

# Lab: Earthworm Dissection

Name: \_\_\_\_\_

10<sup>th</sup> Grade Science

Period: \_\_\_\_\_

Date: \_\_\_ / \_\_\_ / \_\_\_

*Purpose: (5 points)*

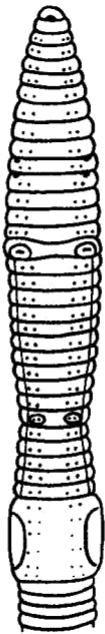
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**Materials:** Preserved Earthworm  
Pins  
Scalpel  
Dissecting Pan  
Forceps  
Probe

**Procedures:**

## External Observation of Earthworm



1. Examine your earthworm and determine the dorsal and ventral surface of the earthworm. (The ventral side is lighter in color)
2. The openings toward the anterior end of the worm are the sperm ducts. The openings near the clitellum are the genital setae.
3. Locate the dark line that runs down the dorsal side of the worm, this is the dorsal blood vessel. The ventral blood vessel can be seen on the underside of the worm, though it is usually not as dark.
4. Locate the worm's mouth and anus. Note the swelling of the earthworm near its anterior end. This is the clitellum.
5. Count the number of segments on your worm from the mouth opening to the clitellum.
6. Locate the setae on the ventral side of the earthworm. Run your finger over the setae.

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## Internal Observation of the Earthworm

7. Place the earthworm in the dissecting pan dorsal side up.
8. Locate the clitellum and insert the tip of the scalpel about 3 cm posterior to the clitellum. Carefully cut through the skin and muscles of the earthworm all the way up to the head. USE A VERY LIGHT HAND!!!! Be gentle or you will cut completely through the earthworm.
9. Spread the skin of the earthworm out, using a probe, to gently tear the septa (little thread-like structures to hold the skin to the organs below it).
10. Place pins in the skin to hold it apart. Put the pins on an angle so they are not in the way, obstructing your view.

11. Reproductive System-The first structures you probably see are the seminal vesicles. They are cream colored and located toward the anterior of the worm. These are used for producing sperm. Use the tweezers to remove these white structures which sit on top of the digestive system.
12. Circulatory System-The **dorsal blood vessel** appears as a dark, brownish-red vessel running along the intestine. The **heart, or aortic arches**, can be found over the esophagus (just posterior to the pharynx). Carefully tease away the tissues to expose the arches of the heart that run across the worm. If you are careful you can expose all five of them. The **ventral blood vessel** is opposite the dorsal blood vessel and cannot be seen at this time because the digestive system covers it.
13. Digestive System-The digestive system starts at the mouth. You will trace and identify the organs all the way to the anus. Find the mouth opening. The first part after the mouth is the pharynx. You may see stringy pieces of tissue attached to either side of the pharynx. These are called pharyngeal muscles. The pharynx is sometimes difficult to locate. Don't worry if you do not see it. The esophagus leads from the pharynx but, since it lies underneath the heart it is also difficult to see. You will find two structures close to the clitellum. First is the crop, followed by the gizzard. The gizzard leads to the intestine which is as long as the worm and ends in the anus.

*Observations:* Draw a labeled, colored diagram of the internal organs of the earthworm as **you** see them. Use the entire page. (15 Points)

*Conclusion:* Answer the following questions in complete sentences. (4 Points Each)

1. How many segments does your earthworm have from the mouth pore to the clitellum?
2. What is the purpose of the clitellum?
3. What does the term “hermaphroditic” mean?
4. What do the setae of the earthworm feel like?
5. For what are the setae used?
6. What does the crop do in the digestive process of the earthworm?
7. What does the gizzard do in the digestive process of the earthworm?
8. What is inside the earthworm’s intestine?
9. What functional purpose does it have for digestion?
10. What is the name of the pumping organs of the earthworm?
11. Why are earthworms so important in nature?

12. Why is it dangerous for an earthworm to be in the sun for too long?

Hint: Think of how an earthworm breathes.

13. Define the following terms:

Dorsal:

Ventral:

Anterior:

Posterior:

14. Identify the labels on the diagrams on the following page. (2 Points Each)

A. \_\_\_\_\_

H. Brain (ganglia)

B. \_\_\_\_\_

I. \_\_\_\_\_

C. Nephridia

J. \_\_\_\_\_

D. \_\_\_\_\_

K. \_\_\_\_\_

E. Ventral Nerve Cord

L. \_\_\_\_\_

F. \_\_\_\_\_

M. \_\_\_\_\_

G. \_\_\_\_\_

N. \_\_\_\_\_

15. In the diagram on the next page, shade in the organs that are part of the digestive system. (6 Points)

Vocabulary for Labeling

*Ventral Blood Vessel*

*Mouth*

*Pharynx*

*Dorsal Blood Vessel*

*Clitellum*

*Gizzard*

*Aortic Arches (heart)*

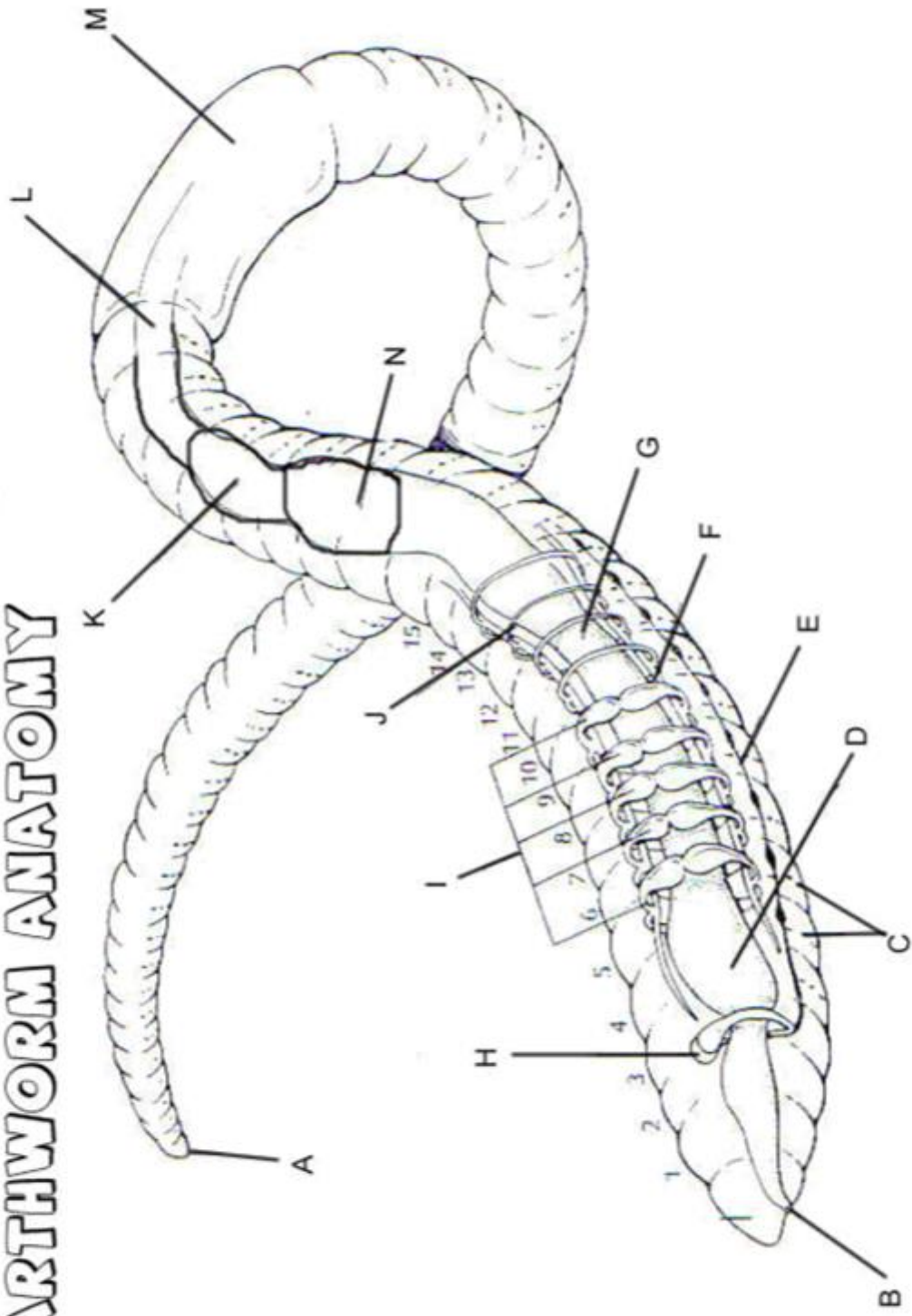
*Anus*

*Esophagus*

*Intestines*

*Crop*

# EARTHWORM ANATOMY



# Earthworms

Do earthworms get a bad rap?



Earthworms have been around for 120 million years. The Egyptians thought them sacred. Aristotle called them the “intestines” of the soil. Charles Darwin studied them for 39 years because they played such an important role in the world’s agricultural history.

Although earthworms are slimy (mucous keeps them moist so they can carry out the life activity, respiration, through their skin) they are very important for our soil. They aerate the soil by digging tunnels in the soil. They eat leaves, twigs and root debris. They then excrete castings that help to fertilize the soil.

**Phylum:** Annelida (segmented worms)

**Habitat:** Underground. Emerge at night; go underground in the morning.

**Locomotion:** The worm works its way along by extending the anterior part of its body and taking hold of the soil by means of setae or bristles. It then expands its body, retracts the bristles of the posterior region and draws up the posterior part of its body.

**Ingestion:** They eat worms, leaves and other parts of plants along with soil. The food enters in through a mouth opening at the anterior end of the worm.

**Digestion:** When food enters the mouth, it is swallowed by the action of the muscular pharynx. It then passes through the narrow esophagus. The esophagus leads into a large, thin walled sac called the crop. No digestion takes place in the crop. The food is stored here. After the crop, the food enters another sac called the gizzard. The gizzard has heavy muscular walls that grind the food along with the help of small stones, swallowed by the worm. From the gizzard, the food passes through the intestine, where the food is digested by juices. The digested food is absorbed into the blood vessels of the intestinal wall. The undigested food passes out the anus.

**Respiration:** Respiratory exchange (taking in of oxygen, giving off of carbon dioxide) occurs by diffusion through the body’s skin and pores, which contains many capillary networks. The outermost layers of the earthworm are thin and must be kept moist so that the respiratory exchange can take place.

**Circulation:** The earthworm has a closed circulatory system, meaning it has no breaks. Since the earthworm is long diffusion of digested materials is very ineffective. To compensate, the earthworm has a circulatory system to distribute the digested materials from the digestive system throughout the body. In segments 7-11 there are five (5) long pairs of muscular tubes called aortic arches that contract and relax to keep blood flowing. The aortic arches that contract and relax to keep the blood flowing. The aortic arches are not true hearts.

**Excretion:** Solid wastes are removed through the anus. Liquid wastes are removed through nephridia. Nephridia come in pairs. A pair is found at the ventral end of every segment of the earthworm. Each nephridium has a funnel containing cilia at one end and a pore to the outside at the other end. Liquid wastes, taken from the blood stream by diffusion, are pushed out the pore by the expansion and contraction of muscles in the earthworm.

**Reproduction:** Reproductive organs of the earthworm are protected behind the clitellum which is toward the anterior end of the earthworm. The earthworm is hermaphroditic. This means that each earthworm has a complete set of male and female reproductive organs. The clitellum secretes a ring of slime to aid and protect the exchange of sperm and eggs. The slime ring later slips off the body and becomes a cocoon in which the young develop.

**Sensitivity:** The earthworm is sensitive to light, touch, and chemicals. The sensitivity occurs in skin cells. The earthworm has a primitive brain. It is a gathering of ganglia.

**Protection:** The earthworm protects itself by retreating underground. In cold weather they go underground in groups. In hot weather they go underground to avoid drying out. In wet weather they go above ground to avoid drowning.

**Other Annelida:** Leeches  
Night Crawlers

**Directional Words:** Anterior End-front end, toward mouth  
Posterior end-back end, toward anus  
Dorsal side-topside, toward sky  
Ventral side-bottom side, side toward ground