

Earthworm Dissection Lab

Instructors Guide

Suggestions:

- The dissection of the earthworm is much improved when it follows the dissection of the roundworm *Ascaris*.
- Have students compare the structures of *Ascaris* and the Earthworm and explain how the additional features of the Earthworm make it more complex.

Pre-lab Discussion:

The earthworm belongs to a group of animals called annelids (segmented worms). The body of an annelid is usually divided internally and externally into well-defined segments which may be separated from each other by membranous partitions. Except for the tail and head regions, all segments are essentially alike. Other members of this group include the clam worms and tube worms, which live in the ocean, and the leeches.

The earthworm hunts food at night and thus has been called a "night crawler." It usually extends its body from the surface opening of a small tunnel which it makes by "eating" its way through the soil. The rear end of the worm's body remains near the opening while the head end forages for decaying leaves and animal debris.

It has been estimated that an acre of good soil contains over 50,000 earthworms. By their continuous foraging and tunneling these worms turn over 18 to 20 tons of soil per acre and bring over one inch of rich soil to the surface every four to five years. Thus, indirectly, the earthworm enriches farmland and provides for more food in a rapidly expanding population.

Purpose: To observe the structures of male and female *Lumbricus terrestris* and compare those structures to those of *Ascaris lumbricoides*.

Materials:

- One specimen of *Lumbricus terrestris*
- Rubber gloves
- Dissection kit
- Dissection tray
- Pins

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Safety:

Put on a laboratory coat if desired. Make sure you handle all specimens with rubber gloves. Handle all dissection equipment carefully. Clean all equipment when finished. *Lumbricus terrestris* requires no special safety measures.

Pre-Lab Questions:

- 1. Please fill in the following classification information on Earthworm (*Lumbricus terrestris*).**
(use <http://www.itis.gov/index.html>)

- a. Kingdom: *Animalia*
- b. Phylum: *Annelida*
- c. Class: *Clitellata*
- d. Order: *Branchiobdellida, Haplotaxida, Lumbriculida, or Moniligastrida*
- e. Family: *Lumbricidae*
- f. Genus: *Lumbricus*
- g. Species: *terrestris*

- 2. What does an earthworm eat?**

Decaying plant or animal matter.

- 3. Annelids are the simplest organism to have a true coelom. What is a coelom?**

A coelom (see-lum) is a fluid filled cavity lined with mesoderm tissue. It helps protect organs, aids in digestion and movement, and provides space for the circulatory "plumping."

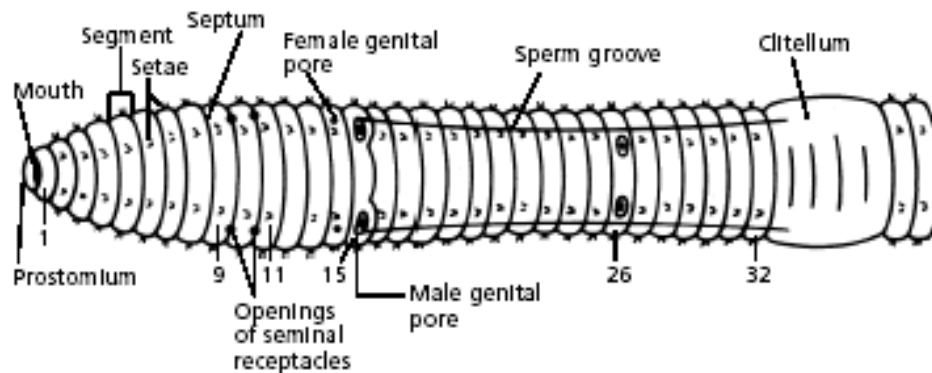
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4. Define the following terms (use dictionary)

- a. Dorsal: *top/back*
- b. Ventral: *bottom/underneath*

Procedure:

1. The body of the earth worm is comprised of over 100 segments. Each segment looks like a ring. The segments are numbered in sequence from the anterior end. Numbers in the diagrams refer to the segment number.



2. Pin worm to dissecting pan. Using a scalpel or scissors, make a shallow incision in the dorsal side of the clitellum at segment 33. **CAUTION: Scalpels and scissors are very sharp. Report any cuts to your teacher.** Using the forceps and scalpel, spread the incision open, little by little. Separate each **septum** from the central tube using a dissecting needle, and pin down each loosened bit of skin. In order to see the pharynx and ganglion (brain), you must open the worm all the way to segment 1.
3. Use the figure 3 below to locate and identify the five pairs of **aortic arches**, or hearts. Then find the **median dorsal vessel**. Look for smaller blood vessels that branch from the dorsal blood vessel.
4. Locate the digestive tract. Refer to figure 3 to locate the **pharynx, esophagus, crop, gizzard, and intestine**.
To find organs of the nervous system, carefully push aside the digestive and circulatory system organs. Use figure 3 to locate the **ventral nerve cord**. Trace the nerve cord forward to the nerve collar, which circles the **pharynx**. Locate the cerebral ganglion under the pharynx. The ganglia above the pharynx serve as the brain of the earthworm.

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5. Wrap the worm and all its parts in a paper towel. Place the worm in the designated garbage can.
6. Clean up your work area and wash your hands before leaving the lab.

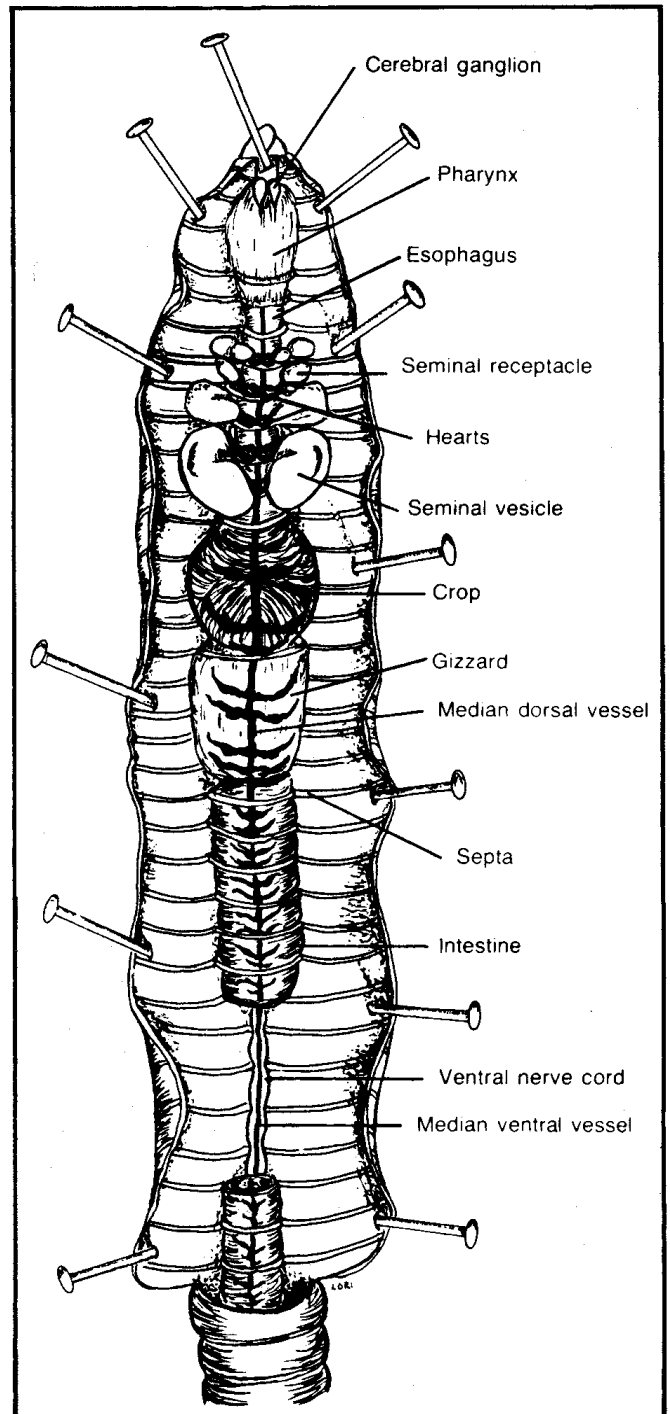


Figure 3

Pictures: *Modern Biology*, Holt & Carolina Biological Supply, *Earthworm BioKit*.

Modified from: http://sps.k12.ar.us/massengale/earthworm_dissection.htm

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Post Lab Questions:

1. Describe two ways in which an earthworm's body is adapted to life in the soil.

Possible answers might include:

- *Shape that narrows at the head to lessen contact with the soil.*
- *Lubricating slime that allows for easier movement through the soil.*
- *Digestive system that is capable of obtaining nutrients from fibrous food sources.*
- *Highly flexible body that can wrap around objects.*

2. Explain how an earthworm demonstrates cephalization.

The earthworm has a small, simple brain that is located at the anterior end of its body. Cephalization is the concentration of nerve cells at one end of the body.

3. Although they are related, the digestive system of an earth worm and *Ascaris* are very different. Why do you think this is?

Ascaris relies on digested food from its host and therefore does not need to digest its own food. The earthworm feeds on tough, fibrous foods such as decaying plant and animal material. Its digestive system must be capable of digesting these and soil components such as rocks and sand.

4. Compare the reproductive system of the earthworm with that of *Ascaris*. Be sure to note both similarities and differences.

*The primary difference between the reproductive system of the *Ascaris* and Earthworm is that the *Ascaris* has separate sexes while the earthworm is a hermaphrodite.*

5. What are some ways that annelids are beneficial?

Answers may include:

- *Enrich and aerate the soil.*
- *Create new topsoil.*
- *Provide food for small animals*

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6. What features distinguish annelids from roundworms?

Answers may include:

- *Annelids are segmented, roundworms are not.*
- *Annelids have a true coelom while roundworms have a pseudocoelom.*
- *Annelids have a more complex nervous system than roundworms.*
- *Annelids have a more complex circulatory system than roundworms.*