

## **Workshop: Youth Gardening Programs**

Lesson Plan #2: “Warming Up to Worms” and “Setting Up a Worm Bin”

This lesson draws upon the following Health Education Standard:

**Health Education Standard 1:** Students will comprehend concepts related to health promotion and disease prevention.

**5-8 Benchmark:** Analyze how environments and personal health are interrelated.

**7-8 Performance Standard:** Analyze the importance of maintaining the environment and promoting its use for stress reduction, wellness and recreational activities.

**The following lesson plans and handouts were copied from: Do the Rot Thing: A Teacher’s Guide to Compost Activities. This guide was published in July 1997. The materials were created to be copied and used, subject only to acknowledgment of the Alameda County Waste Management Authority.**

### **Part 1: “Warming Up to Worms”**

**Worm Composting:** Grades 3-6

**Objective:** Participants will learn about worms and their role in nature through observation and discussion and overcome their fear of worms.

**Time:** 20-40 minutes.

#### **Materials Needed:**

- Magnifying boxes or glasses
- Worms
- Worming Up to Worms Worksheets
- Paper towels
- Toothpicks

#### **Background Information:**

Worms are incredible decomposers. The worms we use for composting in boxes are surface feeders called *eisenia foetida*. They are also called manure worms, red wigglers, or red worms. Over 7,000 species of worms inhabit the world, and they have always been important to our ecosystems. In ancient Egypt, under Cleopatra's rule, it is reported that anyone who knowingly killed a worm would be sentenced to death. Today, there are engineers in India who are learning how to clean sewage water using worm systems.

There are lots of fun facts to know about red worms. They have five pairs of hearts, no eyes, and no teeth. They breathe through their skin, and need dark, moist surroundings. Eight adult red worms can produce 1,500 offspring within six months, if conditions are favorable. Each worm is both male and female and can eat over half of its weight in food every day.

### **Management Skills:**

Worms are very sensitive to light, so handle them with care. Make sure there is a moist piece of paper towel in each participant's magnifying box. You should also put a little bit of bedding or worm castings in the magnifying box with them. For older students, use moist paper towels and toothpicks. Younger children may not be able to use the worksheet.

### **Procedure:**

1. Ask participants to brainstorm questions about worms. Encourage students to ask any kind of question about worms. You might also want them to brainstorm worm adjectives.
2. Discuss how worms are recyclers, how they have been held in high esteem by many cultures for centuries, and that they can help us manage our waste.
3. Tell participants they are now going to investigate the answers to their questions through direct observation of red worms. Have participants divide into small teams of two or more and hand out a magnifying box with a worm to each team. (For older kids, paper towel and a toothpick are fine.)
4. Hand out the *Warming Up to Worms* worksheet to each participant.
5. Ask the teams to observe their worm through the magnifying box for a few minutes. Walk the class through filling out the worksheet.
6. Once the students are finished, facilitate a discussion on the questions that were brainstormed at the beginning of the lesson. Some of the questions might not have been answered from observations. How would participants research those unanswered questions?
7. Ask participants to add adjectives to their list. Point out differences from the first list.
8. Summarize the main points once again.

**Sources:** Cindy Nelson, Alameda County Master Composter/LITES Program, Mills College, Oakland.

## Warming Up to Worms Worksheet

1. **What color is the worm?**
2. **What shape is the worm? Describe it.**
3. **How does the worm's skin feel?**
4. **Is there a difference between the top side and bottom side of a worm? Describe what both sides are like.**
5. **Can you tell which is the front end of a worm and which is its tail? How do you know?**
6. **Does an earthworm have.....**
  - EYES?**
  - EARS?**
  - LEGS?**
  - A NOSE?**
  - A MOUTH?**
7. **How does your worm move? Describe it.**

## 8. What's the name of your worm?

## 9. Why are worms important to life on earth?

### Part 2: "Setting Up a Worm Bin"

**Worm Composting:** Grades K-12

**Objective:** Students will set a worm composting system and learn about the importance of worms in the life cycle and as transformers of garbage.

**Time:** 40-60 minutes.

#### **Materials Needed:**

- Worm Bin
- Bedding Materials
- Handful of Soil
- 1 Pound of Worms
- Water
- Collection Container
- Worms School Worksheets

#### **Background Information:**

Worm composting is fun, low-maintenance way of recycling your organic kitchen scraps. Worms eat your vegetative food scraps, turning it into a high-quality fertilizer known as worm castings.

You provide the living environment for the worms—the bin, the bedding and food—and the worms do the rest. Worm composting can be done inside or outside, requires no turning, is odorless if done correctly, and can be done in small spaces. Worm composting is most appropriate for food scraps.

The compostable matter we throw away—such as apple cores, melon rings, and soggy bread—are things that worms like to eat. Red worms eat food scraps and break them down into rich, dark brown, earthy-smelling material called worm castings. Castings, which are a nitrogen-rich fertilizer, can then be returned to the earth and are good for lawns, gardens, and house plants.

#### **Management Skills:**

Since participants will be setting up a worm composting system in the classroom, it is necessary to secure both worms and a steady supply of worm food. Worm bins need regular maintenance. Worms need darkness, moisture, moderate temperatures, enough bedding and food. Please be mindful not to overfeed. Call the Rotline at 510-444-SOIL for free tips.

**Procedure:**

1. Introduce worm composting by discussing the life cycle, the importance of worms in nature, and worm composting as a waste management strategy.
2. Buy, scrounge, build, or get a free worm bin from the Alameda County Waste Management Authority.
  - A worm bin can be made of wood, plastic or other materials
  - The size of your classroom worm bin should be at least 1.5 square feet and about 16 inches deep.
  - Good ventilation is essential for aerobic decomposition and a healthy environment for worms.
3. Prepare worm bedding;
  - Tear newspaper into ½ inch –1 inch wide strips (tear lengthwise, with the grain)
  - Dunk newspaper strips in water and add to bin
  - Add a handful of soil and fluff
  - Toss everything like a big salad
4. Add worms and food;
  - Purchase or obtain about 1 pound of red worms (about 500-1000 worms)
  - Gently place your worms in the moist newspaper bedding near the bottom of the bin
  - Put of handful or so of food waste near the worms and cover well with the moist newspaper bedding
  - Add more dry shredded newspaper to fill the bin and then a layer of burlap or cloth
5. Explain to participants that using worms to compost our food scraps makes sense for a lot of reasons;
  - We will reduce the amount of garbage we create
  - Compost improves the soil and makes it hold water better
  - When we use compost we use less chemical fertilizers and avoid creating more pollution
  - Composting with worms is fun!
6. Let your worm bin rest by not adding any additional food for 1-2 weeks. This allows the worms a chance to get used to their new environment and for the food to begin to decompose.
7. For on-going maintenance, feed every 3-7 days, always burying the food under the paper. Do not overfeed. Bad smells or large amounts of uneaten food indicate over feeding. Add more paper as needed to cover food.
8. Harvest castings after 3-6 months (see harvesting a worm bin, page 40).