Unit 4 Lesson 2: Worm's World

Focus Area: Science

Focus Skills: researching a topic, conducting an experiment, using the scientific method

Objectives

- To recognize the importance of the interrelationships among plants, animals, minerals, and people in an ecosystem
- To identify human and non-human factors that might change an ecosystem
- To appreciate the life of earthworms and gain a better understanding about other living things with which we share this Earth
- To communicate understanding of a balanced ecosystem of soil and earthworms by writing an expository piece on the importance of worms

Essential Question

How are earthworms beneficial?

Essential Understanding

Earthworms create nutrient rich compost from biodegradable refuse.

Background

Worm composting is a method for recycling food waste into a rich, dark, earth-smelling soil conditioner. The great advantage of worm composting is that this can be done indoors and outdoors, thus allowing year round composting. It also provides apartment dwellers with a means of composting. In a nutshell, worm compost is made in a container filled with moistened bedding and red worms. Add your food waste for a period of time, and the worms and microorganisms will eventually convert the entire contents into rich compost.

Dedicated to Reducing Pesticides

IPM INTEGRATED PEST MANAGEMENT

University of Connecticut
College of Agriculture and Natural Resources
Cooperative Extension System

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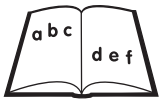
Vocabulary



biodegradable	material that can be decomposed (broken down) by living organisms
compost	decomposed organic matter, usually used to enrich the soil
decomposers	organisms that break down biodegradable refuse
harvest	the gathering in of a crop of any kind; a mature crop. Also, the season of gathering grain and fruits, late summer or early autumn.
humus	partly or wholly decomposed vegetable matter
nutrient	a component of food that provides material for energy or growth
organic	derived naturally, from living or once-living matter
recycling	a system of collecting, sorting, and reprocessing old material into usable raw materials
worm	any of various types of creeping or burrowing invertebrate animals with long slender bodies and no limbs, especially segmented in rings or parasitic in the intestines or tissues

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Logistics

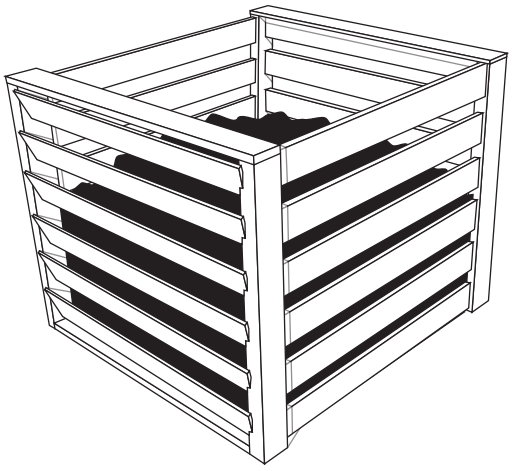
Time: three sessions of 40 minutes each and time over two weeks to observe the worms

Group Size: 5 to 30

Space: an area for group work with flat surfaces, either tables or desks, to observe worms

Materials

Overhead 1 "What Am I?" *
Handout 1 "Worm Observation Sheet" *
Handout 2 "Diagram of a Worm" *
Handout 3 "Worm's Work Investigation" *
large chart or white/black board for questions and ideas
spray bottle to keep worms moist as necessary (**Note:** If refuse being used is largely vegetative, monitor water carefully as soil can become too moist.)
moist paper towels
pencils and journals for recording observations
magnifying lenses
quart size glass jars (1 per four children)
labels (two per group)
sand or gravel (1 cup per jar)
coffee grounds (1/2 cup per jar) for worm habitat jars
brown sugar (1/2 cup per jar) for worm habitat jars
2 sheets of black construction paper per group
potting soil
chopped vegetables, cucumbers, carrots, etc. (about 1/2 cup per jar)
fruit scraps (about 1/2 cup per jar)



grass clippings (about 3/4 cup per jar)
dry leaves (about 10 per jar)
earthworms (3 per jar)
Assessment for a Lab Report *
Assessment for an Expository Piece *

* single copy provided

Preparation

1. Obtain the worms. Earthworms, also called night crawlers, may be dug up from a garden, field, or compost pile. You can also purchase them in a pet or bait shop.
2. Prepare worm **habitat containers** in which to keep the living worms until they are needed.
   a. Rinse jars thoroughly with water only. Do not use soap!
   b. To the jars add a thin layer composed of a mixture of coffee grounds and brown sugar. Put 10 leaves on top.
   c. Place 4 worms into each of the jars. Spray with water until the jars are moist. Worms need to stay moist because they breathe through their skin. Make a sleeve of black construction paper that fits loosely around the jars. **Note:** If time allows, the children may prepare their own worm jars.
3. Copy Handout 1, "Worm Observation Sheet," Handout 2, "Diagram of a Worm," and Handout 3, "Worm's Work Investigation" (1 per child).
4. Assemble all materials.
5. Preview and bookmark the websites for answers to some questions that you might have:
   - www.exploratorium.edu/IFI/resources/lifescienceinquiry/doesawormhave.html
   - yucky.discovery.com
6. If time allows, do the activities ahead of time so that you can anticipate any problems or questions that may arise.

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Activity

Challenge: Discover what important contribution earthworms make.
(Display for group viewing)

Introduction

1. Using Overhead 1, "What Am I?", initiate a discussion on worms.
   a. Show one clue at a time until children draw the conclusion that the mystery guest is a worm.
   b. Brainstorm and list on board or chart paper the children's understanding of worms.
   c. Using a computer lab or LCD projector, go to the website yucky.discovery.com/noflash/worm/pg000104.html and allow children time to research worms.
   d. As a group, add to brainstorm list and correct misconceptions.

Involvement

1. Divide the group into teams of four or five.
2. Have each group gather all materials except the worms. (magnifying lenses, paper towels, spray bottles, pencils, rulers, etc.)
3. Distribute Handout 1, "Worm Observation Sheet," and Handout 2, "Diagram of a Worm."
4. Tell the teams that they will make some predictions, observe some physical attributes of the worms, and record their thoughts and observations.
5. Read Handout 1, "Worm Observation Sheet." Allow time for teams to make predictions.
6. Rinse 2 worms per group in water that has been standing a few hours at room temperature and place them on the wet paper towels.

7. Remind the children to treat their worms with care and respect.
8. Distribute the worms. Circulate among the teams to help and monitor the treatment of the worms.
9. Allow time for the children to conduct their observation, record their results, and draw conclusions.
10. Return the worms to their habitat containers and clean up.
11. Discuss the observations.

Follow Up

1. Divide the children so that each group has two jars. Each group will need 3 worms. (These may be the same teams as in the **Involvement** portion or new groups.) Distribute Handout 3, "Worm's Work Investigation."

2. Tell the group that they will be preparing two observation jars. All jars will be prepared exactly the same. Ask the children why this is important. Direct their attention to the purpose of the observation as stated on Handout 3, "Worm's Work Investigation." (The purpose of their two week observation is to determine the importance of worms in our ecosystem. Therefore, the only variable must be the presence of worms in one of their two jars.) Rinse the jars well. Ask the children why they must not use soap. (Soap would hurt the worms, which will be placed in this habitat we are preparing!) Put into each jar: 10 cm of dry potting soil and 2 to 3 cm of chopped vegetable and fruit scraps. Evenly mix both together. Add 1/2 cup of grass clippings and top with 10 leaves. Gently place 3 worms into one of the jars. No worms will be in the other jar. Label the jars as **control** (wormless) and **experiment** (with worms). Spray the jars with water until moist, <u>not soaked</u>.

3. Explain to the children that worms need to stay moist because they breathe through their skin. Worms have special glands that secrete mucus to keep their bodies moist. Ask the children why both

jars were sprayed. (We need to control all the variables in order to conduct a true observation. This means the presence of worms can be the only difference between the jars.)

4. Make a sleeve of black construction paper and place it loosely around each jar. Have the children complete the title, materials, and procedure portions of Handout 1, "Worm's Work Investigation." (Model this on the board if necessary.) Each group should write a prediction about what will happen in the two jars or what the jars will look like in 2 weeks. This is their hypothesis. Each day over the next two weeks, the children will observe both jars, record the date, the time, and results of their observations. At the end of two weeks they will write a conclusion based on the original stated purpose.

5. Have the children share their conclusions.

Assessment

1. Have the children write a brief paragraph on the importance of worms in an ecosystem. The "Assessment for an Expository Piece" is included.
2. The lab report (Handout 3, "Worm's Work Investigation") may be evaluated using the rubric, "Assessment for a Lab Report."

Answer Key

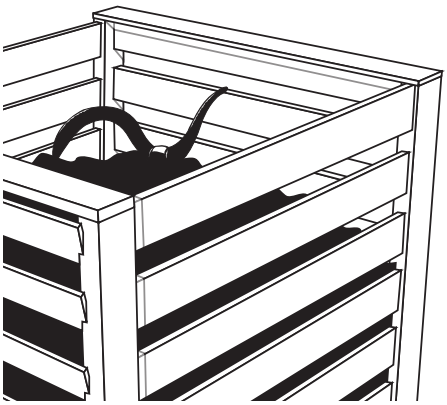
None needed.

Follow Through

Additional Focus Areas: Language Arts
Additional Focus Skills: cooperative learning, persuasive speaking, presenting orally

1. Using their notes from **Investigation** and **Follow Up,** children will develop a recipe and graphic for the creation of worm composting.
2. The children may work in teams of two or three to complete this assignment.
3. The children will choose the best recipe and graphic to be copied for distribution
4. As a group, develop and rehearse a presentation on the importance of worms and worm composting for presentation at a PTO or other adult forum.
    a. script writers
    b. material production
    c. presenters
    d. time and place coordinators (meet with administrators to schedule with organization)
    e. publicity
5. Present the program.

Resources



Worms Eat My Garbage by Mary Applehof. 1997, Flower Press, Kalamazoo, Michigan, 1997. A guide to starting and maintaining a worm composting system in your classroom.

Compost Poster
www.stanslaughter.com/cposter.html