



Science Unit: *Soils, Plants, and First Nations*

Lesson 2: *Earthworms and Making a Wormery*

School year: 2007/2008

Developed for: Britannia Elementary School, Vancouver School District

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Grade level: Presented to grades 1, 2 and 3; appropriate for Grades 1 to 5.

Duration of lesson: 1 hour and 20 minutes

Objectives

1. Learn about earthworms, their habitat, behaviours and their role in the soil.
2. Learn how to set up a wormery for observation in the classroom.

Background Information

Earthworms play a very important role in the soil. They tunnel beneath the soil, in search of dead plant material to eat, recycling organic waste (dead plant matter and animal matter) and turning it into rich topsoil. While constantly searching for food, earthworms mix up and aerate large quantities of soil. Earthworms are nocturnal animals preferring moist, dark habitats. They are toothless, but use particles of sand and grit in their gizzards to grind up their food into tiny parts. Two common types of earthworms found in the Lower Mainland are the nightcrawler or common garden earthworm (*Lumbricus terrestris*) and the Red Wiggler (*Eisenia fetida*), found often in compost piles or under leaves. Earthworms are part of the segmented worm family, Annelida Oligochaeta. They have tiny bristles, called setae that help them grip the ground to move and also anchor the worm in its burrow when predators are near. Earthworms are hermaphrodites, meaning they carry both male and female sexual organs, however during mating two earthworms join together at the clitellum and exchange sperm. Then they return to their burrows where they lay eggs that develop inside a cocoon. Earthworms can lay between 40-900 eggs per year, depending on the species.

Vocabulary

<u>Earthworm</u>	A commonly found worm in soils which helps mix and aerate soils by creating tunnels and digesting dead plant material and turning it into humus.
<u>Wormery:</u>	A built habitat to house and observe worms.
<u>Clay:</u>	Very fine particles made of minerals that are about 100x smaller than grains of sand. : sticky to the touch
<u>Sand:</u>	Small grains of ground rock which feel gritty to the touch
<u>Silt:</u>	Very small particles made of minerals, deposited by moving water, between sand and clay particles in size. Feels smooth and silky to the touch
<u>Humus:</u>	Decomposed dead plant and animal matter in soil that holds moisture and provides nutrients to plants.
<u>Decomposition:</u>	The process of breaking up into parts eg. Leaves and dead plant and animals change into soil.
<u>Hermaphrodite</u>	Animal (like the earthworm) which contains both female and male sexual organs



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<u>Clitellum/Saddle:</u>	A thick band around the middle of the earthworm's body that produces mucus for the cocoons and stores the eggs.
<u>Setae</u>	Earthworm's bristles which help it move and also anchor it in its burrow when in danger from predators
<u>Prostomium</u>	Sensitive mouthpart of an earthworm. It does not have any teeth but grinds up its food in its gizzard, which contains sand.

Materials

- Plexiglass wormery (see end of lesson for design)
- Small pebbles
- Sand
- Mineral soil
- Topsoil
- Dead leaves
- Earthworms from the garden or compost
- fresh green leaves and/or other worm food
- black paper to keep wormery dark
- masking tape
- spritzer bottle to keep worms moist
- magnifying glasses and/or stereo microscope
- rulers
- paper towels
- chart of earthworm with labeled parts

Introductory Discussion

1. Brainstorm about why worms are important and how they help us. What is their job in the soil? What do they eat? How do they move? If we have a wormery we can observe the worms and see what they do over time.

Note: Worms must be handled gently. They breathe through their skin and need to be kept moist or they will suffocate.

Science Activity/Experiment

1. Part of this lesson could be done as a demonstration. Students can help to place pebbles in the bottom of the wormery. Then students can help to layer the soils so that clear bands of sand, mineral soil, topsoil and dead leaves are visible.
2. Place earthworms in the wormery and place fresh leaves on top.
3. Squirt the spritzer bottle to keep the wormery moist but not wet.
4. Cover the sides of the wormery with black construction paper and place in a cool area of the classroom, out of direct sunlight.
5. Observe every few days and spray wormery with water to keep moist.*
6. Give each student a worm on a dampened paper towel. Let them observe their worm with a magnifying glass and /or stereo microscope. Ensure that the worms are kept moist or they will die. Try to locate the head, tail, mouth, segments, setae (bristles which help them move), and clitellum or saddle. Measure your worm with a ruler. How long is it and how wide is it?



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7. Observe your worm carefully and draw your worm. Label it's parts. Write down what worms eat and who their predators are.
8. Briefly place your worm on a dry piece of paper and put your ear close. Can you hear the scratching sound of the worm's setae? Return your earthworm to the moistened paper towel. Place two earthworms together. How do they react? After observing your earthworm, return it to the wormery or back to the garden.

*Note: Worms do not thrive in a classroom environment and should only be kept for a maximum of 3 weeks before they are put back outside in the soil.

Closure Discussion

What have the earthworms done in the wormery? Do the soil layers look any different? What have the worms been eating? What important job do the worms do for us in the soil? How did your earthworm move? Did you hear it moving? What surprised you about your worm?

References

Dixon, Norma. 2005. Lowdown on Earthworms. Fitzhendry and Whiteside. Markham, Ontario.

Harlow, Rosie and Gareth Morgan. 1991. 175 Amazing Nature Experiments. Random House. New York. "Making a Wormery" pp.80-82.

Henwood, Chris. 1988. Earthworms: Keeping Minibeasts. Franklin Watts. London.

Himmelman, John 2000. An Earthworm's Life. Children's Press, Grolier Publishing. New York.

Instructions on Making a Wormery

(see: Harlow and Morgan reference above)

2 sheets of plexiglass 10" x 10"

3 wooden battens 2" x 10"

screws,

Make a wooden frame with plexiglass sides for viewing and an open top for placing soil and worms.

Extensions

See a video such as "Recycling with Worms" Primary/Intermediate Video #487643 12 minutes. Or Observation and Care of a Wormery" Primary/Intermediate #480566. 16 minutes. Both available at VSB Media Services.

Follow up with Forest Decomposition Lesson (bread mold experiment and compost experiment).

Do a worm word search.

My Earthworm

By _____

Date _____

My earthworm is _____ long

and _____ wide. Draw and label your earthworm below.

My earthworm lives

It eats _____

It's predators are _____
