



WORM WATCHING

GRADE LEVEL: 2-3

SUBJECT: Science

NATIONAL STANDARD(S):

(K-1) SC: 4.1, 5.2, 6.1, 7.1, 8.1-2

(3-5) SC: 4.1-2, 6.1, 7.1, 7.2, 7.4, 8.2-3

THEME: Soils

FOOD AND FIBER TOPIC: III-A,B

LEARNER OBJECTIVES:

Students will learn how earthworms help build good soil.

VOCABULARY

antennae—Slender jointed feelers, which bear certain sense organs, on head of insects.

castings—Excrement, or waste of earthworms, an important factor in the enrichment of soils.

digestive system—The alimentary canal and digestive glands regarded as an integrated system responsible for the ingestion, digestion, and absorption of food.

excrete—To separate and discharge (waste matter) from the blood, tissues, or organs.

fertile—Capable of initiating, sustaining, or supporting reproduction.

fertilized—Made (soil, for example) fertile.

minerals—An inorganic element, such as calcium, iron, potassium, sodium, or zinc, that is essential to the nutrition of human beings, animals, and plants.

topsoil—The upper part of the soil.

wormlets—Baby worms.

BACKGROUND

Earthworms are very important to agriculture. They help improve the topsoil and make it more fertile. The tunnels earthworms make in the soil can be as much as six feet long. The tunnels help air and water get into the soil. Earthworms actually eat the soil. They digest the parts of the soil their bodies need and excrete what they don't need. The parts they excrete, the castings, are much richer in minerals after they have been through the worm's digestive system. The average earthworm produces its own weight in castings every 24 hours. According to the Yearbook of Agriculture, the earthworms in one acre can bring to the surface as much as 20 tons of soil in one year. One acre is just a little less than the size of a football field.

Earthworms are found everywhere on the earth's surface, except at the north and south poles, where it is very cold. They can be so tiny you can't see them without a microscope, or they can be several feet long. They are called by several names including, "orchard worm," "rain worm," "angleworm," "red wigglers," "night crawlers" and "field worm." The earthworm has no head, no eyes, no teeth and no antennae. Its body is made up of many ringlike segments. There is a swollen band, lighter in color than the rest of the body, at the front of the earthworm's body.

Earthworms have both male and female reproductive organs. They lay egg capsules that must be fertilized by another worm. Each egg capsule contains several baby worms, called wormlets. The wormlets come out of the capsules three to four weeks after the worm deposits

the capsule near the soil surface. When they first appear, they look like tiny threads, about one-sixteenth of an inch in length.

You can usually find earthworms near the surface of the soil after it rains. They will die if they dry out and don't like strong light. Earthworms are very sensitive to chemicals. Some people raise earthworms to sell as fish bait or to help enrich poor soil.

STEP-BY-STEP INSTRUCTIONS

1. Bring a gallon-size glass jar to class. Fill it loosely with soil, leaving about two inches at the top. Bring several earthworms to class, or ask students to bring them.
2. Share background material, and allow students to examine the worms carefully to find the ringlike segments and swollen band at the front of the earthworm's body.
3. Release all but six of the earthworms in the dirt outside. Place the remaining six in the jar, and cover them with lettuce and grass clippings or decaying leaves. Wrap the jar with black paper, and tape it in place.
4. Leave the jar in a cool, dark place, and do not touch it for at least a week. Have students take turns dampening the soil every day and adding more food as the lettuce and other materials disappear. Do not otherwise touch the jar for at least a week.
5. Have students draw pictures of the earthworms and predict what will happen in the jar.
6. After 10 days, unwrap the jar and have students observe what the worms have been doing. Have them draw pictures of the tunnels the worms dug on their charts.
7. Take the jar outside on a warm day, and carefully dump the contents onto a flower garden or some other spot where the worms can work their way back into the earth. Have students use sticks to gently probe the dirt and look for signs of the food they have placed in the jar over the past 10 days.

RELATED ACTIVITIES

1. Set up another jar, and feed the worms different kinds of organic materials (shredded paper, bread crumbs, thin apple slices, grated orange peel). Earthworm breeders use a mixture of cornmeal and coffee grounds. Have students keep records of how fast each item disappears and make simple bar graphs to demonstrate their data.
2. Have students brainstorm about how the earthworm got each of its different names. (See background material.) Have each student choose one of the names and write a story about it.
3. If your class has started a compost pile, wait until it has had time to start decomposing, then have an earthworm hunt. Students may use sticks, large spoons or garden trowels to dig gently through the compost. Have them look especially for wormlets.

RESOURCES

Student Books

Jennings, T. (1990). Earthworms: Junior Science. Watts.

Kalman, B. (1991). Buried in Garbage. Crabtree.

McLaughlin, M. (1988). My Brother Louis Measures Worms. Harper Collins.

Rockwell, T. (1973). How to Eat Fried Worms. Watts.

Teacher Resources

Wood, Grant, "The Lowly Earthworm: The Gardener's Friend". University of Saskatchewan, Horticulture Extension Department. Available on the internet at: <http://www.ag.usask.ca/cofa/departments/hort/hortinfo/misc/earthwor.html>

Related Internet Websites

Earthworms: Let's Get Growing (The website contains numerous inexpensive earthworm kits.) <http://www.letsgetgrowing.com/pages/worms.html>

"Earthworms" by John Mertus, Copyright 1993. <http://www.cog.brown.edu/gardening/worms.html>

The role of earthworms in healthy soils <http://www.organic.com/Non.profits/F2F/Features/earthworm.soil.html>

Earthworms. This document looks at the relationship between the earthworm's ability to produce nutrients as well as other soil characteristics which they enhance.

<http://www.rain.org/~sals/worms.html>

Plowing Through Garbage: <http://soundprint.brandywine.american.edu/~nstw/activities/earthworm/earthworm.html>

EVALUATION

Were the students able to see the tunnels the worms made in the soil? Do students understand how the worms turned the lettuce and other organic materials into soil?

ACKNOWLEDGMENT

This lesson was adapted from Oklahoma Ag in the Classroom, Department of Agricultural Education, Communications and 4-H Youth Development, Oklahoma State University, Stillwater, OK 74078.