

Composting at Rural Schools:



*An overview of compost systems,
models, best practices, and service
learning tools at Vermont sites*



Table of Contents

INTRODUCTION	3
OVERVIEW OF SCHOOL COMPOST SYSTEM MODELS	3
On-site compost system models	3
Off-site compost system models	4
SELECTED COMPOST PROGRAMS IN VERMONT	6
Stowe Elementary School	6
Bishop Marshall Elementary School	9
Thetford Academy	12
Crosset Brook Middle School	14
Recommendations & Best Practices for school compost programs	17
School to Farm Compost Program	19
TOOLS FOR SCHOOL COMPOSTING PROGRAMS	20
School Training Model	20
Goal Creation and Action Planning Guide	27
Peer to Peer Educational Tools: Educational skits	30
Appendix A: Sample Skit	31
Appendix B: Compost Fact Card Samples	34
Appendix C: Worksheet for Food Waste Separation Data Collection	36

Introduction

The purpose of this report is two-fold: to educate individuals on different types of school composting programs both in and outside Vermont and to offer individuals specific tools and recommendations for creating successful composting programs.

Overview of school compost system models

When schools make the decision to divert organic materials from their waste stream, many different systems are available. One of the biggest decisions is whether to have an on-site or off site composting system. These systems can range from inexpensive and simple to pricey and complex. The following sections will cover different on and off-site composting systems at different institutions. In this report, schools with 350 students or less (or produce less than 105 pounds of food waste) will be considered small-scale. Schools with 350+ (or produce more than 105 pounds) are considered larger scale.

On-site compost system models

Typically, small schools can handle on-site composting with multiple (2-5) home composters (see Figure 1). These bins need to be turned occasionally, but require minimal effort. Dozens of "home composting" models are available to choose from, but often solid waste districts offer a particular brand for a subsidized rate. Some models are simply plastic or wooden containers with air ventilator or side doors, while 'tumblers' can be rotated. Many models have some type of lock to prevent animals from entering. Compost containers can also be created with lumber or crates.

Figure 1: Sample "Home" composters for small-scale use at schools; approx.. 32" x 32" x 32"



Single classrooms can use small vermiculture bins for classroom snacks (see Figure 2). Vermiculture bins can be great educational tools for students, but provide a more management if it is located inside the classroom. Wooden systems can be purchased or built for outdoor use, but worms typically do not endure extreme temperatures. Another vermiculture system, used by the Davis Joint Unified School District Food Waste Diversion Project¹ was a continuous flow system called the "Eliminator 600 EM" that could be moved from class to class. In addition, one side of the bin could be opened to a Plexiglas panel for viewing the worm activity. Large scale vermiculture systems can also be built or purchased (see Figure 3). For more information on vermiculture systems, see *Worms Eat My Garbage: How to Set Up & Maintain a Worm Composting System* by Mary Appelhof.

Figure 2: Sample vermiculture bin: 16" x 16" x 21"

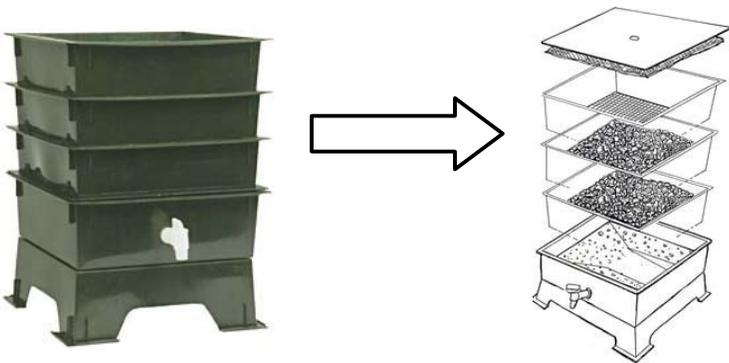


Figure 3: large scale vermiculture system



For schools that produce more than 105 lbs. or more of organic material a day, there are a few on-site systems available. However, with so much waste, the job may become too difficult for a student team or school staff member to oversee. In which case, off-site composting may be more realistic.

Figure 4: The Earth Tub



One example of large scale on-site composting is the California Grey Bears, a non-profit surplus food distributor that needed to discard a large amount of deteriorated food.² This group utilized Earth Tubs (see Figure 4) which can handle up to 150 pounds of organic material per day. Earth Tubs are in-vessel (completely enclosed) composting units and designed to compost organic materials at the sites where they are generated. While the Earth Tubs can be conveniently located on-site, they do take more time to install and manage. The Grey Bears estimated at least 20 hours per week in compost management.

Off-site compost system models

Off-site compost systems typically mean that organic materials get hauled to an industrial compost facility. In Vermont, these facilities are certified by state governments as they handle tremendous amounts of food waste every day. There

¹ <http://www.ciwmb.ca.gov/FoodWaste/CaseStudies/Contracts/2000/Davis2.pdf>

² see link for full report: http://www.dpw.co.santa-cruz.ca.us/downloads/ciwmb_final_report-draft_2.pdf

are at least 3 facilities in Vermont that accept food waste from their surrounding schools, restaurants and businesses. In this type of system, the food waste is diverted at meal times, and left in a convenient pick-up location for the hauler. The school typically pays the hauler a fee, as it would the regular waste and/or recycling hauler. However, this fee may be smaller as tipping fees for organic materials are much lower than waste destined for the landfill. In this case, existing hauling contracts can be reexamined and negotiated to reflect a more accurate fee.

Finally, another system, piloted by The Highfields Institute, is a School to Farm Compost Program. The premise is to connect small schools (with scarce access to industrial facilities) and local farmers (with interest in generating compost to diversify income). In Vermont and across the country, several schools have already connected with local farmer through "Farm to School" programs to increase consumption of local foods. The School to Farm compost program would simply complete the loop. See section below for further information on this system.

School compost program tool kits:

Several helpful tool kits have been created for school compost programs. The following manuals offer concise descriptions, challenges and benefits, and recommendations for schools:

- Connecticut Department of Environmental Protection: *School Composting: the Next Step in Recycling A Manual for Connecticut Schools*
<http://dep.state.ct.us/wst/compost/schmanual.htm>
- Center for Ecological Technology; *Composting in Restaurants and Schools: A municipal tool kit*
<http://www.cetonline.org/Publications/res-schools-online.pdf>
- Davis Joint Unified School District, *Davis Joint Unified School District Food Waste Diversion Project Final Report*
<http://www.ciwmb.ca.gov/FoodWaste/CaseStudies/Contracts/2000/Davis2.pdf>

Case Studies

The first 4 schools described used on-site home composter models. Each school created their own compost squad, which created goals and action plans, and managed day to day needs of the compost program. A brief overview of the challenges and benefits for each school are included. Best practices and recommendations for all compost programs are listed at the end of this section. Finally, the School to Farm Compost pilot program is discussed.

Stowe Elementary School

School population: 270

Grades: K-5

Compost system: 4 home composters and tumbler

Background

Stowe Elementary School began composting in 2003 with the leadership of its special education teacher. A compost workshop and ongoing technical assistance was provided for the first compost squad in 04-05, as well as the 05-06 squad.



Figure 5: Compost bins and tumbler outside Stowe Elementary School library

In the spring, the 5th graders used the compost as fertilizer on the school garden. Their hope was to complete the food cycle by growing foods that their cafeteria would prepare for lunch in the Fall.

Challenges

- **Students sometimes still forget to compost.** While most students stated that they separate their food scraps into the compost bucket at lunch, several students simply forget. *Students and staff suggested this was due to the limited amount of time to eat lunch and simple forgetfulness.*
- **The compost tumbler was difficult for students to turn.** While most of the food waste deposited into the home compost bins, one tumbler was also used (see Figure 5). However, students found the tumbler difficult to turn on a daily basis. *This school recommends completely filling tumbler with partially decomposed materials to create faster compost in the Fall or Spring.*
- **Compost may take longer than expected** Many compost how-to guides mention that compost only takes 6-8 weeks to create. However, many schools find this to be a liberal estimate. Schools should be aware that minimally managed compost bins may take up to 2 years to produce compost. Stowe Elementary found that when a compost bin was full, it would begin to compost faster. In addition, students would sometimes start using a tumbler (see figure 5) to speed up the process.

Strengths & Opportunities

- **Opportunity for student leadership.** Having the 5th graders serve as the compost squad provided the opportunity to practice leadership skills. Students learned that good leaders lead by example, not just words. In addition, younger students looked up to these students, and were excited to be a part of the squad when they reached the 5th grade.

Figure 6: Stowe Elementary School garden uses compost created on-site



- **Service learning opportunities:** 5th graders at Stowe Elementary pick a service learning project each year. The 04-05 compost squad chose to focus on the compost program for their project. Students developed promotional materials, creating a theater show, and implemented educational lessons with younger students.
- **Integrative studies:** Students enjoyed learning basic subjects such as science, math, fine arts and writing with the focus on composting.

Sustainability

Composting has become part of the culture at Stowe Elementary School. While no school-wide composting policy has been adopted by the school board, the lead teacher feels confident that most teachers are very supportive of the composting program and would make sure that it continued. In addition, in the first year, she felt that the program might fail without her dedication and trouble shooting. Now, however, she feels she does very little to sustain the program-that it flows pretty flawlessly with the teamwork of the entire faculty, staff and students.

Impacts

- **Bringing composting to area schools:** Compost squad students who have graduated from elementary school began implementing a compost program at their new middle school. With the assistance of supportive faculty and administration, students will hopefully introduce composting into the area high school as well.
- **Students sharing composting at home:** The lead teacher shared anecdotes that parents had stated that they had begun to compost at home, or learned about the importance of composting through their children.
- **Some pre-food waste being composted:** While the cafeteria staff was not composting pre-food waste initially, they decided to begin composting their coffee grounds this year.
- **Completing the food cycle:** The compost squad used the compost to fuel the school's garden-which grew annuals, perennials and vegetables. Some of these vegetables will be harvested in the Fall for the food service professionals to prepare for school lunches.

Bishop Marshall Academy

*School population: 100 (active composters)
Grades: K-4 (active composters) Composting system: 2-3 home composters*

Background

Bishop Marshall Academy composted several years ago, but the program had gone defunct. The 4th grade teacher decided to revive their on-site composting program in the Winter of 2005, with the 4th graders serving as the compost squad.

Process and Overview

The school hosted a 2 hour compost workshop for the compost squad which covered the basics of composting. They were assisted in creating a skit that would educate their younger peers about composting. The 15 minute skit was performed separately for K-3rd graders. The skit concluded with an assessment and period for questions and answers. After each class had seen the skit, food waste separation after lunch was initiated. At the end of the lunch period, the compost squad stood behind a table and helped students separate food waste into 5 gallon buckets (see Figure 7). This was especially important for the kindergarten students. After food waste was collected, it was consolidated into one bucket, which two students helped carry to the classroom. Here the bucket was weighed and recorded on to a datasheet on the wall.

Figure 7: compost squad members help younger students separate food waste at lunch



Students liked collecting data for the compost bins. A simple chart was created for recording the date, weight and volume of the food waste (see Figure 8). A pen hung from the chart for easy use. Students then emptied the food waste into the bins in the school yard and added a layer of carbon.

Figure 8: Student enters weight and volume of food waste collected



Figure 9: Students empty the food scrap bucket into the bin



In addition to these efforts, the school also purchased biodegradable trays to replace the Styrofoam versions it currently uses. While these may not be easily composted in an on-site bin, the students plan to experiment with the alternative tray's decomposition over the summer.

There is a potential opportunity to eventually compost off-site at a nearby farm. This may incur additional costs for the school, but would eliminate the extra work it takes to maintain an on-site compost program. However, the compost squad enjoyed being leaders at the school and taking charge of the compost program, so it might not be a needed change.

Challenges

- **Short lunch breaks:** While separating food waste at the end of lunch only added a few minutes to lunch, it was still a big portion of the 15 minute lunch break. As students got better at anticipating which foods would be composted (no meat or dairy) the process became a little faster.
- **It's a little gross:** Even the compost squad had to admit that handling food waste was a messy activity. However, the students rarely complained, and were always eager to

assist in any compost related activity. *This aged student- 4th grade- typically enjoy and excel at learning through hands-on activities.*

- **Frequent maintenance:** While student-led compost programs are rewarding in many ways, it can often add additional work for the lead teacher. While the lead teacher at Bishop Marshall happily accepted these tasks, it still added work to her already busy schedule. Her extra tasks included: rinsing out the compost bins, helping the students design their schedule for compost duty, and directing the food waste separation at lunch. *To address this challenge, programs in other states have created stipends for project leaders to compensate for the added work.*

Strengths & Opportunities

- **Teamwork:** Students needed to work together on several levels to accomplish their composting tasks. Initially, they needed to collaboratively create and perform skits for their peers. Then, students needed to teach each other the roles of food waste separation, how to carry a 20 pound bucket without spilling it, how to record the data, and how to maintain the compost bin. These real-life teamwork skills were an essential part of the school's curriculum. In addition, the lead teacher stated that she was pleased about this added benefit of the program, as this particular group needed to work on teamwork.
- **Interdisciplinary subject integration:** During the compost program, the students used math, writing, theater, art, and math to accomplish their duties on the compost squad. While integrating these activities took a little more time, the students enjoyed learning new skills and using these subjects to accomplish their tasks.

Impacts

- **Waste diversion:** According to student calculations, students diverted approximately 144 pounds of organic materials per day, or a total of 432 pounds from February to June 2006. Composting for an entire year will result in the diversion of approximately 2,520 pounds³.
- **Biodegradable lunch plates:** In addition to composting food waste, the school began purchasing biodegradable lunch plates. While these plates may not be compostable in the on-site bins, they could be composted at larger compost farm where the compost reaches higher temperatures. Currently, however, the school is eager to use a greener alternative to petroleum based disposables.

³ Calculation based on 14.4 lbs/day * 175 days

Sustainability

While no school policy has been written or implemented thus far, the lead teacher plans on meeting with the new principal to discuss the compost program this summer. A school policy will be discussed at that time.

Thetford Academy

Student population: 380

Grades: 7-12

Compost systems: tumbler and 3-bin system

Background

Thetford Academy began composting 3 years ago, after a student-led waste audit of the school discovered that the largest category in the waste stream was organic material. A compost tumbler was installed near the school garden, and was co-managed by the environmental club members and horticulture students.

Process and Overview

Environmental Club members created an action plan and timeline in the Fall of 2006. The initial plan was to have the Horticulture class oversee the cafeteria food waste separation and maintain the compost bin in the Fall, while the Environmental Club did so in the Spring. Students took turn emptying the food waste bucket, delivering and emptying it into the compost bins and returning the rinsed bucket back to the classroom. The horticulture class teacher planned to integrate compost lessons into the course, while using finished compost in the school garden. The horticulture teacher had students build an additional 3-bin system, so that they could create compost continually.

Students then began addressing the lack of awareness of the compost program among the student body by creating a skit. The skit addressed how to correctly separate food waste in the cafeteria, who was managing the compost program, and why composting was important. While the script and props were created, and the skit was practiced several times, students did not perform the skit due to lack of time.

Challenges

- **Time constraints:** The greatest challenge of implementing a compost program at the high school level was the students' lack of time for implementation. If a club is primarily responsible for carrying out plans, the school schedule may only allot 10-20 minutes during the school day to meet each week. While some of the students

could meet after school, most students at this school were pre-engaged with extracurricular activities such as sports which limit time before and after school. *While club members may be more passionate about planning and implementing a compost program than students in a class, a regular class period may provide more time to complete important tasks. This challenge should be addressed when creating the action plan.*

- **Over-preparation:** While high school students are able to create more sophisticated plans and activities around composting, it can often turn into planning too much and implementing too little. Often times, thoughtful plans are created, but after hours of hammering out the details, the fun and spirit is long gone. *To avoid this drop in enthusiasm, make sure that objectives are completed in a timely manner, and not just discussed. It is recommended that for every meeting that occurs, at least one action toward the goal is implemented.*
- **Lack of leadership and organization:** While high school students have the ability to make great leaders, they oftentimes have not yet mastered the skill. Student groups without a solid leader often move haphazardly through their plans, and lose hope of successful implementation early on. *Adult mentors can help facilitate early meetings and provide student leaders with leadership skills. These skills might include: how to run a meeting, how to delegate tasks, how to create goals and timelines. After a short "training process" the student leaders can take a greater role, while the adult mentors help move the process along as needed.*

Strengths & Opportunities

- **Integrating compost with Horticulture class:** Schools with a horticulture class have a great opportunity to easily integrate in-depth compost lesson plans with hands-on activities. Once trained, these students could then continue to assist the compost effort after completing the class.
- **Life skills taught through composting:** High school is an ideal time to hone leadership and teamwork skills. Creating and implementing a compost program requires working with several different types of individuals at the school including students, food service professionals, custodians, teachers and principals, and adult volunteers. Helping to implement a program requires creativity, problem solving, and effort. Not only do these skills align with the Vermont educational standards, they are necessary for all youth to master as they enter adulthood.

Crosset Brook Middle School

*Student population: 325 total (200 active composters) Grades: 5-8
(7&8th grade active composters)*

Compost system: 2 home composting bins

Overview & background:

Crosset Brook Middle School decided in the Spring of 2006 to receive help in reviving their defunct composting program. The staff and principal were very receptive in receiving assistance, and wanted the youth to take a leadership role in the Compost Program. While the school houses 6th-8th grade, only the 7th graders began composting this semester. The goal was to start small, and grow as the process strengthened.

Process

A meeting was held with a group of 10 students about 1-2 times a month during the Spring semester. Several activities were covered during these sessions, such as: learning about compost and the benefits of creating compost, devising a goal and action plan for creating a compost program and implementing objectives created (see "compost program action plan in section below).

The students decided to focus their efforts on promotion, as they thought it would be difficult for their fellow middle school classmates to alter their daily lunch habits. Students chose the logo "Compost the Tots!" after the hit movie *Napoleon Dynamite*. The students created a made-for-video skit script which was modeled after the movie. The lead character, Napoleon taught his peers and fellow compost squad mates the ins and outs of the composting process at Crosset Brook Middle School. At the end of the video premier, the "live" Napoleon Dynamite walked into the classroom and lead

Figure 10: Napoleon leads peers in reciting the compost pledge



the 7th and 8th graders in the recitation of the Compost Pledge (see Appendix A). After each student signed his name to the pledge, additional logistics were discussed, such as what the food waste bucket looked like and who to ask for assistance. Time for questions was permitted.

In addition, the compost squad created signs to promote the food waste separation and painted all the food waste buckets gold (see Figure 11). They felt this color would attract attention to the bins and make it more fun. Following the educational skit, the 7th and 8th grade began composting. The compost squad took turns taking the food waste to the bin, rinsing the bucket out and returning it to the cafeteria.

Challenges:

- **Jr. High students can be perceived as shy.** Working on youth leadership skills with the 12-14 year old aged group can be challenging. *While some students in this age group don't mind "sticking out," many become embarrassed when they are not conforming to the norm. Therefore, avoid needlessly putting them in the limelight. This age group seems to excel in their creativity and "behind the scenes" work. Focus on efforts like video taped skits (not live!), writing skits, creating plans and implementing activities in small groups.*
- **Starting in the Spring.** When a composting program is started in late Spring, the school may not have time to create a smooth system and work out the kinks before summer vacation. *It is advisable to begin planning no later than January, and begin composting at least 3 months before the last day of school.*

- **Bins were far away from the school.** For middle school and high school, students have shorter classes. Therefore, it was difficult for them to miss 10 minutes of class while they were tending to emptying, rinsing and returning the food waste container. *One solution would be to keep bins closer to the school or have students empty bins at the end of the day.*

Figure 11: The golden food scrap bucket is displayed at the kick-off event

Strengths & Opportunities:

- **Starting small.** Instead of trying to start the entire school composting, this group worked with about a third of the schools population. Their goal was to create a good system, work out the kinks, and then enlarge the program to include the whole school within 6 months-1 year. In addition, they felt that the current size was sustainable, and they might "give up" if it was larger.
- **Jr. High students are very creative!** Skits are a great activity for this age group. While live skits may simply result in giggling or embarrassment, this group excelled at a videoed skit. In addition, it gave shy students opportunities to be involved in the script development, prop work and video editing.



Recommendations & Best Practices for school compost programs

- **Compost Squad Creation:** Creating a compost squad with a group of students instills student ownerships of the program. This provides an opportunity for students to be leaders in their school, and something for younger students to look forward to being a part of when they are older. However, adult leaders are very much needed to help guide the compost squad and address challenges as they arise.
- **Hold a compost kick-off event:** The school wide compost kick-off should serve as a fun way to energize the school about composting, reinforce the key aspects of school composting (what can and can't be composted, benefits of composting) and provide an opportunity for the compost squad to present themselves as leaders. This is an essential way to ascertain that everyone is generally on the same page about the program, and to elevate the composting program to a high degree of priority.

Kick-off events should invite all school community members, including the school board, parents, volunteers, and school staff. The kick-off event could be a student created skit, an entertaining announcement with games, or the professional compost theater show such as "Chef Suzette's Feedbag Restaurant."

- **Allow sufficient blocks of time for planning and implementation.** Students need at least 1 hour sessions to brainstorm plans and begin implementing their ideas. Working with classmates to create goals, timelines and educational skits can be very time consuming and work best when done uninterrupted by bells.
- **Take action/beware of over-preparation:** While creating and documenting a thoughtful action plan and timeline is a must-be sure to stay on the road to implementation. Regular meetings *that result in action* are important to keep participants engaged. If planning becomes too arduous, or no action occurs-people may begin dropping out, making it difficult to regain momentum.
- **Good leadership and organization:** Before too long, a specific leader needs to be established to move forward. While leaders/facilitators are usually the teacher in elementary schools, middle school and high school students can take on larger responsibilities. Adults should always be present to help student leaders, and provide them with the needed skills to be successful.

- **Create and implement school policy:** While a compost program could run successfully for years with one lead teacher and a compost squad, it may crumble once that teacher leaves the school or gets burned out. Create a presentation for the school board, which provides data on the amount of organics being diverted, benefits of the program, action plan and timeline. Ask that the school board adopt the compost program as a school policy, and keep documents on file for future leaders of the compost program. In addition, when the school hires new staff, they should be made aware of their duties involved in the composting program in the early stages.

Integrate compost into curriculum: The subject of compost aligns well with major subjects and standards. Students will become more engaged in separating food scraps if they gain an in depth understanding of compost. Field trips to local compost facilities, landfills, farms, and material recovery facilities are excellent additions to waste curriculums.

Create a memo of understanding. Project leaders or managers should create a memo of understanding between the principal, coordinators, school staff and volunteers to clarify roles and responsibilities. While several individuals start out supportive of the program, they may forget specific goals and objectives are over time.

Collect data of waste diverted. Audits are critical to estimating the amount of food waste diverted. Collect the weight and volume of organic waste diverted at least 3 times for an accurate estimate. This data can assist in renegotiating waste hauling contracts .

School to Farm Compost Program

Background and purpose:

A partnership was formed to create a School to Farm (S2F) Composting model. The S2F compost model addresses the challenge that many Vermont schools have scarce access to commercial compost facilities, and cannot compost on-site. However, many rural schools are in close proximity to farmers, which would be interested in receiving organic materials to create compost for on-farm use or diversified income. While many Vermont schools have established relationships with local farms to increase local food purchasing, a S2F compost program is the logical next step to close the loop in the food system.

From 2005-2006, attention was focused on choosing a school and farm, preparing the farm to receive compost, and working with participants to create goals, action plan and timeline. Over 10 schools and farms across the state asked to be interviewed for this program. While only one community was chosen (Peacham), this program will serve as a model for similar communities to utilize.

Activities in 2005-2006

- **April 2004** (before grant period): School to Farm Compost program was promoted at Northeast Organic Farming Association of Vermont (NOFA -VT) via a panel discussion. Feedback from farmers on the need for this program was collected.
- **May- September 2005:** S2F program was promoted and applicants sought via NOFA newsletter, solid waste district and SWEEP listserves (see Appendix C).
- **May 2005:**
 - Applications for schools and farms interested in participating in the S2F project were created and distributed to interested parties.
 - Criteria selected for schools and farms.
- **September- November 2005:** Phone interviews were conducted for interested S2F parties.
- **December- January 2006:** Set-up site visits and final interview/discussion for final applicant (Peacham Elementary School).
- **February - June 2006:**
 - a) Farm was visited to test soil, examine slope of the farm, create compost recipes for the farmer, and recommend and oversee appropriate compost bin design.
 - b) Meetings were held with compost program stakeholders to create goals, action plan activities, and timeline. In addition, stakeholders decided on their roles and responsibilities in the program (see below).

Peacham School to Farm Compost Program Draft Plan May 30, 2006

Goals:

- To divert 100% of pre and post consumer food waste from Peacham Elementary to Everlasting Herb Farm
- To increase awareness and understanding of the benefits of composting among students, staff & faculty
- To increase understanding of how to compost among students, staff & faculty

Stakeholders:

- Peacham Elementary (teachers, food service providers, custodians, administrators, school board, community/parent volunteers)
 - Everlasting Herb Farm
 - Northeast Kingdom Waste Management District
- Others: Master Gardeners?, Master Composters?*

I. Suggested activities:

One time activities:

- School staff meeting to discuss projects
- Student training and compost workshops
- Compost kick-off assembly
- Staff /faculty waste diversion training and compost workshops
- Field trip to farm(s)
- Field trip to successful School Compost program sites (for staff and student compost squad)
- Pre-food waste data collection

Ongoing activities:

- Waste diversion monitoring
- Compost curriculum implemented in classrooms
- Technical assistance for farm and school
- Add Compost books to library collection

II. Proposed Timeline:

January -May 2006

- Technical assistance to farm
- School-wide meeting to determine goals & activities & logistics
- Press release/ letter to community members announcing project
- Field trip to compost program school in Central Vermont?

June-August

- Staff/faculty waste diversion training & compost workshops
- Compost curriculum assistance for teachers
- MOU created and signed

September

- Pre and post food waste data collection (weight and volume)
- Student training & compost workshops
- Student/staff compost squad creation
- Compost kick-off assembly

September- December

- Waste diversion monitoring

January 2007-June 2007

- Technical assistance for farm and school
- Sustainability of programs discussed, ideas implemented, program documented

Next steps:

Peacham S2F Compost program stakeholders will work together to finalize the action plan and timeline for the 06-07 school year. In the Spring of 2007, efforts will be evaluated and discussed, sustainability will be examined and the program will be documented for others to replicate.

Tools for School Composting Programs

The following tools were created address specific issues such as: increasing student buy-in, decreasing student apathy, and increasing student leadership skills. These tools can be implemented on any level- though some may be better suited for certain age.

School wide training model

To create a school-wide culture of food waste separation and composting, it is important to create a systematic training model for all participants. The following training model is suggested for K-12th grade. *The entire training process should extend no longer than 3 weeks*, before food waste separation begins. This is to ensure that momentum is not lost on over- preparation.

Step 1: Training the core group or Compost Squad:

The training model uses the creation of a compost squad. The compost squad's responsibilities include managing the food waste separation and compost bin, as well as the school-wide education of composting. Training this core group will result in an opportunity for in-depth learning (that other students may not have time for) and a sense of ownership. *Permit at least 2 hours for the initial core training, though- this could extend up to several class periods.* Training the core group should include:

- a) The stages of decomposition

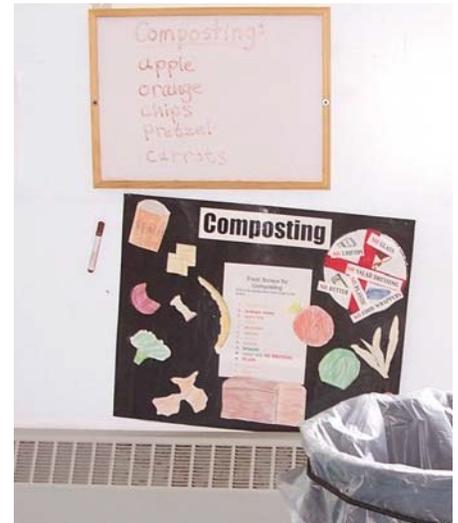
- b) The basic compost recipe: carbon, nitrogen, organisms, moisture, oxygen, and space (approx. 4' X 4' area).
- c) The reasons for composting: diverts food from landfills, excellent soil amendments, erosion prevention, etc,
- d) Proper compost bin management: Students should find a good location for the compost bin, assemble the bin, collect carbon material, practice layering nitrogen and carbon, and examine needs for compost bin - tools such as thermometers and aerators.
- e) Steps to composting at the school (the class may create this themselves- see "action planning" section below). This should include a trip to the cafeteria to examine the area where food separation occurs, where the food waste bucket will be taken, and practice layering the nitrogen with carbon.

Step 2: Small-group training for the school body:

Once the compost squad has received the above components of core training, the rest of the school body should be trained. These training sessions can be co-led with the compost squad and adult mentor, *and should be approximately 20 minutes for each class or audience. This is a manageable time to complete multiple training over a period of 1-3 days.* Be sure not to forget about the food service professionals, custodians, additional staff and administration, as they need this information just as much as students.

A common mistake is to teach only about compost or only about proper food waste separation in the cafeteria. To increase both proper organics diversion and buy-in, participants must understand why they have to spend a few extra seconds separating their food waste, and what happens when it's not separated correctly.

Figure 12: "Do's and don'ts of composting" poster and dry-erase board of compostable materials in the day's lunch hang above the waste station



A good outline for this training session will include:

- I Introduction
- II Overview of the new composting program plan
- III Why the school decided to begin composting
 - all the benefits the school will receive for composting
- IV What is composting?
 - Brief explanation of the decomposition process (how does an apple turn into soil?)
 - Bring example of real compost for participants to smell and feel
- V How to properly separate food waste at school
 - What the food waste separation bucket looks like
 - What can and cannot be composted (Have students create clear posters on what can and can't go in the compost See Figure 12)
 - When to separate food waste at lunch time
 - What happens when compost gets contaminated with non-organic material?
 - What to do if contamination happens; who to ask if help is needed
- VI Why composting is important for the school and for the earth
- VII Assessment
 - Bring samples of breakfast/lunch related materials and ask participant if they can be composted or not composted, ie: metal forks, banana peels, napkins, plastic wrappers, etc.
 - Ask participants questions such as: How does an apple turn into soil? Why is composting important? Who should you ask if you're not sure how to compost?
- VIII Conclusion, question and answer period

Step 3: School Wide Kick-off

A school wide kick-off should occur immediately after the last group has received small-group training session and immediately before organics diversion begins in the cafeteria. The school-wide kick off should serve as a fun way to energize the school about composting, reinforce the key aspect of school composting (what can and can't be composted, benefits of composting) and provide an opportunity for the compost squad to present themselves as leaders. This is an essential way to ascertain that everyone is generally on the same page about the program, and to elevate the composting program to a high degree of priority.

Kick-off events should invite all school community members, including the school board, parents, volunteers, and school staff. The kick-off event could be a student created skit, an entertaining announcement with games, or the professional compost theater show such as "Chef Suzette's Feedbag Restaurant."

Step 4: Monitoring the cafeteria food waste separation

Cafeteria monitoring of the food waste separation should occur daily for the first 3 weeks of the program. While teachers can sometimes serve as compost monitors, this task is perhaps best left to volunteers or assigned members of the compost squad. This will ensure that the task is given sufficient attention, and food separators are correctly reinforced until the system is down pat.

If volunteers are used, a lead coordinator should be responsible for scheduling all monitors and offer a one-time brief training. The monitor training should include:

- what can and cannot be composted and why
- specific times when monitors are needed
- how to reinforce correct food waste separation behavior
- how to correct incorrect food waste separation behavior in a positive way (explain why certain products can't be composted, refer to compost do's and don'ts poster, etc)
- how to gently help younger students decide what can be composted

After approximately 3 weeks of daily monitoring, participants should be skilled at correct separation. If a school decides to not compost meat or dairy products, the monitoring process can be a little more difficult as some meals, such as casseroles or spaghetti, contain both compostable and non-compostable organics. It may help if teachers get a copy of the daily lunch menu and discuss with students before-hand about what materials can be composted. For schools that compost off-site at industrial facilities, this should not present a problem as they can accept meat and dairy.

Step 5: Incentives

Creating small incentives are a great way to reinforce correct food waste separation and increase diversion rates. Compost monitors or squad members can nominate "Outstanding Composters" to be acknowledged in school assemblies, over the intercom, or in school newsletters. Another idea is to create a Composter Hall of Fame, where the Outstanding Composters' photos can be placed. It is best to begin incentives during the first week of composting, and continue weekly for at least the first semester.

Step 6: Continued Training & Education

A crucial step in sustaining a composting program is to incorporate continued training and education. After a successful first semester, diversion rates sometimes begin to taper off. This can be mitigated by inserting brief, strategic training components throughout the school year. Be sure not to wait until the situation is desperate!

Acknowledge increased apathy or awareness, and address as soon as possible.

Some continued training & education ideas include:

- **Bring back monitors.** Monitors may be needed on a once a week basis until diversion rates are back to normal.
- **Renew posters.** Switching up educational compost posters will help catch the eye of students. If the same posters are hanging for too long, participants will most likely stop reading them. Have the compost squad initially create several posters and alternate them throughout the year. Consider having the posters laminated so that they will last longer in the cafeteria environment.
- **Use the intercom.** A school intercom system is a great way to include short reminders about separating food waste. Have the compost squad think of creative "fun facts" about composting to accompany the reminders.
- **Incorporate annual compost kick-off events:** After summer vacation, it is difficult for many students to remember how to properly separate food waste and why they are composting. A short kick-off assembly will re-establish the composting program as an integral part of school culture and reinvigorate enthusiasm. The new compost squad can be presented at this time.
- **Consider new students:** If schools receive several new students, consider providing brief training sessions at the beginning of every semester. For entire new classes entering elementary, middle or high school, always provide them with a training session and opportunity to ask questions.
- **Include updates in the school newsletter.** This is a great medium to provide photos, announcements or status of the compost program. Topics of interest may include: Is the school garden using the compost? Did the school waste hauler bill decrease due to organics diversion? Did students learn about composting and create a presentation for the school board?
- **Don't over do promotion.** If participants are not responding to education or promotion efforts, begin asking individuals why participation is low. Other challenges may be present that need to be addressed before participation will increase.

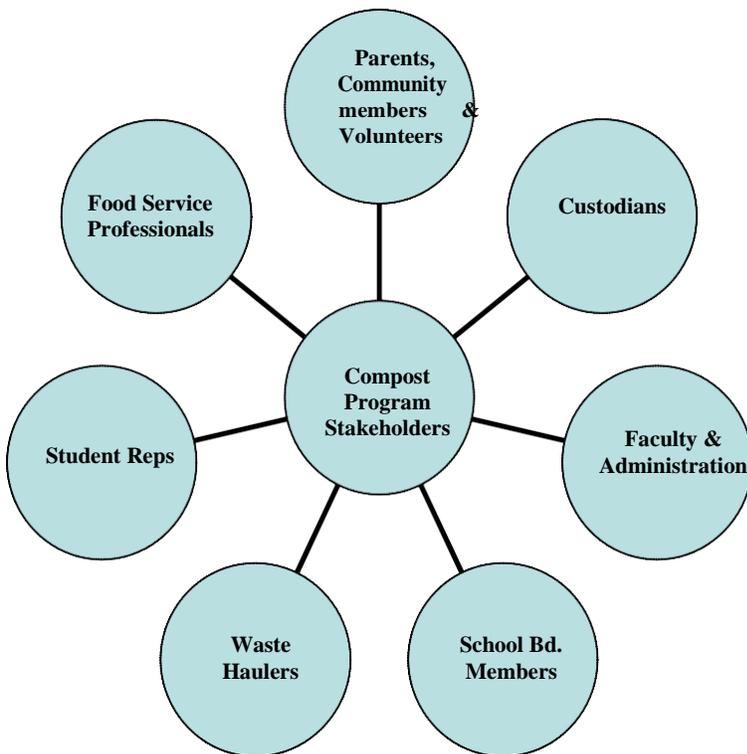
Goal Creation and Action Planning Guide

The first step in maintaining a sustainable compost program is creating a solid plan that all stakeholders involved can agree on. Allow sufficient time (1-2 hours) for an initial meeting with a small group of interested individuals to lay out a draft plan (see Compost Program Action Plan Worksheet below).

Next, all potential stakeholders that will be involved in the compost program should be normally invited to a group planning meeting (see Figure 13). This group meeting will provide an opportunity for all potential stakeholders to be a part of the planning process and will create ownership of the program. It is advised to gain feedback on the goal, activities, challenges and strengths of initial plan. This group planning meeting provides an excellent forum to voice potential concerns and create recommendations and solutions.

Finally, project leaders should consolidate this feedback and disseminate a final draft plan to stakeholders. The action plan and time line will most likely be edited over time, so an updated version should be kept and shared over the course of the program.

Figure 13: Compost Program stakeholders



COMPOST PROGRAM ACTION PLAN WORKSHEET

This worksheet should serve as a basis for establishing your compost program plan. Make sure that your group keeps the final copy, and shares it with all stakeholders involved.

I. Goal:

State your goal in 1-3 sentences:

Short term:

Long term:

What are some ways you can reach this goal?

II. Stakeholders:

Who are the stakeholders who will be impacted by this project?

How will they be involved?

III. Strengths and Challenges

What are the potential **strengths** of your idea?

What are the potential **challenges** of your idea?

IV. Timeline

Create a timeline *See the back of this sheet*

V. Evaluation

How will you know if you reached your goal? *What questions do you need to ask? Who will you ask? When will you ask? What data do you need to gather?*

Timeline and Action plan

Action	Who will do the action	Outcome	Date
<i>example: Create a timeline</i>	<i>Ms. Fellows class</i>	<i>Know what we need to accomplish during</i>	<i>March 15, 2006</i>
<i>example: Stakeholder meeting</i>	<i>All school staff, student committee members, custodian, food service committee</i>	<i>All the key members at the school will understand the goals of the compost program, and be given a</i>	<i>April 15, 2006</i>

Peer to Peer Educational Tools

In addition to carrying the food waste bucket to the compost bin, collecting the waste diversion data, and mixing in the "browns", members of a school compost squad have another big responsibility: educating the school body about compost. Once these students have learned the basics of composting, they can begin creating and implementing teaching tools for their peers. This practice provides a fun forum for reinforcing the materials and engaging other younger students.

Research shows that peer-to-peer learning can result in (a) team-building spirit and more supportive relationships; (b) greater psychological well-being, social competence, communication skills and self-esteem; and (c) higher achievement and greater productivity in terms of enhanced learning outcomes.⁴ While teachers can prepare some instructions and parameters for peer to peer instruction, it is also valuable to have students create and implement them for younger students.

In *Peer Learning*, Alice Christudason notes four strategies that teachers can use to facilitate successful peer learning:⁵

- 1) **Buzz Groups:** A large group of students is subdivided into smaller groups of 4-5 students to consider the issues surrounding a problem. After about 20 minutes of discussion, one member of each sub-group presents the findings of the sub- group to the whole group.
- 2) **Affinity Groups:** Groups of 4-5 students are each assigned particular tasks to work on outside of formal contact time. At the next formal meeting with the teacher, the sub-group, or a group representative, presents the sub-group's findings to the whole tutorial group.
- 3) **Solution and Critic Groups:** One sub-group is assigned a discussion topic for a tutorial and the other groups constitute 'critics' who observe, offer comments and evaluate the sub- group's presentation.

⁴ (<http://www.cdtl.nus.edu.sg/success/sl37.htm>)

⁵ (<http://www.cdtl.nus.edu.sg/success/sl37.htm>)

- 4) **'Teach-Write-Discuss'**: At the end of a unit of instruction, students have to answer short questions and justify their answers. After working on the questions individually, students compare their answers with each other's.

It was discovered that student created educational skits were great models for peer to peer education. Students delved into research on the benefits and steps to composting, and worked hard to develop appropriate mediums for delivering that information. While most of the skits developed were humorous, all of the incorporated well researched facts and specifics about composting. Basic skills such as writing, reading, speaking in front of audience, researching, and teamwork were utilized in this process.

The following worksheet can be used as a guide for students who are creating educational skits for their composting programs.

STUDENT CREATED EDUCATIONAL SKIT WORKSHEET

I. Basic initial questions

- What is the goal and objective of this skit?
- Who is the target audience? How large is the audience?
- How much time do you have to perform? What is the attention span of your audience?
- What medium will you choose (video, live skit, puppets)?
- Where will it be performed? How will this change your skit?

II. Creating the body of information

Once these questions are answered, decide 5 or less items that your skit will convey. List these items and refer back to them throughout the process to make sure you are reaching your objective.

For example:

- 1) **What** is composting?
- 2) **Why** our school should compost? (*ie: for the garden, redirects 30% of our school's waste from landfill*)
- 3) **Who** is helping to manage the compost at school? (*ie: the 8th grade environmental group*)

- 4) **How to compost at the school?** (ie: exactly what does the food waste bin look like, where it will go, no meat or dairy)
- 5) **Other pertinent information:** (ie: one person will get a prize every week for the best composting)

III. Writing the script of the skit

- What is the plot of the skit? Make sure there is a beginning, middle and end
- Who are your Characters? Consider using a hero or heroine, or an evil character? Is it a parody of a popular movie, TV show or other fable?
- Don't lose sight of your goal-to educate your audience about those 5 items.
- Repeat relevant information throughout the skit and again at the end. Audience members need to see or hear information at least 3 times to have it sink in!

IV. Tips for creating a successful skit

- Don't get too caught up in elaborate costumes- a little costume can go a long way. Let the audience use their imagination.
- Speak slowly and loudly. If the audience is laughing, wait until they finish before you continue with your lines.
- Face the audience at all times.
- Have someone introduce the skit, or follow up with some information at the end. For example, the 9th Grade Horticulture group is working to start a composting program. They will now present a skit entitled "Compost the Tots" which will teach you about how you can help compost at Union High School.

V. After the skit-reinforcement

- Have audience members interact with the actors- ie: ask them questions, have them sign a pledge.
- Reinforce information from skit on posters in the hall OR on provide information again on weekly intercom announcements.
- Use positive reinforcement through prizes-elect 1 person per week for an award.
- Have infrastructure changes immediately in place after the skit- ie: if you are composting-make sure the compost bucket and monitors are ready to go immediately after the skit.
- Make sure all necessary target audience members see the skit- don't forget the principal, food service and custodial staff, and community members and volunteers.

APPENDIX A:
Sample Composting Skit

(Courtesy of the Crosset Brook Middle School compost squad)

Scene 1:

(Cafeteria by the trash and compost bins)

Pedro walks up to trash bins and starts to put food waste in the trash can. Napoleon comes out of the trash can searching for food waste.

Napoleon: Don't throw the tots in the garbage. Compost the tots! (shows Pedro how to separate food waste)

Pedro: "You mean I can compost my tots, my lettuce, my apple core, my orange peels, the bread crusts from my sandwich?. "

Napoleon: You can compost all food waste except for meat and dairy products

Girlfriend comes up to the compost bins. She separates correctly and impresses Napoleon.

Napoleon: Did you know that I am the best composter in the school? I am the captain of the Prodigy Compost Squad! See my badge? Me and my squad mates will be overseeing the separation of food waste and the composting here at CBMS. We will be in charge of taking the food waste out to the compost bins behind the school. Each week, we will monitor the compost pile to make sure that the process is running smoothly.

Girlfriend rolls eyes and walks away.

Scene 2:

Family dinner at Napoleon's Grandmother's house. Grandmother and Uncle at dinner. Talking about how they ate too much quesadilla and now they will have to throw it away. **Grandmother:** I made too many quesadillas and now we

will have to throw them away!

Napoleon: You've got to compost the tots! And the quesadillas! Composting takes food that would go to the landfill and creates soil for your garden Grandma.

Uncle: My cyber-girlfriend, Lafonda, says that 20% of our landfills are made up of food waste that may never decompose! But how would we compost here?

Napoleon: We compost at school! (flashes compost squad badge) First you need an area about 4' by 4' to compost. Then you mix materials containing nitrogen like food waste (no meat or dairy products) with materials high in carbon like dead leaves and straw. It's not that hard, all you have to do is turn the pile to make sure it gets plenty of oxygen and that the pile stays moist. All the organisms that decompose these materials come and get the party started.

Grandmother: What would we use the compost for?

Napoleon: You could use it for your garden or to plant trees. You could even use it to grow more hay for Tina. She needs to go on a diet and she could use a little less casserole anyway

Scene 3:

All characters line up and receive their compost squad badge from Napoleon. Napoleon leads actual student audience in the recitation of the compost pledge.

Napoleon: Raise your right hand and repeat after me:

- 1. I promise to put my food waste in the compost bin, no meat and dairy products!**
- 2. I promise to spread the word about the benefits of composting and how it can reduce the trash going to the landfill.**
- 3. I promise to balance the browns and the greens to keep a healthy and happy compost pile.**
- 4. COMPOST THE TOTS! COMPOST THE TOTS! COMPOST THE TOTS!**

**APPENDIX B:
COMPOST FACT CARD SAMPLES**

True or false?

Only professional *experts* can make compost.

Answer: False! You do not have to be an expert to make compost. Composting just happens - it is nature's way of keeping our planet clean.

True or False?

A compost heap has to reach 140 °F in order for it to start the decomposition process.

Answer: False. Heat helps to make quicker compost, and to kill weeds and diseases. However, your compost may never heat up, especially if it is made over a long period. The compost can be just as good if it doesn't heat up, but it will take longer to be ready for us.

How long does it take to compost organic material?

- a) 6-8 weeks
- b) 1-2 years
- c) 4 hours
- d) a million years.

Answer: a or b. Compost can be made in 6-8 weeks, or it can take a year or more. In general, the more effort you put in, the quicker you will get compost.

In 4 hours one bacteria can grow into a colony of _____.

- a) 500,096
- b) 5,096
- c) 596
- d) 59

Answer: b) 5,096

Bacteria is a very important part of the compost. As bacteria eats, they can grow and multiply at an amazing rate. At the day's end, there are millions and billions of them working together. Why, in one spoonful of soil there are more bacteria and fungi than all the people on earth!

_____ is the process of breaking down dead plants, animals and animal waste into simpler nutrients.

- a) Sterilization
- b) Simplification
- c) Decomposition
- d) Sillyazation

Answer: c) Decomposition

_____ is the dark organic matter found in topsoil that consists of decayed organic matter.

- a) Humus
- b) Chocolate syrup
- c) Granite
- d) None of the above

Answer: a) Humus.

Humus is what we create when we compost. It is a nutritious material to use on our plants, and it helps prevent erosion.

Appendix C: Worksheet for Food Waste Separation Data Collection

Collecting and reporting this data is a crucial step in this compost bin program. This data helps you to know how much material you are keeping out of the landfill and turning into rich humus! In addition, it will help quantify your hard work and the need for continued composting assistance.

1. After approximately 3 weeks after the initial food waste separation has begun (or whenever your students and staff get comfortable with the process), set aside 3 normal days to collect food waste data. Do not use days that have special meals, like a Thanksgiving lunch.

2. Each day, record the weight and volume of the food waste. Some schools use 5-gallon containers to collect food waste. These buckets are a good tool for estimating the amount that is being diverted. Make sure that the food is lightly compacted in the bucket. When weighing the food waste, **make sure that you subtract the weight of the container that the food is in.** The food waste in a five gallon bucket could be around 20 - 30 lbs. You can use any scale that will weigh around this much. The center office might have a postal scale. Perhaps the science lab has a larger scale, though the scales tend to be smaller. The nurses station might have a scale for checking children's weights, or you could bring a bathroom scale from home. With the latter two, it may be more accurate to have someone hold the bucket, then subtract their weight.

	Weight in pounds (remember to subtract the container's weight!)	Volume
Day 1		
Day 2		
Day 3		
Average (add Day 1, 2 & 3. Divide by 3)		

3. Plug the average weight or volume into these equations:

a) Days per year that food waste is separated * average **weight** = estimated food waste diverted in 1 year

_____ * _____ = _____

b) Days per year that food waste is separated * average **volume** = estimated food waste diverted in 1 year

_____ * _____ = _____