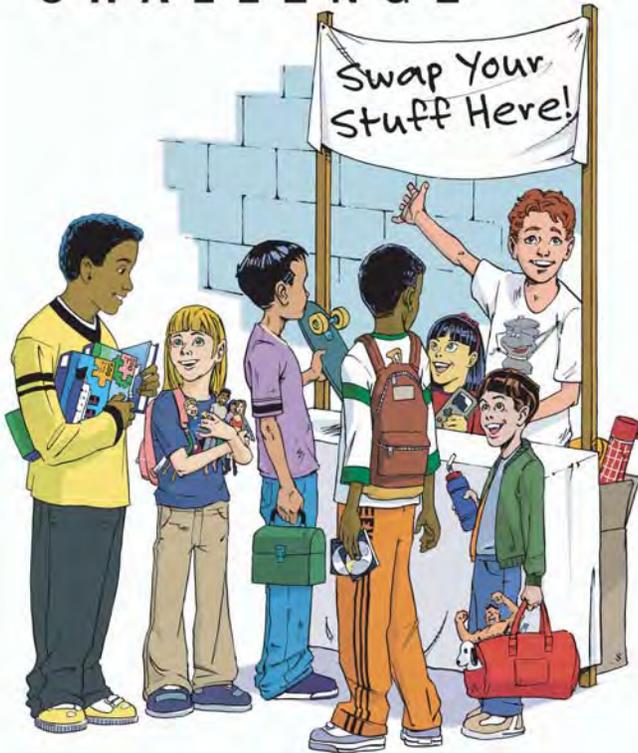


TrashMasters!™
REDUCE & REUSE
CHALLENGE



High School Division
Manhattan Borough
& Citywide Winner

Urban Assembly
NY Harbor School

2012 GOLDEN APPLE AWARDS

This certificate is awarded with the sincere appreciation and esteem of a grateful Department and City in recognition of your school's efforts to help make New York City shine.



City of New York
Department of Sanitation
Bureau of Waste Prevention, Reuse and Recycling
nyc.gov/wasteless



NYC Compost Project GOLDEN SHOVEL



Manhattan Borough
Master School Composter

Urban Assembly
NY Harbor School

2012 GOLDEN APPLE AWARDS

This certificate is awarded with the sincere appreciation and esteem of a grateful Department and City in recognition of your school's efforts to compost more and waste less.



NYC
recycle more,
waste less!

City of New York
Department of Sanitation
Bureau of Waste Prevention, Reuse and Recycling
nyc.gov/wasteless

Created and funded since 1993 by the Bureau of Waste Prevention, Reuse and Recycling, NYC Compost Project provides compost outreach and education to NYC residents, community groups, and landscapers in all five boroughs.



2012 Golden Apple Awards Contest Entry Judging Info

(This sheet prepared for judges' use by DSNY BWPRR)



ID Info: 12025
School: Urban Assembly NY Harbor School
Grade Division: HS
Borough: M

Golden Shovel Award contestant
(for borough Master School Composter)

2012 Project Entries received for:

School Population: total # 420

Core Group: **Total Participating:**

TrashMasters! Super Recyclers

Received:

TrashMasters! Reduce & Reuse Challenge

Received: 5/1/2012

5

420

Island Compost

The main objective of Harbor School's composting project was trying not to harm the school's beautiful environment on Governors Island. Harbor separates food, yard, and wood waste from shop class to create compost that is used as a fertile additive for the school's garden. The school used the compost to grow vegetables and fruits such as pumpkin, squash, and strawberries.

TrashMasters! Team Up to Clean Up

Received:

Prior Year Entries:

first entry

School Contact Information:

Phone: 212-458-0800 x2141
Address: 550 Wheeler Ave
Governors Island 11231

Block&Lot: 1000020001
DOE Location: M551
DOE Bldg: M877

REQUIRED for Super Recyclers only:

Custodian: Mike Sherock
Custodian's Phone: x1021
Custodian's Email: cm877@schools.nyc.gov

Sustainability Coord:

Contest Coordinator: Roy Arezzo
Coord Phone (if different): 718-852-5096 or x3092
Coordinator Email: rarezzo@nyharborschool.org

Principal: Nathan Dudley
Principal Email: NDudley@schools.nyc.gov

Comments (may not be relevant to judging)

RArezzo@schools.nyc.gov. Mailing address: 10 South St, Slip 7
10004

Info Confirmed:

6/27/2012

Deadlines: May 1st, 2012; Tuesday

REDUCE AND REUSE CHALLENGE

The Urban Assembly New York Harbor School Compost Program, Roy Arezzo, coordinator

Submitted by Rosaly Nunez, 11th grade

Why this? What type of waste did you target for reduction, prevention, or reuse in this project? Explain why.

*The type of waste that the Harbor Composting program targets is mostly organic waste. Specifically, we reduce the amount of trash exported off the island and we recycle kitchen prep waste and plate scrapings from the cafeteria. These waste and scrapings are mostly food. On a typical day this might include orange and banana peels, bagels, salads, onions and plenty more. This waste is then processed in an earth tub. Our Harbor composting program reduces organic waste and creates fertile additives for our garden. We mix in a fair amount of leaves, wood chips and yard waste from our garden and surrounding areas on Governors Island. Lastly, we recently started taking saw dust and scrap wood from the shop classes to increase the amount of waste we reduce.

What did you do? How did you reduce this waste?

*We reduced the amount of trash by collecting all of the organic waste in buckets that are located in the staff room, the kitchen, and the school cafeteria. We take all of this waste and chop it all up to create surface area, and then we dump it into the earth tub. When the organic waste is in the Earth tub, we add browns (wood) that gives the nutrients that the composting process needs. Therefore, we reduce the amount of food that is being trashed in the school and recycle it to make compost.

Project planning. Your objectives, and the planning and organization that drove this project.

*The Harbor School encourages the students to help out the environment. Some ways the school has encouraged students is by having compost interns and volunteer students promote the school by doing PowerPoint presentations about the importance of composting. They also posted signs all over the school about composting. The school is located on an island where trash has to be ferried off the island. It's not like we can handle the garbage like a regular school in the city. The main objective of Harbor School's composting project is trying not to harm the environment. We are surrounded by a beautiful island and we reuse, or recycle, this waste to grow our own food to eat. We have used the compost to grow vegetables and fruits such as pumpkin, squash and strawberries.

Student Involvement. All student efforts to plan and implement the project. Include activities conducted by classrooms, cluster, grade, school wide, team, club, or afterschool program.

*The student interns who run the composting program taught compost lesson plans to the Harbor School community and created signage for the school's kitchen and cafeteria to encourage students and staff members to separate their cafeteria waste for composting. Students apply to be interns (5 a

semester) and basically run the program. Student interns meet as a club twice a week after school. but each school day a different intern is in charge of processing the compost waste.

Promotion. Efforts to promote this project, such as announcements, memos, flyers, posters, letters, web pages, skits, songs, assembly programs, media coverage, or other special events.

*These student interns started creating significant signage to encourage students to compost. We have placed posters and flyers all over the cafeteria and hallways. We also put waste composting buckets in the teacher's lounge and the cafeteria. We have presented on the importance of composting and why it should be required for students at Harbor.

Collaboration. Any corroboration with other schools, professionals, businesses, or community organizations on this project. Did you solicit donations or help?

*The Harbor Foundation raised money for stipends for the composting intern students and a nonprofit organization called Earth Matter helped at the start the project in the year 2010. This year we are working towards being an in-house program that is run by students. Less adults are involved this year and each a different intern is in charge of processing the waste. We attended the Greenthumb Growtogether conference and had an educator from Brooklyn Botanic Garden come to meet with us about other compost projects around the city. We also met with GrowNYC about the possibility of collecting rain water. Ideally the program will be student run and we will raise our own funding.

Educational components. Include learning standards met, lesson plans, and exemplary samples of student work.

*Roy Arezzo, science teacher, has developed a lesson plan that is included in this application. We invite you to visit with our interns to see our signage and tour our facilities. Student interns work on projects each semester. One student designed a worm bin for the classroom. Other students worked on signs. Another project involved a new bin to store browns. This spring the interns are in the process of designing their projects. This application is part of a a project I am working on (Rosaly).

Each day we collect to monitor the state of the compost process (temperature), and we measure the volume and the mass of the waste. This data is used to measure how much waste we divert from a trip to a landfill. During the 2010-2011 school year, the composting program at Harbor school collected up to 35 pounds a day of organic waste and produced approximately 3-5 yards of compost for our garden.

ANALYSIS

What worked? What were the most successful aspects of this project?

*The most successful aspects of this was working all together as a team, and keeping the earth bin as healthy as possible. Adding wood chips in the composting bin was a successful fix when our compost cooled off and became too wet. We have done a good job of preventing bad odors and any ill feeling towards our compost area. In conclusion, since we started this program, the Harbor composting

program has produced 3-5 yards for of compost and involved over 400 members of our school community. We feel this is a very successful and magnificent achievement aspect of the project.

What didn't work? What were the least successful aspects of this project?

*The least successful aspects of this project were bad weather, and getting meat into the earth bin which was trying to be avoided. Bad weather was a least successful aspect because it made the organic waste in to earth tub get wet and really smelly. We has an outbreak of fruit flies during the warm weather in the late fall. These insects can get into our school which can get really distracting and annoying for the students.

Applicability to other schools. What advice would you give to other schools with similar populations who want to replicate your project?

*Advice I would give to other schools with similar populations who want to replicate this project is that it could be a lot of work but you can reduce waste by just starting with a worm bin in your classroom or hooking up with a local community garden. If they have space they should consider building a compost bin and experiment with separating waste in their cafeteria. Composting can be very fun if you are really down to earth and if schools are considering this they will be saving a lot of organic waste that is picked up as trash headed to landfill outside the city - this can make a huge difference and help the environment. I highly encourage these schools to promote themselves of what they do with composting so the community around them can be highly influenced into how to make the environment.

Measuring success. Describe how you measured the success of your project. Explain any impact on the students or community

*We measured the data collection of the temperature of the compost, which indicated the state of the compost, the volume of mass which estimated how much waste was being kept away from the landfill and if the soil that is being created in the Earth tub by the organic waste is good to grow food. One measurement of success is that the amount of waste we separate as a school increased from last year demonstrating that our program is reaching more students.

We will be presenting to other groups to teach more people about compost and spread the word. When people visit the island we give them tours of our compost system and garden.

GOLDEN SHOVEL AWARD

- Describe your school's indoor and/or outdoor composting efforts.
- Describe collaborations with outside organizations, including compost education.
- Explain if and how these composting efforts will be maintained on an ongoing basis.

- Could your school's composting efforts be replicated by other schools with similar populations? Please explain.

The school is located on an island where trash has to be ferried off the island. It's not like we can handle the garbage like a regular school in the city. The main objective of Harbor School's composting project is trying not to harm the environment. We are surrounded by a beautiful island that highly influences the Harbor community to be a lot more environmentally friendly and encourages their students to take care of the environment which is one major reason why the Harbor composting program exists. Harbor's compost program targets organic waste from the place in the school people have food.

We reuse, or recycle, this waste to grow our own food to eat. We have used the compost to grow vegetables and fruits such as pumpkin, squash and strawberries. Specifically, we reduce the amount of trash exported off the island and we recycle kitchen prep waste and plate scrapings from the cafeteria. Our collected organic waste gets chopped up to create more surface area, and then it is dumped into the earth tub which is the main source of our program, where the compost is processed through. When the organic waste is in the Earth tub, we add browns (wood) that gives the nutrients that the composting process needs. Therefore, we reduce the amount of food that is being trashed in the school and recycle it to make compost and fertile soil.

The Harbor Foundation raised money for stipends for the composting intern students. Roy Arezzo, the advisor of the composting program, created a lesson plan to help teach students about compost. We have regular data collection of the state of compost (temperature), and the volume of mass which estimated how much waste is being kept from landfill. During the 2010-2011 school year, the composting program at Harbor school collected up to 35 pounds a day of organic waste and produced approximately 3-5 yards of compost.

Harbor school's composting efforts could be replicated by other schools with similar populations because even if they do not have an earth tub, they're still able to compost through worm bins or other compost bin designs made from simple materials that can be researched online.

Golden Apple Award entries with composting programs may be entered in the ***Golden Shovel Award*** competition for your borough's Master School Composter, selected by the [NYC Compost Project](#).

To enter, check the box "We Compost" on the [Reduce & Reuse Challenge Contest Entry Submission](#): http://www.nyc.gov/html/nycwasteless/html/recycling/schools_goldenapple_RR-entry.shtml, and include answers to the following questions in your contest entry:

TOTES Stewardship Project Report: Waste Reduction through Compost, Grades 9-12

Main Concepts: The increase of the need for landfill space poses a major threat to our wetlands and water quality. Organic waste, such as food scraps, leaves and yard clippings, tend to make up as much as 30% of the urban waste stream. Reducing waste through composting makes good economic and environmental sense. This project report and the lesson plan below include some background on urban composting and a brief description of the project we are designing on Governors Island. The lesson plan will be used to educate the students/staff in compost basics and motivate participation in the project. Participation of the entire school community will be made possible through volunteer opportunities, internships and separation of organic waste in common spaces such as the garden, the aquaculture lab, the cafeteria and teacher's lounge.

Goals: In the fall of 2010, **The Urban Assembly New York Harbor School (NYHS)** moved to a new campus on Governors Island. The island, sitting between Manhattan and Brooklyn in Upper New York Bay, is a suitable location to monitor and learn about our harbor. Working on the island poses challenges – there is no road/bridge and thus everything comes off and on by boat. The island thus has limited vehicle traffic and affords us a great opportunity to model sustainability. In this vein, the school was designed with two in-vessel *Earth Tub* compost systems to reduce the amount of waste we export. Last year we began collecting food waste from the common areas of the school. By winter we were collecting approximately 25 pounds each school day – most of it from the kitchen prep area and the dining hall.

My goal is to assemble a team of students charged with decreasing the amount of waste we produce. We would like to experiment with composting weeds, meat and paper in addition to the kitchen scraps we currently take in. Our goal is to collect waste each full school day, starting in the fall. It is my hypothesis that we can increase separation so that we are diverting a minimum of 40 pounds (over 3 metric tons in a school year) of organic material a day from the waste stream.

To achieve this goal we will create a team of “master-composter” students (4-6 interns) that will participate in an after school internship, earning stipends for their work. To train youth “master composters” we will continue to partner with local greening groups and tap into their expertise. We have links to Brooklyn Botanic Garden, Earth Matter, GrowNYC and Green Map System. Through field trips and guest consultants we will learn how other compost systems operate. Interns will use the lesson plan below as a model to educate the entire NYHS community of approximately 500 Harbor staff and students in an attempt to increase participation in the project through signage, presentations, class visitations, workshops and staff development. Interns can use the lesson plan as a guide and modify it as is appropriate for the audience/length of presentation. They will create visual aids and use props to present compost basics. Interns will also be responsible for collecting and analyzing data on compost batches. In addition to research, education and outreach the students will learn how to operate and maintain the Earth Tub systems so that we are able to effectively manage the increased waste flow. The soil produced through the project will be used in our organic garden. NYHS receives a regular flow of visitors. It is possible to expand our project to establish the Earth Tubs and garden as a compost demo site to include volunteers, tourists and visiting educational institutions in the process of waste reduction. Part of our project will include presentations of our work to reach audiences outside the school through school tours (already in place), workshops and presentations. Interns will meet twice a week after school - some of this time will be used to assess and guide the direction of the project.

Stewardship Project Funds: Temperature is an important indicator in the compost process. Funds will be used to purchase more data loggers so that students can experiment with different bulking agents and compost batches. Data loggers will be used to monitor spikes/reductions in temperature to assess bacterial break-down of waste. Through temperature regulation and monitoring we are hopeful that we can increase our capacity to compost waste.

Time Line: The project will begin in the fall and run throughout the school year. We will recruit the compost interns the first week of school. By the end of September we hope to educate the entire school community about compost and our project – new kitchen staff will need training in separating waste. In October we will have finalized the volunteer schedule and work to increase separation. Throughout the fall we will collect data on the amount of waste collected and compost processing. In January we will recruit new interns as needed for the spring semester and experiment with different batches. By March we will start reporting on the results of the compost project. Students will create presentation materials in the form of posters, reports, power points or short films – interns will decide the best medium for outreach. We will present at the annual GreenThumb Growtogether greening conference and hold workshops in late spring.

Estuarine Principles:

1. Estuaries are interconnected with the world ocean and with major systems and cycles on Earth.
2. Estuaries are dynamic ecosystems with tremendous variability within and between them in physical, chemical, and biological components.

Standards: This project relates to the following National Science Education Standards: Unifying Concepts and Processes: Grades K–12 Systems, order, and organization/ evidence, models, and explanation.

Content Standards for Grades 9–12

Content Standard A: Science as Inquiry

Content Standard C: Life Science, interdependence of organisms; matter, energy, and organization in living systems; behavior of organisms

Content Standard F: Science in Personal and Social Perspectives; natural resources and environmental quality

COMPOST LESSON PLAN Background:

Since waste reduction and recycling are being explored as solutions to our nation's growing waste stream problem, we can afford our students the opportunity to become social and environmental activists by creating practical solutions for relevant world issues. As New York City residents/employees we need to be concerned with the increasing costs of dealing with trash. The last “dump,” the Fresh Kills Landfill unofficially closed at the end of 2001 and the city is still scrambling to resolve the issue of where and how to process our waste. The closing of this water front facility has reduced the cities’ ability to transport waste by barge, thus more trucks have been added to the already congested roadways. Some neighborhoods are more greatly impacted than others; the Bushwick, Greenpoint, and Williamsburg areas in Brooklyn (where our school first opened) increased the capacity to transport waste to 23 waste transfer stations following the closing of Fresh Kills. Many marginal neighborhoods in Queens and the Bronx are also negatively impacted by the transport of our city’s waste. To overt the burden of this garbage crisis, promote environmental justice and become less reliant on other States, reducing our waste seems like the only practical option.

Most students have heard of organic foods - compost is the main fertilizer ingredient for the soil of organic farming. It also is a form of “true recycling” in that it happens naturally and converts waste into a new product (soil). Many people confuse the separation of bottles, paper, etc with an act of recycling – the recycling process doesn’t happen until a new product is made from the waste they separate. Recycled products are created in industrial plants and require a fair amount of energy and water. It may be relevant to review the definitions of the terms “Reduce, Reuse and Recycle” before discussing compost. Compost is a form of recycling that can be done locally and with minimal environmental impact.

Compost lessons can be integrated into various curricula, including most branches of science, ecology, math, and social studies. Students participating in a compost program can polish their English language arts skills through oral presentations and letter writing campaigns. This document includes ideas for compost activities, content information, and vocabulary but there is much on the subject accessible to educators through numerous print materials, local greening groups and the internet. Harbor compost interns can be made available to assist in conducting these lessons and presentations. Educators may elect to modify and use these lesson plans to suit the audience and class they teach. A power point is also available for your use (20 minute lesson). Please help us keep the program thriving and increase environmental awareness by using class time to conduct compost lessons. As educators we are faced with the challenge of making this project work within the framework of an already full school day and your support is greatly appreciated and vital to the success of the project. Contact Roy Arezzo at x 3092 if you have any questions or would like to volunteer.

COMPOST LESSON PLAN

Aim: Why compost?

Objective: To reduce the organic waste stream in our watershed, learn about science through recycling and decomposition, and to create and enrich garden soil.

Learning Target: I will be able to outline the compost process and list three benefits of using compost

Motivation/Tips for teachers: Provide students with examples of organic materials in various stages of decomposition. Students are often motivated by observing the behavior of other living things. Have students observe various decomposers, such as, fungi, insects and worms. Bacteria are the greatest contributors to the decomposition process, but require a microscope for observation. Red worms are often used in vermiculture – we have a small worm bin which may be used to show students a small scale worm compost system. Finished compost is also available to show students the potential end product of separating organic waste (a product of their lunch scraps). PowerPoint slides are available to teachers to use in the classroom. You can take the students out to the Earth tubs and/or bring our worm bin into the classroom. Conducting a classroom or home waste audit is a simple way to get a sense of the type and amount of waste generated by your students while incorporating math skills into the assignment.

Materials: Various fruits and vegetables can be left out (or in container of soil) to rot to demonstrate this process. Finished compost can be used to compare raw materials with the recycled product. A small shovel can be used to dig up some soil/compost to observe compost critters through a hand lens or microscope. More ambitious classes can create their own worm bin out of wooden boxes or plastic containers. There are many sources for starting and maintaining a worm bin on the web. Links are provided at the end of this document.

TEACHING SEQUENCE/OUTLINE NOTES:

I WHAT IS COMPOST?

Compost is the end product of decomposing organic material. In nature, this material makes up the top layer of soil and is made up of rotting leaves, wood, dead organisms and animal wastes. This natural process is caused by decomposers such as worms, insects, fungi, protozoa, and bacteria, resulting in soil or humus which is rich in organic nutrients necessary for plant growth and reproduction. Composting involves a deliberate separation and storage of waste for decomposition in a given area. All food is made up of organic (living) material and thus can break down into soil. Paper, wood and yard waste can also be easily composted into healthy soil additives.

II WHAT IS THE PROCESS OF COMPOSTING?

The process of compost involves the work of living decomposers breaking down wastes and dead material. Students often find it practical to compare composting to recycling of other materials. Organics can be broken down into soil. The raw materials can be absorbed by plants, through the roots, and made into new organic plant parts. This organic material then moves through the food web and is returned to soil when wastes are produced or something dies.

Composting is influenced by many variables. Some include moisture, type/size of waste, temperature and pH. A cold or dry season can greatly slow down the decomposition process. In a deciduous region which has changing seasons, such as New York, it is difficult to estimate the rate of decomposition. In managed compost bins, temperature and moisture are two of the main variables that will influence the decomposition process.

The word composting is often used in relation to the intentional collection of wastes for decomposition in a contained area. Unregulated compost piles like ones seen in some yards will eventually break down but may take more time. Some gardeners mix grass clippings, manure, or coffee grinds into their garden soil, instead of using fertilizer, to improve the health of the soil. These materials can be mixed directly into the soil, buried in the ground or stored in a pile and often parallel the recycling of organic wastes that happens in nature.

Commercial or formal composting involves storing organics in aerated containers and maintaining the conditions of the pile. Most containers are stored outside and can be constructed with fencing material, wood, plastic, etc. Compost bin wastes are broken down by bacteria and/or worms but tend to attract many other decomposers and predators of decomposers. In order to properly maintain a compost bin, one should chop the waste and add dry brown materials to balance out the moisture. Poorly maintained bins can generate a bad smell and take longer to break down wastes.

Worm bins tend to be shallow so that the worms are close to the surface to access food. The worms of choice are red wigglers, which are a smaller relative of the earthworm. Red worms (*Eisenia fetida* and *Lumbricus rubellus*) are suitable for the temperatures characteristic of compost bins. Shallow worm bins typically do not heat up greatly. Worms are intolerant of very hot compost bins. Worm bin maintenance requires a gradual flow of food waste for worm, bedding material and periodic harvesting of worms/compost.

Bins designed for bacterial action tend to be a minimum of one square meter in size – generally this critical mass is ideal for “hot composting” and faster break down of wastes. To increase air circulation

one should turn their compost with garden tools and/or use screens and air tubes for air flow. Well maintained compost bins will generate heat (80 - 170 F) and break down organic material in as little as three weeks. Since bacteria “prefer” a balanced diet in order to efficiently break down waste, nitrogen-rich “greens” or fresh food waste should be mixed with equal parts of “browns” or dry carbon-rich wastes like leaves or wood chips. Once the pile cools down and waste is visibly broken up, the compost should be allowed to sit or “cure” for a few weeks before applying to living plants.

III. WHAT ARE THE BENEFITS OF COMPOSTING?

There are many benefits and reasons to compost waste. One of the focuses of this project is waste reduction. Students may be unaware of the volume of garbage our city generates – typical Americans generate about 5 pounds of trash a day. In any place where large groups of people live, space for garbage is always a concern. Due to the materials found in garbage, people prefer that it be dealt with at a great distance from the area they live.

In the past, garbage in the city was either dumped on land, in the ocean, or burned in incinerators. Due to environmental concerns, stricter pollution laws now prohibit burning garbage in cities and ocean dumping. Most of the garbage which is not recycled in New York is now sent to a sanitary landfill by the Department of Sanitation or private collection.

A landfill is a dump area which is dug out, lined and then filled with garbage in layers. Each layer is covered by various materials, including soil. Typically landfills are designed in low lying areas where less people live – wetlands often fit this description. Throughout our history, many wetland ecosystems have been filled in with waste, destroying important habitats and impacting local estuaries and water sources. The buried garbage of a landfill lacks sufficient air flow and thus materials rarely break down completely and/or in a timely fashion. Leaching of garbage juice can contaminate nearby soil and water. Noxious gases build up and are often piped into the air. Due to obvious environmental problems, landfills have expiration dates where they are closed down and capped. To date all New York City landfills have been closed, including the largest on the East Coast, the Fresh Kills landfill on Staten Island. Due to lack of planning and financial reasons the Fresh Kills landfill operated passed its saturation point and it has become a serious political issue. The city was hoping that the recycling of glass, plastic, metal and paper would greatly reduce the amount of garbage being sent to the landfill. Statistics indicate that the reduction in garbage by recycling efforts has not been as significant as once hoped. Since over thirteen percent of trash is food waste, composting is a potential way of increasing the recycling efforts. Other organics such as yard waste and paper make up a significant portion of the city’s waste stream, making compost a green solution to managing the waste stream. Cities like San Francisco and Boston have already created city-wide compost programs. Our city currently trucks trash to landfills as far away as Pennsylvania and Virginia for disposal. The further away the landfill the higher the economic and environmental costs.

Making soil is an obvious benefit of composting. Compost can be used to greatly increase the fertility of the soil. This not only helps plants to grow but also reduces wastes and saves money by decreasing the need to purchase soil and packaged chemical fertilizers. The structural make up of compost increases water retention, thus reducing the need for water. Compost is a necessary component of organic farming and gardening. Compost reduces plant pathogens and increases soil fertility. Compost is vital in urban areas where there is not enough natural soil to grow food.

IV HOW DO WE COMPOST AT HARBOR?

The UA NY Harbor School has two Earth tubs and one worm bin. Back in Bushwick days when we didn't have much outdoor space, the science classroom worm bin was used to reduce waste from the teacher's lounge. Since moving to Governors Island we have ramped up our compost operations and hope to do more. We maintain our worm bin for demonstrations but most of our food and garden waste now goes into the Earth Tub. The Earth Tub is an in-vessel system designed by Green Mountain Technology, an environmental company in Vermont. In-vessel bins are enclosed systems that require mechanical engineering to turn and aerate waste since they are typically too large to mix solely by hand. Our system has a small fan that draws air through a bio-filter (container of wood chips) to aerate the waste and reduce odor. To mix the waste we have an adjustable electric auger (which looks like a large corkscrew) attached to the rotating compost lid.

Waste is collected in specially marked buckets in our dining hall and teacher's lounge. The kitchen staff have their own buckets in the food prep area to separate waste. Students and staff are encouraged to separate all fruit, vegetable and coffee grounds into the buckets. It is permissible to put napkins and cooked food items like pasta, rice, breads and grains into the buckets. Shells from most foods are acceptable including egg shells and nuts. We avoid putting trash, liquids, dairy, large quantities of meat and grease into the compost buckets.

Each day trained volunteers bring the buckets of food waste to the Earth Tub after lunch. The bins load from the top and after volume, mass and temperature data is recorded, browns are mixed in as a bulking agent. Our sources for brown material include local leaves, wood chips and sawdust from the boatbuilding shop. The mixing is done 2-3 times a week. To mix we turn on the electric auger and then rotate the compost lid by hand to move the auger. The mixing requires 2-3 people and can take less than 5 minutes.

Our program is designed to engage all 420 plus students and 40 plus staff members in the process of waste reduction and composting.

Web References:

Cornell Extension http://aces.nmsu.edu/pubs/_h/h-164.pdf

Brooklyn Botanic Garden <http://www.bbg.org/gardening/composting/>

NYC Compost Project: http://www.nyc.gov/html/nycwasteless/html/compost/composting_nyc.shtml

Green Mountain Technology Earth Tub:

<http://www.compostingtechnology.com/invesselsystems/earthtub/>

Making a worm bin: <http://www.leaveitbetter.com/blog/composting-in-the-city/>

Book Reference:

Appelhof, Mary Worms Eat My Garbage, Flowerfield Enterprises, Kalamazoo, Michigan 1997
References

Updated: 8/25/11

Name _____ Class _____ Date _____

The compost project is ambitious but important way to truly recycle waste on site. Please take notes and use them to help promote the project by educating visitors, staff and follow students about compost.

I WHAT IS COMPOST?

II WHAT IS THE PROCESS OF COMPOSTING?

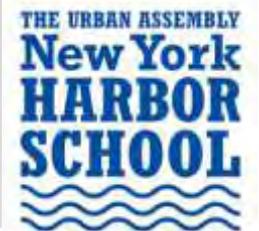
III. WHAT ARE THE BENEFITS OF COMPOSTING?

IV HOW DO WE COMPOST AT HARBOR?

Drawings/Diagrams:



COMPOST HAPPENS



Lesson Plan Outline

- Aim: Why compost?
- Objective: To reduce the organic waste stream, learn about science through recycling and decomposition, and to create and enrich garden soil.
- Learning Target: I can outline the compost process and list four benefits of using compost
- Teaching Sequence:
 - I What is compost?
 - II What is the process of composting?
 - III What are the benefits of composting?
 - IV How does *The Urban Assembly NY Harbor School* Compost?

I What is Compost?

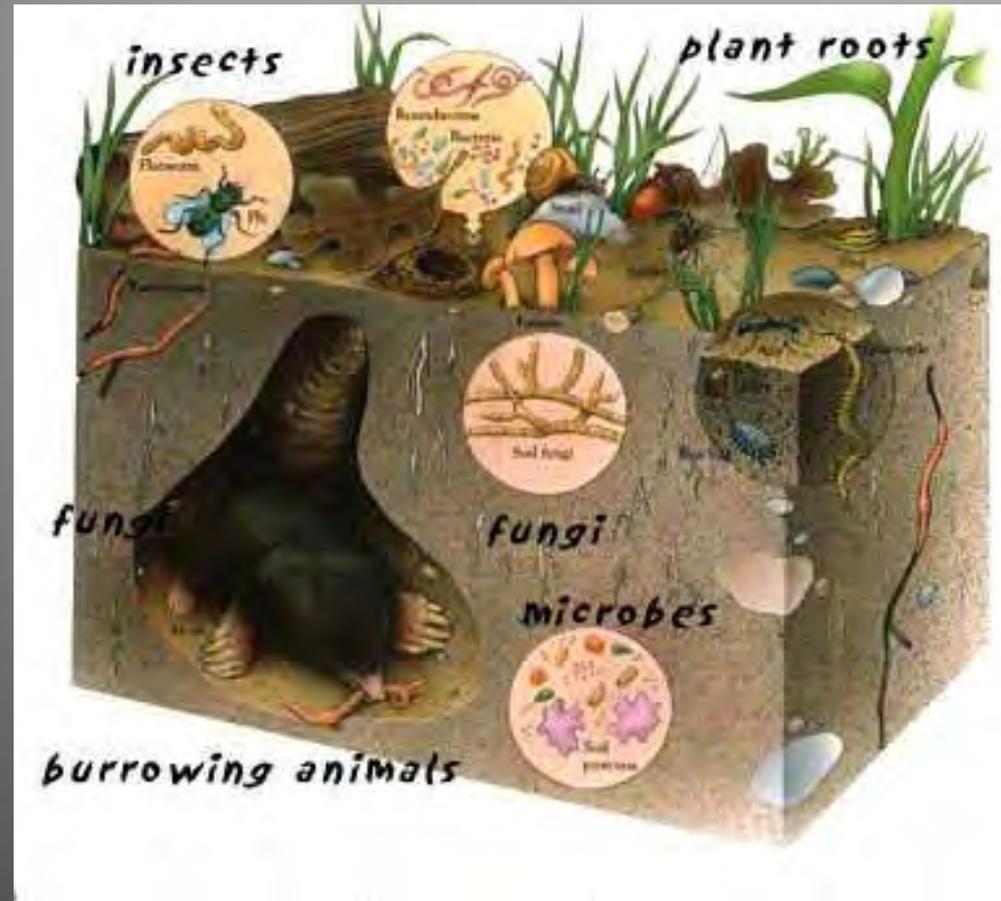
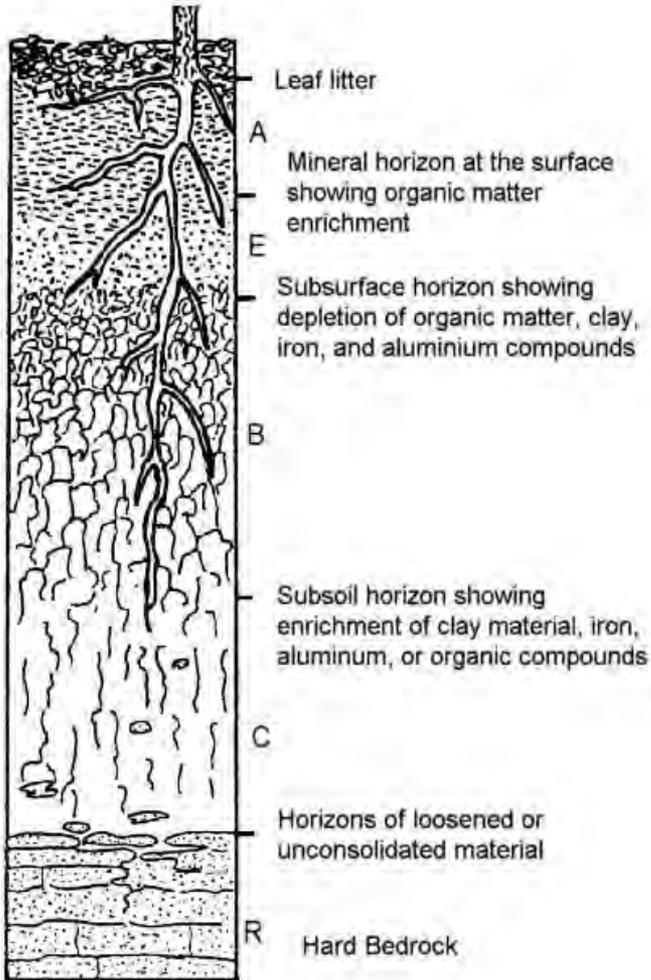
Compost is TRUE RECYCLING!

It involves the collection of organic waste for decomposition in a given area. The waste breaks down into the organic components of soil.



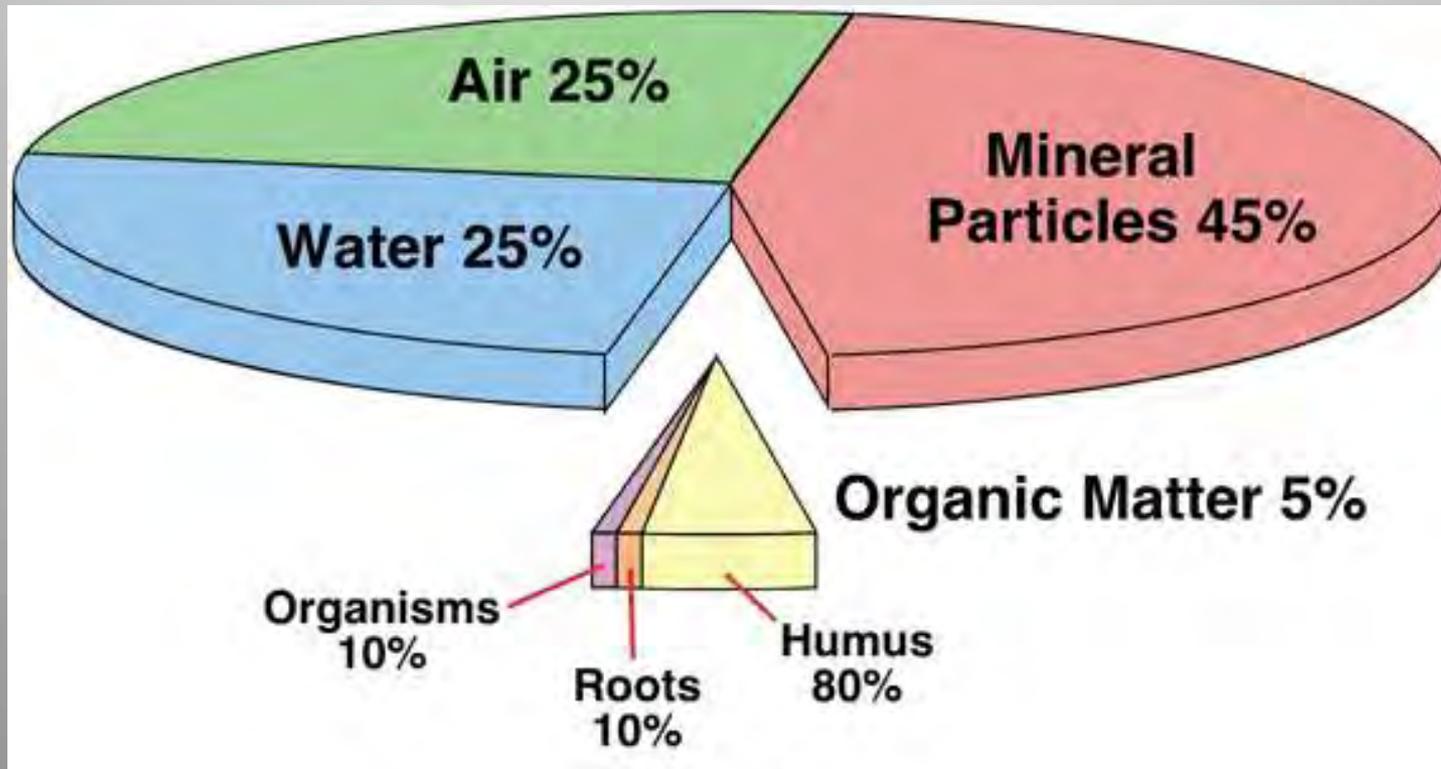
I What is Compost? Life in the soil

Soil Profile



I What is Compost?

Looking at soil – soil is a mixture, made up of the following:



I What is Compost?

Inorganic parts of soil

Mineral Particle	Size
Sand	0.05-2 mm
Silt	0.002-0.05 mm
Clay	<0.002 mm

I What is Compost?

Looking at trash: What is in our waste stream?

ORGANIC WASTE

Food waste

Yard waste

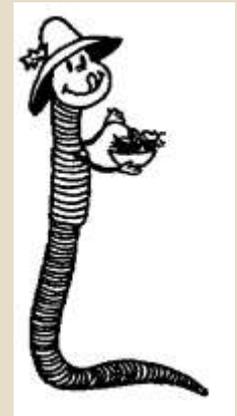
Sewage

Paper

Wood



II What is the process of composting? Main Decomposers in Compost



II What is the process of composting?

Variables that affect decomposition:

- air
- moisture
- temperature
- pH
- space and time
- ratio of carbon/nitrogen



II What is the process of composting? Worm Bins are smaller units and tend not to heat up



II What is the process of composting?



Compost Bins:
Passive Systems designed for bacterial break down

II What is the process of composting?



Large Scale In-Vessel Compost

III What are the benefits of compost? Less is More



III What are the benefits of compost?

- REDUCE

- waste

- truck traffic

- landfill space

- methane production

- chemical fertilizers

- run off from waste

- packaging materials

- INCREASE

- amount of fertile soil

- amount of nutrients (slow release)

- moisture retention



III What are the benefits of compost? Organic Fruits and Vegetables! Soil for the Garden!



IV How do we compost at Harbor? Separation and Collection

DINING/MESS HALL



KITCHEN



IV How do we compost at Harbor? Waste from the Kitchen Prep Area



IV How do we compost at Harbor? THE PROJECT begins with YOU! We need you to separate your waste



Look for our buckets in the
dining hall



Buckets get transported to compost
bins and reset for the next day

IV How do we compost at Harbor?

Chopping waste increases surface area for bacterial break down



IV How do we compost at Harbor? Loading the bin



IV How do we compost at Harbor? Mixing the waste



IV How do we compost at Harbor? Scientific Monitoring and Data Analysis



IV How do we compost at Harbor? Inside the Earth Tub



IV How do we compost at Harbor?

ACCEPTABLE CAFETERIA WASTE	DO NOT PLACE in COMPOST BUCKET
Old Fruit, Fruit Peels, Apple cores, Seeds and Pits	Liquids
Salad Bar Scraps	Dairy
Veggie Scraps	Trash
Pasta , Bread, Rice, Pizza and Grains	Plastic
Egg and Nut Shells	Excessive Meat
Napkins, Shredded Paper	Excessive Grease
Coffee Grounds/Tea Bags	Students

IV How do we compost at Harbor?

For Internship/Volunteer Opportunities
contact Roy



Compost Interns Needed this Fall!

Work 2 X a Week

See Roy in 309/310 for application



Can you do better than this guy?

Internship FALL 11: Emptying Finished Compost from last year's waste and setting up for fall!



New Signage and Compost Area



Internship 2011: Fall Harvest

