

Earthworm (Oithwoim?) Dissection

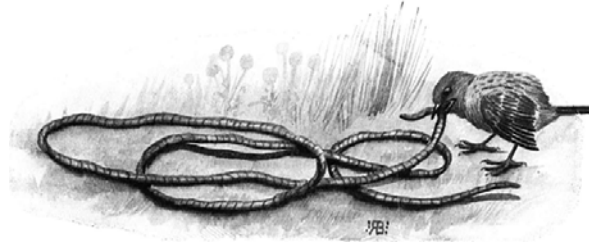


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It costs me never a stab nor squirm
to tread by chance upon a worm.

"Aha, my little dear," I say,
"Your clan will pay me back one
day."

- from *Thought for a Sunshiny
Morning*
by
Dorothy Parker



Lumbricus sp.
Earthworm

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Virtual Earthworm Dissection



Image borrowed from the Virtual Dissection website above

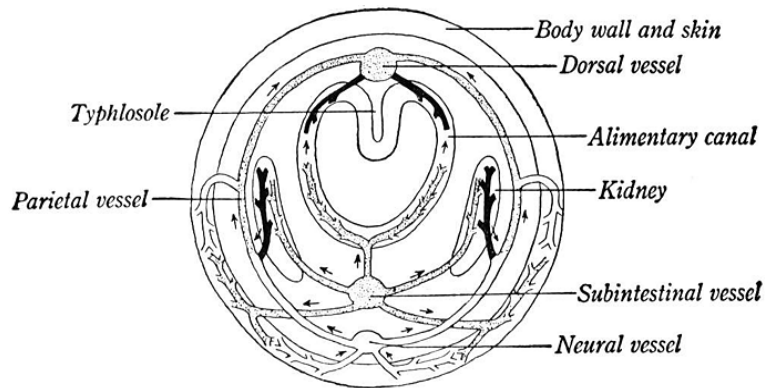
By Day: [Day 1](#) [Day 2](#)

By Topic/Region: [External Anatomy](#) [Internal Anatomy](#)

Skeletal *Lymphatic* [Integumentary](#)
[Cardiovascular](#)
[Muscular](#) *Endocrine* [Nervous](#)
[Reproductive](#)
Respiratory [Excretory](#) [Digestive](#)

S L I C M E N R R E D
(SLIC Woims R RED?)

NOTE: The Systems in *Italics* above have their functions taken up by other systems.



You must create a series of [labeled drawings](#) that illustrate the structures outlined below:

Materials:

1. Safety Goggles
2. Apron
3. A pair of medium thickness rubber Kitchen gloves (with your name on each), as per the [Class Rules](#)
4. A Ziploc-style bag (with your name on it) in which to keep your gloves, as per the [Class Rules](#)
5. A **PENCIL** (keep this in your Ziploc-style bag above, due to the chemicals)
6. An old small towel, as per the [Class Rules](#)
7. **OPTIONAL** An old long-sleeve shirt (for use under our lab aprons), as per the [Class Rules](#)

8. Tool Tray with:
 - (a) Forceps (your **second-most** valuable tool)
 - (b) Pointed Scissors (use with **care**, or you might **damage** your specimen)
 - (c) Rounded Scissors (use with the **rounded** end down)
 - (d) Scalpal (to be used **very sparingly**)
 - (e) Blunt Probe (your **most** valuable tool)
 - (f) Pins (use only a **few**)
 - (g) Bone Cutters (used the **least**, and **only** on the frog)
9. Dissection Tray
10. Plastic Dissection Tray Cover
11. Masking Tape & Pen (for labeling the tray cover)
12. **Pencil** & Paper (for making your diagrams) - **NOTE: Pen will NOT be accepted!**
13. Have I forgotten something . . . Oh, yes . . . an **EARTHWORM!**

Day 1

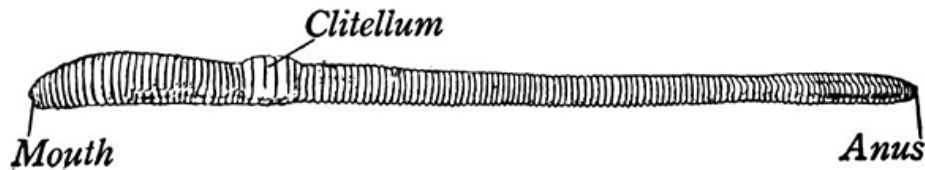


FIG. 153. *Lateral View of Earthworm, Lumbricus terrestris*¹

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External Anatomy

1. Place the specimen *prone* (ventral surface down, dorsal surface upon the dissecting tray. (To what phylum does it belong? What is your evidence for that?)
2. Note the difference in coloration. Why is the dorsal surface of the skin darker?
3. Find the anterior and posterior ends and the clitellum (the wider portion, which is closer to the anterior surface).
4. Count the number of segments. (How many are there in front of the clitellum? In the clitellum? Behind the clitellum?)
5. Using the Dissecting Microscope, place the tray on the stage, and draw:
 - (a) the mouth (What do they eat? What does the soft texture of the mouth say about their diet?)
 - (b) the anus (What type of digestive system does it have, One-Way, or Two-Way?)
 - (c) the setae, which are the dark projections on each section (How many setae are there on each section? What purpose do the setae serve?)
 - (d) the sperm duct opening (Which segment is it on?)
 - (e) the oviduct opening (Which segment is it on? Given the existence of both, what type of creature is it? Given the location of both, is the creature likely to self-fertilize? What type of fertilization does it practice, internal or external?)
6. **CLEAN-UP CLEAN-UP CLEAN-UP CLEAN-UP CLEAN-UP CLEAN-UP**
7. Wipe off the dissecting microscope stage with a *slightly moist* paper towel (if necessary) and dry it thoroughly.
8. Cover your entire specimen with a *wet* (not just *moist*) paper towel.
9. Using masking tape and a pen, write your name and your partner's name on one of the plastic specimen tray lids.
10. Place the lid *snugly* on the tray and place the trays *neatly* on the middle table in the back of the room.
11. Rinse off the tools and **dry them thoroughly** before returning them to the tool tray.

NOTE: This clean up technique will be the same for all dissection days

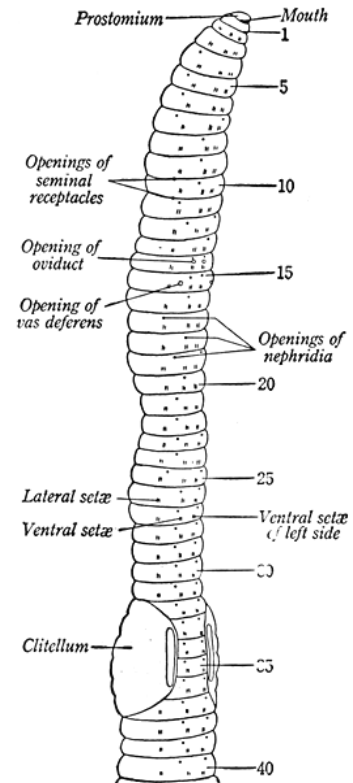


FIG. 154. *Anterior End of Earthworm, Lumbricus terrestris*¹

Each fifth segment is numbered, and the chief structures and openings are indicated

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except the last day for each specimen, described below.

Day 2

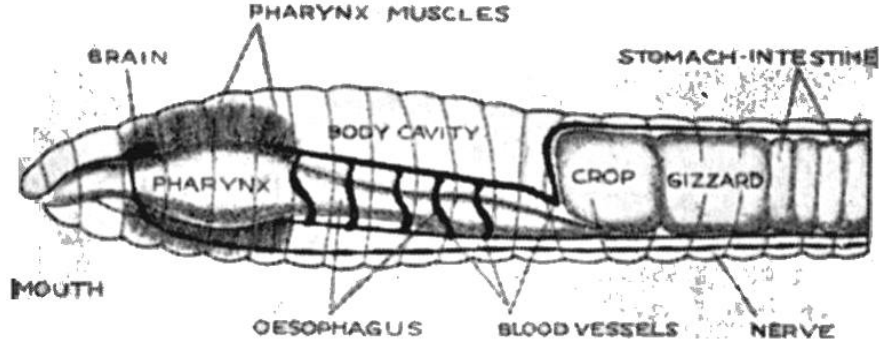


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Internal Anatomy

1. Place the specimen *prone* (ventral surface down, dorsal surface up) on the dissecting tray.
2. Using a scalpal, make a *shallow* medial incision **only 1 cm long** on the dorsal surface 1/3 of the way from the posterior end.
3. Given that scalpals cut *downward*, and scissors can be lifted to cut *upwards*, you will use scissors to cut *all the way* toward the anterior end. **TAKE CARE NOT TO CUT INTO THE INTESTINE.** (What do earthworms eat? Given that, what color would you expect the contents of the intestine to be?)
4. Using dissection pins placed at a 45° angle from the tray, pin back the skin of the earthworm along the anterior third of the specimen. (To what body system does the skin belong? Given the earthworm's form of locomotion, what else are you pinning back, and to what body system do they belong? Lastly, this system takes up the function of what other system?)

NOTE: All subsequent diagrams need to use the dissecting microscope.

5. Identify and diagram the Nephridia (singular = Nephridium). (What is their function? What is the equivalent organ in humans, and to what body system does it belong? Is the fact that they are in pairs in the worm at all retained in our body?)

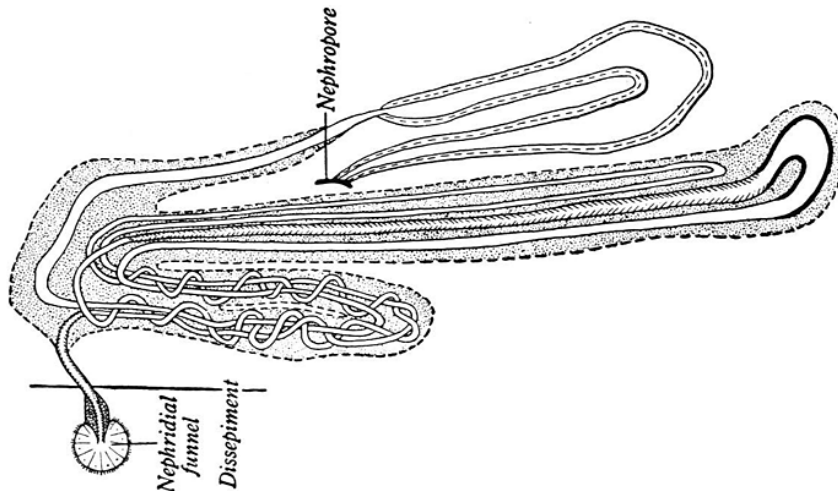


FIG. 158. Nephridium of Earthworm¹

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6. Identify and diagram the Pharynx & Esophagus. (What is the one function of the two organs? How is their function similar in humans, and how is it different?)

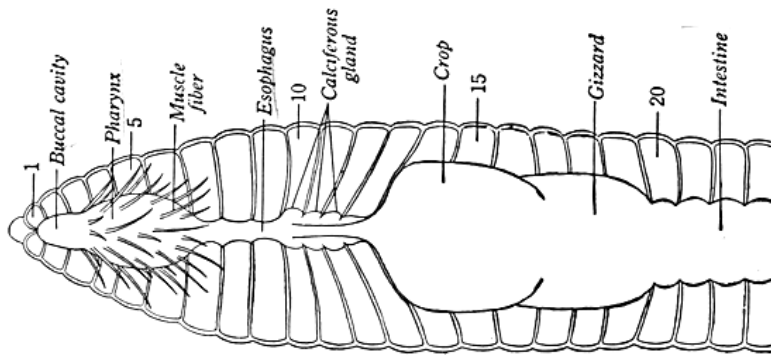


FIG. 156. Digestive System of Earthworm, *Lumbricus terrestris*¹
This is a diagrammatic drawing of the worm dissected from the dorsal side. Each fifth segment is numbered, and the intestine continues with little change to the anal opening, at the posterior end of the body

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7. Identify and diagram the Gizzard & Crop. (Which of the two is harder? What does that say about its function?)
8. Identify and diagram the Dorsal Blood Vessel and the 5 Aortic Arches. (What role do the arches play in the worm? What is the equivalent organ - **be careful here** - in humans, and to what body system does it belong? Why do humans have less than five?)

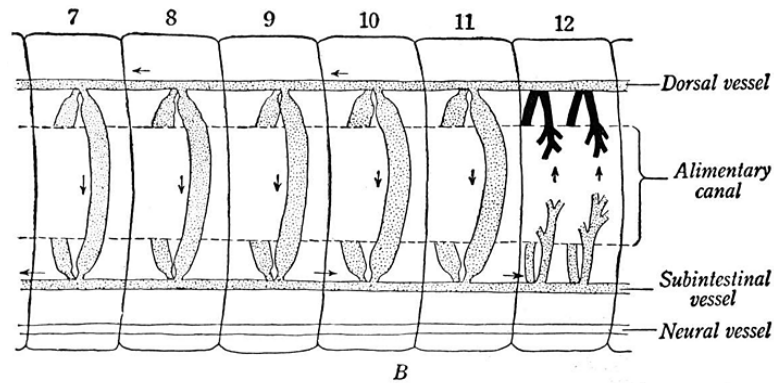


FIG. 157. Circulatory System of Earthworm¹

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9. Given that the earthworm's skin must be kept moist, and what organs that appear in humans appear to be *missing* in the earthworm, what body system's function is taken up here by the skin?
10. Identify and diagram the Seminal Vesicles and the Seminal Receptacles. (What is the function of each? What are the equivalent organs in humans, and to what body system do they belong?)

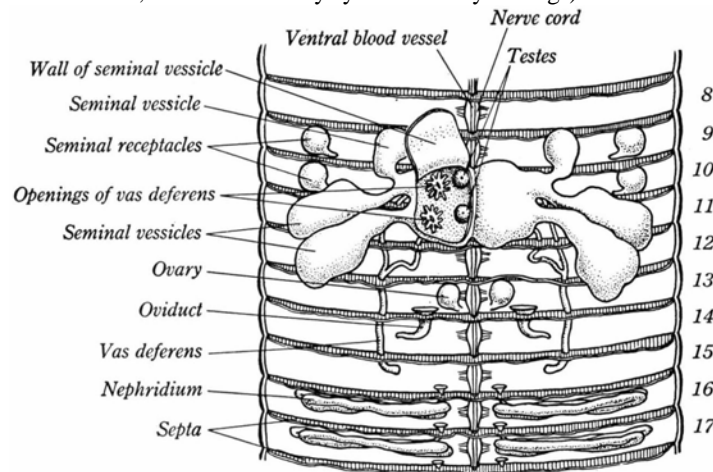


FIG. 160. Reproductive Structures of Earthworm, Dorsal View
Numbers at right indicate segments

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11. Identify and diagram the Suprapharyngeal Ganglia. (What is its function? What is the equivalent organ in humans, and to what body system does it belong? Has the bilateral appearance been retained in humans? If so or if not, what is it about the human organ that supports your statement? *You will need to refer to specific structures in your answer*)

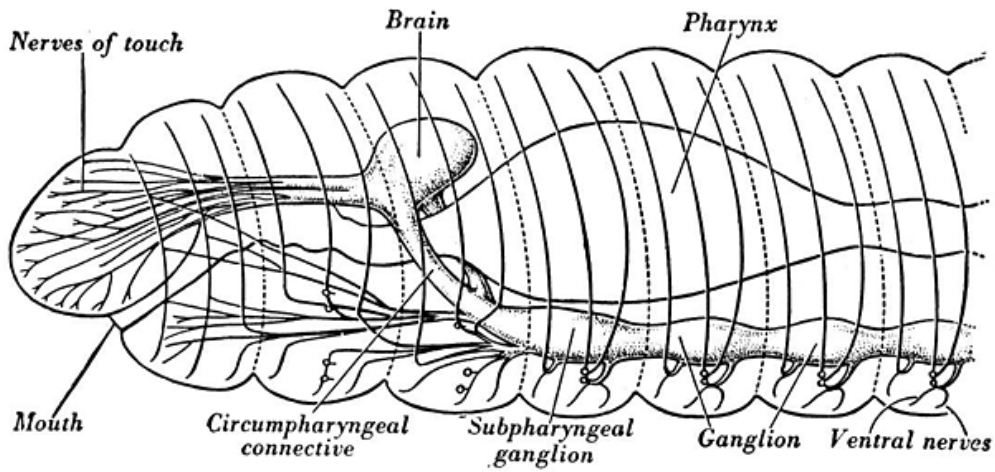
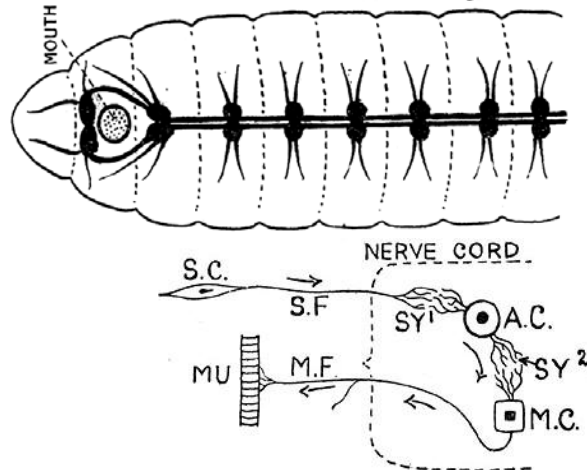


FIG. 159. Nervous System of Earthworm ¹



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- Remove the intestine from the point where you started your incision. (It might help to gently cut the intestine at one end with the scalpal; be careful not to cut all the way through the worm.) On either the underside of the intestine, or on the bottom of the worm - depending on how gently you lifted up the intestine, you will find the Ventral Nerve Cord. Diagram it. (What is - be specific as to direction - its function? What is the equivalent organ in humans, and to what body system does it belong? What aspect of this organ differentiates the earthworm from members of our [phylum](#)?)

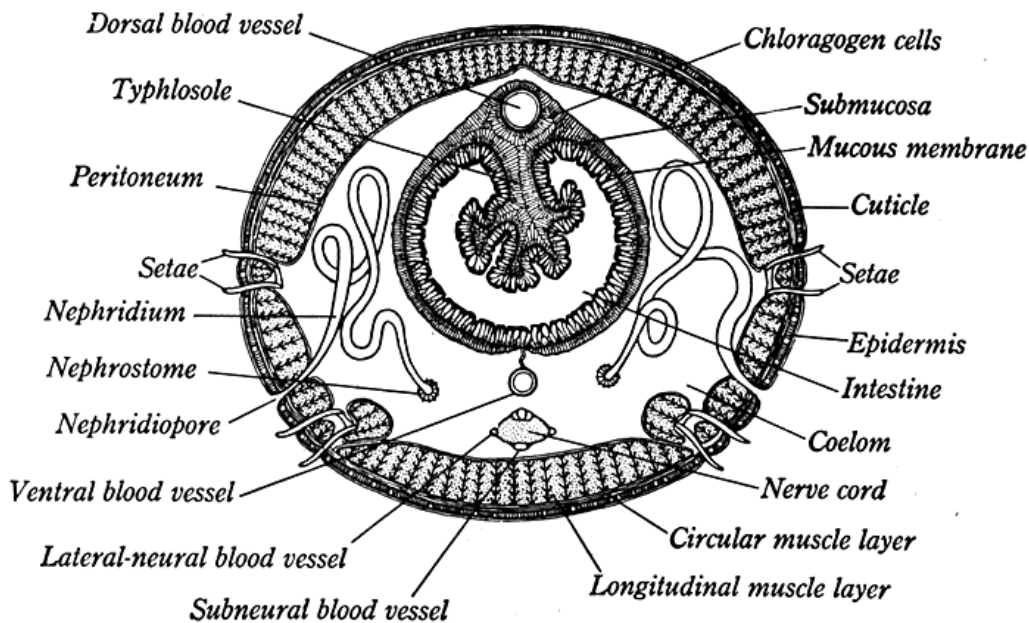


FIG. 155. Cross Section of Earthworm

Note the two layers of muscle, Circular and Longitudinal, that make up the wall of the organism. It is the

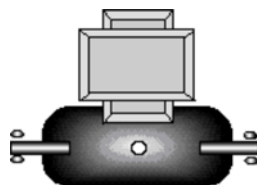
alternating contraction of these two layers that make it possible for the earthworm to propel itself through the soil. As these two layers pull against each other (i.e., acting as an anchor for the opposing contraction), what other body system's function is taken up by the muscles here?

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CLEAN-UP CLEAN-UP CLEAN-UP CLEAN-UP CLEAN-UP CLEAN-UP

13. Wipe off the dissecting microscope stage with a *slightly moist* paper towel (if necessary) and **dry it thoroughly**.
14. Dispose of the worm, and any worm *parts* in the one trash can specified by the teacher.
15. Rinse off the tools and **dry them thoroughly** before returning them to the tool tray.
16. Rinse off the lid and the tray and stack them as seen in the picture [below](#).

Note: the trays need to be placed **upside down** at 90° angles to each other, with one edge of the bottom tray over the edge of the sink to allow all of the trays to **air-dry!**



Note: the trays are **upside down!**
One part of the bottom tray **must**
be over the edge of the sink to
allow the trays to **air-dry!**

Image by [Mr. Lazaroff](#)

NOTE: This clean up technique will be the same on **the last day** for each specimen. At the end of each regular dissection day prior to the last day for that specimen, you will be using the clean up technique **described above**.

Clean up:

[Normal Day Clean Up Technique](#)

[Last Day Clean Up Technique](#)

Drawings:

1. **Use a PENCIL!! NOTE: Pen will NOT be accepted!**
2. **Make the drawings "larger than life" size, as the specimens are so small.**
3. **Draw the general shape (outline) and location of the organs, as the squiggles so many of you use to "shade" your drawings make your drawings sloppy and hard to interpret.**
4. **Include Labels on all drawings.**
 - **Labels should start outside the drawing, and be connected to the structure by arrows with tips (==>).**
 - **The Tip of the arrow should be touching the structure.**
 - **Be sure to include the magnification for any drawings done with the dissecting microscope.**

Hang on to the drawings; they will all be handed in later, together with some questions to answer.

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