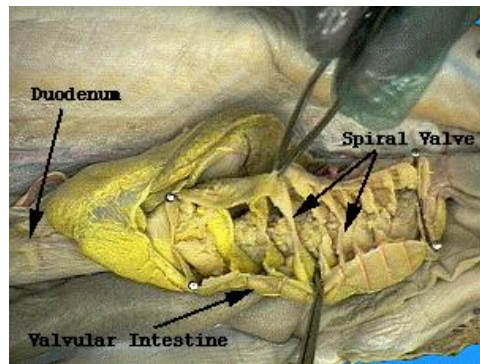
Male

19. Remove a 2 x 2 inch of the shark's skin. The **muscles** revealed by skinning the side of the shark are arranged in W-shaped bundles. **What is the name of these muscles and what is their purpose?**

## The Internal Anatomy:

20. Using your scalpel and scissors make an incision down the center of the **shark**'s ventral side that starts in between the **shark**'s pectoral fins and extends down to its pelvic fins/girdle. Be careful to lift with forceps while you cut so as to not damage the internal organs. Make a cut on either side of your incision that extends far enough out so that you can pin back the skin and easily view the organs.
  
21. A smooth, shiny membrane called **peritoneum** can be seen lining the inside of the body wall. The visceral organs are suspended dorsally by a double membrane of peritoneum know as **mesentery**.
  
22. Make a sketch of the **shark**'s internal organs and label it "Internal Sketch".
  
  
23. Locate the **shark**'s liver. It is the largest organ lying within the body cavity. Its two main lobes, the right and left lobes, extend from the pectoral girdle posterior to most of the length of the cavity. A third, much shorter lobe is located medially and contains the green **gall bladder** along its right edge. Label both of these on your sketch. What important purpose does the liver serve the **shark**?
  
  
24. Move the liver to the side so that you can see the **stomach**. Label it on your sketch and describe its appearance. The **esophagus** is the thick muscular tube that extends from the top of the cavity connecting the oral cavity and pharynx with the stomach.
  
  
25. Cut open your **shark**'s stomach and describe any contents you find. The mucosa is the inner lining of the stomach. The **rugae** are longitudinal folds that help in the churning and mixing the food with digestive juices. A circular muscular valve, the **pyloric sphincter**, is located at the far end or pyloric end of the stomach. It regulates the passage of partially digested food into the intestines.
  
  
26. Continue past the stomach into the **intestines**. You might need to move your liver to do this.

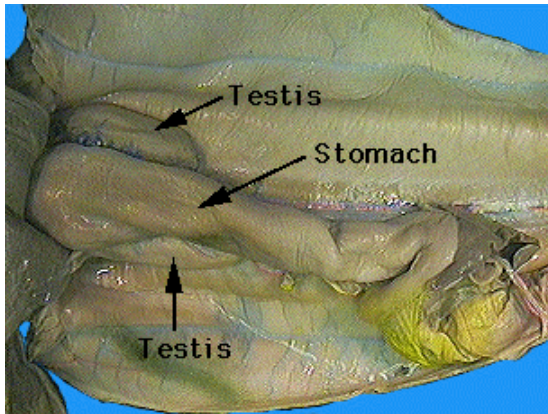
27. The **duodenum** is a short "U"-shaped portion of the small intestine that connects the stomach to the intestine. The bile duct from the gall bladder enters the duodenum. The **pancreas** is located on the duodenum and the lower stomach. The secretions of the pancreas enter the duodenum by way of the pancreatic duct. The dark, triangular-shaped **spleen** is located near the posterior end of the stomach. Although a part the lymphatic system, the spleen is closely associated with the digestive organs in all vertebrates. The **valvular intestine** is the second, and much larger, portion of the small intestine. It follows the duodenum and rings mark its outer surface. Label these on your sketch.



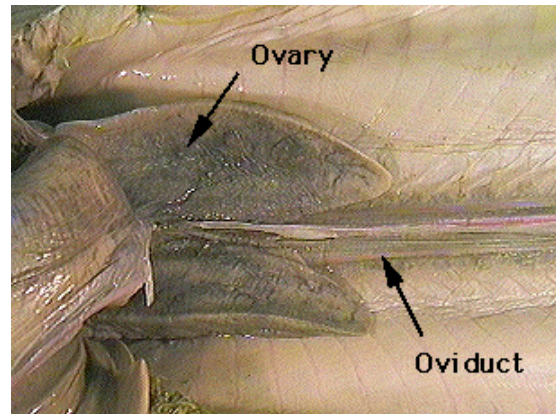
28. Cut open the valvular intestine so that you can view the **spiral valve**, which is the screw-like, symmetrical shape within the valvular intestine shown below. What purpose might it serve? (Hint: Think surface area)
29. Pull the intestine forward so that you can view the **colon**, which is the narrowed continuation of the valvular intestine. It is located at the posterior end of the body cavity. The **rectal gland** is a slender, blind-ended, finger-like structure that leads into the colon by means of a duct. Draw and label this on your diagram. It has been shown to excrete salt (NaCl) in concentrations higher than that of the shark's body fluids or seawater. Why would that be important for the shark? (Hint: Think about osmoregulation)
30. The **cloaca** is the last section of the canal. It collects the products of the colon as well as the urogenital ducts. It is where the wastes of the body are removed via the cloacal opening.



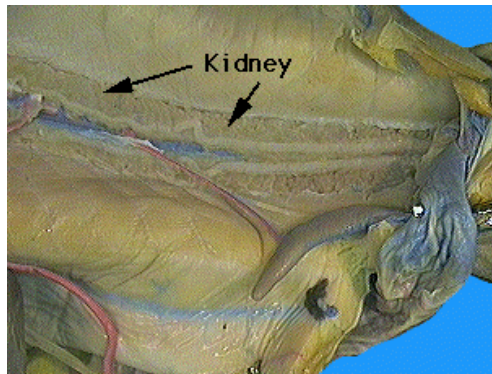
31. Remove the liver, pancreas, and spleen in order to reveal the urogenital structures: **gonads (testes or ovaries) and kidneys**. Label these organs on your shark diagram.



**Male**



**Female**



32. Cut across the gill slits from the pectoral fin to the corner of the mouth. You will have to cut across the ventral musculature to lay the area flat.

33. The gills are provided with a rich blood supply. Arteries run directly from the nearby heart to the gills bringing deoxygenated blood into the gill **lamellae**. Lamellae are thin plates or disks that are in rows in the gills and greatly increase the surface area through which gas exchange can take place. Oxygen diffuses from the ventilating water current flowing over the gills into the blood. Label the gills and heart on your diagram.

34. What is the term used to describe this blood flow and why does it occur?

35. Wrap up your **shark** and throw it away in the garbage bag provided by your teacher. Wash off all dissecting equipment and return items to area you got them from. Clean off dissecting area with disinfectant so classroom doesn't stink! **WASH YOUR HANDS!!!!**