

# THE NEW YORK BOTANICAL GARDEN

## How to Build a Worm Bin Pre-/Post-Visit Activities



### TEACHER GUIDE

Thank you for registering for the GreenSchool workshop ***How to Build a Worm Bin***. During this workshop, students will observe the red worm and other decomposers hard at work recycling our kitchen food scraps as they digest it into vermicompost, a rich fertilizer for soil. Students will build a worm bin to bring back to your classroom and learn for themselves the basics for maintaining an environment that helps these decomposers thrive.

### PRE-VISIT ACTIVITY IDEAS

Decomposition happens! Here are some suggested ways for students to observe the natural cycle of organic matter as it decomposes under a variety of conditions.

#### Create Mini-“Decomposiums”

Students will understand that microscopic organisms begin the process of decomposition.

#### Materials:

Zip-top bags per student  
Small amount of kitchen food scraps (i.e. apple core, banana peel, orange skin)

- Fill a small plastic zip-top bag with a few kitchen food scraps and punch holes close to the top of the bag.
- Hang the bags on a bulletin board.
- Ask students to think about what is happening inside the bag and to predict what will happen to the contents.
- Encourage discussions based on their observations of the bags over the course of a few days.

#### Dig and Drop

Students observe the decomposition of food scraps buried in the ground.

#### Materials:

Outdoor space  
Garden trowel  
Kitchen food scraps  
Plant marker

- Dig a small 10” x 10” x 4” shallow hole in the ground.
- Collect kitchen food waste and bury the food waste in the hole.
- Use a plant marker to indicate where the hole was made.
- Challenge students to predict what will happen to the food scraps over a given amount of time.
- Check on the contents of the hole over the course of a few weeks. Based on your observations, discuss with the class what is happening to the food scraps.

#### Make Your Own Compost

Humans manage the decomposition process in order to make compost. Compost has four main ingredients: green plant matter (like grass clippings, fruit and vegetable scraps, coffee), brown plant matter (like dead leaves, twigs, shredded newspaper), air, and water. Mix these materials together to make your own plant fertilizer!

#### Materials:

Quart-size plastic zip-top bag  
1 cup green plant matter torn in small pieces  
1 cup brown plant matter torn in small pieces  
1 tbs. soil  
Spray mister water bottle

- Place moistened green and brown plant materials and soil into the bag. (Mixture should feel like a moist sponge—not dripping) and zip the top.
- Shake the bag daily to mix up the ingredients.
- Open the bag every other day for a few hours in order to aerate it.
- In two to eight weeks you will have compost.

*What is it like?*

*What can you do with it?*

*How does it smell?*

*Where might we find this in nature?*

(If during this process you notice a bad smell, your bag may have an improper balance of ingredients and may need to be adjusted. Often, too much water, too little air, or too much green matter is the problem.)

## POST-VISIT ACTIVITY IDEAS

**Can You Prove it?** The roots of young plants can easily feed on the moist nutrients found in worm castings. Students test the benefits of adding castings to soil for planting.

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### Materials:

9 small plant pots  
tray to hold pots and catch water  
tomato seeds  
worm castings  
3 mixing bowls  
garden topsoil  
peat moss  
sand

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Using garden topsoil, peat moss, sand, and worm castings, prepare 3 different planting mediums:

1. Soil Mix A:  
25% worm castings  
25% garden topsoil  
25% peat moss  
25% sand
  2. Soil Mix B:  
25% garden soil  
25% peat moss  
50% sand
  3. Soil Mix C:  
50% peat moss  
50% sand
- Add each soil mixture to fill 3 pots of each. Line up the pots by soil mixture in rows on the tray. (Soil Mix A, Soil Mix B, Soil Mix C...)
  - Plant 2-3 seeds about ¼ inch deep in each cup, then water and cover all cups with a piece of plastic film until the first seeds sprout.
  - If more than 1 seed sprouts, pull out all but the strongest looking sprout.
  - Water each plant regularly with the same amount of water per cup.
  - Observe and measure height of each plant and count its leaves once a week for 4 weeks. Record your observations.

### Student Worm Bin Build

Using the knowledge students gained for maintaining a worm bin during the GreenSchool workshop and their experience maintaining the classroom bin, students will adapt the process to construct their own worm bins to take home.

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### Materials:

Classroom worm bin from GreenSchool  
Small recycled plastic containers (take-out, fruit packaging)  
Push pins for making holes  
Newspaper for shredding  
Water  
Red worms (*Eisenia fetida*)  
Fruit and vegetable scraps

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- Have students bring in a recycled container they think meets the conditions of a suitable worm habitat.
  - Divide the class into small groups and have students explain to their group members why they chose their containers.
  - When all of the containers have been deemed suitable for worm habitats, have students brainstorm what other conditions must be met to sustain this ecosystem:

Air holes (*Students use the push pins to poke air holes in container*)

Shredded newspaper (*students shred the newspaper in fine, light strips*)

Water (*Students wet the newspaper and use as container bedding*)

Food (*Students place fruits and veggie scraps under the bedding*)

Red worms (*"Adopting" worms from the classroom bin, students add them to bedding*)

### Pen Power for Worm Power

- Write a letter of invitation to a representative from the municipal waste management department for your town or city asking him/her to come and speak to your class about waste composition and municipal waste disposal practice in your neighborhood.

Include a student-generated list of questions your class would like to

learn about before s/he arrives.

(Hint: Use a phone book. Call a city or county office to learn the public official's name and office address.)

- In order to encourage municipal support of home composting, write persuasive letters to local government outlining the environmental benefits of people using worm bins to reduce waste.
- Or, invite a public official in your community who has responsibility for recycling or for handling solid waste into your classroom to see your worms at work.

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### RECOMMENDED TEACHER RESOURCES

Bronx Compost Project @NYBG "Rotline" Helpline: 718.817.8543

[nyccompost.org](http://nyccompost.org)

Appelhof, Mary. *Worms Eat My Garbage*. Kalamazoo, Mich.: Flower Press, 1982.

Appelhof, Mary, Fenton, Mary Frances, Harris, and Barbara Loss. *Worms Eat Our Garbage; Classroom Activities for a Better Environment*. Kalamazoo, Mich.: Flower Press, 1993.

Hannemann, Monica. *Brooklyn Botanic Garden All-Region Guides, Gardening With Children*. Brooklyn, N.Y.: Brooklyn Botanic Garden, Inc., 2007.

### RECOMMENDED RESOURCES FOR CHILDREN

[yucky.com](http://yucky.com)

Bial, Raymond. *A Handful of Dirt*. New York: Walk & Company.

Cronin, Doreen. *Diary of a Worm*. New York: Scholastic Inc., 2003.

Pfeffer, Wendy. *Wiggling Worms at Work*. New York: Harper Collins Publishers, 2003.

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**For more information, call the  
Manager of School Programs  
at 718.817.8124**

