

# COMPOSTING IN THE CLASSROOM

Successful implementation of waste reduction, reuse, recycling and composting in schools brings many rewards – including potential cost savings for tight school budgets. Our author shares a detailed how-to on composting for rural schools of all sizes.

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**B**est management practices for setting up and sustaining waste reduction, reuse, recycling and composting in rural schools have been the focus of a multi-year grant from the U.S. Department of Agriculture to the Northeast Recycling Council. This project included onsite assistance and the development of resources and tools that can be used by other schools in other settings.

Every school day each student generates two pounds, or more, of compostable material, such as food scraps and soiled paper. Composting these materials can help schools significantly reduce their waste while providing educational opportunities for students. Following are some of the key actions necessary for a successful school composting program.

## Getting started

Integrating food scrap collection into the cafeteria or lunchroom requires dedication and teamwork to ensure success and sustainability. We recommend phasing-in the program over the course of the school year (e.g., one lunch period at a time).

**Form a compost team:** The team should include representa-

tives from administration, teachers, custodial and cafeteria staff, parents and students. The team will be responsible for program development, ensuring that there is administrative, staff and student support for the program. Ultimately, the team will likely be responsible for oversight of the composting efforts as well.

**Choose a composting option:** A suitable composting system depends on a variety of factors, including whether there are available offsite services (such as processing and hauling) or an onsite area suitable for composting; the amount of food waste generated; and the student body size and age. Schools may want to consult with the local solid waste office and other schools to discuss options.

### COMPOSTING OPTIONS

- \*Off composting facility, animals feed or farm digester operation.
- \*Onsite composting using outside compost bins or a compost pile.
- \*Vermicomposting
- \*In-vessel composting, using a commercial system.

## Basic school compost recipe

**Nitrogen (“green”) nutrients:** “Wet” green materials such as kitchen preparation waste, cafeteria wastes (vegetable and fruit scraps, napkins), fresh grass clippings, manure.

**Carbon (“brown”) nutrients:** “Dry” woody, “bulking” materials such as fallen leaves, dry grass, straw, sawdust, newspaper.

**Create a “nutrient stew”:** About 40 percent green material and 60 percent brown material (by volume).

**Add a little soil:** Soil or finished compost provide microorganisms necessary in the compost process.

**Moisture:** School food scraps are usually wet.

If not, add water or leave materials uncovered during rain. Materials should be moist like a damp sponge.

**Air:** Microorganisms need lots of air to work and decompose the materials.

### **Mix it up!**

Start with a layer of brown ingredients; add green materials. Always cover food scraps with leaves or other carbon materials.

Next, sprinkle on a thin layer of soil or “finished compost” and a little water – then mix well. Keep compost ingredients loose to allow more oxygen to circulate.

Turn the composting material once a week

or so. It may be easiest for students to mix materials on the ground first, and then shovel them into the bin.

Cover the bin (or pile) in the winter and during heavy rains.

### **Fill ‘er up!**

Fill the first bin until full; when the first bin is full, begin filling the second bin; when the second bin is full, begin filling the third bin; etc., and harvest materials in first bin. Cover with tarp until fully composted. Add additional bins if necessary.

Do not compost: Meat, cheese, creamy sauces (small amounts of cheese and meats are okay, such as on pizza).

**Formulate a budget:** There will be costs associated with the introduction of a composting program but these can often be offset by avoided disposal costs. For offsite composting, there are hauling and container rental charges. Onsite composting costs include an initial investment in compost bins, collection buckets, shovels, as well as other supplies. There will also be labor costs associated with the program, but these will vary depending upon the compost system and the availability of students to assist.

**Conduct a cafeteria waste sort:** Calculations from the waste sort will be used to estimate the number of compost bins needed for onsite composting or the amount of storage area needed for offsite composting. Consider at least three sorts: compostables (food scraps, such as vegetables, fruit, bread; and soiled paper, such as napkins, paper bags); non-compostable wastes (plastics, meat and dairy); and recyclables. Use separate bins to collect the materials, weigh each and record both volume and weight after each lunch period. Including students in the sort is a great way to develop enthusiasm for the project while providing critical environmental education.

**Decide how compost will be collected and handled:** The team will need to decide how the materials will be collected in the kitchen/cafeteria. Five-gallon buckets with lids work well; often these are available at no cost from restaurants or area retail stores. Curbside bins, small tubs or small carts on wheels also work (see Image 1). Bins for the kitchen need to be accessible, but out of the way.

How materials will be moved to the storage area for offsite composting or to the onsite composting area must also be determined. Food scraps are heavy, so smaller containers or carts on wheels work best, especially if students are involved with moving the materials. A wagon or a four-wheel garden or utility cart can be used. If materials are stored outside (for offsite composting), they must be secure from animals. Odors might be an issue if the materials are stored inside for longer than a couple days.

## Composting onsite

Composting food waste on school grounds requires dedication and a long-term maintenance commitment, but it is likely the least expensive option.

**Location:** A garden, grassy area or bare ground about 10-by-10 feet will work for most schools, depending on the number of students. Water should be accessible. The site should be away from buildings, but within close proximity to the cafeteria to allow for easy movement of collected materials.

Before deciding on a composting site, the compost team should discuss it with school officials, the local or regional board of health, local solid waste staff, custodians, food service staff, other teachers and neighbors.

**Contain it:** The number of compost bins needed depends on the volume of compostables – for every bucket of food scraps, two buckets of leaves or carbon materials will be added. At least two bins are recom-

mended to start.

Home compost bins can be used. If bins are to be constructed, a decision needs to be made as to who will make the bins (perhaps by a parent volunteer or local carpenters union). There are many ways to construct compost bins from pallets, used wood or concrete blocks; instructions can be found on the Internet (see Images 2 and 3).

Consider how the materials will be turned in the compost bins. If a small bucket loader is available, be sure to construct the opening of the bins wide enough to fit the loader. A home improvement store or garden center may be willing to sponsor the compost site by donating materials or compost bins in exchange for signage and promotion.

Proper composting requires enough leaves or other carbon sources for a 60-to-40 ratio of carbon (dried grass, straw, animal bedding or shredded newspaper) to nitrogen (food scraps). The compost team can distribute a message to teachers, parents, and area residents asking for leaves or other carbon sources to be brought to the school. Carbon materials are bulky and require proper storage near the compost area to prevent unsightliness and being windblown. An inexpensive wire fenced area or a tarp can be used to cover materials. It is best not to keep materials in plastic bags outside. Leaves can be mowed to reduce bulkiness.

Schools with sufficient compostable materials and available land can consider composting materials in a pile or “windrow” (an elongated pile) without a bin. This type of system can present challenges to manage

and must be done in a location away from the school and public view. Plan for enough room to maneuver in order to turn the piles manually or using a tractor. Start with a layer of wood chips or sawdust, on the bottom, if available. If not, put down a layer of straw or leaves. Be very thorough about determining the state and local laws around such type of composting before getting started.

**Equipment/supplies:** A shovel and/or pitchfork for loading materials into the bins, turning and aerating the materials will be necessary. Schools that are making compost bins or piles can use a small tractor with a bucket to easily turn the materials. Gloves for students and containers for collecting and transporting materials within the school and signage will also be important.

## On-site vermicomposting

Vermicomposting offers an alternative strategy for onsite composting. It is a process that uses worms to convert organic material into a soil amendment. A worm composting bin in the classroom offers an exciting demonstration of ecology and recycling in action; larger outside bins can be built for composting of kitchen and cafeteria food scraps

A worm home can be made from a plastic tote (colored, not clear or see-through), with holes drilled every 2 inches (using a 3/8-inch drill bit works best) around bin, lid and a few on the bottom. Larger bins can be made from a wooden box with holes around the side and bottom (1.5 feet high by 2 feet deep by 3 feet wide).

## Offsite composting

The compost team will need to find a hauler and a compost facility or farm. Several resources are likely to be able to help in this search: local solid waste officials, the school's waste hauler or the Internet (e.g., [www.findacomposter.com](http://www.findacomposter.com)). In rural areas, there may be farms that compost or raise chickens or pigs (food scraps can potentially be used

## Image 1



*Sample collection container*

for feed). The team will need to determine how the materials will get from the school to the compost operation or farm and any costs involved. Is there a hauler that collects organics? Would the farmer be willing to collect the materials? Is there a parent volunteer who would transport the materials?

**Determine materials to be composted:** A commercial compost operation or digester can often accept a wider range of materials than could be composted onsite. These include soiled paper (such as napkins) and all food scraps, even meat. However, pig or livestock operations may only accept vegetable scraps. The cafeteria (and/or kitchen) waste audit will provide the information needed about approximate amount and type of scraps generated at the school.

## Making it happen

Once the compost system is determined (offsite or onsite), the compost team is ready to assign project tasks, develop a schedule and train students and staff. It is helpful to review all tasks with students/staff participating in the project – from material collection to transporting the materials to storage or the onsite compost area. Decide how the materials will be transferred from the kitchen to the compost or storage area and who will carry out these tasks. If students are to be responsible for moving the materials, they must be instructed in proper lifting/hauling techniques.

A schedule of tasks and assigning individuals (e.g., classes, student clubs) to complete each task will ensure that everything gets done. Rotating tasks allows experiences to be shared and helps to reduce project burn-out.

## To make a vermicomposting system

Soak enough shredded cardboard (to fill the bin about half-way full) in water for several hours. Drain the cardboard and mix with about a cup of garden soil (not potting soil) or finished compost. Add a crushed egg shell. Add about one-fourth to one-half pounds of worms (300-500 worms) for smaller bins, more for larger bins. Have a three-pronged hand fork or trowel for students to use to move the bedding and view the worms. Use a small water spray bottle (like kind used for plants) to keep the worm bedding moist.

Worms and bedding must be moist at all times. Wait a few days to feed the worms, they will start eating the paper bedding and get used to their new home. A healthy wormy diet includes: salad and other uncooked vegetables (shredded or small pieces work best), bread, pizza crust, small amounts of cheese, coffee grounds, tea bags and egg shells. Check the Internet for worm purchases and other worm resources.

Be sure to start the program slowly – with one lunch period or one grade period, for example. Place cafeteria collection bins near where students normally bus tables. Label each bin with easy to read signage and with pictures. Consider having students design and create the signage so that the “right” message is communicated about what to compost. The compost team will need to schedule student volunteers to monitor the collection. Monitors assist younger students in sorting their compostable scraps and help older students learn what is acceptable and not acceptable. The process should be monitored for at least the first few months.


**Onsite composting:** Discuss the composting process, proper attire and hygiene (e.g., wearing gloves and washing hands) with everyone involved. Compost maintenance duties, such as turning materials, also need to be established. All students involved in the project need to know how to safely handle shovels and other tools used in composting. The compost team should regularly monitor the cafeteria collection to watch for contamination and the compost area to ensure proper composting.

## Example of a successful program: Mansfield Middle School, Connecticut

In the 10-year period the school has been composting, more than 43 tons of materials have been composted, equaling \$3,030 in avoided trash fees. The school has achieved a 40-45 percent diversion rate with recycling and composting. More than 2,000 students have participated in making about 22 cubic yards of finished compost.

**Promote the program:** Promoting the program and its impact will help to maintain enthusiasm and participation in the program by students, faculty and staff. Weigh collected materials once per month and publicize the weights in school announcements, newsletters, the school website and local media.

## Conclusion

School composting, whether offsite or on-site, is a formidable challenge. The benefits, however, can be substantial – from significant reductions in waste to a wide array of educational opportunities. For a more in-depth discussion about school composting options, including a presentation that can be used at schools, go to <http://nerc.org/documents/schools/schools.html>. 

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## Image 2



*Onsite Composting - Mansfield Middle School, Connecticut*

## Image 3



in 2009 to provide technical assistance and training in waste reduction, recycling, and composting to rural schools in Connecticut, New York and Delaware. Eight schools participated in the project over the course of two years. She can be reached at [\[nerc.org\]\(http://nerc.org\) or 802-254-3636.](mailto:athena@</a></p></div><div data-bbox=)

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