

EARTHWORMS Science Page

EARTHWORMS ARE ADAPTED FOR LIVING IN SOIL

MOVING

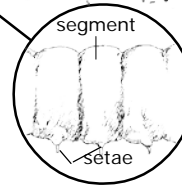
A worm moves through soil by using special muscles and hydraulics. Hydraulics is the movement of liquids under pressure.



An earthworm is divided into segments. Each is filled with liquid, and each has its own set of muscles. Long muscles run along the sides of each segment, and circular muscles go around each segment.



When long muscles tighten—or contract—the segment is squeezed so it gets shorter. The liquid in the segment presses outward, making the segment fatter. When circular muscles tighten, the segment is squeezed around the middle, so it gets thinner. Liquid in the segment is pushed lengthwise, making the segment longer. The tightening of one set of muscles and then the other happens in waves down the segments of the earthworm's body. This helps to pull and push the worm along.



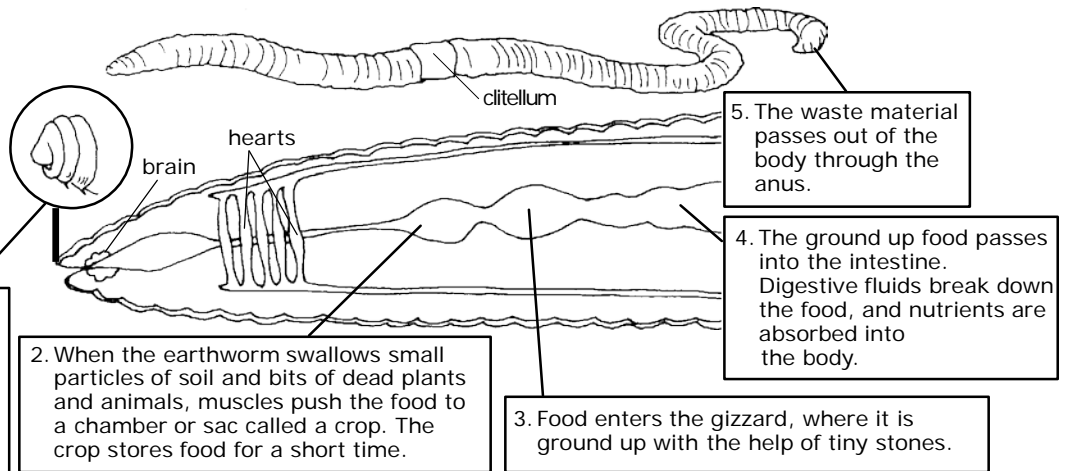
Bristles, called setae, are located on each segment of the earthworm's body. They prevent the earthworm from slipping backwards.

BREATHING

The earthworm's skin has glands that give off mucus. This mucus helps the earthworm breathe because it keeps the body moist. The earthworm breathes through its thin skin. Oxygen dissolves in the moisture on the earthworm's body, and then passes into the body.

FEEDING

The earthworm is specially adapted for feeding underground.



1. A hard area on the head forces open cracks in the soil. The earthworm can then crawl into the cracks in search of food.

2. When the earthworm swallows small particles of soil and bits of dead plants and animals, muscles push the food to a chamber or sac called a crop. The crop stores food for a short time.

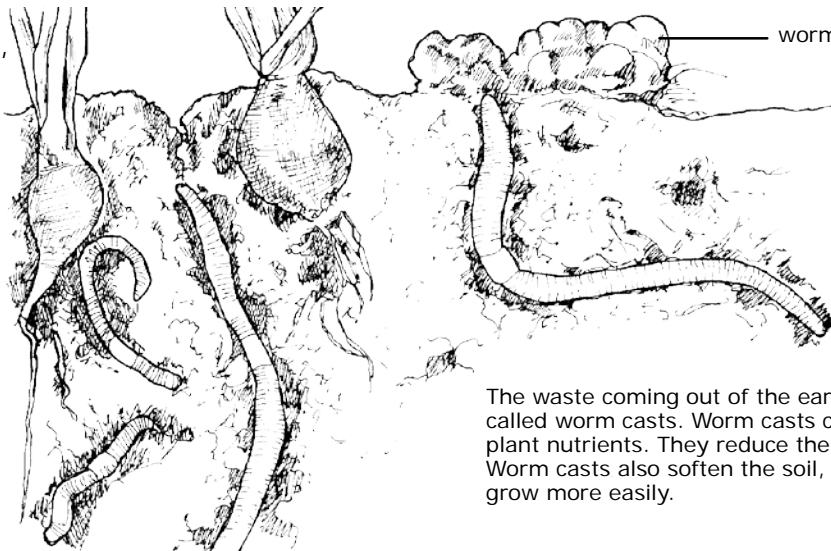
3. Food enters the gizzard, where it is ground up with the help of tiny stones.

4. The ground up food passes into the intestine. Digestive fluids break down the food, and nutrients are absorbed into the body.

5. The waste material passes out of the body through the anus.

EARTHWORMS CULTIVATE AND FERTILIZE SOIL.

As earthworms move through soil, they make tunnels. These tunnels let air reach plant roots, and let water drain through soil. Mucus that earthworms produce helps bind soil particles together, so that the tunnels keep their shape. Earthworms also mix soil layers as they burrow.



The waste coming out of the earthworm's body is called worm casts. Worm casts contain valuable plant nutrients. They reduce the acidity of soil. Worm casts also soften the soil, so roots can grow more easily.



WORD SEARCH

Find these earthworm words in the puzzle on the right: crop, circular, mucus, mouth, anus, intestine, gizzard, setae and worm casts

S	I	M	D	J	S	E	T	A	E
U	N	O	Y	R	T	K	K	X	W
C	T	O	C	E	A	P	V	O	M
U	E	K	G	R	E	Z	R	W	H
M	S	H	T	O	O	M	Z	T	I
A	T	G	V	Q	C	P	U	I	M
N	I	X	V	A	C	O	V	A	G
U	N	K	S	X	M	Y	B	F	X
S	E	T	B	U	B	K	Q	D	G
K	S	R	A	L	U	C	R	I	C



TRY THIS

EARTHWORM STUDY

What you need

- * earthworm
- * paper towels
- * stiff paper
- * eyedropper
- * water
- * pan
- * ruler
- * Q-tip
- * vinegar
- * flashlight

What to do

- Place the earthworm on a moist paper towel in a pan. Observe the worm for a few minutes. How does it move? What muscles are necessary for the earthworm to move?
- Roll the worm over and observe what happens. The side that the worm prefers up is the dorsal or top side. The side it prefers down is the ventral or underside.
- The body of the earthworm is made up of segments. At around segment 30 from the front end of the worm, look for a wide thick band around its body. This swelling is called the clitellum, and is found on adult worms. The clitellum is used in mating.
- On the underside of the earthworm are small bristles called setae. Put the earthworm on a piece of stiff paper. Can you hear it make any noise as it moves? Hold the paper up level with your eyes. Do you see the setae? Run your fingers along the underside of the worm. Can you feel the setae?
- Study the earthworm's head. Does it appear to have any sense organs, such as eyes, ears, or a nose? Do you think the earthworm is able to sense moisture, light, or odors? Make your predictions, and then find out. Can an earthworm sense moisture? Place a dry paper towel on one side of the pan and a moist paper towel on the other. Stretch the worm so that it lays across both towels. Observe the earthworm's response. Try this ten

times, but each time change the direction that the worm's head is pointing. Which direction does the earthworm move?

Does a worm have a sense of smell?

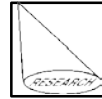
Dip a Q-tip in vinegar, wave the Q-tip near the worm's rear end, and then near its front end. Do not touch the worm with the Q-tip.

Does the earthworm show any response?

Can an earthworm sense light?

Now darken the room, and shine the flashlight on the worm. What does the earthworm do?

Were your predictions accurate?



SPOTLIGHT ON RESEARCH

An earthworm has both male and female sex organs in its body

An earthworm has both male testes and female ovaries in its body, but it usually needs another worm to mate. Mating worms put their bodies together, and sperm passes from one worm to the sperm storage sac of the other worm. After mating, a mucus ring is formed by the clitellum on each worm. As the worm wriggles out of the ring, the ring passes over the worm's ovaries and sperm storage sacs. Eggs and sperms are deposited in the ring. As the ring slips off the worm, both ends of the ring seal to form a cocoon. Inside, the sperm fertilizes the eggs. A short time later, baby worms hatch.

Worm casts makes plants grow faster

Scientists at Ohio State University wanted to know how well vegetables, fruits, and flowers would grow if worm casts were added to the soil. They fed worms a special diet of pig and cow manure, and then collected the worm casts. They added the worm casts to some soil, and left other soil alone. Then the scientists compared the growth of crops planted in the two soils. In the greenhouse, lettuce, tomatoes peppers, carrots, radishes, onions, marigolds, and petunias grew faster in the soil with the worm casts added. In fields, tomatoes, peppers, strawberries, raspberries, and grapes all grew faster, and produced fruits faster when worm casts were added to the soil.

Sources:

Edwards, C.A. (1998). Vermicomposting's potential: small to large-scale operations. [Resource Recycling](#).

Atiyeh, R.M., Edwards, C.A., Subler, S., and Metzger, J.D. (2001). Pig manure vermicompost as a component of a horticultural bedding plant medium: effects on physico-chemical properties and plant growth. [Bioresource Technology](#). 78, 11-20.



RIDDLE

Why did the earthworm cross the road?

Answer: Because it was in the chicken's mouth!

