

# Spiny Dogfish Shark Dissection

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Name: \_\_\_\_\_

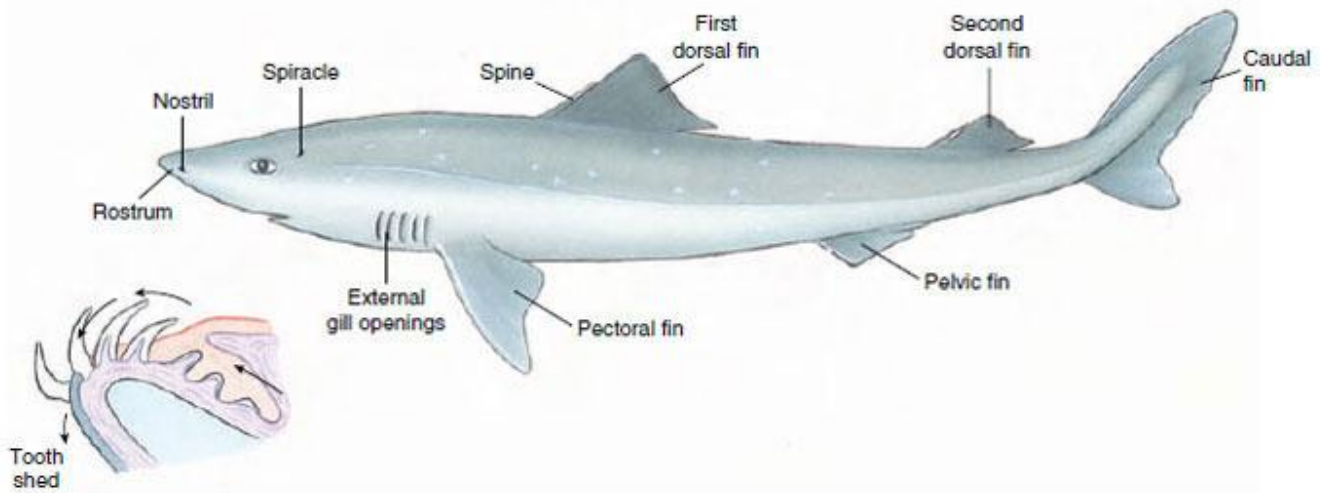
Partners: \_\_\_\_\_

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## Introduction

In this lab we will be dissecting the spiny dogfish, *Squalus acanthias*. Sharks are very primitive fishes. They have a cartilaginous skeleton, biting jaws, and paired appendages. Their skin is tough and leathery, covered with denticles (scales).

Sharks belong to the Class Elasmobranchiomorphii (Chondrichyes) of the subphylum Vertebrata. They are commonly referred to as elasmobranchs because of their exposed gill openings.



**Ventral:**

**Dorsal:**

**Anterior:**

**Posterior:**

## Part 1: External Anatomy:

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1. Locate the **head**, **trunk**, and **tail** regions on your shark.

🌀 Look at the **color** of the **dorsal** and **ventral** sides of the shark, **what** do you notice? **Why** do you think it is colored this way?

2. Locate the **Lateral Line**.

🌀 Discuss the **function** of the Lateral Line with your group.

3. Locate the **Anterior Dorsal Fin** and the **Posterior Dorsal Fin**.

🌀 Discuss the **function** of the dorsal fins with your group.

4. Locate the **spines** that are directly in front of the dorsal fins. These spines carry a poison secreted by glands at their base.

5. Look in the **mouth** of your shark. Shark's mouths are always located **ventrally**.

🌀 Feel their **teeth**, including their orientation, number, ect.

6. Touch the shark's **skin** and feel its **skeleton**.

🌀 Discuss the **texture** of the shark's skin with your group.

🌀 What part of **your body** has a **similar** feel to that of the shark's skeleton?

7. 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**.

8. The **rostrum** is the pointed snout at the **anterior** end of your shark.

9. The **eyes** are prominent (stand out) in sharks and are very similar to your eyes. 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 (**nictitating membrane**).

🌀 Discuss with your group how the shark eye is **similar** to your eye.

10. 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.

11. Locate your shark's **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.

12. Look at the **ventral side** of your shark. Locate the **pectoral** and **pelvic** fins.

13. The external nostrils (**nares**) are located on the **ventral side** of the rostrum **anterior** to the jaws. Water passes into and out of the **olfactory sac**, permitting the shark to detect the **odors** of the water.

14. The **patches of pores** on the head in the areas of the eyes, snout, and nostrils are the openings of the **Ampullae of Lorenzini**.

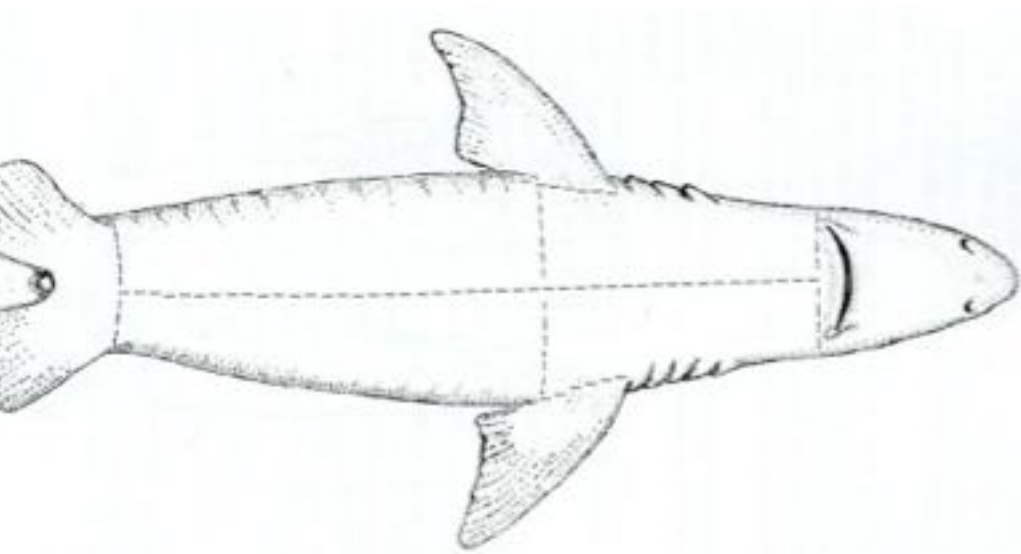
@ Discuss the **function** of the Ampullae of Lorenzini with your group.

15. **Fertilization** in the dogfish shark is **internal**. During copulation, one of the male's **claspers** is inserted into the **cloaca** of the female. The sperm proceed from the clasper of the male along the groove on the dorsal surface of the cloaca into the female.

### The Internal Anatomy:

16. 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**. 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.

17. 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.



18. Move the liver to the side so that you can see the **stomach**.

@ Discuss the appearance of the stomach with your group.

19. The **esophagus** is the thick muscular tube that extends from the top of the cavity connecting the oral cavity and pharynx with the stomach.

20. Cut open your shark's **stomach**. Discuss what you find with your classmates and compare the contents

to the other groups.

21. Continue past the stomach into the **intestines**. You might need to move your liver to do this.

22. Pull the intestine forward so that you can view the **colon**, which is the narrowed continuation of the 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.

23. Remove the liver, pancreas, and spleen in order to reveal the urogenital structures: **gonads** (testes or ovaries) and **kidneys**.

24. 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.

25. The **gills** are provided with a rich blood supply. Arteries run directly from the nearby **heart** to the gills bringing deoxygenated blood into the gills. Oxygen **diffuses** from the ventilating water current flowing over the gills into the blood.

26. From your cut, make an **anterior** incision to reveal the heart. The **heart** has 2 main chambers; **atria** (which appears like a sack) and **ventricle** (harder structure, due to muscular pumping needs.)

27. **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. **WASH YOUR HANDS!**

**Analysis & Conclusion Questions:**

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1. List 3 traits that the perch and shark shared.

2. List 3 traits/characteristics that were different between the perch and the shark.
  
  
  
  
  
  
  
  
  
  
3. What type of scales does the shark have?
  
  
  
  
  
  
  
  
  
  
4. What is the purpose of the claspers and cloaca?
  
  
  
  
  
  
  
  
  
  
5. How does a shark maintain buoyancy?
  
  
  
  
  
  
  
  
  
  
6. What is the purpose of the caudal fin?
  
  
  
  
  
  
  
  
  
  
7. How many gill slits did your shark have?
  
  
  
  
  
  
  
  
  
  
8. What purpose do the pectoral and pelvic fins serve in the shark?
  
  
  
  
  
  
  
  
  
  
9. What is the function of the Ampullae of Lorenzini?
  
  
  
  
  
  
  
  
  
  
10. What sex was your shark? How could you tell?

**Extra Credit:** Label the internal anatomy of the dogfish shown below.

## Word Bank

nasal cavities

liver

esophagus

stomach

intestines

cloaca

claspers

pelvic fin

