

Mighty Earth Movers

Background

The lowly earthworm is a mighty earth mover. Earthworms live underground in burrows. The tunnels they make can be as much as six feet long. The tunnels help air and water get into the soil. The naturalist Charles Darwin proposed there would be no topsoil without earthworms. He believed topsoil had to be processed and re-processed through the bodies of worms. He collected and weighed worm castings, or waste material, and estimated that earthworms bring between 7 1/2 and 18 tons of material to the surface in each acre of land.

When it rains, earthworms emerge from their burrows, not because they are drowning, but because they are starved for oxygen. Earthworms breathe through their bodies. They have no ears but are very sensitive to vibrations.

For farmers, earthworms are living plows. Commercial earthworm farms in California and the southern states ship earthworms and earthworm eggs to farmers all over the United States. Worm manure, sacks of sifted worm castings, is sold to florists for fertilizer.

Science

1. Order a unit of worms (about 25 worms).
 - Divide students into groups of two or three official worm watchers. For each group, provide one 16-ounce container, a dark cloth to cover the container, two worms, and habitat materials.
 - Have groups pour the habitat materials into the containers in equal parts, with crushed leaves or unfertilized potting soil on top and the rocks or coarse gravel on bottom.
 - Provide spray bottles, and have each group lightly spritz the top layer of the worm habitat before adding the worms.
 - Then have each group cover its container with the dark cloth or construction paper, and place it in a cool, dark part of the classroom.
 - Instruct students to keep their habitats moist but not wet. Note: Worms will try to crawl out if the habitat is too wet.
 - Students should also make sure the worms have a steady supply of leaves or cornmeal for food.
2. Hand out the “Worm Watcher Worksheets,” and have students complete the blanks individually for each day of observation.
3. On the second day, have students remove the dark cloths and tape tracing paper around the containers.
 - Have students trace the layers and tunnels the worms have created.

P.A.S.S.

GRADE 3

Reading—2.1;

Writing—6.1b,2b

Science Process—1.2;
3.1,2,3

Life Science—2.1,2,3

GRADE 4

Writing—5.2c

Science Process—1.2;
3.1,2,3

Life Science—3.1,2,3

GRADE 5

Writing—5.1a

Science Process—1.1,2

Life Science—2.1,2

Earth Science—3.1

Materials

unit of fishing worms, like Canadian night crawlers (available through science supply catalogs)

2-3 clean, clear 16-ounce containers (drinking glass, tall salsa jar, mayonnaise jar)

dark cloth or construction paper

habitat materials (unfertilized potting soil, dead crushed leaves, garden soil, sand, cornmeal, bone-meal)

tracing paper

rocks or coarse gravel

Vocabulary

burrow—a hole in the ground made by an animal for shelter or protection

process—to change or prepare by special treatment

topsoil—surface soil usually including the rich upper layer in which plants have most of their roots and which the farmer turns over in plowing

worm castings—the excrement of an earthworm) that is cast out or off

—Students should write the date on the tracing paper so they can keep track of how much dirt the mighty earth movers are really moving.

4. Have students take the worms out to measure them and compare with the worms of other groups. Students may also have worm races.
5. After a week or so, have students dump the entire contents of the containers into a garden or a compost pile so the worms can do their work in their true habitat.

Language Arts

1. Have students research the different names for earthworms (night crawlers, red wigglers, etc.) and find out where the names originated.

Extra Reading

Brendler, Carol, and Ard Hoyt, *Winnie Finn, Worm Farmer*, Farrar, Straus and Giroux, 2009.

Gardner, Robert, *Super Science Projects About Earth's Soil and Water*, Enslow, 2007.

Lindbo, David, *SOIL! Get the Inside Scoop*, American Society of Agronomy, 2008.

Nardi, James B., *The World Beneath Our Feet: A Guide to Life in the Soil*, Oxford, 2003.

Name _____

Worm Watcher Worksheet

	Day 2 _____ date	Day 3 _____ date	Day 4 _____ date	Day 5 _____ date
Before you lift the cloth each day, hypothesize what you will see. Write your hypothesis in a complete sentence.				
Use an adjective to describe your worms.	Give your worms names. Write the names below. _____ _____	Design a badge that shows you are an official worm watcher. Be creative. Use crayons, markers and construction paper.	Use a reference to find a picture or drawing of an earthworm. Draw an earthworm along the left side of the worksheet. Label one of its <i>somites</i> .	Earthworms can move soil particles up to 40 times their weight. Use this formula to find out how much soil you could move if you were a worm. $40 \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$