

Crayfish Dissection

Objectives:

- Describe the appearance of various organs found in a crayfish.
- Name the organs that make up systems of the crayfish.

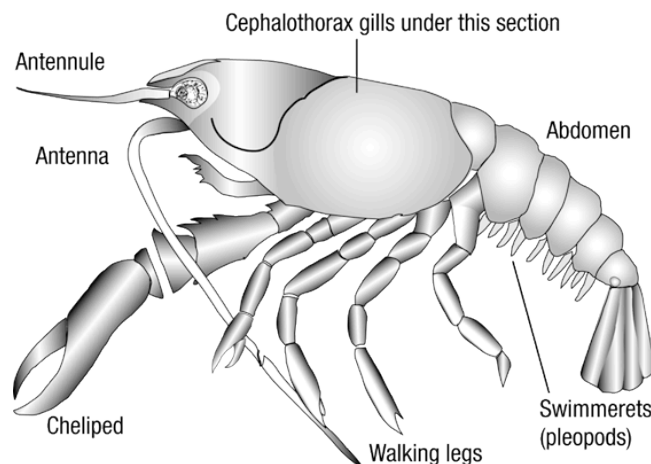
Background:

Like all crustaceans, a crayfish has a fairly hard exoskeleton that covers its body. As shown in the diagram on the next page, its body is divided into two main parts, the **cephalothorax** and the **abdomen**. The cephalothorax consists of the cephalic (or head) region and the thoracic region. The part of the exoskeleton that covers the cephalothorax is called the **carapace**. The abdomen is located behind the cephalothorax and consists of six clearly divided segments. The cephalothorax consists of 13 segments. Each segment of both the cephalothorax and the abdomen contains a pair of appendages. The head (or cephalic) region has five pairs of appendages. The **antennules** are organs of balance, touch, and taste. Long **antennae** are organs for touch, taste, and smell. The mandibles, or jaws, crush food by moving from side to side. Two pairs of **maxillae** hold solid food, tear it, and pass it to the mouth. The second pair of maxillae also helps to draw water over the gills. Of the eight pairs of appendages on the cephalothorax, the first three are **maxillipeds**, which hold food during eating. The **chelipeds** are the large claws that the crayfish uses for defense and to capture prey. Each of the four remaining segments contains a pair of **walking legs**. In the abdomen, the first five segments each have a pair of **swimmerets**, which create water currents and function in reproduction. The sixth segment contains a modified pair of **uropods**. In the middle of the uropods is a structure called the **telson**, which bears the anus. The uropod and telson together make up the tail fan. The crayfish moves backward by forcing water forward with its tail fan.

Materials:

- safety goggles, gloves, magnifying glass, a lab apron, plastic ziplock bag preserved crayfish, pen, dissecting tray, paper towels, scissors, forceps, dissecting needle, and dissecting pins.

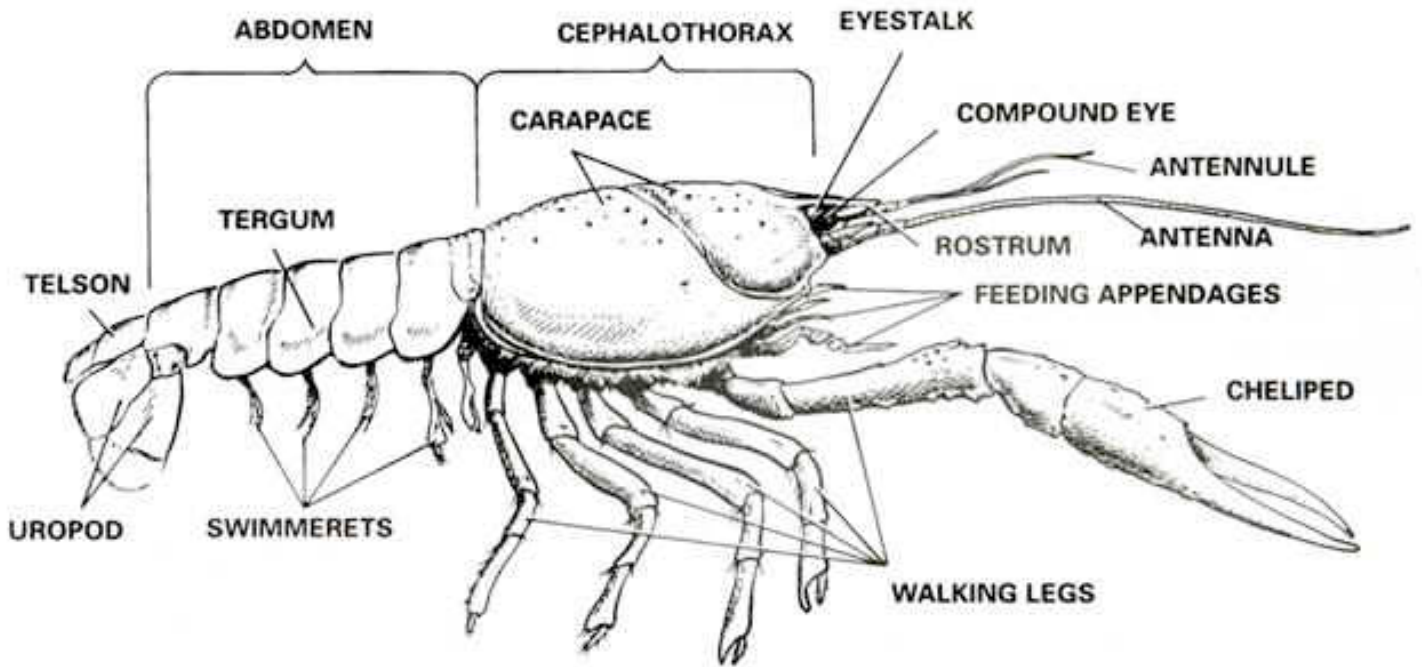
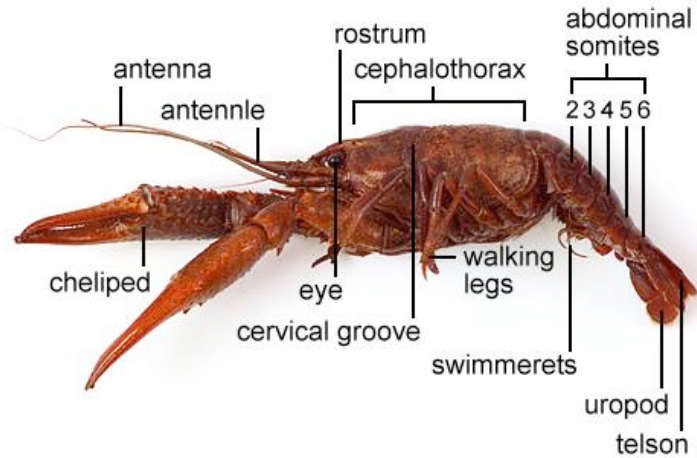
Procedure Part 1—External Anatomy of a Crayfish



1. Place a crayfish on its **dorsal** side in a dissection tray. Use the diagram below to locate the **cephalothorax** and the **abdomen**. The **carapace**, a shield of chitin, covers the dorsal surface of the

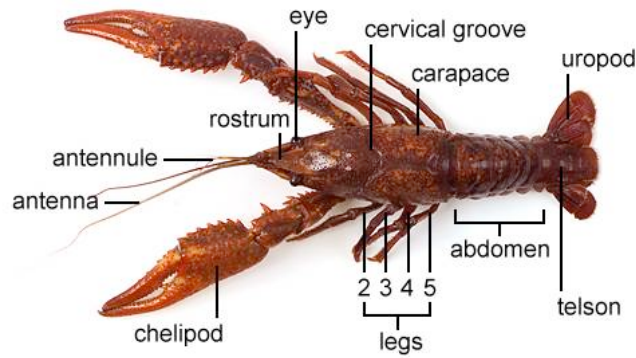
cephalothorax. On the carapace, observe an indentation, the **cervical groove**, that extends across the midregion and separates the head and **thoracic regions**. On the thoracic region, locate the prominent suture or indentation on the cephalothorax that defines a central area separate from the sides. Note the individual **segments** of the abdomen.

Crayfish - Side View

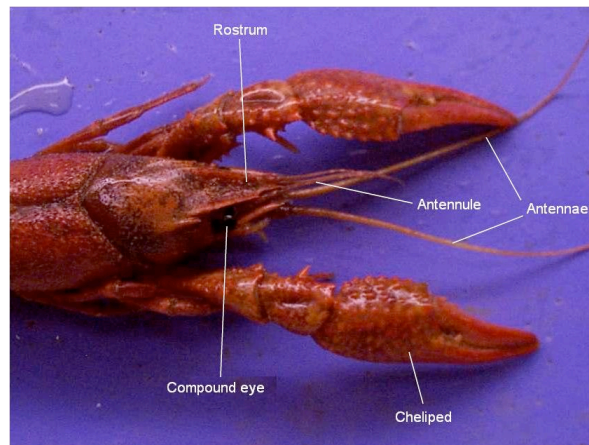


2. Turn the crayfish on its side, and locate the **rostrum**, which is the pointed extension of the carapace at the head of the animal shown in the diagram above. Beneath the rostrum locate the **two eyes**. Notice that each eye is at the end of a **stalk**.

Crayfish - Dorsal View

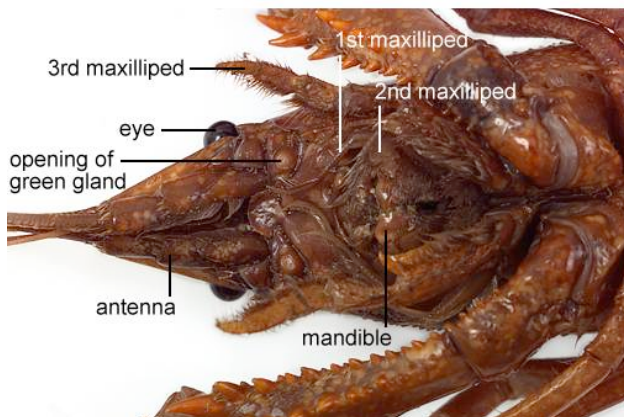


3. Locate the **five pairs of appendages on the head region**. First locate the antennules in the most anterior segment. Behind them observe the much longer pair of antennae.

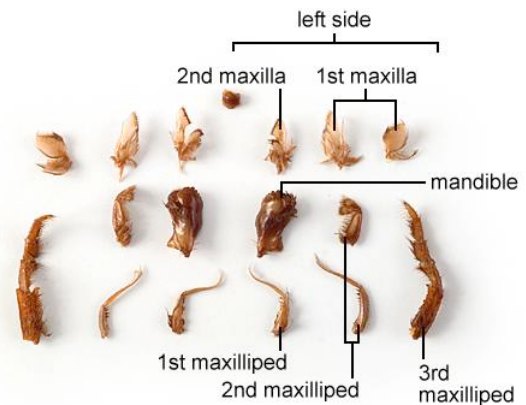


4. Locate the mouth. Then observe the mandibles, or true jaws, behind the antennae. Now locate the two pairs of maxillae, which are the last appendages in the cephalic region.

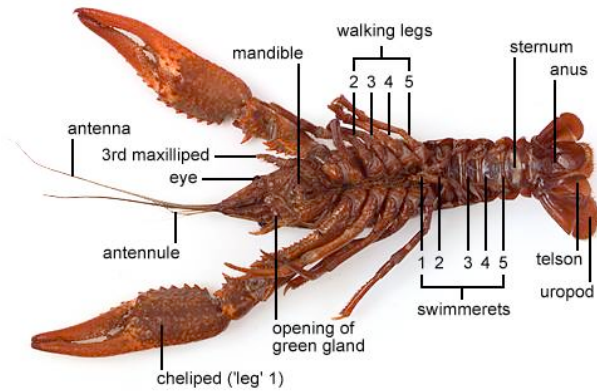
Crayfish - Mouth Appendages



Crayfish - Mouth Appendages



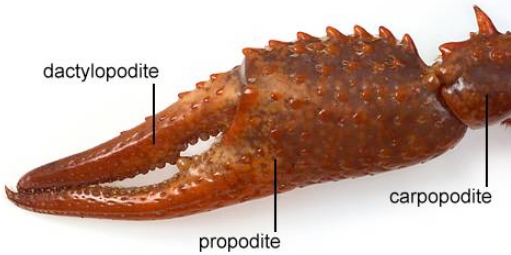
Crayfish - Ventral View (Male)



5. On the thoracic portion of the cephalothorax, observe the **three pointed maxillipeds**.

6. Next observe the largest prominent pair of appendages, the **chelipeds**, or claws. Behind the chelipeds locate the **four pairs of walking legs**, one pair on each segment.

Crayfish - Cheliped (1st 'leg', Claw = Chela)

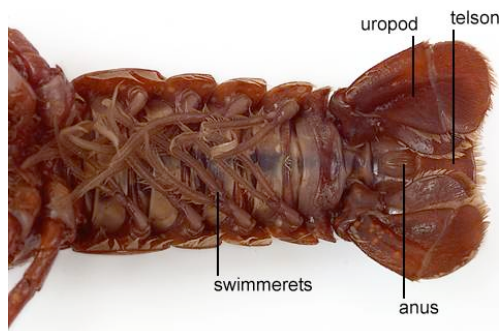


Crayfish - 2nd Walking Leg (Close Up)



7. Now use the walking legs to determine the **sex of your specimen**. Locate the **base segment** of each pair of walking legs. The base segment is where the leg attaches to the body. Use a magnifying glass to study the inside surface of the base segment of the third pair of walking legs. If you observe a crescent-shaped slit, you have located a **genital pore of a female**. In a male, the **sperm duct openings** are on the base segment of the fourth pair of walking legs. Use a magnifying glass to observe the opening of a genital pore.

Crayfish - Ventral Abdomen (Female)



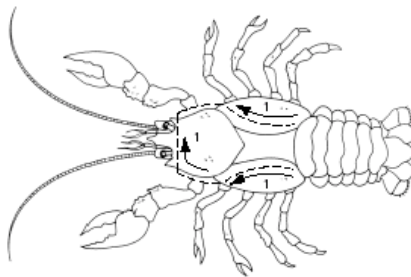
8. Exchange your specimen with a nearby classmate who has a crayfish of the opposite sex. Then study its genital pores.
9. On the abdomen, observe the six distinct **segments**. On each of the first five segments, observe a pair of **swimmerets**.
10. On the last abdominal segment, observe a pair of pointed appendages modified into a pair of **uropods**. In the middle of the uropods, locate the triangular-shaped **telson**.
11. Now turn the crayfish **ventral** side up. Observe the location of each pair of appendages from the ventral side.
12. Remove all jointed appendages of the crayfish and attach them to the table on the crayfish worksheet.

Complete steps 13 and 14 only if dissection takes two days!

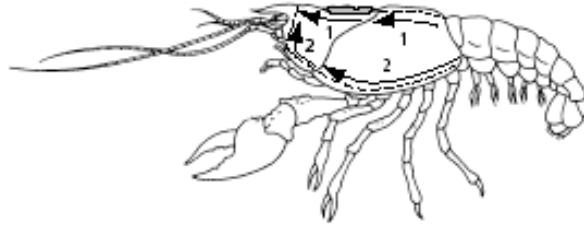
13. Next you will study the internal anatomy of a crayfish. If you must store your specimen until the next lab period, cover it with a dampened paper towel. Then place the specimen on the tray in a plastic bag. Close the bag with a twist tie. Write your name on the bag with a felt-tip marking pen, and give your specimen to your teacher.
14. Clean up your work area and wash your hands before leaving the lab.

Part 2—Internal Anatomy of a Crayfish

15. Using one hand to hold the crayfish dorsal side up in the dissecting tray, use scissors to carefully cut through the back of the carapace along dissection cut line 1, as shown in the diagram below. Cut along the indentations that separate the thoracic portion of the carapace into three regions. Start the cut at the posterior edges of the carapace, and extend it along both sides in the cephalic region.

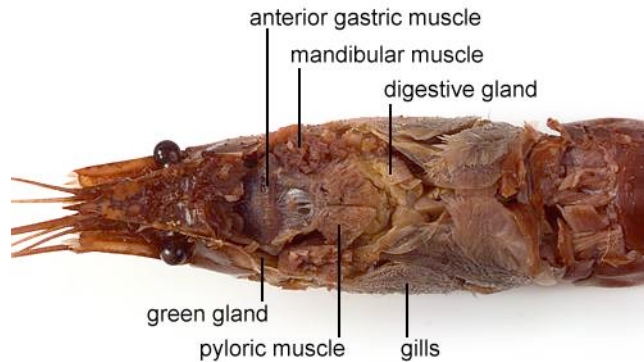


16. Use forceps to carefully lift away the carapace. Be careful not to pull the carapace away too quickly. Such action would disturb or tear the underlying structures.
17. Place the specimen on its side, with the head facing left, as shown in the diagram below. Using scissors, start cutting at the base of cut line 1. Cut along the side of the crayfish, as illustrated by cut line 2. Extend the cut line forward toward the rostrum (at the top of the head).

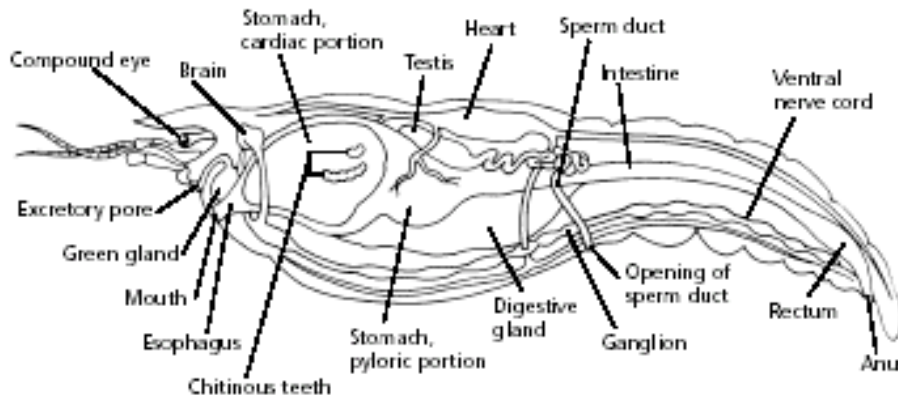


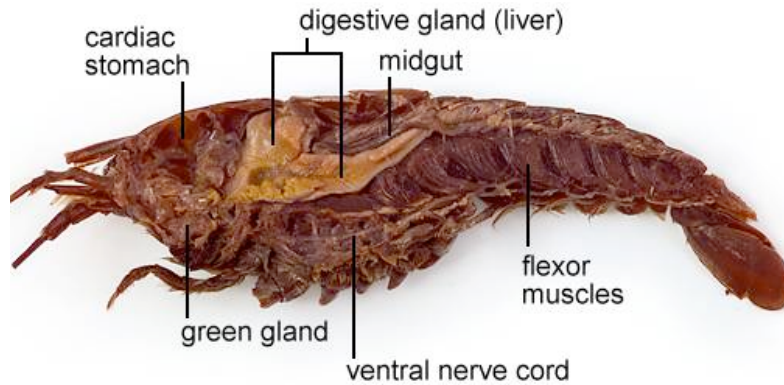
18. Use forceps to carefully lift away the remaining parts of the carapace, exposing the underlying **gills** and other organs.

Crayfish - Internal Features (Dorsal View)

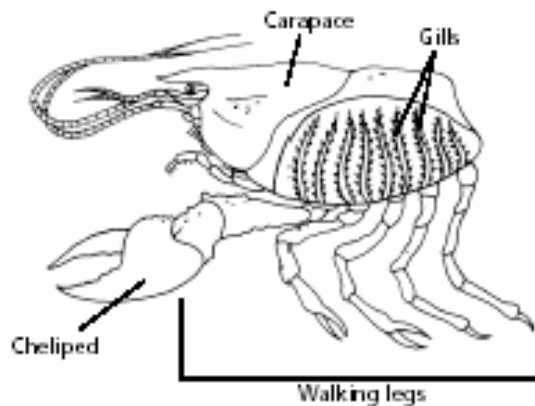


19. Use the diagram below to locate and identify the organs of the digestive system. Locate the **maxillae** that pass the pieces of food into the mouth. The food travels down the short esophagus into the stomach. Locate the **digestive gland**, which produces digestive substances and from which the absorption of nutrients occurs. Undigested material passes into the **intestine**. Observe that the intestine is attached to the lobed **stomach**. The undigested material is eliminated from the **anus**.

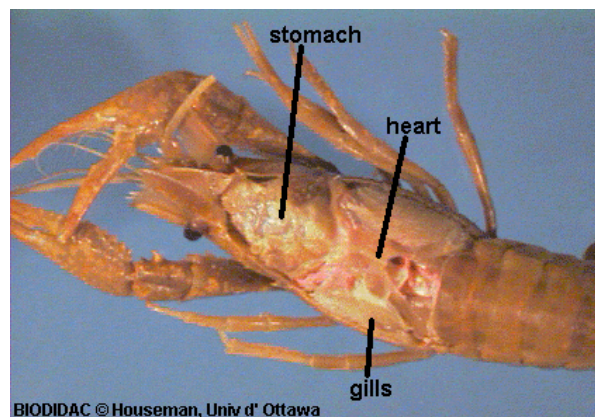




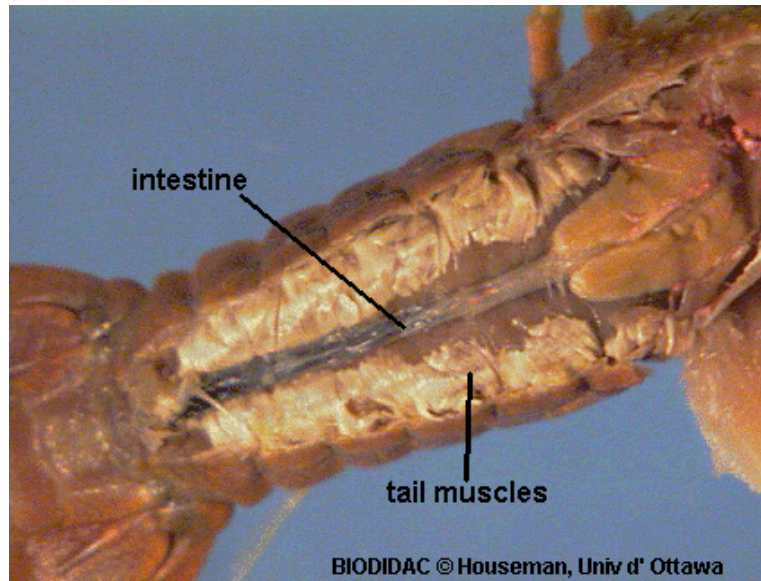
20. Use the diagram below to locate and identify the organs of the respiratory system. Locate the **gills**, which are featherlike structures found underneath the carapace and attached to the chelipeds and walking legs. A constant flow of blood to the gills releases carbon dioxide and picks up oxygen.



21. Use the diagram of the internal anatomy of the crayfish to locate and identify the organs of the circulatory system. Locate the **dorsal tubular heart** and several **arteries**. The crayfish has an **open circulatory system** in which the blood flows from arteries into **sinuses**, or spaces, in tissues. The blood flows over the gills before returning to the heart.



22. Use the same diagram to locate and identify the organs of the nervous system. Find the **ventral nerve cord**. Locate a **ganglion**, one of the enlargements of the ventral nerve cord. Locate the **dorsal brain**, which is located just behind the compound **eyes**. Note the two large nerves that lead from the brain, around the esophagus, and join the ventral nerve cord.
23. Use the same diagram to locate and identify the organs of the excretory system. The blood carries cellular wastes to the disk-like **green glands**. Locate these organs just in front of the stomach. The green glands excrete waste through pores at the base of each antenna.



24. Use the diagram once again to locate and identify the organs of the reproductive system. The animal shown in the diagram is a male crayfish. If your specimen is a male, locate the testis. The testis is the long, white organ under the heart and a bit forward. The sperm ducts that carry sperm from the testis open at the fifth walking leg. If your specimen is a female, locate the bi-lobed ovary. It is in the same relative position as the testis, but the ovary appears as a large, reddish mass under the heart. Then locate the short oviducts that extend from near the center of each side of the ovary and open at the third walking leg. **Exchange your specimen with a nearby classmate who has a crayfish of the opposite sex. Then study its reproductive system.**
25. Dispose of your materials according to the directions from your teacher.
26. Clean up your work area and wash your hands before leaving lab.