



Worms Are Our Friends

Lesson

Goals

Students will learn about Red Wiggler worms, composting and decomposition.

Objectives

Students will begin to explore garden friends and garden foes by starting a worm-composting bin.

Standards

Science: Life Science

GR.6-S.2-GLE.2

Science: Earth Science

GR.1-S.3-GLE.1

GR.3-S.3-GLE.1

GR.6-S.3-GLE.3

Total Time – 60 minutes (plus weekly care)

Did you know?

Red Wiggler worms:

- Consume their weight each day in raw organic matter.
- Live about one year.
- Do NOT turn into two worms when cut in half.
- Take only six weeks to grow from hatchling to adult.

Materials

- Container (wood or plastic)
 - Drill about 30 holes along the long sides and bottom (1/4" holes)
- Newspaper (black and white only)
- Red Wiggler worms
- Fall leaves
- Food scraps (Old bread, eggs shells, fruit and vegetable peels, coffee grounds, etc. Do not use meat, fat, dairy, junk food or citrus.)
- Magnifying glasses
- Journals
- Healthy snack

Vocabulary

cocoon

cold-blooded

compost

erosion

fertilizer

hatch

improvement

invertebrates

moisture

oxygen

recycle

vermicomposting

Mentor Text

- *Compost Happens*, Mike Peters, 2000.
- *The Worm Café*, Binet Payne, 1999.
- *Wormology*, Michael Elsohn Ross, 1996.
- *Composting with Willie the Worm*:
<http://www.michigan.gov/kids/0,4600,7-247-49067-62499--,00.html>

Background for Teachers

This lesson covers:

1. How garden friends can help decompose material and turn it into compost.
2. Why compost is good for garden soil.
3. How to recycle for the garden and why recycling is good.
4. How to care for worms.

See the Worm Composting 101 resource sheet for more detailed information on how to care for your worm bin (http://dug.org/storage/school-garden-curriculum/Worm_Composting_101.pdf).

This is a great follow up lesson to *The Rotten Truth*

(http://dug.org/storage/school-garden-curriculum/The_Rotten_Truth.pdf).

Method

Introduction (10 minutes)

1. Explain the benefits of worm composting (vermicomposting) to the class. Emphasize how worm composting recycles materials.
 - a. Review the basic definition of composting. (Compost is well-rotted plant and animal waste prepared by people to be used as a soil amendment in the garden.)
 - b. About 25% of all trash is yard waste or food scraps—both of which could be composted.
 - c. Compost has the ability to increase water retention in gardens and decrease overall usage.
 - d. Compost reduces erosion.
 - e. Compost reduces or eliminates pesticide and chemical fertilizer usage.
2. Ask the class what they know about worms. Have them make a list or go around the room and give each student a chance to add to the list. Teach them what they do not already know. (See “Did you know?” above.)
 - a. Worms are invertebrates, lacking bones and cartilage.
 - b. Worms are blind.
 - c. Worms breathe by absorbing oxygen through their moist skin.
 - d. Worms have no teeth.
 - e. Worms possess both male and female reproductive organs (hermaphrodites) but require a partner in order to reproduce.
 - f. Worms are sensitive to light and possess organs along their upper side that sense ultra-violet light. After prolonged exposure, breathing becomes depressed and the worm may die.
 - g. If worms are managed properly, it only takes two to three months to produce worm compost (castings).

Activity (35 minutes)

1. Have students tear single pages of black and white newspaper into strips and then into small squares. If time is limited, pre-tear the newspapers.
2. Have students fill the container with the torn newspapers and dry leaves, adding equal amounts of each by volume. Mix them together. Slowly, add lukewarm water to make the bedding moist but not soaking. It should feel like a wrung out sponge. Have a few students

break up all the newspaper to avoid big clumps and to create air space, which will help control odors and provide ideal living conditions for the worms. Thoroughly mix the newspaper and leaves together.

3. Spend some time looking at the worms with the magnifying glass. Have the students try and identify the longitudinal and circular muscles, the clitellum (band or ring) that indicates sexual maturity and explain that the head of the worm is closer to the clitellum.
4. Explain what worms like to eat (decaying organic material).
5. Make a worm sandwich. Using old bread and other appropriate items, make a sandwich. Explain to the class what to put and what not to put into the worm bin and why.
 - a. You can compost non-meat food scraps, such as fruit and vegetable peels, tea bags and coffee grounds. Pulverized eggshells help the worms “chew” their food since they do not have any teeth. This is similar to the way birds use small rocks.
 - b. It is advisable not to compost meats, bones, dairy products and oily foods because of problems with smells, flies and rodents. Do not add junk food, hot peppers or too many onion skins or citrus peels. Only add small amounts of citrus items and grains because too many can promote an acidity problem, leading to an overabundance of pests such as decomposition mites. Be moderate with the amount of fruit added (over-ripe fruit such as bananas left on the kitchen counter are a perfect breeding ground for fruit flies). It goes without saying that worms decompose organic materials only. Therefore, do not add plastic bags, rubber bands, aluminum cans, glass, etc.
 - c. Any food that is to be added to the box is best kept in sealed containers in the refrigerator.
6. Always bury the food waste by pulling aside some of the bedding, dumping the waste and then covering it up with the bedding again to avoid fly and odor problems. Bury successive loads in different locations in the bin.

Conclusion (10 minutes)

Have students brainstorm in their journals what they learned about worms and any new vocabulary words during today’s lesson.

Snack (5 minutes)

Hand out a healthy snack. While students are enjoying their snack, discuss as a whole group the proper ways to care for the worms.

Assessment Tools

- Journals

Modifications

- Have students draw a detailed picture of a worm in their journal and label the parts. You may want to have them look at the worms under a microscope or have a diagram of a worm available.

Extensions

- *Wormology* by Michael Elsohn Ross is a student friendly worm book with many experiments and lesson extension ideas.
- Hand out the worm related resource sheets and review their material (<http://dug.org/school-garden-curriculum/resource-sheets/gardening-tips.html>).
- Weigh the amount of food scraps going into the bin each week. Do various math or graphing projects with the numbers.

Suggested Products

- Roughneck storage containers, 10 gallon size are perfect for classroom worm bins.
- Worms can be purchased by the pound at <http://www.wilsonsworms.com>
- *The Worm Café* by Binet Payne has a lot of great information about worm composting at the school level.

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