Take a good look at the squid's outside, first. The directional labels above are not a mistake; the tentacles are derived from the foot, so dorsal-ventral directions go the long way. Imagine a snail with its shell uncoiled and sticking straight up, to get the idea. The muscular, short arms have suckers all along their inner sides; these suction cups have hard rims-toothed, in some squid—which leave neat circular scars on animals they grapple with (sperm whales sometimes show up with saucer-sized scars). The tentacles have suckers only on their flat ends; they dart out to snatch fish and pull them in until the ring of arms can grip them. The siphon (cf. exhalant siphon in the clam) can be aimed in any direction, and makes the squid a fast swimmer; the body is rigid and bears stabilizing fins.

Place the squid, siphon up, in the dissecting pan, and cut open the body tube from the collar to the dorsal end. Pin open the tube and identify the following:

Note the iridescent ink sac; this produces a highly concentrated solution of melanin (the brown-black pigment in human skin also is melanin) which can be squirited out via the siphon to create a smoke screen or a squid-shaped dummy while the squid escapes from an attacker. Note also the extent of the mantle cavity, and the size of the gills. Here you can see the circulatory connections to the gills quite well. Also note the paired posterior venae cavae—probably quite distended in your specimen.
Now cut the rectum and ink sac at the base of the siphon. If you want to make ink, by the way, save the contents of the ink sac and add a tiny pinch of gum arabic to thicken it — this was a fine ink in the ancient world. Pull the rectum to one side. Lift the kidney and note, below it, the systemic heart. You will have to cut the aortae coming from the heart before you can lift it, also; then you can identify the stomach and caecum. (Their size may vary from that shown.) Down below the ink sac, observe the large digestive gland or liver. Finally, cut through the head and tentacles to expose the tough buccal bulb — a surprise awaits you. The squid has a beak! If you can cut the mouth further open, the rough, tongue-like radula can be seen.

Just between the eyes, you will see the white, large ganglia which form part of a highly centralized nervous system. This is a smart, swift predator. If your squid is a male, you will find, below the caecum, a large testis quite separate from the vas deferens (the sperm are sucked in by cilia in the vas), and a convoluted gland which puts out packets of sperm — spermatophores. The penis is misnamed — it never touches the female; instead one of the two posterior arms delivers a sticky packet of sperm from the penis to the female's mantle cavity, gluing it on near the oviducts. (In some octopods, the arm breaks off and stays with the female!)

**QUESTIONS:**

1. Squid and clams have adapted a common body plan for two very different lifestyles — one a sedentary filter feeder, another a very active predator. Comment on their most significant differences in this light.

2. Why has the squid got such a complex circulatory system, compared to the clam?