Investigating the Structure and Function of the Squid

Squid are classified in the Mollusk Phylum and Class Cephalopoda, along with octopuses and cuttlefish. Common invertebrates, species of squid are found in waters around the world—at the surface, in the Deep Sea, and everywhere in between. Squid can be smaller than your finger or as long as a tractor trailer truck. They are well suited for withstanding pressure, blending in with their environments, and capturing prey. Some are even bioluminescent. They are a very interesting invertebrate to dissect, and a tasty one to eat.

Part A: External Anatomy

Follow the procedures with your lab group. Have one group member read each step aloud. Remember that each individual squid is slightly different. Be sure to make observations based on what you see, feel and smell. Use the hand lens and stereoscope to make more detailed observations.

1. Describe your squid in words. Make as many quantitative and qualitative observations as possible.

2. At the back of this packet are two diagrams of a squid. As you go through the dissection label the parts you see on these two diagrams.

3. At the top of the “torpedo” shape are two fins. They are attached to a structure that covers and protects many of the internal organs. This structure is the mantle. Describe the structure of the mantle.
4. Note the size and the location of the eyes.

5. The squid should have 8 arms and 2 tentacles that surround the mouth. Compare and contrast the arms and tentacles.

6. Carefully examine the mouth. Describe what you observe.

7. Lift your squid and examine the siphon, which sticks out from beneath the mantle. As it swims, a squid sucks in water to pass over its gills. The siphon also helps to determine the direction in which the animal swims.

Part B: Internal Anatomy

8. Place the squid back on the tray with the siphon down on the pan. Use a dissecting probe to gently lift the mantle and hold it taut. A Dissector should use the scissors to carefully make a long slice, from the head to the fin, to open the mantle. Do not cut too deep. You do not want to damage the underlying organs.

9. Open the “flaps” of the mantle and lay them out on the tray. The internal organs will now be exposed. Remember to label the various parts you see on the diagram provided at the back of this packet.

10. Use the Squid Anatomy Diagram to help you identify and label the internal structures as you proceed through the dissection.

11. Near the fin, farthest from the head, you will notice the reproductive organ, or gonad. There are several other organs, a bundle of them, just below the gonad. Organs in this bundle can be hard to distinguish, but include the systemic heart and kidney.

12. To the sides of the bundle are the long, feathery gills. Use the hand lens to examine them more closely. Describe the gills.
13. Next to the gills you will find the flat, white, brachial (pronounced: BRĀK-ee-ill) hearts. A squid has 3 hearts.

14. Now look for the ink sac. Try not to rupture it. Beneath the ink sac and the bundle of organs you observed earlier, you should find the stomach. Slice open the stomach. Describe its contents. Use the hand lens to examine the contents if necessary.

15. Below all of the organs, within the mantle, feel around until you note a hard, long, clear, stick-like structure. This is the shell, or pen, of the squid. This is the only shell that this mollusk has. Do some cutting to remove the pen. Describe its structure.

16. If time allows, investigate anything else you would like to about your squid. Use the hand lenses and observe structures under the dissecting microscope. Provide diagrams, descriptions and other information below. Things worth investigating include:

- The eyeballs
- The beak
- The liver
- The ink sac

17. Clean up your station as directed by your teacher. Once you are done, begin working on Part C with your group.
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