

Setting Up a Worm Bin



OBJECTIVES:

Students will:

1. set up and maintain a worm compost bin in the classroom.
2. learn about the importance of worms as decomposers and identify other compost critters in the bin.



STANDARDS: Science



SKILLS: Analysis, classification, description, problem solving



SETTING: Classroom



TIME: Setting up bin:
30 minutes

Ongoing: 5 minutes daily
to once a week, maintaining
bin by adding food
Worm bin observation:
30 minutes (2–3 weeks
after setup)



VOCABULARY:

Bedding
Compost
Decomposition
Food scraps
Organic
Red worms
Worm bin
Worm castings
Vermicompost

Introduction

Overview:

In this lesson, students will set up a worm compost bin in the classroom, maintain the bin and observe how the contents change over time.

Teacher Background:

Worm composting is a fun, low-maintenance way of recycling food scraps and other organic material. Red worms or composting worms eat vegetative food scraps and turn them into a high-quality fertilizer known as “worm castings.” Worms can thrive in a composting bin as long as they have moisture, air, bedding, and food. 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 (no meat or dairy).

Worms like to eat decomposable matter that we throw away such as apple cores, melon rinds, and soggy bread, breaking organics materials down into a rich, dark brown, earthy-smelling material called “worm castings.” Castings are a nitrogen-rich fertilizer that is good for lawns, gardens and houseplants.



Materials:

Student:

- Newspaper
- Handful of soil
- Popsicle sticks or cotton swabs
- Water
- Food scraps
- “Worms at School” worksheet

Teacher:

- One pound of red worms
- Worm bin
- Rubric overhead
- Rubrics (one per student)

Preparation:

For information on obtaining a school worm compost bin for teachers in Alameda County call 1-877-786-7927. Get worm composting advice by calling 510-444-SOIL. You can also visit www.StopWaste.Org.

Assemble compost bin before the lesson. See information in the “Teachers Resources” on building a worm bin.

Optional: Assign students to bring in vegetable or fruit scraps collected from home.



ACTIVITY

Discussion

1. Introduce worm composting by discussing the importance of worms as a waste reduction strategy. Worms help reduce waste by turning food scraps and other organic materials into a rich soil amendment.
2. Describe how worms turn vegetable and fruit scraps into compost. For example, red worms eat vegetable food scraps, digest the scraps and produce rich vermicompost that can be used as soil amendment.
3. Ask the students what conditions worms need in order to live in a worm bin (darkness, moisture, moderate temperatures, bedding and food).
4. Tell the students that they will be setting up a worm bin in the classroom that will help reduce organic waste. The students should try to save fruit and vegetable scraps from their lunches to feed the worms instead of throwing them away.
5. Show an overhead of the lesson rubric, and review the expectations for this lesson.
5. For ongoing maintenance, feed the worms from one to several days a week, always burying the food under paper. Do not overfeed. Bad odors or large amounts of uneaten food indicate overfeeding. Add more paper as needed to cover food. Make sure to never include meat or dairy.
6. After several weeks, the students may do an exploration of the worm bin. Hand out piles of material from the worm bin on newspaper and provide the students with popsicle sticks or cotton swabs. Organize the students into groups of four or six. Have them list all of the things they see in the compost and answer these questions: Can you see pieces of food? What kinds? What kind of compost critters are present? Are the worms active? Describe.
7. Worm castings will be ready to harvest from the worm bin after three to six months. Refer to Lesson 24, "Harvesting a Worm Bin," for information on how to harvest worm castings.

Procedure

1. Give each student the "Worms at School" worksheet.
2. Explain how to prepare the worm bin bedding by modeling how to tear newspaper into 1/2" to 1" wide strips. Tear about ten sheets of newspaper lengthwise with the grain. Dunk the newspaper strips in water (the paper should be wet as a wrung-out sponge), and add to the bin. Add a handful of soil, and fluff the "bedding" like a big salad.
3. Add worms and food: purchase or obtain about one pound of red worms (about 500 to 1,000 worms). See the "Teachers Resources" section for worm sources. Gently place the worms on top of the moist bedding near the bottom of the bin. Put about a handful of food waste near the worms and cover the worms and food well with the moist newspaper bedding. Add more dry, shredded newspaper to fill the bin to the top. This will keep fruit flies out of the worm bin.
4. Let the worm bin rest by not adding any additional food for one to two weeks. This allows the worms a chance to get used to their new environment and for the food to begin to decompose.

Wrap-Up

1. Ask students to share some reasons for using worms to compost food scraps. You may share some of the following reasons:
 - a. We will reduce the amount of garbage we create.
 - b. Compost improves the soil and makes it hold water better.
 - c. When we use compost, we use fewer chemical fertilizers and avoid creating pollution.
 - d. Composting is fun!
2. Have them explain how worms turn food scraps into compost.
3. Explain to the students that after three months, they will harvest the worm bin.

Final Assessment Idea

Have students write an expository paragraph that describes the sequence of setting up a worm bin and how the contents of the bin has changed over time based on their own observations.



RESOURCES

Extensions:

Have students measure the weight of food scraps that are added to the worm bin for one week. Have them calculate how much food they have diverted from the waste stream for one month by composting it instead of throwing it away.

Teacher Materials:

California State Content Standards

The standards below represent broad academic concepts. This lesson provides connections to these academic concepts through hands-on activities and exploration. This lesson is not designed for a student to master the concepts presented in the standards. Additional lessons in the classroom that build on this lesson or the standard(s) ensure that students will have the opportunity to master these concepts.

SCIENCE	CONTENT STANDARDS
Grade 4	Life Science 2.b. Students know producers and consumers (herbivores, carnivores, omnivores and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem. 2.c. Students know decomposers, including many fungi, insects and micro-organisms, recycle matter from dead plants and animals. 3.a. Students know ecosystems can be characterized by their living and nonliving components.
Grade 5	Life Science 2.g. Students know plant and animals cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO ₂) and water (respiration).





Teacher

Setting Up a Worm Bin Rubric

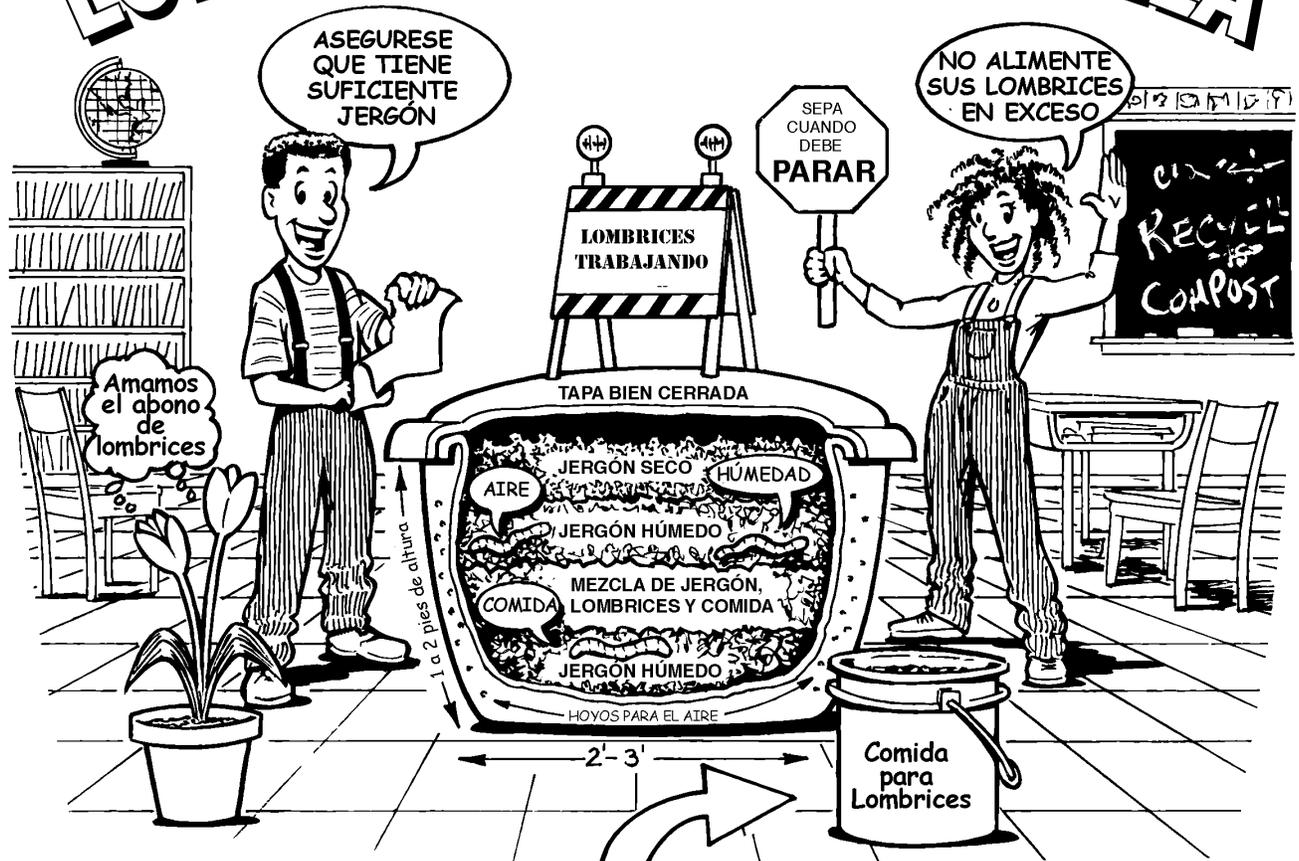
A rubric is a scoring tool that defines the criteria by which a student's work will be evaluated. This rubric is provided to assist you in setting expectations for students and assessing their performance and engagement during the lesson based on specific tasks. Ideally, a rubric is developed with the cooperation of the students. Two blank rows have been provided for you and your class to develop and add your own assessment criteria.

Category	4	3	2	1
Setting up the worm bin	Student helps with setting up the bin.	Student tries to help with setting up the bin.	Student does little to help with setting up the bin.	Student does not help with setting up the bin.
Maintaining the worm bin	Student helps maintain the bin.	Student sometimes helps maintain the bin.	Student does little to help maintain the bin.	Student does not help maintain the bin.
Exploring the worm bin	Student examines and identifies the contents in the bin.	Student examines and identifies some content in the bin.	Student examines very little content in the bin.	Student does not examine the content in the bin.





LOMBRICES EN LA ESCUELA



- AQUI ESTAN ALGUNOS TIPOS DE "SOBRAS DE COCINA: QUE LAS LOMBRICES AMAN COMER !
- | | | | | | | | | |
|---------------------|---------------------|----------------------|-----------------|-------------------------|---------------|-------|---------|----------------|
| | | | | | | | | |
| Corazón de Manzanas | Cascaras de Naranja | Cascarones de Huevos | Papel Triturado | Tostaditas de Tortillas | Posos de Café | Melon | Lechuga | Corteza de Pan |

- Como ser humanos las lombrices necesitan _____ y _____ para poder vivir.
- Papel triturado le ofrece el _____ para que las lombrices puedan vivir.
- * Las lombrices hacen _____ que puede ser utilizado en las plantas

Nombre: _____ Fecha: _____



Vocabulario:

Abono: El proceso ó resultado final de organismos vivos que digieren y reducen materiales orgánicos y los convierten en un aditivo de tierra rica..

Abono de vermi (lombriz):

Abono producido por medio de un sistema de abono de lombrices. Es un mezcla de desecho orgánico que está descompuesto parcialmente, jergón y vaciado de lombrices. Cuando está terminado, es un abono que tiene balance y es rico en sustancias nutritivas para que sea usado en el jardín.

Descomposición: El proceso de materiales que son digeridos y transformados a sustancias simples, haciendo las sustancias nutritivas más disponibles a las plantas. La descomposición ocurre todo el tiempo en la naturaleza y en los sistemas controlados por seres humanos como por ejemplo el recipiente de abono.

Jergón: Material como hojas secas o papel triturado utilizado para retener humedad, crear espacios de aire y cubrir las sobras de comida en un sistema de abono de lombrices.

Orgánico: Materiales que alguna vez vivieron ó material producido por un organismo vivo como comida, hojas, recortes de plantas, cabello, fibras de ropa, papel, etc. La palabra Orgánico puede utilizarse al describir comida que fue cultivada usando métodos agrícolas sostenibles.

Lombrices rojas: El tipo de lombriz que se usa típicamente en sistemas de abono de lombrices. Las lombrices rojas pueden ser encontradas en el moho de hojas y en montones de estiércol y pueden ser compradas en tiendas donde venden anzuelos y materiales de jardín. El nombre científico en Latín es Eisenia Fetida.

Sobras de comida: Comida que puede ser depositada en un recipiente de abono, típicamente fruta y sobras de vegetales. La carne, productos lácteos y aceites son excluídos porque atraen plagas.

Recipiente de lombrices(gusanos): Un envase/recipiente/contenedor que se usa para poner lombrices, sobras de comida y jergón para que se produzca el abono

Vaciado de lombriz: Estiércol de lombrices ó el producto final del abono de lombrices. Es un rico aditivo de tierra the alta calidad que se usa para fertilizar las plantas.