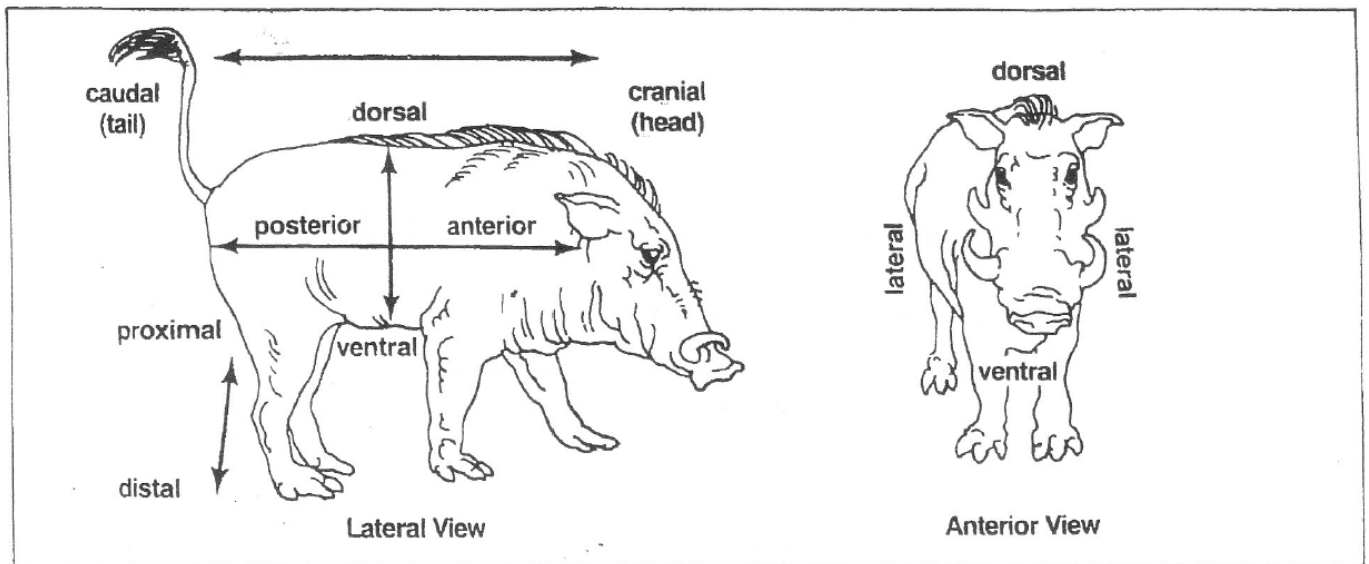


Dissection Vocabulary

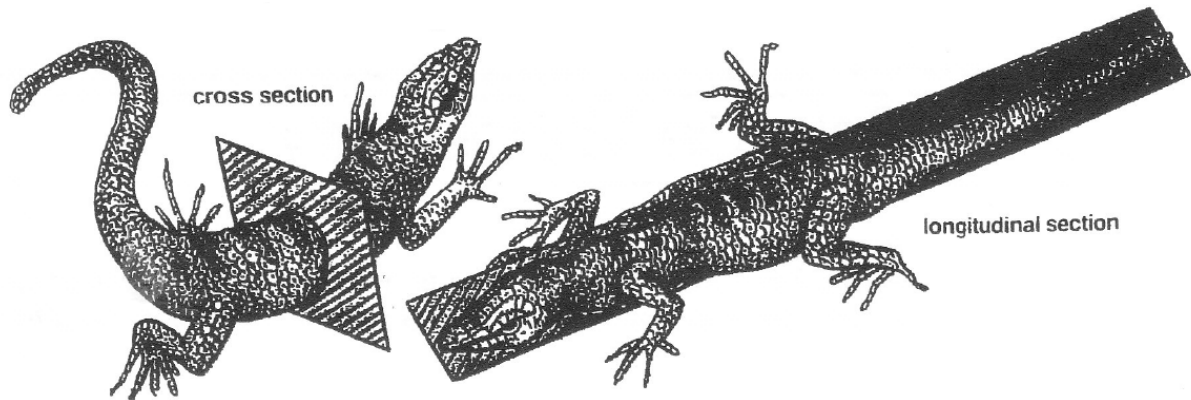
If a friend asked you to scratch his dorsal (DOR-sul) side, where would it be? If you had a ten-dollar bill in a ventral (VEN-trul) pocket, which pocket would that be? If you were asked to move in a lateral (LAT- uh-rul) direction, which way would you go?

In cell biology (and other areas such as geography), special terms are used to describe the position of an organism's parts in relation to its other parts. This terminology is very useful when describing animals. The words on these diagrams show the location of the animal's body parts in relation to each other. Study these words. Complete the sentences that follow, using the terms shown on the diagrams.

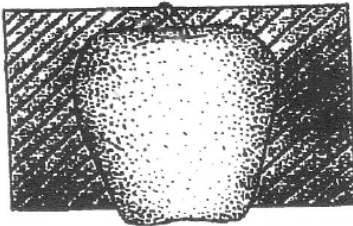


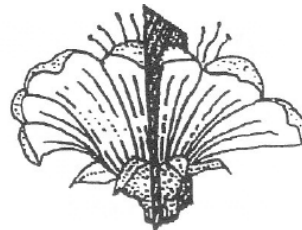
1. The head is _____ (anterior, posterior) to the chest.
2. The toes are at the _____ (distal, proximal) end of the leg.
3. The term caudal refers to the _____. It is at the opposite end of the body from the _____ end.
4. The word that means toward the side of the body is _____.
5. The young of these animals receive milk from the teats located on the _____ side.

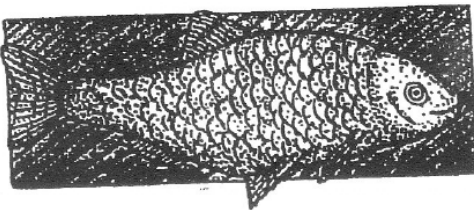
The illustrations below show “slice lines” that divide an animal’s body into sections. They show a cross section and a longitudinal section made. Both slice lines cut the animal in half. The cross section cuts an animal in half. The longitudinal section cuts the animal in half from front to back along the length of the body.

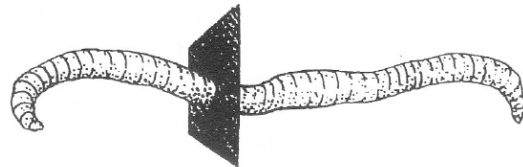


Label each slice line as cross section or longitudinal section.









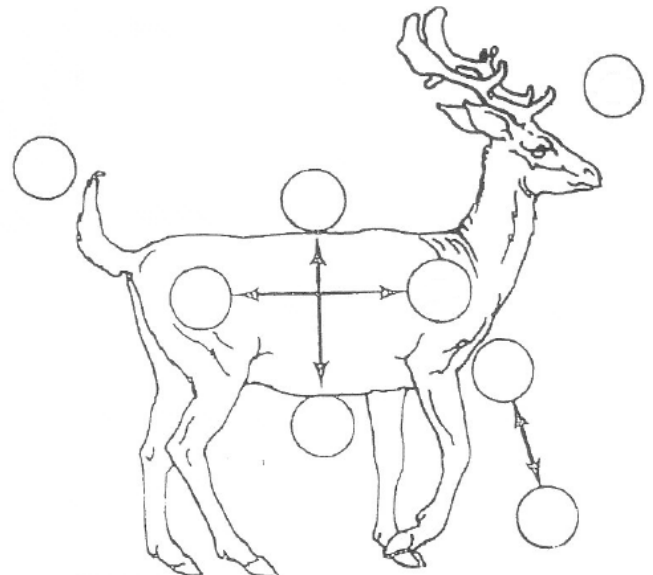
Practice in Using Science Words

Directions: Complete the following.

1. Write the term for the opposite direction in each of the pairs.

- | | |
|-------------|----------|
| a. Anterior | e. _____ |
| b. Ventral | f. _____ |
| c. Cranial | g. _____ |
| d. Proximal | h. _____ |

2. Label the deer using terms in question 1 writing the letter that appears next to the name inside the circles of the deer.



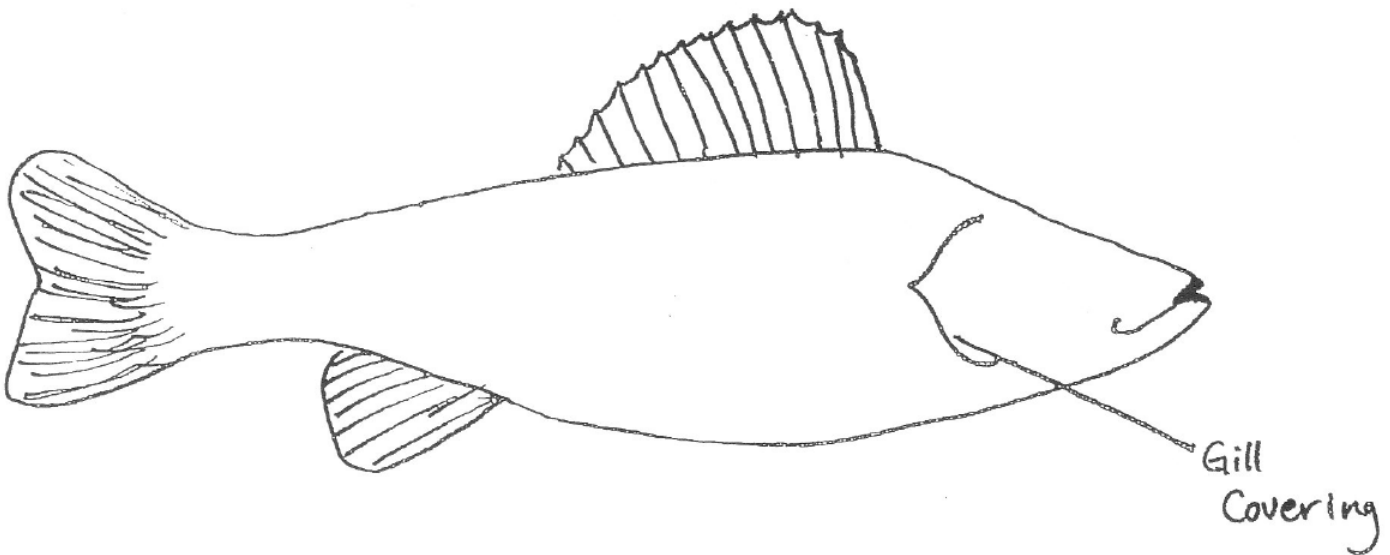
Vocabulary of Position

| | | | |
|-------------------|--------------------|-----------------|---------|
| Vocabulary | anterior/posterior | proximal/distal | lateral |
| | ventral/dorsal | caudal/cranial | |

Directions Complete the fish and shark pictures by drawing the listed structures.

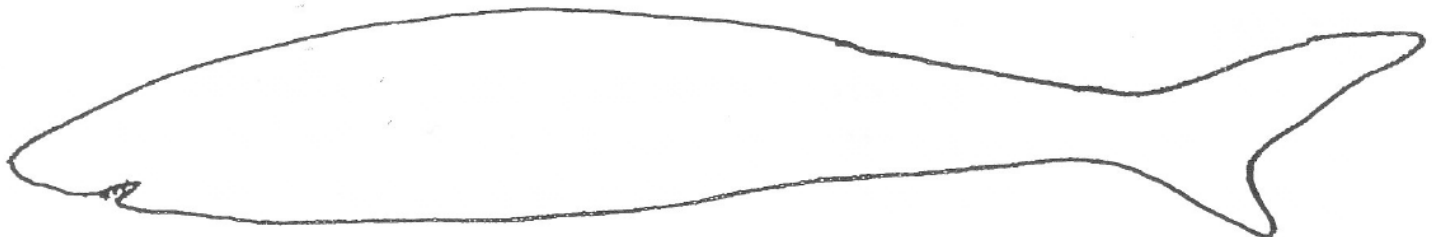
Fish

1. Add a dorsal fin directly (no space) posterior to the dorsal fin already drawn.
2. Add one ventral fin starting at 2.5 cm anterior to the ventral fin already drawn.
3. Add a lateral line (horizontal) directly posterior to the gill covering extending to the caudal fin.
4. Add one lateral fin posterior to the gill covering and on the ventral side of the lateral line you just drew in #3.
5. Add an eye 0.5 cm in diameter and 1 cm from the anterior tip.



Shark

1. Add one large dorsal fin 5.5 cm from the anterior tip.
2. Add a smaller dorsal fin 2.5 cm posterior to the fin you drew in #1.
3. Add one large ventral fin 3.5 cm from the anterior tip.
4. Add two smaller ventral fin 2.5 cm and 5.0 cm posterior from the fin you drew in #3.
5. Add an eye 0.2 cm in diameter and 1 cm posterior from the anterior tip.
6. Draw five vertical lines 0.5 cm in length in the following range: 2.5 cm to 3.0 cm posterior to anterior tip.
7. Shade the entire dorsal side of the fish by adding very small pencil dots.



Lumbricus Terrestris

Directions: Read, highlight, and then answer questions.

The earthworm is an invertebrate (no backbone) that has a segmented body. The number of segments (the tiny ridges) in a full grown earthworm varies from 120 to 175. All segments, except the first which contains the mouth and the last which contains the anus, are similar. The outside surfaces of segments 31-37 are glandular, swollen, and smooth. This region is called the clitellum. This is located about one third of the way from the front end of the worm. The clitellum means that the worm is an adult and can mate and lay eggs.

Earthworms have to stay moist in order to breathe. They have no lungs. Instead they take oxygen from the air right through their damp skin into blood vessels. Carbon dioxide moves out of the body the same way. Getting dried out is fatal for an earthworm.



Adaptations

Earthworms have regenerative powers and are capable of replacing damaged or destroyed segments depending on where it is damaged.

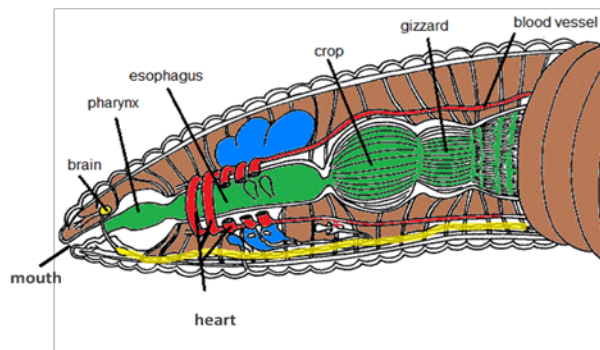
The earthworm also has five pair of enlarged tubes which act as hearts. The tubes pump blood through the vessels of the earthworm's body.

One last adaptation is the earthworm's color. Earthworms have enemies even though they spend much of their time underground. Their predators include birds, frogs, centipedes, moles, and humans. A protective adaptation is the worm's brownish color. This makes the worm harder to see against the soil.

Obtaining Energy

A worm eats enormous amounts of soil to absorb the decaying parts of dead plants and animals for nourishment. The soil is forced through an opening called the mouth. As a worm moves through the soil, it opens its mouth forcing the soil into its body. Once it enters the mouth, a muscle (the pharynx) pulls it in further passing it to the esophagus (a tube connecting pharynx to crop).

From the esophagus, the food moves to the crop. The crop serves as a temporary storage place (kind of like your own built in pantry). From here, it passes on to the gizzard which acts like your stomach grinding the food. Grains of sand are present here and the thick, muscular walls work the food and sand back and forth until the food is ground up.



The food is then forced into the intestine, the longest section of the digestive system. The glands here secrete chemicals that complete the digestion, and the digested food passes through the walls of the intestines and into the bloodstream. The bloodstream circulates the digested foods to other parts of the organism.

Because the earthworm's source of nutrition is organic matter in the soil, large quantities of soil are eaten. The undigested soil passes through the intestines and is eliminated as worm castings (worm poop ☺) through the anus. This helps enrich the soil. Lower levels of earth are brought to the surface which improves chemical composition. By burrowing (digging), they are also improving farm land as air and water can enter the ground easier. Charles Darwin (the same guy that talks about evolution) once calculated that an acre of farm land may contain as many as 50,000 earthworms. In the course of a year, those worms could overturn as much as eighteen tons (36,000 pounds!) of soil per acre.

Using Energy

When watching the movement of earthworms, you will notice that part of the worm stretches out while another part squeezes together. This is because beneath the skin (called the epidermis) is a layer of circular muscle whose contraction decreases the diameter of the worm but increases the length of the body. Another muscle layer called the longitudinal muscle runs the length of the worm. These two muscles work together to squeeze (circular muscle) and pull (longitudinal muscle) the work along.

There are bristles on the underside of the worm called setae. There are four pair on all of the interior segments; the first and last ones do not have setae. The bristles are made of the same material that makes up the outer covering on many insects. The setae help the worm dig into the soil when it moves and helps it cling to the sides of the hole it digs when predators (animals wanting to eat them) try to pull them out.

Responding

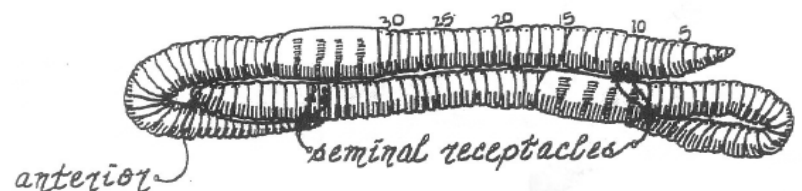
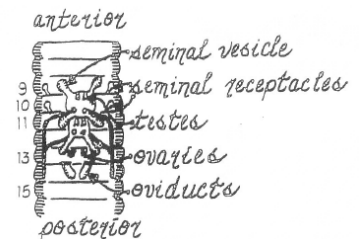
Although the earthworm is sensitive to light and touch, it does not have sense organs (no eyes or nose). There are light sensitive cells scattered through the skin. These cells enable the worm to distinguish between light and dark. The worm is also sensitive to vibration which is a useful adaptation since it's a mole's favorite food.

Reproduction

Boy or girl? The earthworm is actually both. It's called a hermaphrodite because it has both ovaries and testes. The two pairs of tests are located in segments 10 and 11, counting from the anterior end (front of the worm) while the two ovaries are in segment 13. Self-fertilization cannot take place (it can't create its own off-spring). A worm is old enough to lay eggs at about one year.

When mating, each worm receives the others reproductive cells. Afterwards, the clitellum secretes a tube of mucus which slips over the front of the worm. The tube receives the eggs as it passes segment 14 and receives the other worm's reproductive cells as it passes segments 9 and 10. Fertilization occurs inside the tube as it slides forward until it finally slips off the anterior end. It's kind of like pulling a mucus covered shirt over your head ☺. Because fertilization happens outside the worm, it's considered external fertilization.

The tube, which is then sealed, is usually left in the ground to form a cocoon containing several fertilized eggs. After three to four weeks, pale, whitish wormlets crawl out as miniature adults. If the moisture and temperature are not quite right, the eggs can stay in the case for a year or more.



Lumbri Questions

General Information

1. The earthworm is an _____ meaning it has no backbone.
2. Are all of the segments of an earthworm the same? Explain?
3. What does the swollen area called the clitellum indicate?
4. All animals need oxygen. Since earthworms don't have lungs, how do they get oxygen into their circulatory system?
5. Earthworms have to stay moist in order to _____. Getting dried out is _____ for an earthworm.

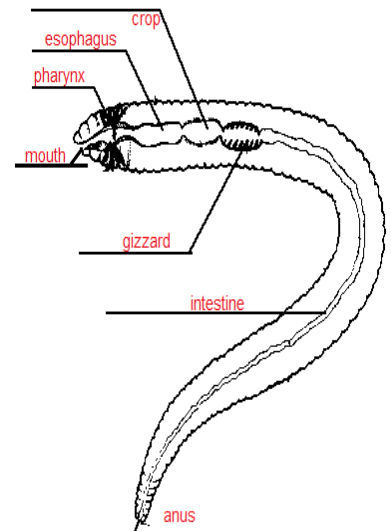
Adaptations

6. Earthworms can _____ damaged or destroyed segments depending on the region.
7. How many "hearts" do earthworms have? Describe their shape.
8. What type of adaptation do earthworms have to protect them from predators?
9. List 5 predators to earthworms:

Obtaining Energy

10. What is the main food for earthworms? _____
11. Earthworms are looking for decaying organic matter which is dead parts of _____ and _____.
12. Number the following parts of an earthworm's digestive tract in the order of how soil moves through it and give the function of location.

| Location | Function (Job) |
|-----------------|-----------------------|
| ___ mouth | _____ |
| ___ gizzard | _____ |
| ___ pharynx | _____ |
| ___ crop | _____ |
| ___ intestine | _____ |
| ___ esophagus | _____ |
| ___ anus | _____ |



13. The digested food passes through the walls of the intestine into the _____.

14. Where do earthworms spend most of their time? _____

15. What are worm castings?

16. It's been calculated that one acre of farmland may contain as many as _____ earthworms.
How much soil would this many earthworms overturn in one year? _____.

Using Energy

17. When an earthworm moves, one part of it _____ out while another part _____ together.

18. What are the four pairs of setae on each segment used for?

19. These setae are made of material similar to what part of an insect?

Responding

20. Earthworms are sensitive to what three things?

21. Do earthworms have eyes? Explain.

Reproduction

22. Earthworms are a hermaphrodite which means each worm has two sex organs. _____ and _____.

23. Can an earthworm fertilize itself? _____

24. Is fertilization internal or external? Explain

25. Baby worms (wormlets) usually emerge in _____ to _____ weeks after fertilization. Why do they sometimes stay in the case for a year or more?