

Teacher's Name: _____

Name: _____

Partner's Name: _____

Date: _____ Block: _____

Phylum Annelida: Earthworm Dissection

- Purpose:
- (1) To identify the external and internal structures of the earthworm.
 - (2) To relate the structures of the earthworm to their functions.

Materials:

dissecting microscope
scalpel
razor blade
forceps
probe

dissecting pins
dissecting pan
preserved earthworm
structure labels

Procedure:

1. Place the earthworm, dorsal side up, in the dissecting pan. To differentiate between the dorsal and ventral sides of the earthworm, run your thumb and forefinger along the worm. The smoother side is the dorsal side. Ensure that the worm is placed so that the anterior end of the worm is nearest the top of the dissecting pan. The anterior end is closest to the clitellum of the worm.
2. Using a scalpel or razor blade, make a shallow, lengthwise incision along the dorsal surface of the worm, from about halfway back from the anterior end all the way up to the mouth. As you are making the incision, you will need to pin the walls of the body down to keep it open. You will also need to use the scalpel to remove the membrane between the body wall and the internal organs (as demonstrated by Mrs. Wilkie).
3. As you read through the following section regarding the digestive system of the earthworm, locate and label (with dissecting pins and the structure labels) the structures (in your specimen) that are mentioned in **bold face** in the text.

The **mouth** is at the anterior end of the organism. It opens into the **pharynx**, which is typically located in segments 2-6. Following the pharynx is the tubular **esophagus** which extends through segments 6-14. It opens into the gray, thin-walled **crop** in segments 15-16. The crop connects with the white, muscular **gizzard** in segments 17-18. The gizzard empties into the **intestine**. The intestine continues to the **anus** at the posterior end of the worm. Using a blunt-end probe, gently press on the crop, and then do the same to the gizzard. You should notice a difference in the structures.

Muscular action of the mouth and pharynx draw soil (containing food) into the digestive system. Food is temporarily stored in the crop. As it moves into the gizzard, the food is ground up by being churned with grains of sand in this structure. Enzymes are secreted by the intestinal walls. These enzymes digest proteins, fats, and carbohydrates. The nutrients (i.e. products of digestion) are absorbed by the blood, which distributes them to body cells. Undigested materials (i.e. solid wastes and soil) are removed from the body of the earthworm through the anus.

4. As you read through the following section regarding the respiratory and internal transport systems of the earthworm, locate and label (with dissecting pins and the structure labels) the structures (in your specimen) that are mentioned in **bold face** in the text.

Encircling the esophagus in segments 7-11 are the five **aortic arches**. These pump blood from the **dorsal blood vessel**, lying along the top of the digestive tract (as your worm is placed dorsal side up), to the **ventral blood vessel**, underneath the digestive tract. Blood flows toward the anterior end of the worm in the dorsal blood vessel, and back to the posterior end in the ventral blood vessel. It circulates to all body cells through a network of *smaller blood vessels*. The earthworm's blood contains hemoglobin, which absorbs oxygen through the moist skin and transports it to all body cells. The hemoglobin also takes carbon dioxide from the cells and releases it into the air through the skin. The diffusion of gases can only occur when the epidermis is moistened by mucous glands or by fluid from the dorsal pores.

5. As you read through the following section regarding the response system of the earthworm, locate and label (with dissecting pins and the structure labels) the structures (in your specimen) that are mentioned in **bold face** in the text.

Directly above the mouth, in segment 3, there are two small white masses of nerve tissue. These masses are the ganglia that merge to form the **brain**. The ganglia are connected to the **ventral nerve cord** in segment 3. The enlargements of the nerve cord in each segment have *nerves* that branch to the various body parts. The nerves are too small to see.

6. As you read through the following section regarding the excretory system of the earthworm, locate and label (with dissecting pins and the structure labels) the structures (in your specimen) that are mentioned in **bold face** in the text.

In each segment of the earthworm, there is a very small pair of coiled tubes on each side of the digestive tract, called *nephridia*. The nephridia may be too small to see. Try using the dissecting microscope to view these. The nephridia release nitrogenous wastes from the worm through excretory pores.

7. As you read through the following section regarding the reproductive system of the earthworm, locate and label (with dissecting pins and the structure labels) the structures (in your specimen) that are mentioned in **bold face** in the text.

The **sperm vesicles** contain testes, which produce sperm. They are found as white masses, on both sides of the esophagus, attached on the ventral side of the worm in segments 9-13. The smaller white structures on the ventral side of the worm in segments 9-10 are the two pairs of **sperm receptacles**. These receive sperm during mating and store it until it is needed to fertilize eggs. The **ovaries**, which produce the eggs, are located under the sperm receptacles. They may be difficult to see.

8. Clean up as instructed by Mrs. Wilkie.

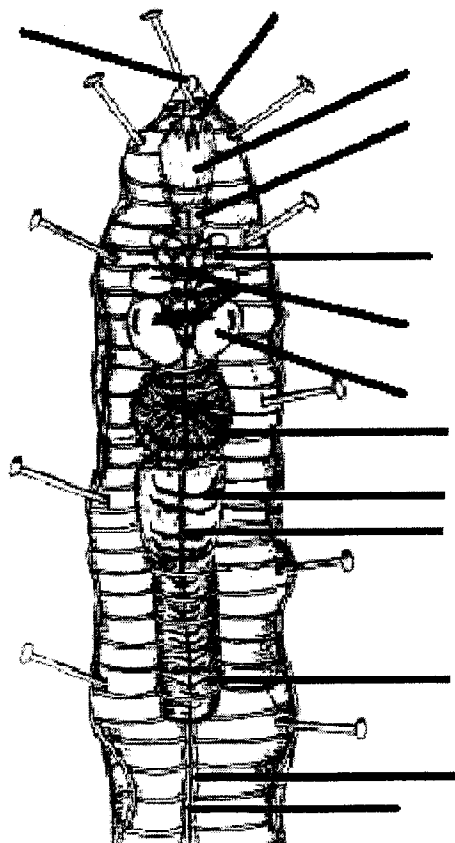
Data and Observations:

1. Provide qualitative and/or quantitative descriptions of the following structures of the earthworm:

Structure	Description
mouth	
pharynx	
esophagus	
crop	
gizzard	
intestine	
anus	

Structure	Description
aortic arches	
dorsal blood vessel	
ventral blood vessel	
brain	
ventral nerve cord	
sperm vesicles	
sperm receptacles	

2. Label the following diagram of the earthworm:



Questions:

1. Why is it that the ventral side of the earthworm is rougher than the dorsal side? Relate structure to function. (1 mark) _____

2. Relate the structures of both the crop and gizzard to their functions. (4 marks)

3. Explain the significance of the placement of both the sperm receptacles and the ovaries in relation to each other. (2 marks) _____

4. Why is it that the clitellum is closer to the anterior end of the worm as opposed to the posterior end? Relate structure to function. (2 marks) _____

5. How does the earthworm's system of gas exchange limit the worm's lifestyle? (2 marks) _____

Evaluation:

PLO #s	Lab Components	Your Score	Total Possible Score
A2c	Data & Observations #1		14
G3e	Data & Observations #2		13
	Specimen labeled correctly		14
	Total		27
G3f	Q1, Q2, Q3, Q4, Q5		11