



Cornell Waste Management Institute

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School Composting - Let's Get Growing!

A guide for student leaders and teachers

Sustainability and going green are all the rage. For most of us, recycling glass and plastic bottles, aluminum and metal cans and cardboard, newspaper and other paper products has become automatic, but what about the rest of our waste? Organics such as food scraps, food soiled paper products, leaves and grass clippings comprise over 60% of our waste stream and are completely recyclable. That's where composting steps in. Composting is a natural process to turn organic material into a soil amendment and is possible in almost every setting. You can get things started. From small worm compost bins in the classroom, to composting lunch scraps we can make a difference one apple core at a time!

As educators, we have an important task ahead. The next generation of decision-makers is being educated in your classroom. How can you help? By starting this generation off with information and habits that emphasize reducing the amount of waste we produce, reusing, recycling and composting whatever we can, and incinerating, landfilling, and finding other technologies to dispose of the rest.

Organic materials comprise over 60% of the waste stream and include leaf and yard trimmings, manure, uneaten and spoiled food; basically, everything that was once alive and is now dead and needs to be managed or disposed of. Organic residuals are resources that should not end up in a landfill or incinerator. All organic residuals have the ability to feed the soil which in turn will feed us! Uneaten and spoiled food should be fed first to humans, second to animals and if inedible, to a composter or digester. In a cafeteria, unwanted food of one student may be a treasure to another, i.e., unopened packaged food like milk or snack bars. If a cafeteria has prepared but not served, food can be stored and served the next day or donated to those in need.

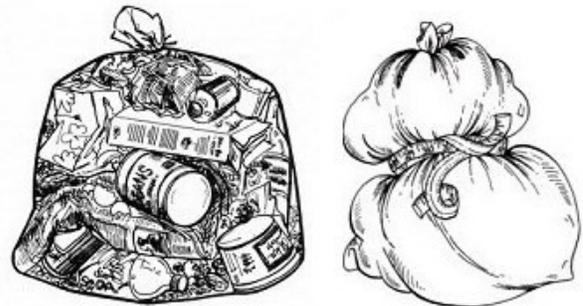
Schools, along with others, are encouraged to reduce their food scraps by separating excess food for donations and composting the remainder.

Reducing, donating and composting excess food can have a major impact on "greening" both your financial bottom-line and the environment.

The US Environmental Protection Agency (USEPA) has a "Food: Too Good to Waste" program with a toolkit that can be used to help reduce wasted food: <https://www.epa.gov/sustainable-management-food/food-too-good-waste-implementation-guide-and-toolkit>.

USEPA's food donation information for K-12 schools can be found at: <https://www.epa.gov/schools/information-k-12-schools-reducing-wasted-food-including-donation-school-breakfast-and-lunch>.

Further with Food is a central hub to find and share information and tools dedicated to reducing food loss and waste in the US: furtherwithfood.org/.



School composting can reduce your waste



This document provides you with:

1. Ideas for incorporating composting into the curriculum.
2. Steps to take to start a school composting/diversion program.
3. Descriptions of successful school composting programs.

Ideas for Incorporating Composting into the Curriculum

There are far-reaching benefits of a composting program for the school community. When students begin to manage their own food scraps they are inevitably drawn into broader learning related to ethics, personal responsibility and environmental citizenship. Taking responsibility for the solid waste stream at school empowers students by giving them a specific action to help their community and the earth. Members of the team that are trained will continue to be leaders throughout their tenure in school and train additional leaders. Younger students who receive the education will make the action a life-long habit. If trained effectively their ethic will carry on throughout their lives. Environmental issues such as protecting water, soil and air will provide jobs now and in the future, and youth that possess a good understanding of these issues will be better prepared for the future.

There are a number of ways in which composting can be integrated into the curriculum while meeting many learning outcomes. Integrate recycling/composting into your science program, have a poster contest in your art program, collect re-usable items as a community service project. Specifically:

- ◆ Younger students can analyze the composition and texture of finished compost, or can compare plants grown in soil with and without compost.
- ◆ Science classes, such as chemistry, can check the temperature, pH, mass, density and carbon and nitrogen content of compost at various stages of decomposition. These measurements are vital diagnostic tools in managing a compost pile.



The Green Team at Seneca Falls Middle School, along with adult volunteers, build a compost bin

- ◆ Biology students can study the complex web of organisms and interactions that help to create compost.
- ◆ Social studies classes can examine how composting reduces the need for landfills and lowers associated waste management costs.
- ◆ Math classes can calculate compost recipes, record the data, and create visuals for the rest of the school to evaluate how they are doing as well as bringing that message home to their families and community.
- ◆ Physical education classes can turn the compost and distribute finished product to planted areas on the school grounds.
- ◆ Finally, the loop can be closed by growing food, in the compost amended soil, to serve in the cafeteria or special events and start the process all over again.

Trash Goes to School (available at: <http://hdl.handle.net/1813/14280>) is an excellent resource to teach all ages about managing our solid waste.

Additional curriculum materials can be found at: <http://cwmi.css.cornell.edu/solidwastecurriculum.htm>. Materials in Spanish can be found at <http://cwmi.css.cornell.edu/spanish.htm>.

Steps to Take to Start a School Composting/Diversion Program

- ◆ Form a Team
- ◆ Promote the Idea
- ◆ Assess the Situation
- ◆ Decide on a Strategy
- ◆ Develop a Collection System
- ◆ Start the Program
- ◆ Use your Product

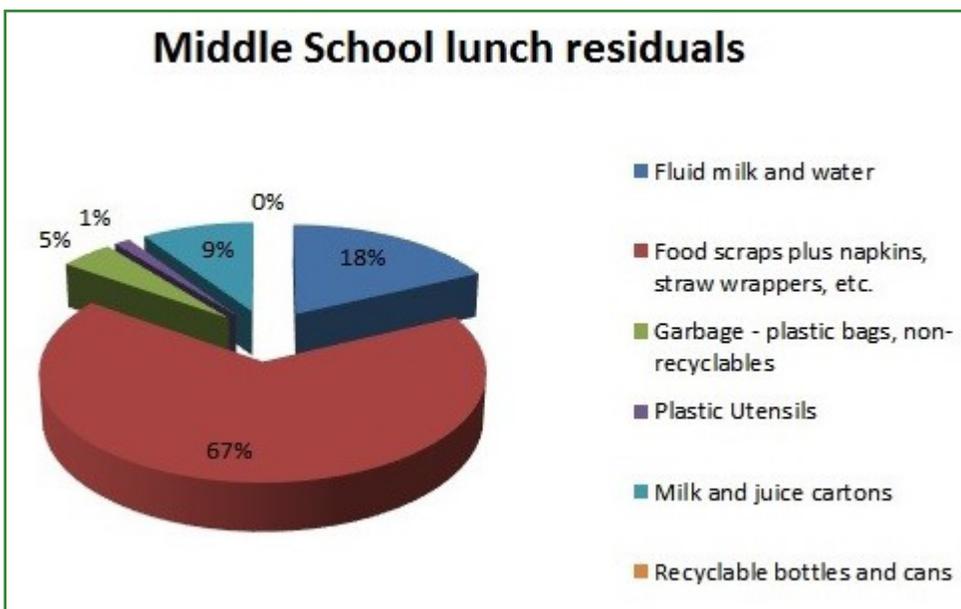
Form a Team

Before moving forward with implementing composting as a waste management tool, students and teachers will need to present the idea to the Principal and/or Superintendent and the Board of Education. Starting to compost school organics will take a commitment to change the status quo and implement for long-term change. It is important for the process to continue even if/when students and teachers move on. It takes commitment from cafeteria staff, maintenance people and teachers in different grade levels that work it into their long-term curriculum and of course school leadership. Science teachers can usually have vermicompost bins without school buy-in but setting up composting for a whole school district needs approval. Composting is a great tool to teach natural resource management, biology and chemistry. Applied learning is the most effective!

Foremost among the elements critical to sustaining a composting program is to have a team of “compost kids” who help to advocate for composting, design the system to use in the school and who actively and consistently maintain and monitor the program. This team should

include representatives from administration, teachers, maintenance, food service, students and parents and choose an adult coordinator. The coordinator will be responsible for all aspects of the program, but will need to delegate tasks to other members of the team. Make sure there is buy-in/support from all representatives.

- ◆ Decide which students will participate. Will it be a student club or organization, or will it be a class? An environmental or other club might take on composting as a service learning project, which is then adopted as a school-wide program. A team of teachers could build a composting program into the science or social studies curriculum, or students learning about composting in science class, may want to develop a program.
- ◆ Set goals as a team, such as:
 - * Should separation and collection be from the kitchen only, or cafeteria-wide?
 - * Will diversion of organic waste be to a nearby composting facility or farm, or will it be done on-site?
- ◆ The team is responsible for promoting the benefits of recycling and composting to the rest of the school. Use posters, announcements and assemblies to get the information out. Explain why recycling and composting are important and how easy it can be when organized. Some



Close to 70% of this school's lunch waste was compostable, while only 5% is actually trash

frequently asked questions about school composting can be found on page 14.

Promote the Idea

The school community will need to know what is happening and why. Promotional material and signage are important to any new recycling and composting program. Suggestions for on-going education before, during and after the program has been implemented include:

- ◆ Have a school-wide assembly to kick off the program.
- ◆ Newsletters to parents to garner parental support.
- ◆ Posters around the school and in the cafeteria that promote the benefits of reduction, recycling and composting.
- ◆ Bin signs showing students what to put where. Drawings and/or actual materials on the signs give visual confirmation of what goes in each bin. Color-coding also helps. Consider green for compost, blue for recycling, a bucket for liquids, and gray for trash. And, consider using a very small bin for the “trash”.
- ◆ Morning announcements reminding students that everyone’s help is needed for the program to be a success.
- ◆ School blogs are a great way to discuss the program and spread the word.
- ◆ Praise and encouragement in the form of t-shirts, stickers and other special rewards such as field trips and “pep rallies” are also helpful to keep the momentum going.

Assess the Situation: Conduct a Weigh and Sort

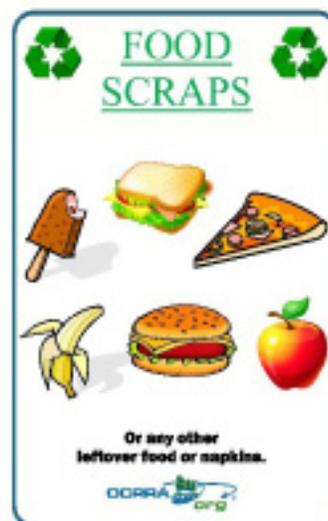
Weigh and sorts quantify the type of wastes generated from cafeteria activities. Conducting a weigh and sort allows schools to gain insight into what students are and are not eating and can therefore make better decisions about what to offer to reduce waste. It allows students and staff to see first-hand how much they would be able to reduce their trash disposal if they composted and recycled, and gives them an idea of what type and



Students learn where to put what

size composting system and how much carbon material they will need. Conducting the weigh and sort for several days or over a week will generate a more accurate understanding of waste generated.

- ◆ Materials:
 - * Plastic disposable gloves for handling food.
 - * Data sheets: School Food Scrap Data and Foods Thrown Away (Appendix A). These sheets can be revised to fit the actual lunch periods at the school.
 - * Four or more “known volume” containers: one for food scraps and food soiled paper products such as napkins, paper towels and paper straw wrappers, one for recyclable bottles, cans, etc., one for disposable service ware, and one for all other material.
 - * One or more five-gallon pails for leftover milk.
 - * Clipboards for holding/recording on data sheets.
 - * Scale (if one is available) to weigh empty and full containers.
- ◆ Procedure:
 - * Label each of the 4 containers with the appropriate label (food and



Food scrap sign for diversion to a commercial facility

compostable paper; recyclables; disposable forks, knives, spoons; trash) and use pictures to depict items if possible. Label the milk pail(s).

* Weigh the empty containers and record on the data sheet. If no scale is available, record the total volume of the container.

* Record on the "Foods Thrown Away" data sheet what is on the menu for the day.

* When students bring their trays back, instruct them to pour their leftover milk into the milk pail and help them separate the contents on their tray into the appropriate containers.

* Record on the "Foods Thrown Away" sheet how much of each item is discarded by putting a hash mark in the appropriate column. Use extra spaces to record the contents of bag lunches if desired.

◆ If interested, to learn why people don't eat certain food, interview students and write down their comments.

* At the end of each lunch period (or when it is convenient), weigh the containers and record in the appropriate places. If no scale is available, estimate how full the container is after each period.

* Record the total amount of milk discarded.

* Use this data to create graphs and other visuals showing how much can be recycled and how much should actually be thrown away. Many schools are surprised by the very small amount of actual "trash" they generate.

◆ Other things to think about in the weigh and sort that can have an impact on waste management:



Signage with actual items

* Styrofoam trays vs paper/compostable trays vs reusable trays vs trayless.

* Plastic utensils vs reusable.

* Are milk cartons and juice boxes recyclable?

* Do you have a "donation" table/cooler/refrigerator

for unopened or unwanted food, such as milk and fruit?

* Do you have a plan for donating prepared, but not served food?

Decide on a Strategy (offsite or onsite)

Recycling of food scraps can occur in one of three ways in schools. On-site composting in bins on school grounds, classroom composting using worms, or diversion of food scraps to a farm or centralized composting facility.

◆ **Composting in Bins:** Schoolyard composting is just like residential composting in which buckets of food scraps are regularly tipped into an outdoor holding bin on the property. The bin should be placed in an out of the way but convenient location away from water supplies and school air intakes. There are many systems available for onsite composting. Commercially available bins or tumblers are a good choice for small volumes, such as kitchen prep waste only. Turning units built out of untreated wood are an economical choice for cafeteria-wide systems with larger volumes. The choice of what system to use depends on space, time and money available. See figure 1 for plans for a wooden 2-bin system (please note that the width of each bin in these plans is 6', but this can be adjusted to fit the width of the bucket loader or bobcat available at the school). There will be daily tasks that need to be carried out in order to compost on school grounds (see Start the Program, page 7).

◆ **Worm Composting:** Did you know that worms can eat leftovers! Before you say "yuck", note that this composting system is not only interesting, it works! The worms work in a container and help process food scraps giving off only an earthy smell. The potential of worm composting to manage waste is a great way to teach ecology, biology, sustainability and caring for the workforce (the worms and other microbes that do the work). See Vermicomposting, page 8.

◆ **Organics Diversion:** If your school has access to a commercial compost facility or farm that can take food scraps for composting, offsite composting may be a good choice. The specifics

of what can be composted, where the scraps will be stored until pick-up/delivery and how often this will occur will have to be negotiated with the facility receiving the material. Some examples of schools doing this can be found in Successful School Programs, page 9.

Develop a Collection System

It is helpful to color code your collection system. Make sure the containers and lids are well labeled. Laminated signs or posters behind the cans are a great way to communicate what goes where.

- ◆ Collection buckets or bins will be used. Five gallon buckets with lids work well. These are often available at no cost from restaurants or stores. Food scraps are heavy, so keep the pail size small, especially if students will be moving the material.

- ◆ Collect recyclables in cans with a hole cut in the lid (round holes for cans and bottles, square for milk cartons) to remind students it is for recycling only.
- ◆ Use a very small can for “trash” as this should have the least amount of material in it.
- ◆ Include a strainer on the liquid collection bucket to keep straws and other solids out.
- ◆ Flat carts with wheels, or wagons are helpful for carting the buckets around. Make sure the carts are sized to maneuver around the kitchen, cafeteria and doorways.
- ◆ Develop a schedule of tasks (cafeteria monitors, bringing food scraps to the composter, collecting brown material, etc.) and assign students, teachers and volunteers, rotating these tasks, so that experiences can be shared and no one “burns out”.

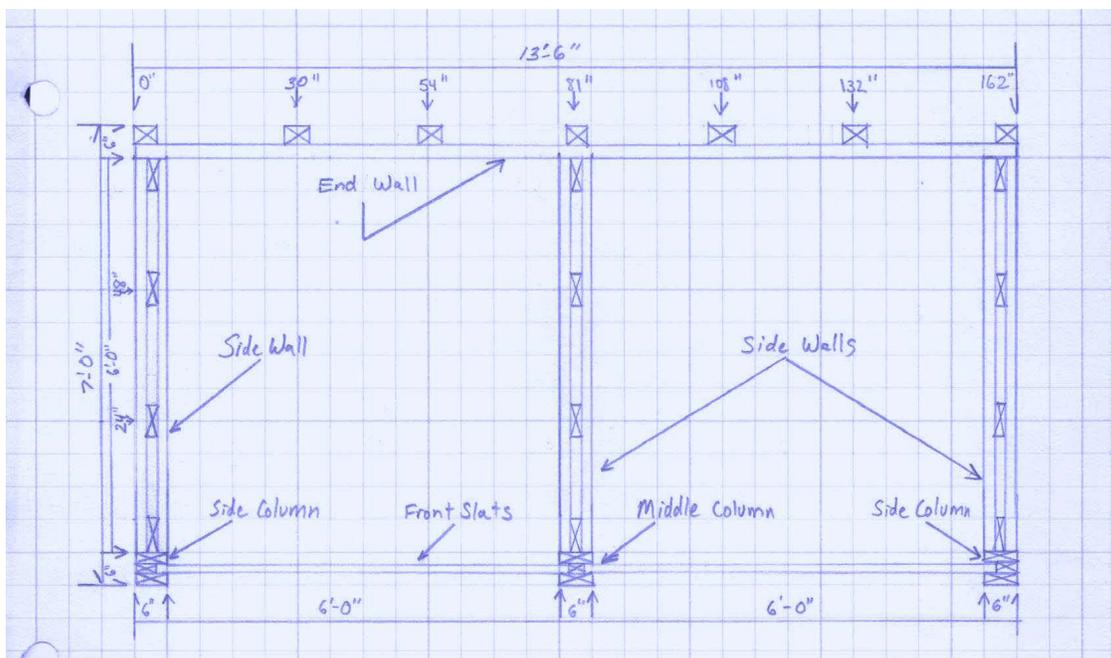


Fig. 1: 2-bin composter top view - available at <http://hdl.handle.net/1813/45758>

Materials List

Use	Quantity	Dimension	Full Length	Cut into (qty)	Cut Length
End wall	4	4 x 4	12'	7	72"
End wall	12	2 x 6	14'	12	13' 6"
Side walls	6	2 x 6	12'	12	72"
Side walls	36	2 x 6	12'	72	72"
Columns	3	2 x 6	12'	6	72"
Columns	2	2 x 4	12'	3	72"
Slats	12	2 x 6	14'	24	74"



◆ Collect daily tallies of waste diverted from the school's trash dumpsters, recording weights or volumes of liquids, food scraps and recyclables.



Three-bin system with 4th bin for holding browns

Start the Program

On-site Composting

The following tasks will need to be carried out in order to compost in bins on-site. These should be scheduled by the Team. Scheduling will depend on school lunch schedules, availability of volunteers and what works best for kitchen and custodial staff involved.

- ◆ Collect food scraps.
- ◆ Weigh food scraps: Recording the weight can be used to keep track of the total amount of organics processed in a given amount of time showing the savings in solid waste disposal. It can be compared to the weight of the finished compost product to establish loss of material through composting. Weight records can be used for calculating math problems. Classes can track and analyze the compost operation, including the amount of food processed.
- ◆ Transport food scraps to bins: This can be done by students, staff or other volunteers, depending on the weight and amount of material being transported.
- ◆ Take temperature: Taking the temperature of the pile is a way to monitor the composting process. A working compost pile will go through stages, getting hotter as the microorganisms start digesting the material and cooling off as the material decomposes. A working compost pile should measure between 104 and 150°F. When the temperature drops below this it is an indication that the balance of food, moisture and air needs to be adjusted, most likely by turning into the next bin, or that it has finished its hot phase and needs to be moved to cure.

◆ Spread the food scraps: Food scraps should be layered on top of a layer of brown (carbon) material, leaving a 1-2' edge of brown material around it so that no food is visible when more brown material is put on top.

◆ Layer with bulking material: Several inches of carbon (brown material) should be spread on top of the food scraps to cover the food completely. The brown material acts as a filter to soak up the moisture from the food scraps and eliminate odor. You will need a large source of carbon based materials such as dry leaves, wood shavings/sawdust or woodchips. Carbon should be available at a ratio of 2 or 3:1. That is, for every unit of food scraps, 2-3 units of carbon will be needed. Source wood chips from local companies such as the highway department, utility company or a tree company. Gather leaves in the fall and stockpile them. Save sawdust and shavings from Technology Classes.



Students spreading food scraps in a bin



Manufactured drum composter

- ◆ Clean up: Wash and wipe off shovels and thermometers, and rinse out the food scrap barrels or bucket.
- ◆ When the first bin is full, it can be turned into the second bin and left to work/cure, while filling the first bin again. Troubleshooting problems in your composting system can be found on page 13.

Vermicomposting in the Classroom

Worms eat organic matter, bacteria and fungi and release castings, which is the finished compost. Worm composting is especially good for schools that have no yard space. The worms stay in the box, eat the food scraps and do not smell. Composting in a worm bin can be done through the following steps:

- ◆ Acquire a bin. Reuse an old dresser drawer, build a box out of wood or find/buy a plastic bin.
- ◆ Prepare the bedding. Wet paper, leaves, sawdust and other carbon sources are placed in a container that has some air holes in it. Since the worm workers need moisture, check to make sure that the mixture feels like a wrung out sponge.
- ◆ Mix in some food scraps. Cut or break the food scraps into small pieces – the smaller, the better.

- ◆ Add the superstar food processors, red wigglers (*Eisenia fetida*). The worms process 2-3 times their weight in food each day.
- ◆ Students can take turns feeding the worms, but need to be careful not to overfeed! Feed, water and fluff. To keep worms happy, feed them about once a week. If the bedding dries up, spray with water, if it gets too wet, add more dry material. Fluff up the bedding once a week so the worms get enough air.
- ◆ As time goes on, the worms work tirelessly to eat your leftovers and produce compost.
- ◆ More information on worm composting can be found at <http://compost.css.cornell.edu/worms/basics.html> and <http://cwmi.css.cornell.edu/vermicompost.htm>.

Use the Product

Your first batch of compost should be ready in 4-6 months with turning, or 6-12 months without turning. The finished product is a dark crumbly soil-like mix with small pieces of organic material. It should have an earthy smell. Compost can be used in landscaping, growing food for the cafeteria or as a topdressing on athletic fields. The addition of compost on or in the soil has a number of benefits:

- ◆ Compost improves soil structure, porosity and density, creating a better plant food environment.
- ◆ Compost increases water infiltration and permeability in heavy soils and improves water holding capacity in sandy soils, making nutrients more plant available.
- ◆ Topdressing compost on athletic fields improves playability. The addition of organic matter promotes aggregation of soil particles, increasing porosity and reducing bulk density to make a less compact soil.



Examining worm bin contents at a preschool

Successful School Programs

ON-SITE COMPOSTING

Composting lunch scraps on school grounds

Fifth and 6th grade science classes at Candor Elementary School, Candor, NY, started learning about decomposition. They learned that decomposition involves all kinds of neat creepy, crawly critters you can see with your eyes, and microorganisms like bacteria and protozoa you will need a microscope to see. The composting environment creates conditions to speed up the process of decomposition. Food scraps (wet, green, nitrogen-rich material) and dry, brown carbon-rich material are mixed together to create a habitat for the decomposers. These critters are the “work force” and are able to break down organic matter and turn it into a soil conditioner on which plants thrive. The students at Candor wanted to see these micro and macro organisms first hand, and do their part for sustainability. They learned what to do in a school program, purchased compost containers, and are happily composting food scraps from the cafeteria, shredded paper, lawn clippings and sawdust from the woodworking classes. Staff and the 6th graders help the younger kids separate their “compostables” from their trash. Students deliver the scraps to the compost unit, add the carbon source, sawdust and leaves, and mix it by giving it a full turn. Their process takes about 6-9 months to produce compost that will then be

mixed with soil for perennial plantings around the school. The students really like doing this because it makes them feel like they are doing something good and are making a difference for the planet.

Lessons learned: *Drum composters need to process a whole batch at a time. One to ten pounds in a big drum will not start to process until full.*

Long time composting program

About 15 years ago, Bunny Goodwin, a Master Gardener volunteer, worked with students to start a composting program at Keene Central School. They built concrete bins and layered their food and carbon source in the bins on a regular basis. It is turned a few times per process with the town Bobcat. Food collection begins in the school cafeteria and ends in the bountiful harvest of flowers and vegetables that sometimes become lunch. These composting programs prevent valuable organic waste from ending up in the landfill, provide a unique educational opportunity for students (and teachers as well) and nourish and amend the soil in school gardens. In turn, many kids and teachers have started composting at home, multiplying the green effect.

Start small, expand district-wide

In 2012, the middle school in the Bethlehem Central School District started a separation and collection program in the cafeteria. Their District Green Team is responsible for the program. There are recycling stations in all cafeterias with separate slots for compostables, recyclables, liquids and garbage. Their biggest hurdle was the cost; paying for a compost pick-up and composting receptacles. These were paid for by savings through energy performance contracts that provided additional funding. They compost their waste at the middle school in Earth Tubs using leaves from the school grounds as their source of browns. They use the finished compost in the school garden. In 2015, the program went district-wide. This additional food scrap is hauled away by a composting company. As there is buy-in from administration and head custodial staff, BCSD is confident their program will be sustainable.



Cafeteria recycling stations, Bethlehem Central School District

Seneca Gr&een Club composts on-site

by Barb Reese, Seneca Gr&een Club Advisor

Our school composting program began in March 2014 when interested students, staff and community partners gathered to build our compost bins on Seneca Falls Middle School campus. We had previously completed food waste studies at our school cafeterias so we had an idea of how much food was being thrown away. Our high school student council also financed a month long trial using a compost service where our food waste was picked up weekly and composted off-site. We found the service to be cost prohibitive and decided to build our own bins and compost on-site.

The composting program is currently overseen by two teachers and their students, along with school facility and maintenance staff. Barb Reese is the advisor of the Seneca Gr&een Club and with her club is responsible for maintaining an active pile, securing adequate cover materials, scheduling periodic turning of static piles, and ensuring that no problems with odors or vectors arise. District English teach Diana Foster and members of her English class are responsible for weekly composting of the food waste that is collected. Our school custodial staff is responsible for collecting the food waste. Maintenance staff help rotate the piles when needed.

The most difficult hurdle was getting the program

started. It helped that our composting conversation began at the District Steering Committee and included our superintendent, all administrators, teachers, staff, and parents. Our goal was to reduce what we throw away, because in doing that we are more environmentally friendly and also save money in trash hauling expenses. We were fortunate to have the support of the District Steering Committee, the Director of Facility and Maintenance, and the Cafeteria Manager. Once the bins were built we also had to determine the best mechanism for collecting food waste, delivering it to the bins, and setting up a regular schedule for composting.

Our greatest success is hard to single out because there are many. Over the past three years we have diverted approximately 50,000 pounds of food scraps from our local landfill. Composting on-site has exposed our students to the process and has helped some fulfill their community service requirement for graduation. We've shared our school compost with community gardeners and are also using it in a new garden at one of our elementary schools.

Each day food waste is collected in all four of our school district cafeterias. All liquid waste is dumped into a bucket and poured down the drain. We accept ALL food items *including* meats, dairy, fats, and oil. Food waste from our elementary and middle schools gets picked up daily by farmers to feed their chickens and pigs. Food waste and paper items from our high school cafeteria gets delivered by our custodian to a secure container at the compost bins.



Green Club members harvesting finished compost

Once or twice a week members from Seneca Gr&een or from Mrs. Foster's English class empty the food waste into the active compost bin and cover it with wood chips and other cover materials available. When the active pile bin is full, our maintenance department uses a bucket skidsteer to turn the pile into an empty bin where it heats up and decomposes further. A new active pile is started with browns on the bottom.

We currently have a four bin composting system that allows for an active pile, a bin for cover materials, a curing pile, and a bin to rotate into. We've partnered with two tree service companies that are willing to deliver wood chips to us as needed.



Curing pile (left), active pile (right)

So far we've managed to grow the program from one school to include all four. It helps that we diversify where the food waste goes. Feeding farm animals is a better use for food waste than composting, but if the farmers decide they don't want it, we can compost it. Likewise, if we experience problems with odors or lack of cover materials we can give all food waste to the farmers instead of composting. Diversifying where it goes gives us flexibility if complications arise. As long as students, teachers, custodians, and maintenance staff continue to work together, the program will be sustainable.

We have produced compost each year and it is impressive to see the rich dark compost in our bin compared to the cover materials. We've offered our finished compost to students and staff for home gardens, have delivered compost to the

Seneca County Community Garden and are using it in our school gardens.

DIVERSION TO A COMMERCIAL FACILITY

Commitment to a greener environment

Food served in the Jordan-Elbridge high school, middle school and elementary school cafeterias isn't just feeding students anymore, it's feeding the environment. Jordan-Elbridge's composting program was started in September 2014 as a component part of the commitment of the district to both "do the right thing" regarding responsible management of potential environmentally harmful practices, as well as move toward becoming green certified. The custodial personnel in all three schools are key to making the program work by guiding the student body to properly separate their lunch waste. In each cafeteria there are three containers: RED for trash, BLUE for recyclable and YELLOW for compostables. Students are educated on what constitutes each type and are expected to put them in the proper container. There is a 20 yard covered container housed at the high school. Each night, a designated person visits each school and takes the compostables to the high school, deposits the material into the 20 yard container and returns the container to the respective schools. The 20 yard container is periodically retrieved by a contracted hauler and transported to the Onondaga County Resource Recovery Agency for composting. The teaching staff at Jordan-Elbridge, particularly the science teachers, regularly encourage responsible handling of the waste stream. Jordan-Elbridge is satisfied that this program is sustainable, thanks to the commitment of the district to remain responsible regarding proper handling of issues that adversely affect the environment. As long as that policy remains, the program is sustainable.

Recycling Rangers divert organics and create less lunch waste with reusable water bottles, food containers and lunch boxes

Recycling Rangers rule the roost in the lunchroom at Greenacres Elementary School. They are a

student “green team” of eagle-eyed third, fourth and fifth graders keeping tabs on who’s putting what in a set of bins marked “trash”, “recycle” and “compost”. The district then pays to have the compostable material taken to a large composting facility in Connecticut. The school launched the composting program in the fall of 2014 with a school wide assembly. The kids were told they would be turning their food scraps into soil instead of trash. It has become second nature for kids to put the correct “trash” in corresponding color-coded bins. They are taking a generation of kids and teaching them waste doesn’t have to be waste. Before the program started, kids generated 18 bags of non-compostable lunchroom trash per day. Now there are only three bags of trash after mealtime. The first step toward less lunch waste was for kids to bring reusable water bottles, food containers and lunch boxes from home. No more paper bags or Ziploc baggies, no more plastic bottles or disposable drink boxes. In addition, the lunchroom switched completely away from single-use and disposable items. Scarsdale schools are rolling out composting in the middle school right now (2016) which makes six of the seven Scarsdale schools “composting” their food scraps. Most of their compost related education is putting the kids in charge of the program (Recycling Rangers) or simply by being aware and separating organics every day. In addition, they have a number of educational programs around composting:

- ◆ Assembly each year to kick off the composting program.
- ◆ Introductory lessons in the classroom when a school launches the program.
- ◆ Earth week programs such as having the kids in the elementary schools grow seeds in soil/compost mix from the facility they use.
- ◆ Making school events zero waste which often gets the parents included in the program as well.

Small School District diverts food scraps/ compostables to local farm

In the spring of 2010, students in a greenhouse program elective at Spencer-Van Etten (SVE) Middle School in Spencer, NY, wished to make

their school a greener place by investigating the ability of their school to compost full-scale and district wide. There is a waste line in the cafeteria where kids can put unwanted, but edible food, compostable waste, cartons, and finally trash. There is also space for “Terracycle” – hard to recycle items that get sent to a company for repurposing into new items. Green teams in both the elementary school and middle school, comprised of student volunteers, take care of watching this waste line at lunch. There are also smaller compost bins in each classroom that are collected a couple of times a week by a student runner and emptied into their larger compost bins.

“Blue bins” with compostable material in them are set on the loading dock and collected bi-weekly by a community volunteer, taken to a local farm, and emptied, washed and returned by the volunteer. Their most difficult hurdle was finding a place that would take their food scraps for free! They tried a farm in a neighboring community for a bit, sent food scraps to a commercial facility for a fee, and finally happened on a local farmer that would take the residuals. It was the help of local community members, school board members and mentors that helped all the pieces finally fall into place. The local farmer is asking for “browns” from community members.



Color coded bin

Their greatest success is keeping this program running for so long without using a lot of district funding. Most of the project has been funded through grants or community donations of space, materials and volunteer hours. SVE feels that their program is, and will continue to be, sustainable.

Brenda Anderson, middle school teacher in charge of the program has this to say, “We’ve made it this far. Our district currently has a developing agriculture program in the high school that is a nice district-wide tie-in to this initiative and hopefully they can help make it sustainable by

using some of the composted material for school purposes as well as lending a hand at the farm where we currently compost. The district is more supportive than in the past financially to make this initiative continue.”

My Compost is Not Working - Troubleshooting

Sympton	Problem	How it Fix it
Pile is wet and smells like a mixture of rancid butter, vinegar, and rotten eggs	Not enough air Too much nitrogen (greens) or too wet	Turn pile Add carbon (browns) Turn pile and add browns; provide drainage
Pile doesn't heat up	Pile is too small and/or pile is too dry	Make pile larger Add water
Pile is damp and sweet smelling but will not heat up	Not enough nitrogen	Add greens/Use less browns May need additional moisture
Center is dry and contains tough materials	Not enough water	Add water or wet organics and turn
Pile is attracting animals	Pile not covered well or mixed with enough brown material	Add more browns or cover completely with browns or soil Keep meat/milk/oils out of pile
Ants and flies are attracted to compost pile	Pile is not heating up	Need larger mass Small compost piles under 4'x 4' x 4' do not have the mass and insulation to heat well
Pile is too hot	In hot, dry climates pile can get too hot and even catch on fire	Keep pile moist (remember the squeeze test) and turn pile to dissipate heat
Vermicompost pile is heating	Compost medium is too deep	Keep less than 30"
Vermicompost attracts fruit flies	Smell of uncovered fruit attracts flies	Keep container covered and outside in warm climates Keep carbon over new food additions
Worms are all gone	Predator has eaten them, skunks, other worms	Keep bin elevated off the ground. Place a petroleum jelly barrier around the sides of the container.

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School Composting - Frequently Asked Questions

Q. Separating and composting seems to be a lot of extra work. Why should we compost at school?

A. Once trained, separation is easy, and will become routine. Compostable cafeteria “waste” makes up to 70% of what is currently going to the landfill. Diverting that waste through composting not only saves money and landfill space, but the resulting compost can be used in gardens to grow fresh vegetables for the school.

Q. I don't think the students will be able to sort out the food waste correctly. How do we teach them?

A. Daily announcements, class presentations, posters and having helpers in the cafeteria for the first week or two will help transition to food waste composting. Having older students help the younger students learn the process is helpful. Incorporating the science of composting into the curriculum can also help and will provide students with a well-rounded education.

Q. What are greens and browns?

A. Greens are wet materials with high nitrogen content. Fruit and vegetable waste, green leaves, weeds and fresh grass clippings are good examples. Browns are dry materials with high carbon content. Dry leaves, sawdust, paper, and wood chips are good examples.

Q. Is composting at school going to smell or cause bad odors?

A. Well-managed compost should not smell or cause odors. By getting the right mix of nitrogen (wet, colorful materials) and carbon (dry, brown materials), odors will be neutralized. A good starting ratio would be 1/3 nitrogen materials and 2/3 carbon materials by volume.

Q. Won't animals like raccoons, skunks and bears be attracted to the compost pile?

A. Most pests are attracted to smells that are airborne. If food wastes are covered with a good layer of carbon based materials, smells will be greatly reduced and pests will not find the compost. Also, once it starts heating up, critters will be deterred by the heat.

Q. Aren't the inks in paper toxic? Are you sure it is safe to compost paper?

A. Some inks in glossy paper can contain heavy metals and should be avoided. It is ok to put in small amounts of shredded office paper, newspaper or other non-glossy paper, newsprint uses a soy-based ink, but other sources of carbon are necessary.

Q. Can I compost in the winter?

A. Yes. Although the decomposition process may slow down in winter, you can continue to add to the pile and decomposition will start back up when spring arrives.

Q. Do we need to turn the compost pile?

A. Turning is not necessary but can be done to speed up the decomposition process. When using a 3-bin system, it keeps you organized: fill bin-1, turn to bin-2 and fill bin-1 again.

Q. A plastic fork and straw got into the compost. Is this bad?

A. No. Finished compost is often screened or sifted and it is common to find some unwanted junk. Be sure to throw these items out before the compost is used in the garden.

Q. Everyone has said I can't add meat or dairy to compost. Why is it OK to add them here at school?

A. School composting in a 2 or 3 bin system should have enough volume (more than 1 cubic yard) and create enough heat to properly compost meat and dairy items. Most home systems do not get hot enough.

Appendix A: Weigh and Sort Tables

Date: _____

School: _____

School Food Waste Data

Container name	Empty weight/volume	Weight/volume after 1st lunch period	Weight/volume after 2nd lunch period	Weight/volume after 3rd lunch period

Questions:

1. How many pounds of food were thrown away at lunch? _____
2. How many gallons of milk were thrown away at lunch? _____
3. Based on 5 days of school per week, and using your findings as a typical day, how many pounds of food are thrown away at your school in one week? _____
4. Based on 180 days of school per year, and using your findings as a typical day, how many pounds of food are thrown away at your school in one year? _____

Date: _____

School: _____

Foods Thrown Away

School Lunch Food	Whole Serving	More than 1/2 serving	1/2 serving or less

Bag Lunch Food
