

# Earthworm Anatomy

## Problem

What are the internal and external structures of an earthworm?

## Background

Earthworms are common representatives of the phylum Annelida. The annelids are the segmented worms, their bodies being made up of distinct rings called *segments*. In this lab, you will examine the external characteristics of an earthworm. Then, you will dissect the earthworm to examine its internal structures.





## Materials (per group)

plastic disposable gloves	water dropper	dissecting pins
earthworm	hand lens	dissecting scissors
dissecting pan	paper towel	dissecting probe

## Safety First!



In this lab, you will be working with anesthetized or preserved earthworms. Observe all precautions, especially the ones listed below. If you see one or more safety icons beside a step in the procedure, refer to the list below for its meaning.

-  • **CAUTION:** Wear your safety goggles. (All steps.)
-  • **CAUTION:** Wear your laboratory apron and disposable plastic gloves, if provided. (All steps.)
-  • **CAUTION:** Treat the preserved animal, preservative solution, and all equipment that touches the earthworm as potential hazards. Wash your hands with soap and water before leaving the lab. (All steps.)
-  • **CAUTION:** Be careful when working with sharp tools. (Part B, steps 1–3, 9.)
- **NOTE:** Return or dispose of all materials according to the instructions of your teacher.

## Procedure

### PART A



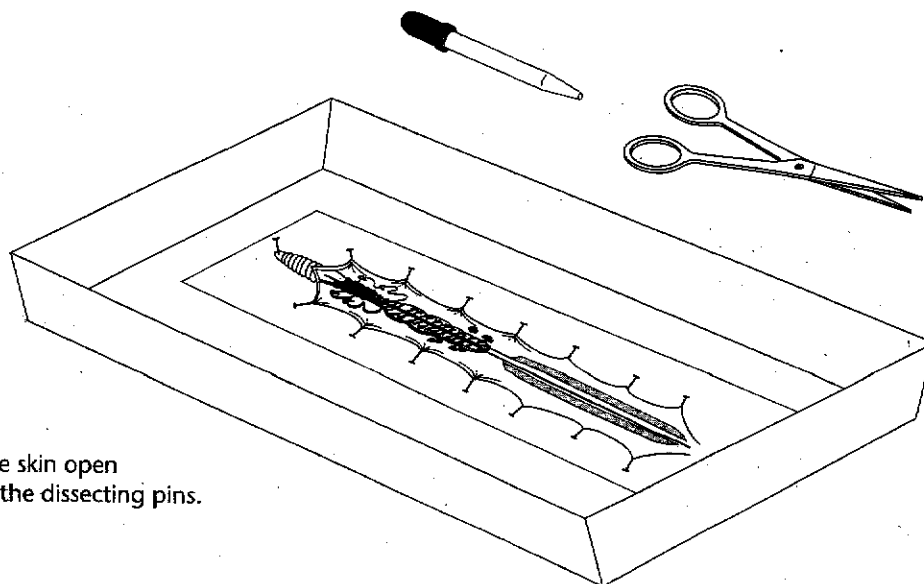
1. Work with a partner. Wear your safety goggles, laboratory apron, and disposable plastic gloves. Place an anesthetized or preserved earthworm in the dissecting pan with its dorsal side upward. Add a few drops of water to a live earthworm to keep it moist as you observe it. Using the hand lens, observe the segments and locate the *setae*. Run your fingers along the sides of the worm to feel the *setae*.
2. Count the number of segments the earthworm has. Determine the anterior and posterior ends by locating the wide band known as the *clitellum*. It is closer to the anterior end of the worm. Locate the *mouth* on the anterior end of the worm and the *anus* on the posterior end.
3. Draw the external view of your earthworm in the space provided. Label the external parts that you observed. Record any other observations you make about the external characteristics of your earthworm.

### PART B



1. Straighten out the worm, dorsal side upward, on a wet paper towel in the dissecting pan. Pin the ends of the worm to the wax in the pan. **CAUTION:** Use care when handling dissecting pins.
2. Using the scissors, make a shallow cut along the length of the worm's dorsal surface (its darker-colored side). Be sure to make the cut slightly off to the side of the center of the worm, so that you do not cut the dorsal blood vessel. **CAUTION:** Use care with dissecting scissors.
3. Using the dissecting probe, carefully separate the organism's cut skin from the internal organs as you open the worm. Pin the skin open along the body using the dissecting pins. **CAUTION:** Use care when handling the dissecting probe and pins.
4. Observe the circular muscles just under the skin. Also observe the longitudinal muscles beneath the circular muscles.
5. Locate and examine the digestive system. Begin with the *pharynx*, the widened structure behind the mouth. Observe that it is connected to a narrow tube, the *esophagus*, which is connected to the *crop*. The crop is a large, thin-walled structure. Locate the *gizzard* just behind the crop. Locate the *intestine*, the tube that reaches from the gizzard to the *anus*. If you start counting segments at the anterior end of the worm, the pharynx is usually located in segments 4 to 6, the crop in segments 15 to 17, and the gizzard in segments 18 to 20.

6. Examine the closed circulatory system. Locate the *dorsal blood vessel* that runs along the surface of the worm. At the anterior end of the worm observe the five *aortic arches*, which surround the esophagus. The aortic arches connect the dorsal blood vessel with the ventral blood vessel. Locate the *ventral blood vessel*. It may be easier to see in the posterior end of the worm.
7. Locate the *nephridia*, small white tubes at the sides in each segment. They are located on both sides throughout the digestive tract, near the body walls. Each segment has a pair of nephridia. You may need to use a hand lens to see them.
8. Locate the three pairs of white, sac-shaped structures on the sides of the esophagus. These structures are the *seminal vesicles* and can usually be found in segments 9 to 14. The *testes* and *ovaries* lie beneath the seminal vesicles. Use the hand lens to try to locate these structures.
9. At the anterior end of the worm, locate the brain, a white mass of tissue above the pharynx. It is connected to a *ventral nerve cord* that runs the length of the worm. To view the nerve cord, cut a piece of the intestine about 1 cm long out of the worm. The nerve cord looks like a white thread attached to the lower side of the intestine.
10. In the space provided, draw and label the parts of the earthworm that you dissected. Record any other observations you make about the earthworm's internal structures.
11. When you finish the dissection, dispose of your earthworm according to your teacher's instructions.



Pin the skin open  
using the dissecting pins.