

# STARFISH (ECHINODERM) Dissection Lab Report

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

Date: \_\_\_\_\_

## PROBLEM:

## HYPOTHESIS:

My hypothesis is...

The anatomy of the starfish ...

## EXPERIMENT PROCEDURES:

- A. Read entire lab instructions entirely
- B. Get materials on list
- C. Examine starfish with magnifying glass

### **Part A: External Anatomy**

1. Place your starfish in the dissecting tray so that the dorsal surface faces upward as shown in Fig 1 of the handout.
2. Examine the animal's dorsal surface. Locate the central disc and the five arms or rays that extend from the central disc. Locate the madreporite plate. It is a round, sieve like structure on the dorsal surface of the starfish, and it looks almost like a wart. Try to identify the eyespots that are located on the end of each ray. They are used for sensing light.

Use Fig. 1 in the handout to assist you.

Label the following structures on Figure 1: Spines, Ray, Central Disc, Dorsal, Eyespots and Madreporite.

### **MATERIALS**

- starfish
- Dissection tray
- Scalpel
- Pins
- Alcohol
- Paper towels
- Magnifying Glass
- Dissection tool kit
- Sketch Paper
- Pencil
- Lab Report
- Goggles

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3. Note the many spines scattered over the surface of the arms and the central disc. These spines are attached to the plates of the starfish skeleton just under the skin. These plates are called ossicles. See Fig. 2 in the handout.
4. Turn the starfish over and locate the mouth. Examine the five ambulacral grooves that extend from the mouth along the middle of each ray. Numerous tube feet used for locomotion (movement) and absorption of dissolved oxygen are present along the grooves.

## Part B: Internal Anatomy Digestive System

5. Once again, place the starfish in the dissecting tray so that the dorsal surface faces upward.
6. Carefully cut a ring in the skin around the madreporite plate.
8. Use your scissors to cut off the tip of any arm/ray EXCEPT for the two arms next to the madreporite plate.
9. Starting at the end of the arm with its tip cut off, use your scissors to remove the remaining skin/skeleton from the central disc and from the top of the arm. This will expose the starfish's internal organs. It is better to cut laterally up the left and right side of the arm and on the very far outside edge of the central disc.
10. Examine the digestive gland, a large olive-green gland with two branches that fills most of the arm.
11. The pouch like bag is called the stomach, which can be seen through the opening you have cut in the dorsal surface.

## Reproductive System

12. Remove the entire digestive gland from the dissected arm of the starfish.
13. Locate the pale, lumpy organ under the digestive gland near the central disc. These are the reproductive organs called gonads. Starfish have separate sexes. During spawning, the gonads are very large, but in preserved specimens they are usually very small. The male and female gonads look very much alike in preserved specimens. In living specimens, the testes are gray and the ovaries are orange.
14. Draw and label the following parts for

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Figure 2: one arm with a digestive gland, one arm with gonads, and stomach. Water Vascular System:

15. Carefully remove the reproductive organs and the remaining parts of the digestive system (including the stomach). This will expose the water vascular system. Be careful not to damage the madreporite plate.
16. Follow the path of water as it enters the madreporite plate. The madreporite plate is connected to the ring canal, a hard, white, round structure under the stomach, by the stone canal, tiny white tube that in under the madreporite plate.
17. The water is then distributed to the radial canals that are in each ray. These canals deliver water to the ampullae (bulblike structures), which are pink in color and line the right and left sides of the radial canal. The ampullae control the tube feet which work as little suction cups with great power. By alternating between contracting and expanding the ampullae, the starfish is able to move. As the ampullae contract, they force water into the tube feet, and the tube feet lengthen. The starfish places the lengthened tube feet in the direction it is going. Then the ampullae relax, and expand. When this happens, water leaves the tube feet, thus shortening each tube foot and creating suction at its end.
18. Draw Figure 3. Label the following structures: Ring Canal, Radial Canal, Ampullae, Madreporite, and Stone Canal.
19. Trace the pathway that seawater takes from the madreporite plate to the tube feet; mark this pathway with a red colored pencil in Figure 3.

Data: Drawings that should be included in the lab report:

Figure 1 – external dorsal view

Figure 2 internal organs

Figure 3 – internal organs and water vascular system path

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FIGURE 1:

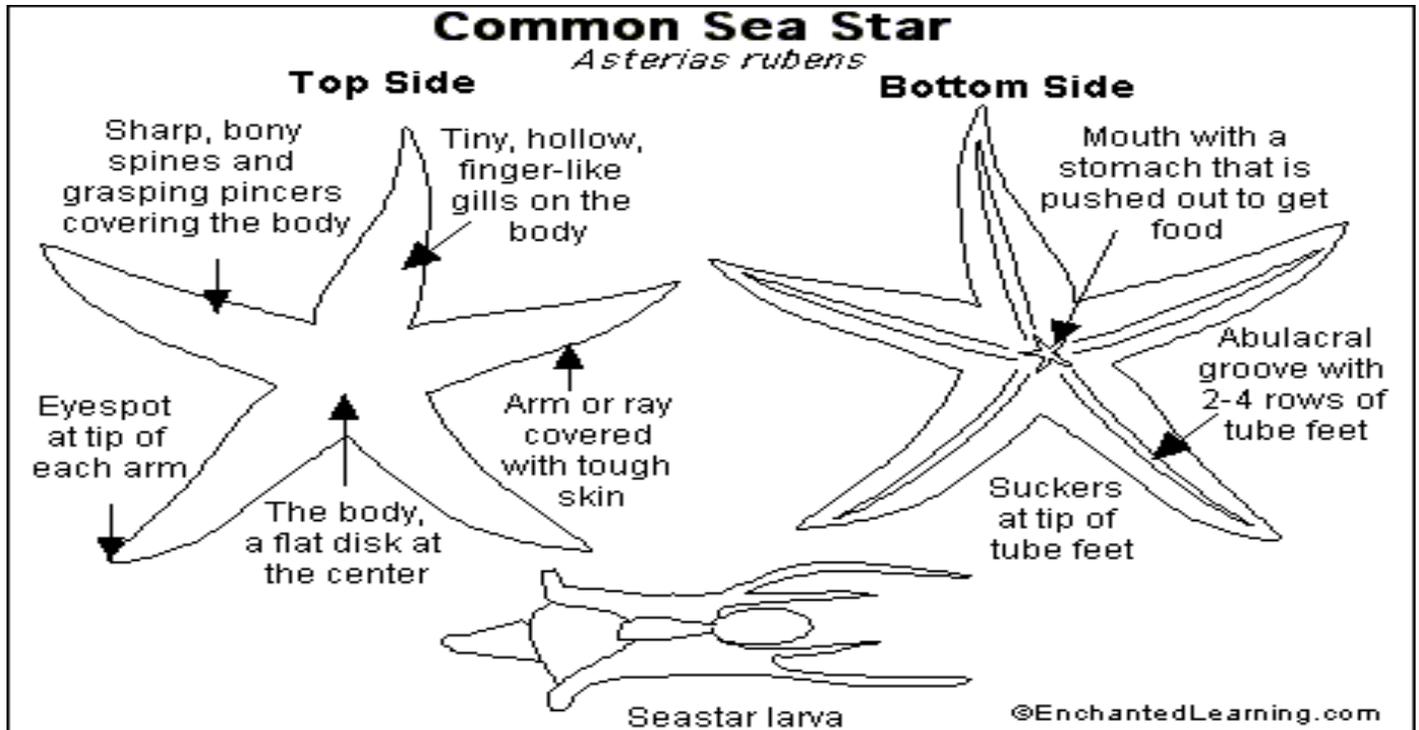
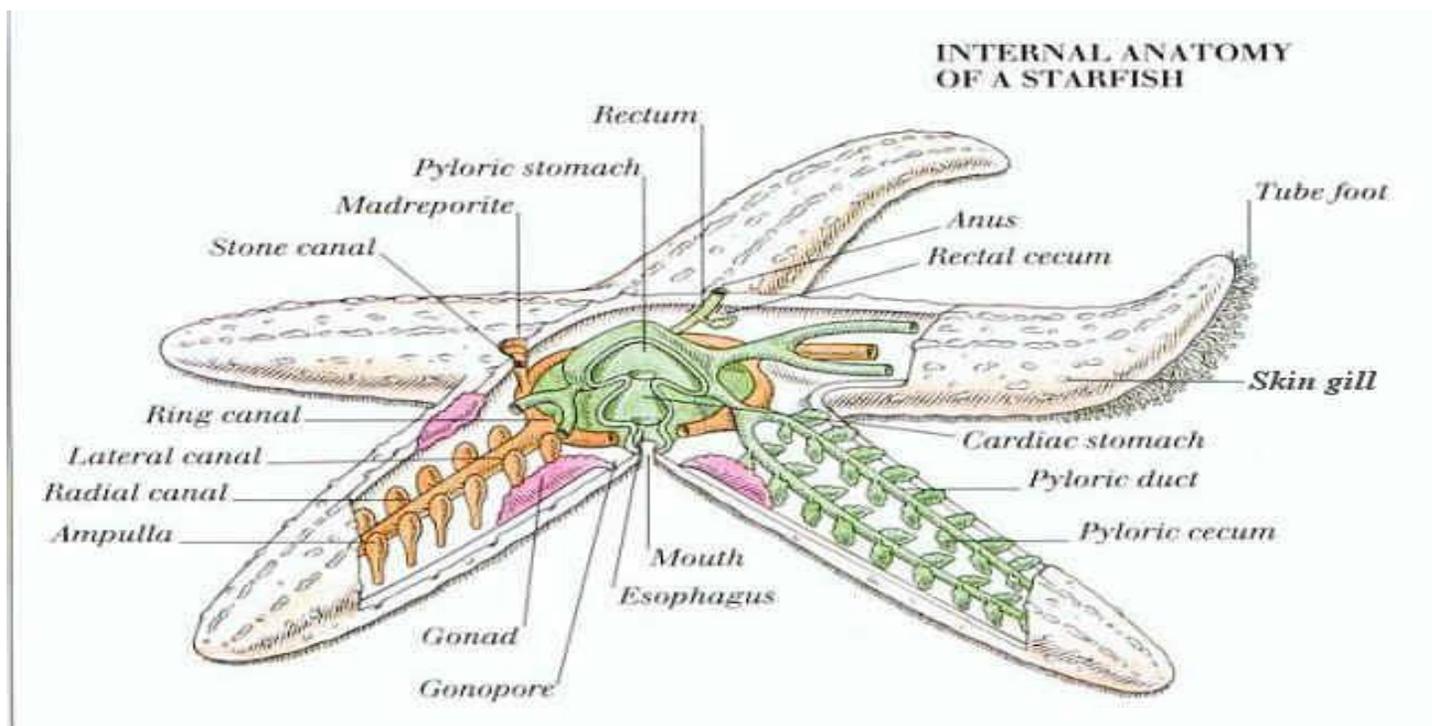


FIGURE 2:



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## OBSERVATION:

### **Analysis Questions:**

1. What phylum are starfish in? What class are starfish in?
2. What do starfish feed off of?
3. How does a starfish detect food if it can't see?
4. What is the name of the plates that spines are located on?
5. Explain how the water vascular system works to open and close the tube feet.

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Data: Drawings that should be included in the lab report:

Figure 1 – external dorsal view

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Figure 2 - internal organs

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Figure 3 – internal organs and water vascular system path

