



Vermicomposting (or vermiculture) is the practice of using worms to turn organic food waste into a nutrient-rich soil called vermicompost instead of sending it to a landfill. Vermicomposting is an easy way to compost in an urban setting where outdoor compost bins may not be practical.

## Did You Know?

Food scraps make up 12% of the waste that Americans generate every day. That adds up to about 28 million tons of food that gets thrown out over the course of a year. Food scraps that are sealed in airtight landfills can react with other materials and create methane, a greenhouse gas, and acidic leachate.

To do this project, organize a workshop to teach your community about worm composting. During the workshop, demonstrate how to compost with worms and then help community members build their own worm composting bins to take home. After a month or two, contact the workshop attendees to see how their bins are doing and to track how much waste the bins divert from landfills each week.

## Timeline:

- **Project Proposal due online:** 2 weeks after the Community Organizing class
- **Part I: Preparation:** ~1 month
- **Part II: Workshop:** 3 hours (1 hour set up; 1½ hour workshop; ½ hour clean up)
- **Part III: Follow-Up and Tracking Environmental Benefits (2 months after workshop):** ~1-2 hours
- **Final Report due online:** 2 weeks after your project is complete

## Materials:

- Rubbermaid bins
- 1 pound of red worms per participant
- ¼ pound of organic food waste per participant
- **Guide to Composting with Worms**
- **Shedd Aquarium's 'Care and Keeping of Worms'** brochure
- **Take Five for the Environment** pledge cards
- Black-and-white newspaper

## Part I: Preparation:

~1 month

1. **Become an expert!** Read through our **Guide to Composting with Worms** and the **Shedd Aquarium's Worm Composting** brochure, and set up your own worm bin.
2. **Define your project vision and goals.** What do you hope to achieve by doing this project? How many community members do you hope will participate in your workshop? How much waste do you hope your bins will compost?
3. **Choose a community to serve.** Decide to whom you will present your workshop. Refer to your **Asset Map** for ideas.
4. **Gather a project team.** Refer to the **Building Your Project Team** worksheet in your **Project Development Workbook**.

### *Ways to Involve Your Project Team*

- Ask your project team to help you brainstorm ideas and create an outline for your workshop. Team members can also help you create, edit, and/or practice your presentation.
- Make a list of locations where you want to place advertisements for your workshop. Ask your team members to sign up to distribute advertising materials to some of these locations.
- Workshops need people power to run smoothly. Sign up your team members as workshop volunteers.
- Two people could help with a registration table making nametags, distributing handouts, and taking registration information. Be sure to make a script for your volunteers to follow so they know exactly what information to collect from your workshop attendees and why that information is collected.
- A team member could introduce you at the workshop, help set up any AV equipment, pass out materials during your presentation, etc.
- After the workshop, your project team could help with follow up calls, contacting participants (to make sure you have all the information you want to collect).



- Let them know the results. Your team will definitely be interested in the success and progress of your project. Keep them informed and involved along the way.
5. **Find a location and set up a date and time for your event.** The venue you choose will depend on the community to whom you will present your workshop. Make sure to contact the appropriate person at the venue to check availability and set up a date and time. Confirm logistics, (e.g., who will open the building/gate?). Possible locations include:
- Local farmers' market
  - Neighborhood community center (e.g., gym, art center, library, school)
  - Alderman's office
  - Your office
  - Condo association meeting
  - Your church
6. **Order materials through your liaison.**
- Refer to your **Material Checklist** in your **Project Proposal**.
  - Confirm with your C3 liaison final quantities of each material requested and the address where materials should be shipped. Note: some materials will need to be picked up at the Chicago Center for Green Technology, 445 N. Sacramento Blvd.
  - Remember, materials can take up to 3 weeks to arrive after C3 orders them so plan ahead!
7. **Advertise.** Make sure to use the newsletters, listhosts, bulletin boards, etc. that serve your community and/or your venue. You might also advertise using:
- Community newspapers and newsletters
  - Aldermen's newsletters
  - Signs at your location (e.g., farmers' market, community center, office, etc.)
  - Signs/booth at neighborhood events

Make sure to put your contact information on all advertisements. Ask people to RSVP so you know in advance how many people to expect.

8. **Prepare for your workshop.** Gather supplies, create handouts, and plan your presentation.

## **Part II: Workshop**

**3 hours: 1 hour set up; 1½ hour workshop (demonstration, questions); ½ hour clean up**

Put all your planning and preparation to work! Make sure to:

- Get there at least 15 minutes early to set up.
- Ask participants to take the pledge. Let them know that you will use their contact information to contact them in ~1-2 weeks to track what changes they've made in their lives.
- Provide nametags and make sure people introduce themselves.
- Ask for questions and feedback at the end of the workshop.
- Take pictures!



## **Part III: Follow-Up and Tracking Environmental Benefits (1-2 months after the workshop):**

**~1-2 hours**

1. **Follow-up with participants.** Once your participants have had time to establish their worm bins, contact them to ask how their bins are doing and to track environmental benefits. We suggest that you either call or send each participant a short survey. Make sure to ask:
  - How the worm bin is functioning. If the bin has any problems like flies or odor, recommend solutions (see the "Troubleshooting" section in **Guide to Composting with Worms**).
  - How much food waste they feed to the worms each week. You can ask participants to measure the weight of food for a day or two and give you an average, or to just give you an estimate based on their experience. As an example, ½ pound of food equals about 1½ c. of sliced fruit OR 8 slices of bread.
2. **Calculate environmental and community benefits.** Based on your workshop and participants' survey responses, estimate the benefits of your project. Be sure to include:
  - How many people participated in your workshop.
  - How many bins you distributed.
  - How many pounds of food waste your project diverts from landfills each week (number of bins x average pounds of waste fed to worms per week).
  - Any publicity you received (e.g., 1 community paper write-up about your project).
3. **Compare your results to your project's vision and goals (see Part I, step 2 above).** Did you achieve the results that you hoped for?

## **Part IV: Turn in Final Report**

**Within 2 weeks of project completion**

As soon as you've calculated environmental benefits, please fill out your **Final Report** online. Corresponding materials such as digital photographs, outreach flyers or posters, press releases, or news clippings should be emailed to [conservation@cityofchicago.org](mailto:conservation@cityofchicago.org). Please also enter the information from your 'Take Five for the Environment' pledge cards on [www.chicagopledge.org](http://www.chicagopledge.org). In the 'How did you hear about this pledge?' box, write **C3**. We will not contact your participants or share their information.

### **Additional Resources:**

See **Guide to Composting with Worms**.

Food scraps make up 12% of the waste that Americans generate every day. That adds up to about 28 million tons of food that gets thrown out over the course of a year! Food scraps that are sealed in airtight landfills can react with other materials and create methane, a greenhouse gas, and acidic leachate. If the food is composted instead, it creates environmentally friendly, nutrient-rich soil.

Vermicomposting (or vermiculture) is the practice of using worms to turn organic food waste into a nutrient-rich fertilizer called vermicompost. Worms eat the decaying food and transform it into castings (i.e. worm poop) that are full of the nutrients and bacteria that gardens and houseplants love. Vermicomposting is a great way to compost in an urban setting where outdoor compost bins may not be practical. You can keep the worm bin inside, and, if you do it right, it won't smell or attract flies.

## Did you Know?

Compost can help remediate soil, water, and air contaminated with hazardous waste. Using compost costs 50% less than traditional remediation technologies. Moreover, compost can capture and destroy 99.6% of industrial volatile organic compounds (VOCs) in contaminated air! (US EPA)

## Materials to build a bin for a family of ~4:

- Rubbermaid bin
- 1 pound of red worms
- ¼ pound of organic food waste
- Black-and-white newspaper
- 1 electric drill with 1/16 inch drill bit

## Building a Worm Bin:

**Step 1:** Use the 1/16 inch bit to drill ventilation holes about 2 inches apart along the side of the bin near the top (to prevent worms escaping). Drill 8-10 holes in the bin's top. Remember to wear safety glasses when you drill.

**Step 2:** Prepare bedding materials. Bedding provides the medium in which worms live, holds the moisture and provides the air worms need to survive, and covers the garbage you bury.

- Tear black and white newspaper into long strips about 1 inch wide. Fill the bin with the strips. Note: Do not use colored pages or slick paper, which can be toxic to the worms. The paper should be well-fluffed – don't pack it in.
- Add just enough water to moisten the paper so it is about as damp as a wrung-out sponge.

**Step 3:** Add about 1 pound of worms.

**Step 4:** Bury about ¼ lb (about a handful) of food in the bedding. ¼ pound of food equals about ¾ c. of sliced fruit OR 4 slices of bread.

**Step 5:** Put the lid on it! Worms are sensitive to light, so keep the lid on the bin whenever you're not adding food or working on maintenance.

## Making a Home for Your Worms:

### Finding a place for your worm bin

Worms prefer moderate temperatures (between 55 and 77 degrees Fahrenheit), so find a place for the bin somewhere where it will not freeze or overheat. The kitchen is a good spot because it is where most of your food waste will occur, but you could also keep them in a garage, utility room, or other out-of-the-way location.

### Feeding the worms (Ongoing)

- In general, earthworms consume about half their weight each day. Since we gave you about 1 pound of worms to start with, add no more than 1/2 pound of food a day. The worm population will adjust according to how much food you add, but the bin will probably not be able to handle much more than 1 pound of worms, so don't add too much food.
- Chopping the food scraps into small pieces with more surface area should help the worms eat it faster and will decrease the chance of rotting or molding.
- **Begin feeding the worms a little at a time. You can add more food as they multiply.**



- Bury the waste in pockets, rotating around the bin as you go. Most of the food should have been eaten by the time you return to the first spot. If not, cut back on the amount of waste you add.
- You may have to do some trial and error to figure out what food scraps work best in your bin, but to start, here are some basic tips on what to feed the worms:

<b>Worms LOVE...</b>	<b>Worms HATE...</b>
Vegetable scraps	Meat, bones, fat
Fruit peelings	Dairy products
Bread and grains	Rubber bands
Tea bags	Twigs and branches
Coffee grounds and filters	Dog and cat feces
Well-crushed eggshells	Greasy foods
Non-greasy leftovers	Plant materials (e.g., banana peels) that have been sprayed heavily with pesticides

## Maintenance (Ongoing) – Keeping moisture in check

In addition to feeding the worms, you'll want to remove excess liquid to keep the worms from drowning. To keep moisture levels down, you can add dry shredded newspaper to the surface of the worm bin to soak up moisture, use a turkey baster to draw off excess liquid, and/or carefully pour the liquid out of the bin (making sure to keep everything else in). The liquid produced in the bin is known as "worm tea" or "compost tea" and makes a great, potent fertilizer for house or outdoor plants.

## Harvesting the Compost (After about 8-16 weeks)

After 2 to 6 months, you should start to see compost. Once you see that most of the bedding has been eaten and replaced with dark, crumbly fertilizer, it is time to "harvest" the compost and provide new bedding for the worms. Worm castings (i.e. the compost) are toxic to worms, so you should harvest within a few days after you see compost. Here are a few suggestions for harvesting:

**Scoop Method:** If you just need a little compost, leave the top of the bin open for about 10 minutes. After the worms have wriggled to the bottom (to escape the light), scoop out a few handfuls of compost.

**Migrating method:** Push the compost to one side of the bin and add fresh bedding to the other side. After a month or so, all the worms will have migrated to the fresh side and you can remove the old compost.

**Pile Method:** Empty the contents of the bin onto a sheet of plastic and separate the compost into little piles. The worms will wriggle away from the light into the center of each pile and you can brush away the compost on the outside by hand.

## Troubleshooting:

<b>Problem</b>	<b>Probable Cause</b>	<b>Solution</b>
Worms are dying	<ul style="list-style-type: none"> <li>• Too hot</li> <li>• Too dry</li> <li>• Too wet</li> <li>• Not getting enough food</li> <li>• Bedding is used up</li> </ul>	<ul style="list-style-type: none"> <li>• Move bin to cooler location</li> <li>• Moisten bedding</li> <li>• Add more bedding</li> <li>• Add more food</li> <li>• Harvest bin and add more bedding</li> </ul>
Bin stinks or attracts flies	<ul style="list-style-type: none"> <li>• Exposed food in bin</li> <li>• Not enough air circulation</li> <li>• Improper items added</li> <li>• Too much food added</li> </ul>	<ul style="list-style-type: none"> <li>• Bury food in bedding</li> <li>• Fluff bedding and add more</li> <li>• Remove meat, dairy, etc.</li> <li>• Turn contents, add bedding; stop feeding until problem goes away</li> </ul>
Other	<ul style="list-style-type: none"> <li>▪ Mold</li> <li>▪ Worms trying to escape</li> </ul>	<ul style="list-style-type: none"> <li>• Mold is an active part of the worm bin; the mold helps break down the food that the worms eat. People with extreme mold sensitivities should avoid tending the bin.</li> <li>• The bin probably has other problems; troubleshoot using the above tips.</li> </ul>



## **Applying Compost:**

Many of you probably know how to apply compost, but here is some guidance for those of you new to gardening:

### **Outdoor plants:**

- To mulch (after planting): Apply a one-inch deep layer to the soil around plants; make sure compost is not piled against plant stems.
- To amend (before planting): Mix an inch or so of compost into soil before planting, or mix it into the bottom of seeding trenches or transplant holes.

**Houseplants:** Sprinkle compost around the base of plants.

## **FAQs:**

- **Q:** What do I do if the compost is ready to harvest before I'm ready to use it in my garden?  
**A:** Worm castings (i.e. the compost) are toxic to worms, so you should harvest the compost soon after it is ready. You can try storing the compost, but it may dry out or get moldy. We recommend finding a way to use compost soon after it is ready – such as on your houseplants or sharing it with a friend or local community garden.
- **Q:** Will population control be a problem? Will our worms multiply out of control?  
**A:** Your worms will not take over the house. The availability of food and space limit the population size. Worms reproduce quickly, but if you continue to add the same amount of food you always have, the population size will be kept in check. (Don't worry about finding dead worms in the compost; they decompose very quickly.)
- **Q:** Can I put too much waste in the worm bin?  
**A:** Yes. If you put more food waste in the bin than it is equipped to handle, anaerobic conditions may develop, causing odor. To decrease the odor, you can aerate the bin by turning the material and stop adding food until the odor goes away.

## **Additional Resources:**

- Mary Appelhof's *Worms Eat My Garbage* is considered the authoritative source on vermicomposting. Check out her book if you want to become an expert on worm composting.
- There are many informational websites available online, and even chat rooms and discussion boards devoted to worm composting. Here are some of our favorites:
  - **The Shedd Aquarium's 'The Care and Keeping of Worms' brochure at:**  
[http://www.sheddaquarium.org/pdf/shedd\\_worm\\_brochure1.pdf](http://www.sheddaquarium.org/pdf/shedd_worm_brochure1.pdf)
  - Earth 911's "Vermiculture Worm Compost." A good overview of building and maintaining worm bins.  
<http://www.earth911.org/master.asp?s=lib&a=organics/composting/wormcompost.asp>
  - "Cheap and Easy Worm Bin!" Includes directions and pictures.  
<http://whatcom.wsu.edu/ag/compost/Easywormbin.htm>
  - WormDigest.org. Everything you ever wanted to know about worms and vermiculture. Includes discussion board. <http://www.wormdigest.org/>
  - The GardenWeb's forum on vermicomposting: <http://forums.ga0rdenweb.com/forums/verm/>