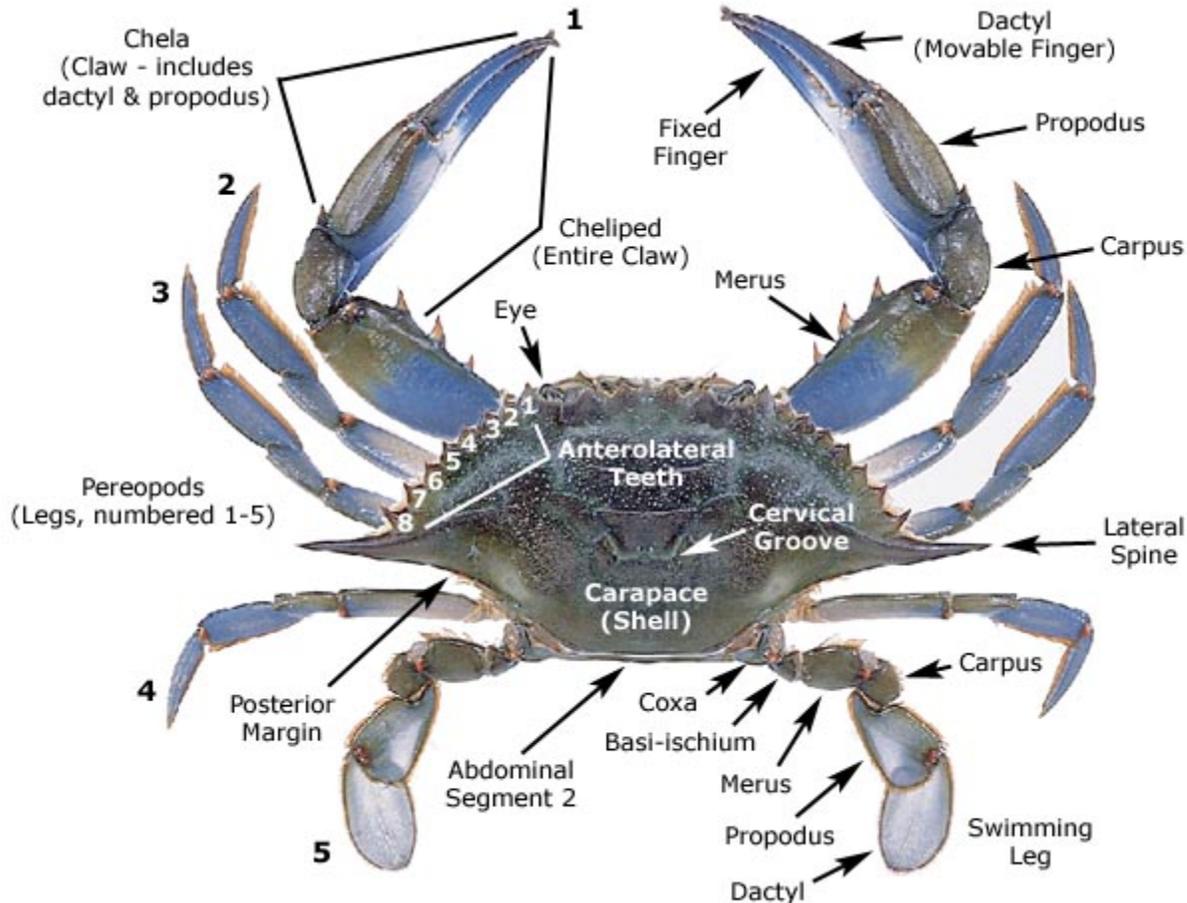


Name: _____

Blue Crab Dissection

External Anatomy

Examine your crab and note that, unlike more primitive decapods such as shrimps and crayfish, the body is very wide and is dorsoventrally flattened. Most of the body is head and thorax which are covered dorsally by a large hard carapace.



Examine the external anatomy of your specimen.

Pereopods can be voluntarily autotomized (=self cut) to escape predation, reduce blood loss from a wound, or in response to physiological stress. Pereopods 2-5 are similar to each other. Pereopod 1 is the cheliped and the pincer at its distal end is the chela. The cheliped is much more robust than the other pereopods and is constructed so that the dactyl is a movable finger that opposes an immovable finger. Note the teeth on the fingers.

1. How wide is the body of your crab? (Measure from the point of one lateral spine to the other) _____
2. Locate the periopods
 - a. How many are there? _____

3. The cheliped is the entire claw which is made up of a movable (dactyl) and fixed finger.
 - a. Can you open and close the dactyl? _____
 - b. What is the function of these pereopods? _____

4. Find the last pair of pereopods.
 - a. What is the function of this pair? _____
 - b. How does their shape lend to this function? _____

5. Locate the eyes of your specimen
 - a. How does general position and anatomy differ from a human's eye?

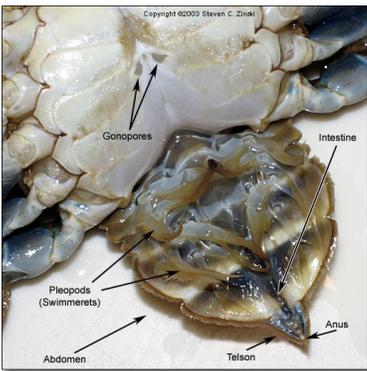
6. Locate the anterolateral teeth located on the carapace of your specimen. How many are there? _____

Turn Over Your Specimen

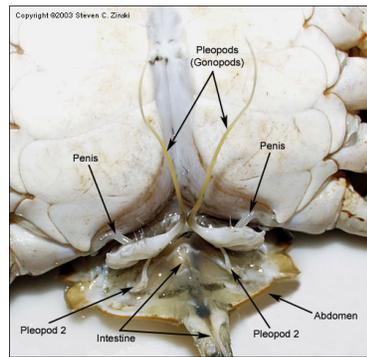
7. How many body regions does your specimen have? _____ Name each of the regions below.
 - a. _____
 - b. _____
 - c. _____

On the ventral surface locate the abdomen folded beneath the thorax. The abdomen is sometimes called the pleon and its appendages are pleopods. In true crabs (such as Callinectes and Cancer) the abdomen is a small segmented structure whose shape varies with sex and maturity. In mature females it is broad with convex sides and covers most of the posterior ventral surface of the thorax. In immature females the abdomen a nearly equilateral triangle whereas the abdomen of males is narrow with a broad base. Determine the sex of your specimen.

Female



Male



8. Is your specimen a male or female? _____

Extend the abdomen so it is no longer folded but points posteriorly from the thorax. The transparent, membranous intestine runs along the ventral midline of the abdomen and terminates at the anus on the telson. It may be filled with dark feces in which case it is easier to see.

9. Locate the intestine.

10. Is it filled with feces? _____

Study the appendages without removing them from the animal. The basic crustacean appendage is biramous, meaning they have two extensions. Extend the abdomen again, look at its ventral surface, and find the abdominal appendages, or pleopods. Males have only two pairs of pleopods and they are located anteriorly on the abdomen, on segments 1 and 2. Both function in the transfer of sperm to the female during copulation. The long, curved, tubular first pleopod is the gonopod. It, not the penis, is the organ used to deliver spermatophores to the female gonopore. The second pleopod is much shorter and functions as a piston to push spermatophores through the hollow core of the gonopod.

Check the box once you have identified these structures:

Male:

Gonopod

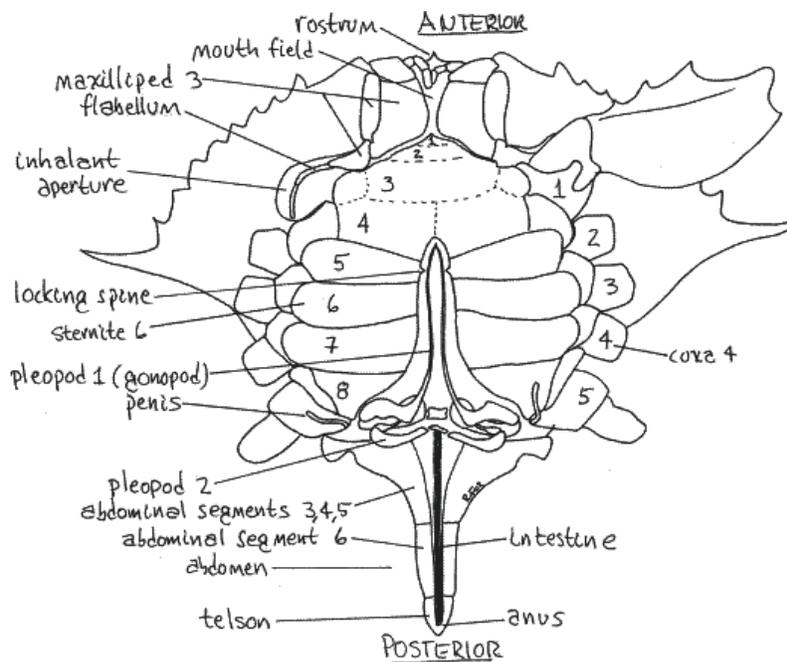
Pleopod 2

Penis

Female:

Pleopods

Gonopores

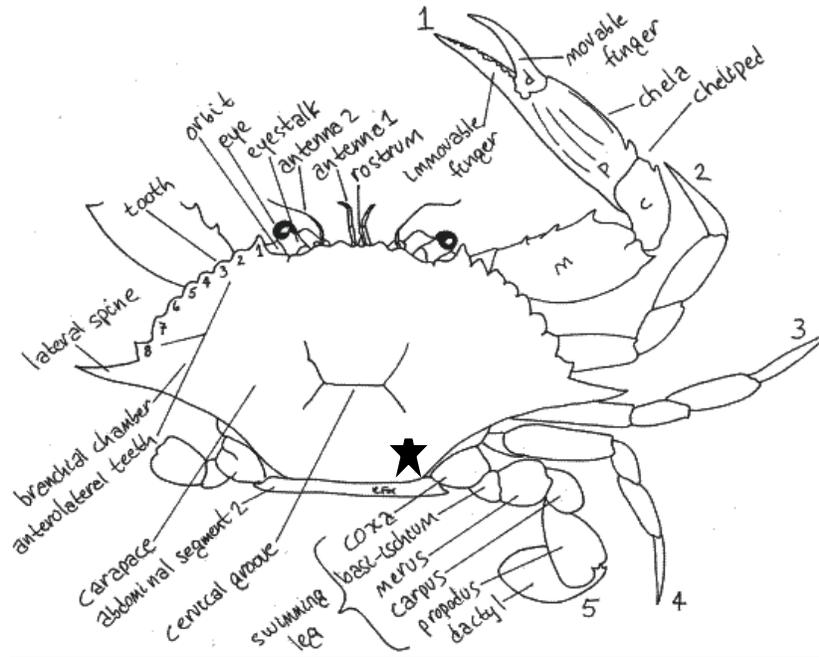


The maxillipeds, which are the appendages of the first three thoracic segments, function as mouthparts. The maxillipeds and other mouthparts overlie each other so only maxilliped 3 can be seen at present.

Maxilliped 3

Locate the two pairs of Antennae

Internal Anatomy

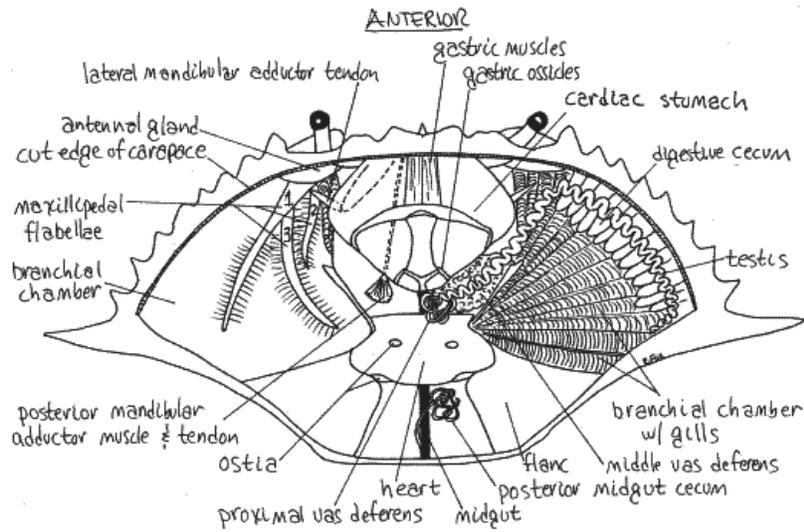


Turn the crab so its dorsal side is up. Insert the tip of a heavy scissors at the position indicated with a ★ make a cut around the periphery of the carapace on its dorsal surface. Be careful that you cut only the exoskeleton and not the organs beneath it. Keep your scissors about 5mm from the edge of the carapace and cut completely around it. Use a scalpel to separate it from the underlying tissues. Carefully remove the carapace, in pieces if necessary, without disturbing the underlying tissues.

The thin, dark body wall, which is little more than the epidermis, lies immediately beneath the carapace and as much of it as possible should be removed with the carapace. Muscles extending to the gut must be disconnected as you remove the carapace.

Carefully remove most of the remaining epidermis (i.e. body wall) without damaging the underlying tissues. This is a tedious task but must be done with care as some of the crab's organs adhere tightly to it.

Refer to the following figure to identify the internal structures of your crab.



The stomach is a large, bulging, transparent, thin-walled sac lying dorsally on the midline in the anterior thorax. It is the most conspicuous part of the gut. It is an exceptionally complex structure whose walls bear some 40 calcareous ossicles and 80 muscles. It is divided into a large, dorsal anterior chamber (or cardiac stomach) and a smaller, ventral posterior chamber (or pyloric stomach). The digestive glands are large, soft, amorphous, yellow or greenish organs occupying the periphery of the dorsal thorax.

The respiratory system consists of the gills located in the two lateral branchial chambers. These chambers occupy the pointed lateral sides of the body. The thin transparent body wall lying over the gills is a chitinous membrane investing the dorsal surface of the branchial chamber. It is almost invisible but it is all that separates the branchial chamber (which is filled with seawater) from the hemocoel (which is filled with blood). Remove this thin, transparent sheet from the gills. The branchial chamber is now open and the gills are exposed for study. There are eight gills on each side of the body but two of them are small and easily overlooked. Water flows in the inhalant aperture to the ventral region, then across the gill filaments into the dorsal region.

The soft, white or gray heart lies on the midline posterior to the stomach. The heart has three pairs of large ostia, two dorsal and one lateral, through which blood enters the heart. The blood, or hemolymph, contains the respiratory pigment hemocyanin, which is colorless when deoxygenated and pale blue when oxygenated.

The excretory system consists of two soft, grayish or pale greenish-white antennal glands located inside the anterior wall of the cephalothorax behind the second antenna. They may be difficult to find. These antennal glands are very effective osmoregulatory organs and blue crabs are tolerant of a wide range of salinities. The glands play little or no role in nitrogen excretion, most of which occurs across the surfaces of the gills.

Stomach

Digestive Glands

Gills

Heart

Antennal Glands

Discussion Questions:

1. What anatomical feature of the crab did you find most interesting and why?
2. How do you tell the difference between a male and female crab?
3. What is the significance of the antennal glands for blue crabs in particular?
4. Why does the blue crabs blood appear pale blue when oxygenated?
5. How would you go about catching blue crab? Where would you go?