

# A School Waste Reduction, Reuse, Recycling, Composting & Buy Recycled Resource Book



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[www.dec.ny.gov/chemical/294.html](http://www.dec.ny.gov/chemical/294.html)

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## INTRODUCTION

The purpose of this Resource Book is to provide you with basic information and ideas on a waste reduction, reuse, recycling, composting and buying recycled products and packaging programs for your school.

The office that is responsible for the oversight and management of solid waste is the likely candidate to be responsible for the waste reduction, reuse, recycling and composting. Your procurement office should be responsible for the purchasing of recycled products and packaging.

All directives concerning this program need to come out of the Superintendent or Principal. If everyone knows that upper management is behind this program you will have better participation. But everyone should be involved... students, faculty, custodial staff, office staff... everyone!

Here is a summary of our school educational materials and programs:

### **New York Recycles! Poster Contest**

<http://www.dec.ny.gov/education/32506.html>

New York Recycles is our way of promoting recycling and buying recycled in New York State. The twelve New York State winners receive the honor of having their artwork in a calendar which will be distributed throughout the State. The schools with winning entries will also receive a recycled content tote bag filled with educational materials and videos. The 2012 NY Recycles! Poster Contest Rules will be available on our website soon.



### **New York Recycles Green Schools Challenge**

<http://www.dec.ny.gov/chemical/43349.html>

The New York Recycles Schools Challenge is sponsored by the New York State Department of Environmental Conservation and the State Department of Education to recognize those schools that are working towards responsible solid waste management by developing waste reduction, reuse, recycling, composting and/or buy recycled products and packaging programs. Information on the 2011-12 New York Recycles School Challenge is on our website.

### **Green Schools**

<http://www.dec.ny.gov/chemical/8803.html>

This website will help you on your journey to become a Green School! The focus of this webpage is a comprehensive solid waste management program; however, here are areas to consider that will help further your transformation to a Green School.

### **Teacher and Student Activity Book**

<http://www.dec.ny.gov/chemical/9109.html>

For a booklet with a variety of for student activities, visit our website.

## BACKGROUND

According to our latest numbers, New Yorkers generates over 4.0 pounds of waste per person each day. There is a tremendous cost to both society and the environment to collect and dispose of this waste material. The advent of widespread recycling has changed the way many of us view our trash. Instead of a useless "waste", we have come to realize that much of what we once threw away can be used again many times over.



New York State addressed our garbage problem in the March 1987 and again in the January 2011 New York State Solid Waste Management Plans. The original plan established a way to address the State's solid waste problem. The hierarchy is as follows:

- first, to **reduce** the amount of solid waste generated;
- second, to **reuse** material for the purpose for which it was originally intended or to **recycle** material that cannot be reused;
- third, to **recover**, in an environmentally acceptable manner, energy from solid waste that cannot be economically and technically reused or recycled; and
- fourth, to **dispose** of solid waste that is not being reused, recycled or from which energy is not being recovered, by land burial or other methods approved by the DEC.

The 2011 New York State Solid Waste Management Plan established a goal of 0.6 pounds of waste per person per day by 2030.

Each municipality was required by to have a recycling law or ordinance requiring source separation of recyclables by September 1, 1992. The municipalities developed a recycling program that fit their needs and met the goals established by the State. Each municipality has their own penalties or fines for those people who do not recycle.

Recycling is required for everyone who generates garbage in New York State. Recycling is one part of a total solid waste management program; waste reduction and reuse take precedence in a comprehensive solid waste management program.

## MOVING BEYOND THE MANDATE



In accordance with the Solid Waste Management Act of 1988, New York schools must recycle right along with other municipal agencies, residents and businesses. It is important not only that schools make certain that their program meets the requirements of the law, but that they do not send young people mixed messages by having them recycle one thing at home but not at school. Many municipalities have gone far beyond what is required and recycle many additional items for which they are able to find markets. As more and more industries start to use recyclables as a raw material to manufacture new products, it may be possible (and financially

beneficial) to recycle many items that we may currently throw away. What follows are some suggestions as to how you might improve an existing school recycling program.

**Evaluate Your Current Recycling Program.** Review your current recycling program. Make certain that you are recycling all of the items required by your local law. If you are not, meet with your hauler and custodial staff to get your school in compliance. Conduct a waste audit to evaluate what materials you generate and where they are generated.

**Contact Your Municipal Recycling Coordinator.** Your city/town probably collects many recyclable items. Your local coordinator may be able to provide you with information on what is mandated in your community and how to prepare these items. You can find a list of recycling coordinators at [www.dec.ny.gov](http://www.dec.ny.gov)

**Take a Long Look at Quality.** Because collected recyclables are a raw material for industry, they must meet manufacturers' specifications just like any other raw material. This means that quality does count. Improperly prepared recyclables may lose value or become so contaminated that they cannot be recovered and must be disposed of as trash instead. For example, the addition of a broken ceramic cup or Pyrex dish to a truck load of glass containers at a glass recycling plant may result in rejection of that entire load. Recyclables contaminated with food residue may cause odor or pest problems. Thus it is important that school staff and students are reminded on a regular basis of the proper items and the correct methods of preparation.



**Make Waste Reduction a Priority.** Reducing waste whenever possible results in even more environmental benefits than recycling. See "Tips on Waste Reduction" for some ideas on how you can reduce waste at your school and save money at the same time.

**Evaluate Your Purchasing Habits.** For recycling to be successful, we must all work to create markets for those products that are made from recycled materials. All sorts of paper products, office supplies and playground equipment are now made from recycled materials. The cost of these products is competitive with products made from new raw materials and quality is not only comparable, but is better in some cases. Schools, and any municipal agency, can buy these products from state contracts for further cost savings.

**Publicize Program Success.** It is important that everyone have an opportunity to see the results of their efforts. Utilize your school newsletter or social media to let everyone at the school know how they are doing, i.e., how many tons of paper were recycled, revenue from returnable cans, natural resources saved, etc.

**Make Recycling an Integral Part of Your Curriculum.** This booklet contains many suggestions for how you might integrate recycling into your regular classroom activities including: integrate composting into your science program, the poster contest into your art program, collecting reusables as a community service project, etc. We hope that you and your staff will view recycling as an opportunity to teach young people the importance of stewardship of natural resources.

## TIPS ON WASTE REDUCTION

Although recycling is an important part of any waste management strategy, the greatest environmental benefits are achieved through source reduction and reuse. Consider a simple example; we can reduce trash disposal and save raw materials if we collect plastic grocery bags for recycling and incorporate them into a new product such as plastic lumber. However, a better option would be to take no bag at all, as no natural resources or energy are used to first produce, then collect and reprocess disposable bags. Using a reusable canvas or string bag would have similar environmental benefits as the bag could replace thousands of disposable bags over its useful life. Any organization reviewing their waste management strategy should first consider ways to reduce waste and incorporate reusable products to achieve the maximum benefit to the environment.

We hope that you will consider some of the following suggestions to reduce the waste stream generated by your school. Your efforts may provide the additional benefit of saving money as well. Remember, even small changes can make a big difference!

- Make double-sided copies whenever possible. This can dramatically reduce your paper usage.
- Instead of making individual copies for everyone, use a routing slip when circulating information to staff, or post notices on a bulletin board. Better yet, an electronic bulletin board.
- Use reusable envelopes for interoffice mail.
- If applicable, use electronic mail instead of making hard copies of all communications.
- Request staff remove their name(s) from junk mail lists.
- If possible, limit the number of subscriptions to periodicals and share them. This will reduce both trash and subscription costs.
- Arrange to have a vendor collect and recharge empty laser printer toner cartridges. Such cartridges can be recharged several times, saving money and reducing waste generation.
- Encourage the reuse of office supplies, i.e. paper clips, rubber bands and brass fasteners, etc.
- Use scrap paper for messages and make your own scrap pads.
- Require suppliers who deliver products on pallets or in metal drums to take them back.



- Have your cafeteria switch to reusable utensils and dishes instead of throwaways whenever possible. Investigate the possibility of switching to refillable containers for milk and juice.
- Purchase reusable and washable cleaning cloths, aprons, tablecloths, etc., rather than single-use disposable products.
- Buy institutional sizes of "green" cleaning supplies, food products, beverages, etc..
- Buy recycled content paper products, like, copier paper, paper towels, napkins, toilet paper.

## REUSE TIPS



You may also want to incorporate reuse into special projects or activities at the school. A few examples of this type of project are listed. Hold a "SWAP DAY". Have student bring in items from home to swap with other children. (Of course parental permission will be needed.) You may want to limit the types of items that can be brought in to items such as books or small toys to facilitate "even" trading. This can be part of a history lesson in the development of trade and monetary systems.

- Collect other reusables such as clothing for local charities.
- Maintain a free listing service of used musical instruments and sporting equipment in your school newsletter. Parents will appreciate this effort! It may encourage some children to try an activity that their family might not be able to otherwise afford.
- Incorporate the use of reusables into your art program. Host a sculpture contest in which the children make their creations from items that would have been recycled or thrown away. This can be fun even without the added incentive of a contest.
- Incorporate the use of reusables into your science program by hosting an inventors fair. Have the children design some machine or other contraption from found items. You will be amazed at what the children come up with!
- Establish a bird feeding/observation area with feeders made from containers that have already been used once for another purpose such as milk jugs, paper milk cartons, soda bottles, etc. Establish a site where these feeders can stay for an extended period of time. Allow the children some observation time to record which birds frequent the different feeders.

## RECYCLING



All schools must recycle what is mandated in their community. A basic recycling program would include paper, metal, glass, and plastic, but there is much more to consider. The following provides you with information on the basic recyclables and other recyclables to consider.

The best way to develop a recycling program is to conduct a waste audit to see what materials you generate and where they come from. Email us at [recycling@gw.dec.state.ny.us](mailto:recycling@gw.dec.state.ny.us) for our waste audit manual.

Many communities in New York State are going from dual stream recycling (two recycling sorts) to single stream. Check with your waste hauler or local recycling coordinator to determine which program you have access to or if you are a large university, consider marketing materials yourself.

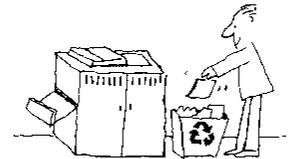
### MATERIALS TO RECYCLE

#### PAPER

Paper constitutes the largest single component of the municipal waste stream - over 1/3 by weight. Markets exist for many types of waste paper. Remember, collecting paper for recycling is only half of the cycle. You need to have a proactive purchasing program to buy paper made from post-consumer recycled materials. Recycled paper is available in all types with quality and pricing comparable to paper made from "virgin" raw materials.

The four categories of paper that are most relevant to school recycling programs are:

- **High-grade white office paper** includes white typing, writing, and copy paper, white scratch paper, index cards and computer paper.
- **Mixed office paper** is recovered from offices and schools in an unsorted but clean form, and usually includes white, colored, glossy, junk mail and magazines.
- **Corrugated cardboard** is used to ship merchandise. For maximum value, contaminants such as polystyrene, packing materials, plastic-coated cartons and other debris should be removed.
- **Old newspapers** (can include telephone books) should be kept clean and dry.



Paper markets fluctuate with supply and demand. When the supply of paper is plentiful, markets retain suppliers of high quality materials who can guarantee large tonnages of paper free of contaminants. Therefore, it is advisable to design your program to maximize both quality and quantity of the waste paper collected.

#### GLASS, PLASTIC & METAL

All schools should have a program to recycle all plastic, glass & metal food and beverage containers. This includes both the containers generated during food preparation as well as those generated by vending machines, lunches brought to school, etc. Since these items are also collected in much

larger quantities from homes in every community, your school may want to use the same collection and processing system that serves local residents. More information on plastic and metal recycling can be found in Appendix A.

### CONSTRUCTION AND DEMOLITION (C&D) MATERIALS and SCRAP METALS

C&D materials and scrap metals can be a big part of your waste stream and should be recycled. Check with your local recycling coordinator for more information on recycling options.

### SPECIAL WASTES

- [Asbestos](#) - General information from federal, state and local agencies involved in regulating asbestos containing material, including abatement, removal and transportation.
- [Creosote](#) - General information on creosote and products treated with or containing creosote, including Frequently Asked Questions and a brief description of Article 27 Title 25 of the New York State Law.
- [Lumber Pressure Treated With Chromated Copper Arsenate](#) - Information on lumber that has been pressure treated with chromated copper arsenate (CCA).
- [Regulated Medical Waste](#) - Information on Regulated Medical Waste in New York State.
- [Waste Tires](#) - Background information on waste tire stockpiles, including legislation and tire fire information.
- [Fluorescent and HID Lamps](#) - New York State-fluorescent lamps as hazardous waste and universal waste
- [Used Oil](#) - Information on used oil regulation in New York State.
- [Used Electronic Equipment](#) - Due to rapid changes in technology, electronic equipment quickly becomes out of date. NYSDEC provides guidance and regulatory information on the reuse, recycling, and disposal of used electronic equipment.

More information on Special Wastes can be found at this website - [www.dec.ny.gov/chemical/8480.html](http://www.dec.ny.gov/chemical/8480.html)

There are new laws in New York State for Electronics and Rechargeable Battery recycling, see Appendix B.

### OTHER RECYCLABLES

The following are other types of wastes that can be reuse or recycled:

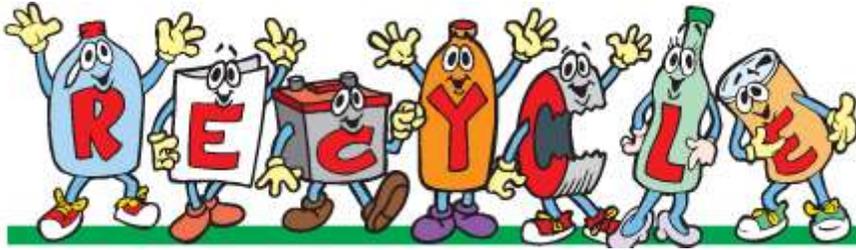
- |                                 |                            |
|---------------------------------|----------------------------|
| Disks (3.5)                     | Smoke Detectors            |
| CD's                            | Styrofoam Peanuts (reused) |
| Ink Jet Cartridges              | Toner & Printer Cartridges |
| Fluorescent Lights and Ballasts | Tyvek Envelopes            |

Check this website to find out where these materials can be recycled - [http://www.dec.ny.gov/docs/materials\\_minerals\\_pdf/oddr recyclables.pdf](http://www.dec.ny.gov/docs/materials_minerals_pdf/oddr recyclables.pdf)

You can also reduce waste by getting off junk mail and catalog lists.



Your Fleet Management should also collect for auto fluids (oil, antifreeze), tires and car/truck batteries.



## COLLECTION OF RECYCLABLES

It is essential that your collection system be as convenient as possible. In general, you should have recycling containers wherever you have trash containers. Good signage is also extremely important. Special recycling containers are available which have slots or small holes ideally designed to only accept a certain material. For example, some have a round hole for cans, others a narrow slot designed to take only newspapers. Outdoor dumpsters should be locked to minimize contamination.

Evaluate all areas of your school that generate waste and recyclables: dorms, offices, labs, athletics, etc.

Make sure you renegotiate your waste contracts when you implement or expand your recycling and/or composting program.

## COLLECTION SERVICE

Whether your collection service is provided by your town, a private hauler or the school itself, it is important to design a system that works well with the materials you generate and the needs of your school. This becomes important when you are deciding on the size, number and location for consolidating disposal and recyclable materials. Please note, it is illegal for a hauler to take trash commingled with recyclables and separate them at a later time.

## NUMBER & TYPE OF COLLECTION CONTAINERS

You will also need to determine the number and location of waste and recycling bins. Again, you should have recycling containers wherever you have trash containers and good, clear signage is extremely important. There is a wide variety of recycling bins and you should choose ones that fit your campus. It is important to be consistent - same type and color across the campus makes education of students and staff easier.

## EVENT RECYCLING

Don't forget about event recycling - football games, concerts, etc. Because many special events occur outdoors, and often take place in public spaces, planning is particularly important to ensure the success of a recycling program at a special event. See Appendix C.

## GREEN MEETINGS

Green meetings or Green conventions are conducted in ways which minimize the environmental impact imposed by such activities. Green event planners apply environmentally preferred practices to waste management, resource and energy use, travel and local transportation, facilities selection, siting and construction, food provision and disposal, hotels and accommodations, and management and purchasing decisions for a conducting a more sustainable gathering. For more information on green meetings see Appendix D

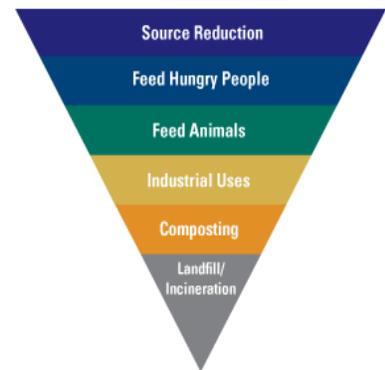
## EDUCATION & OUTREACH

Educate your students, faculty and staff. As with all recycling efforts, the education process should be ongoing. Utilize school newsletters, social media, etc to provide regular updates. Again, consistency in your message is important! See Appendix E for more information on education programs. Also see Appendix F for information on NY Recycles and the poster contest and calendar.

## COMPOSTING

Organic materials make up between 25-30% of the waste stream. Organics include items such as grass clippings, yard trimmings, leaves, food scraps, etc. Actually, most of these materials need not be considered waste at all. They can easily be transformed into a useful soil amendment through a process called composting. Check out our website - [www.dec.ny.gov](http://www.dec.ny.gov)

Schools are encouraged to reduce their food waste by separating excess food for donations and composting the remainder. Reducing, donating and composting excess food can have a major impact on "greening" both your financial bottom-line and the environment. See more in Appendix G



### Why compost?

By composting food scraps and yard trimmings, you can avoid the high costs of commercial collection and processing programs for these items. The following steps are guidelines for developing a composting program.

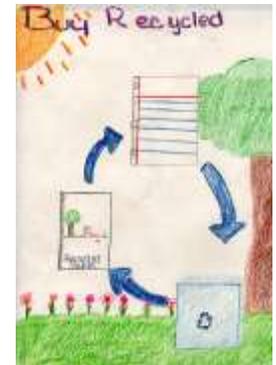
- Step 1. Evaluate where compostable materials are generated.
- Step 2. Decide on a composting system that fits your needs. Static pile, in-vessel, etc.
- Step 3. Determine your collection options
- Step 4. Evaluate your transportation options.
- Step 5. Determine how the project will be funded.
- Step 6. Provide outreach and education.
- Step 7. Audit your program for contamination issues and improvement options.
- Step 8. Use your compost.

Composting is a great way to integrate real world situations and environmental issues into your school program. For more information on institutional composting, check [www.cwmi.css.cornell.edu/](http://www.cwmi.css.cornell.edu/)

## CLOSE THE LOOP

For recycling to be successful, it is essential that we not only separate materials for recycling, but also purchase products and packaging made from recycled material. Concerns about quality and price have caused many people to avoid buying products made with recycled materials. However, as the use of recycled materials as feedstock has become more common, the quality of recycled products has increased and the price has decreased.

When choosing to support recycling through your purchasing procedures, it is best to have a policy to request that products have the highest percentage of **post-consumer** content possible. For example, 100 percent post-consumer recycled paper is available and is cost competitive.



**Post-consumer** materials are products or packages used by a consumer and then recycled. Purchasing these products will help create markets for the recyclables collected in your town.

Products with **pre-consumer** recycled content usually contain industrial scrap that has been recycled within the factory where the product is made. This practice has been common for some time.

What follows is a listing of some of the more common products made from post-consumer recycled materials that might be used in a school setting. Remember, your school can take advantage of existing state contracts that have very favorable prices for many recycled products.

Item Recycled	Examples of New Products
#1 PET water and soda bottles	Carpeting, T-shirts, fleece jackets & hats, fiberfill for gloves, jackets & sleeping bags
#2 HDPE milk & water bottles	Envelopes, protective wear, new containers
#4 LDPE - grocery bags	Composite lumber used for decks, fencing, outdoor furniture
White office paper	Recycled office paper (ask for 30% post-consumer content)
Magazines, junk mail & catalogues	Tissue paper, toilet paper, paper towels and paper napkins
Steel cans	Any steel product - cars, cans, refrigerators, etc.
Aluminum cans	Any aluminum product - door/window frames, cans, etc.

Item Recycled	Examples of New Products
Corrugated cardboard	Linerboard for new boxes
Newspaper	Newspaper, egg cartons
Mixed Paper	Cereal & cookie boxes
Glass bottles	More glass bottles, fiberglass insulation, glassphalt
Clothing	Carpet backing, rags, recycled content clothing
Motor oil	Re-refined motor oil

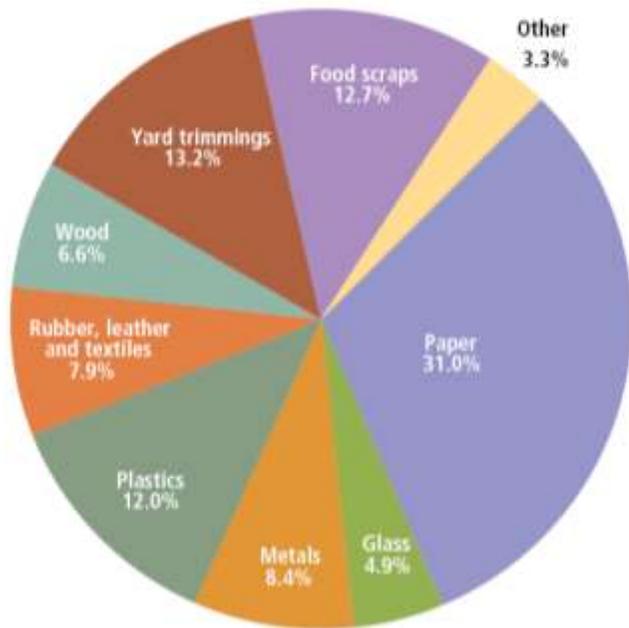


## SUMMARY

We hope you found this Resource Book helpful. Waste reduction, reuse, recycling, composting and buying recycled are important not only for saving energy and resources, reducing pollution, saving landfill space but also for creating jobs and reducing your waste management costs.

If you have any questions, please contact us at 518-402-8706 or by email at [recycling@gw.dec.state.ny.us](mailto:recycling@gw.dec.state.ny.us)

Figure 5. Total MSW Generation (by material), 2008  
250 Million Tons (before recycling)



What is in your trash!



## APPENDIX A - GLASS BOTTLES, METAL CANS & PLASTIC

All schools should have a program in place to recycle all glass & metal food and beverage containers. This includes both the containers generated during food preparation as well as those generated by vending machines, lunches brought to school, etc. Since these items are also collected in much larger quantities from homes in every community, your school may want to use the same collection and processing system that serves local residents.

### Why recycle glass & metal food containers?

- Throwing these items away is a waste of natural resources. Aluminum cans, steel cans and glass bottles can be readily made into new cans and bottles without any loss in quality. Thus the same natural resources can be used many times over, instead of always mining for new natural resources.
- As a general rule, the manufacturing of new consumer goods from recycled materials uses less energy and creates less air and water pollution than using new natural resources. Aluminum is a very dramatic example of this, as it takes 95% more energy to make an aluminum can from bauxite than it does to make that same can from recycled aluminum.
- Some of these cans and bottles may be returnable. If your school has a soda/water machine, these cans and bottles can be redeemed.

### How are glass & metal food and beverage containers made into new containers?

When aluminum cans are recycled they are simply "melted" and new aluminum is made. Steel cans are detinned, the tin is reclaimed and the rest of the can is recycled into new steel. Glass containers are separated by color, then crushed into "cullet", and then mixed with some new raw materials (sand, soda ash, limestone) and then made into new containers.

### How do you prepare bottles and cans for recycling?

All bottles and cans should be rinsed out.

### How do you design an efficient collection system?

It is essential that your collection system be as convenient as possible. In general, you should have recycling containers wherever you have trash containers. Good signage is also extremely important. Special recycling containers are available which have slots or small holes ideally designed to only accept a certain material. For example, some have a round hole for cans, others a narrow slot designed to take only newspapers. Outdoor collections bins or dumpsters should be locked to minimize contamination.

### **How do you work with your collection service?**

Whether your collection service is provided by the town or you contract privately to have your trash and recyclables removed, it is important to work with your hauler to design a system that works well with your pick-up schedule. This becomes important when you are deciding on the size and number of containers needed to properly store all of the materials that you generate between pick-ups. It is important to minimize glass breakage to the extent possible.

**Remember** that municipalities are required by state law to "provide for separation" of recyclables. It is illegal for your hauler to take trash commingled with recyclables and separate them at a later time. Although some materials may be stored together (such as bottles & cans) without contaminating one another, common sense tells us that if certain materials are to be recycled then some pre-segregation is necessary to prevent contamination of the collected materials. For example, if cafeteria and other wet waste are mixed with any type of paper, the paper materials will become contaminated and unfit for recycling.

### **What else is important?**

Educate your students, faculty and staff. As with all recycling efforts, the education process should be ongoing. Utilize your morning announcements and school newsletter to provide regular updates. Have a poster or logo contest to kick off your program.

## **PLASTICS RECYCLING**

Although plastics make up only nine (9) percent of our waste stream, that amount continues to grow, as does the public's interest in recycling as much of this material as possible. What follows are answers to some of the most commonly asked questions about plastics recycling.

### **What is plastic?**

The word "plastics" comes from the Greek word it "plastikos", which means "to form". Almost all plastics begin as fossil fuels - mainly petroleum, natural gas and coal. Plastic manufacturers refine, heat, pressurize or treat these fuels with catalysts to convert them into simple chemicals, called monomers, such as ethylene, propylene, etc. These monomers are then treated with heat, pressure and a wide range of chemicals in a process called polymerization. The process combines simple monomers into ever-increasing chains called polymers, or plastic resins. The wide variety of resins and additives account for the wide range of products made from plastics.

### **What type of information does the container code system provide?**

In 1988, the Society of the Plastics Industry introduced a container coding system to help make separation of the different resins easier. The system identifies the six most common thermoplastic resins by a number either stamped or molded into the plastic (#1 -6). Mixed resins are identified by a #7. The number is enclosed by the chasing arrows symbol, with an abbreviation for the chemical name being listed under the symbol. The symbol is sometimes mistakenly thought to denote recyclability on a local level.

## **Are all plastics recyclable?**

Which resins a community decides to recycle will be affected by a combination of factors including: the availability of markets, the cost of collection and sorting, and the price paid per ton for particular resins. **Most municipal programs in New York collect only resins #1 and #2.** These two resins are the most valuable and make up the largest percentage of plastic waste generated by a household. When in doubt as to whether or not a type of resin or container is accepted in your local program, it is always best to contact your local recycling coordinator. Adding the wrong kind of material to your bin can adversely affect the quality and value of the collected materials.

## **What happens to the plastics that I recycle now?**

Bottles usually end up at a materials recycling facility or "MRF", where the different resins are separated from each other. The separated resins are then flattened and baled. These bales are then sent to a manufacturer who shreds them into flakes and washes them to remove metal caps, glue and paper. The material is then ready to be reprocessed into a new product. PET bottles may end up as carpeting, fleece outerwear, T-shirts, some types of food packaging and fiber fill. HDPE bottles (milk & water jugs) often find new life as new containers, envelopes or protective wear, while the pigmented HDPE bottles may return as plastic lumber or marine pilings.

The following is a summary of the different plastic codes and some common applications:

### **#1 PET (Polyethylene terephthalate)**

PET is used in the production of soft drink bottles, peanut butter jars...

PET can be recycled into fiberfill for sleeping bags, carpet fibers, rope, pillows...

### **#2 HDPE (High density polyethylene)**

HDPE is found in milk jugs, butter tubs, detergent bottles, motor oil bottles...

HDPE can be recycled into flower pots, trash cans, traffic barrier cones, detergent bottles...

### **#3 V (Polyvinyl chloride)**

PVC is used in shampoo bottles, cooking oil bottles, fast food service items...

PVC can be recycled into drainage and irrigation pipes...

### **#4 LDPE (Low density polyethylene)**

LDPE is found in grocery bags, bread bags, shrink wrap, margarine tub tops...

LDPE can be recycled into new grocery bags...

### **#5 PP (Polypropylene)**

PP is used in most yogurt containers, straws, pancake syrup bottles, bottle caps....

PP can be recycled into plastic lumber, car battery cases, manhole steps...

### **#6 PS (Polystyrene)**

PS is found in disposable hot cups, packaging materials (peanuts), and meat trays...

PS can be recycled into plastic lumber, cassette tape boxes, flower pots...

## #7 OTHER

This is usually a mixture of various plastics, like squeeze ketchup bottles, "microwaveable" dishes... Other (number 7) is usually not recycled because it is a mixture of different types of plastics.

### How Plastics Are Made?

There are two methods for making plastic containers, **blow-molding** and **injection molding**. Blow-molding produces necked bottles (shampoo bottles) while injection molding produces tubs (margarine tubs).

### What can I do to support plastics recycling?

Contact your local recycling coordinator to find out which types of plastic are recycled in your community. Purchase products that use less plastic to do the same job. Support manufacturers that use recycled plastic to make their product or package by choosing their products over those of manufacturers that do not use recycled plastic.



## APPENDIX B - BATTERY, ELECTONICS, HAZARDOUS WASTE, INTEGRATED PEST MANAGEMENT, MERCURY

### Battery Recycling

#### Rechargeable Batteries

The Rechargeable Battery Recycling Corporation (RBRC) ([www.rbrc.org](http://www.rbrc.org)) is an organization of battery manufacturers which has established a collection and recycling program for rechargeable batteries. Contact them to start a rechargeable battery collection program.

Also, the NYS Rechargeable Battery Recycling Act was signed into law by the Governor on December 10, 2010. The law requires manufacturers of covered rechargeable batteries to collect and recycle the batteries statewide in a manufacturer-funded program at no cost to consumers. Check this website for more information - [www.dec.ny.gov/chemical/72065.html](http://www.dec.ny.gov/chemical/72065.html)

#### Lead-Acid Batteries

Nearly 90 percent of all lead-acid batteries are recycled. Retailers in New York State that sells lead-acid batteries must take back used batteries for recycling and most scrap dealers will take lead acid batteries for recycling.

#### Alkaline and Zinc Carbon Batteries

Are non-hazardous, can be disposed of in the garbage. These batteries typically contain a manganese dioxide cathode and a zinc anode. The electrolyte in an alkaline battery is usually potassium hydroxide or sodium hydroxide, while in a zinc carbon battery the electrolyte is ammonium chloride or zinc chloride. Recent laws have restricted & levels of mercury allowed in alkaline and zinc-carbon batteries. Today, alkaline batteries on the market are required to have zero-added mercury.

### Electronics Recycling

The NYS Electronic Equipment Recycling and Reuse Act was signed into law by the Governor on May 28, 2010. The law will ensure that every New Yorker will have the opportunity to recycle their electronic waste in an environmentally responsible manner. The law requires manufacturers to establish a convenient system for the collection, handling, and recycling or reuse of electronic waste. For more information on this law, check our website - [www.dec.ny.gov/chemical/65583.html](http://www.dec.ny.gov/chemical/65583.html)

### Hazardous Waste

Federal and state hazardous waste regulations have focused strictly on commercial and industrial generators. Because they generate the vast majority of hazardous wastes, commercial and industrial generators must comply with regulations concerning the identification, storage, transportation and disposal of hazardous wastes.

Hazardous wastes are generally defined as having one or more of the following characteristics:

**Ignitable** - can catch fire - example, gasoline

**Reactive** - cause violent chemical reaction - example; drain cleaners

**Toxic** - harmful to human health -example, paint strippers

**Corrosive** - eaten away by a chemical reaction - example, muriatic acid

**Toxic Reduction/Waste minimization** - It is better for your budget, and the environment, if you reduce your use of potentially hazardous products whenever possible. We suggest that you consider the following:

**Substitute non-toxic products when possible.** Examples include using latex paint instead of oil-based paint; or "green" cleaning products.

**Buy Only What You Need.** Carefully look at the amount of product you need to complete your particular job and buy only that much. Don't get more just because the larger size is on sale - it isn't a bargain if you really don't need the product.

**Donate Usable Product.** If you have large amounts of usable product, such as cans of oil-based paint in a color that you no longer need, try to donate it to someone or another organization who can use it, like a local non-profit group such as a theater group.

**Use According to Product Directions.** The threat to the environment is often caused when these products are not used properly or are mixed inappropriately with other products in your home or in the trash. Follow package directions carefully and keep the product in its original container.

Most hazardous wastes from schools are generated in science laboratories, shops, art rooms, photography studios and maintenance operations. Hazardous wastes found in schools could include solvents, alcohols, paint thinners, solvent-based paints and stains, acids, bases, photographic chemicals, toxic metals and automotive fluids.

Contact your school environmental safety officer for information on how your school handles hazardous waste.

### **Integrated Pest Management**

Integrated Pest Management (IPM) on school property is a long term approach to maintaining healthy landscapes and facilities that minimize risks to people and the environment. IPM uses site assessment, monitoring and pest prevention in combination with a variety of pest management tactics to keep pests within acceptable limits. Instead of routine chemical application, IPM employs cultural, physical and biological controls with selective use of pesticides when needed.

Your school may already be practicing IPM to varying degrees in and around campus buildings and on school grounds.

The United States Environmental Protection Agency (EPA) supports IPM through activities such as distribution of IPM publications, awarding grants for IPM activities, offering training, guidance and information on IPM programs at universities and national associations. You can find this information on EPA's website - [www.epa.gov/pesticides/ipm/](http://www.epa.gov/pesticides/ipm/)

### Mercury

Mercury is a toxic metal that has historically been used in chemistry labs because of its unique chemical and physical properties. However, due to an increased awareness of the health and environmental impacts, as well as some recent costly spill incidents, there has been a concentrated effort to eliminate mercury and safely manage existing supplies.

**Managing Mercury in Schools** - Schools do not need elemental mercury. The human health and environmental risks associated with handling mercury do not justify its use in a school classroom. Schools should hire a licensed hazardous waste handler to clean out any mercury, mercury compounds, mercury barometers and other hazardous chemicals not being used. Mercury fever thermometers can be replaced with digital equivalents.

**Managing Mercury Spills** - If a mercury spill occurs at your school, regardless of the amount, contact your local Health Department. Remember to dispose of mercury through a licensed hazardous waste vendor.

Mercury can be found in: fever and laboratory thermometers; thermostats; switches; relays; gauges; manometers, barometers, vacuum; thermostat probes; fluorescent lamps; mercury vapor lamps; metal halide & high pressure sodium lamps.



## APPENDIX C - EVENT RECYCLING

### Before the Event

1. Create a recycling planning committee to help with logistics, create partnerships and build support from management, administration, vendors, attendees, cleaning services, and recycling facilities.
  2. Recruit and select a hauler. This can be a waste hauler or group of volunteers who will separate and transport the recyclables to a redemption center or other recycling facility.
  3. Recruit volunteers to monitor the recycling collection areas.
  4. Talk to vendors beforehand to see what materials and food items will be sold at the event. Educate them on the use of biodegradable containers and utensils - maybe prohibit the use of Styrofoam! Ask them to be a partner in the recycling effort by encouraging their patrons to recycle in the proper bins - perhaps have signs for each of the booths/vendors to display indicating the items that can be recycled and the location of the bins.
  5. If vendors expect to have empty boxes from supplies, coordinate a collection for cardboard. This could take place throughout the event as supplies are used, either by having a volunteer make rounds, or by designating a holding area for vendors to take the boxes. If you have enough room, it may be easier to wait until the end of the event for collection.
  6. Promote the waste reduction and recycling program along with the rest of the event. Write about these recycling efforts in your advertisements, fliers, brochures, schedules and posters for the event, include information about the recycling effort - who is involved, what will be recycled at the event and where to find a recycling container.
- Why it is important? Recycling saves energy, conserves resources and more, check our website for our Gee Whiz Recycling Facts - <http://www.dec.ny.gov/chemical/8801.html>
7. Consider taking the bottles/cans to a redemption center, and donating the money to a local charity. Don't forget to mention this in all the ads for recycling. Some people are more motivated to recycle if they are also contributing to a good local cause.
  8. It is best to have a recycling bin placed next to each trash can. Do not leave it up to people to search for recycling bins, because most won't. Be sure to clearly identify and label the recycling bins and waste containers to help prevent contamination (as well as to help raise awareness about recycling in general).
  9. Make sure all signs, advertisements, and displays are consistent so attendees are aware of recycling goals. Also be sure that all are weather-proof, lightweight and portable.

10. If necessary, designate a temporary holding area for recyclables collected from smaller containers.

### During the Event

1. Schedule volunteers to monitor the recycling containers. They should encourage and remind people, prevent contamination and make sure the bags/bins do not overflow.
2. Make sure volunteers are visible with coordinated t-shirts, hats or badges. Buttons or stickers are also good for vendors or other personnel to help publicize recycling efforts.
3. Make announcements throughout the event (if there is a PA/speaker) about the recycling program.

### After the Event

1. Keep track, if feasible, of the number of bottles and cans collected and the number of pounds generated and calculate energy and resource savings. Include this information in news articles and post-event follow-ups. Subtract savings when calculating disposal costs!
2. When possible, donate leftover food to a food pantry or other local shelter. Or, look into composting with a local facility. If neither of these options work, try to compost food scraps.

### Consider Other Options

You can help raise awareness by offering discounts or other incentives to those who arrive by alternative transportation - bike, bus or foot.



## APPENDIX D - GREEN MEETINGS

These are suggestions for you and for groups/individuals that are participating in your meetings or conferences.

### Printed Materials

- Always meets the Executive Order 4 requirements for recycled paper (100% post consumer recycled content paper)
- All printed materials should list the amount of post-consumer recycled content in the paper.
- Always use double-sided copying and printing.
- Limit the use of glossy paper to applications where it significantly improves the publication (e.g. high-quality photography)
- Give event attendees the option of having their names removed from any post-event mailing lists.

### Promotional Materials

- Use electronic advertising, promotion, and registration whenever possible.
- Make materials self-mailers whenever possible and do not tab self-mailers unless necessary.
- Print with vegetable-based ink (unless inadvisable because of the paper used).
- Use mailing labels with water-based adhesives.

### Confirmation Materials

- Email confirmation materials whenever possible.
- Mail only confirmation of registration and any significant changes to the event program. All other confirmations and information will be available online and mailed only when requested.

### On-site Materials

- *Name Badges.* Collect plastic name tag holders for reuse, with collection boxes at all registration, exhibit, and exit areas. Also ask hotels to collect name badge holders at the check-out desk. Hold a prize drawing from the recycled badges.
- *Signs.* Use reusable or recyclable signs.
- *Sponsor Materials.* Ask sponsors and others who provide materials to:
  - (1) Ensure they meet the 100% post-consumer recycled content paper.
  - (2) Avoid glossy paper.
  - (3) Give-aways (trinkets) should not contain toxic components and should be something useful.
- For exhibit areas, use reusable table dressings (cloth table covers and skirts).

### Speaker Handouts

- Encourage speakers to provide electronic copies of handouts and any visual presentations and post them on your website.
- Request that speakers gather business cards and mail presentation materials to interested attendees after the event.

- When paper copies are preferred, request speaker handouts prior to the event and copy them according to this policy.
- Ask speakers/moderators who will provide handouts themselves to comply with the policy.
- Educate attendees that speakers were asked to comply with this policy.

### **Food & Beverage Functions**

- Eliminating Disposable Service Ware
- Require all facilities to use china service. If the facility can demonstrate that china service cannot be used (for safety or damage control reasons), biodegradable disposable service ware in conjunction with a compost program should be used.
- Eliminate the use of plastic stir sticks with any beverage service. Reusable spoons should be used at coffee service.
- "Box lunches" must be served buffet style.
- Request cloth napkins and table cloths. In cases where this is not feasible, request paper products with high post-consumer content.
- Provide attendees with event mugs. Ask that they use them each day for coffee/water service. Make sure that mugs will be usable with the facility's beverage service containers (i.e. that they fit under coffee urns). Collect mugs from those who don't want them after the event.
- Encourage attendees to use their mugs at facility water coolers. Put signs on water coolers reminding attendees to use their mugs.
- Understanding that most facilities have contracts in place with beverage companies, work with the facility to understand what kinds of containers are being used for beverage service (glass bottles, cans, etc.). Ensure that recycling collection containers are available for the beverage containers being served.
- Work with facilities to eliminate the unnecessary use of glasses (i.e. if beer is being served in bottles, see that glasses are given only on request). Check if beer can be served in kegs and provide reusable glasses to eliminate unnecessary container waste.
- Provide water in reusable pitchers to eliminate disposable water bottles.

### **Food Service**

- All condiments (ketchup, mustard, mayonnaise, jelly, butter, sugar, creamers, etc.) should be served in serving containers and not in individual packets. If the facility claims this cannot be done because of health regulations, ask for proof of this health policy.
- Ask to have food served without garnishes or use edible garnishes.
- Where possible, donate surplus food to local shelters, soup kitchens, etc. Let attendees know about any donation programs already in place at the facility.

### **Food Composting**

- Look into providing food composting. Depending upon what local facilities are available, either work with the city or local university to compost food scraps, or offer free booth space/demonstration space in return for a food compostor onsite at the event. If either of

these options is not available, check to see if there is a local pig farm that can take food scraps.

- Work with the facility to educate them on food composting services that they can incorporate into their facility.

### Contracts

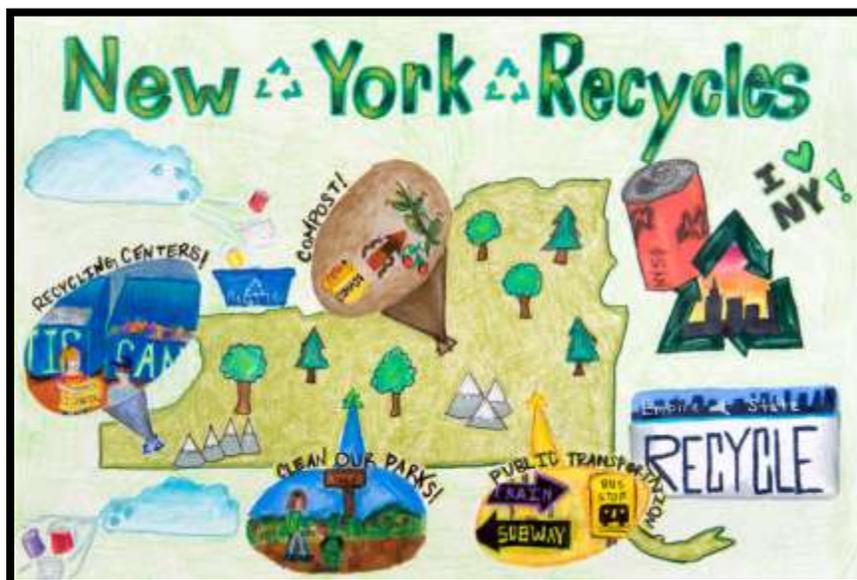
- Include the food and beverage requirements in this policy with your Request for Proposal during the initial site selection process.
- Put all food and beverage policies in the contract with all convention centers, hotels, and other facilities.
- Include recycling requirements in the contract (all businesses need to comply with their local recycling laws anyway!)

### Hotels

- Give preference to hotels that participates in Green Seal Lodging certification or is a member of the Green Hotels Association.
- See if mass transportation options are available.
- Arrange for shuttle service from mass transit stops or hotels to the event site, or check if the hotel provides this service to guests

### Travel

- Encourage public transportation.
- Encourage carpooling.
- Schedule meeting to accommodate the train schedule.
- Provide information about the routes and availability of the mass transit to/from meeting/conference site
- Be an example, take public transportation or carpool to a meeting.
- If time allows, walk to the meeting. Meetings within  $\frac{1}{2}$  mile often are quicker to walk to than to start, drive, and park a car.
- Be flexible enough in your demands to allow effective carpooling to meetings
- Teleconference meeting if people are traveling a long distance or the meeting is short.
- Have people attend via telephone conference call.



## APPENDIX E - EDUCATIONAL TOOLS

An ongoing educational program is required to assure your program's continued success.

### Initial Promotion

When you first kick off the recycling program, reminders to recycle should be prominently posted throughout the building, in cafeterias, lounges, conference area, elevators, stairwells, on bulletin boards, etc.

### Slogans and Logos

You may want to develop a slogan or logo for your recycling program. A poster campaign specifically developed for your program will promote interest and participation. Your staff and students will be able to identify with it and interest will be stimulated.

### Educational Pamphlets

In addition to a kick-off memo, you may want to develop an educational pamphlet or brochure. Given to all the employees, it can become a useful reminder of your program. It can also be used for good public relations, if shared with other companies or schools.

### Social Media

Posting these materials on your website or through social media outlets are a great waste reduction measure.

### Publicity

Your recycling program may be of interest to the community. Do not hesitate to contact local TV, radio stations and newspapers. They may like the opportunity to report on your recycling efforts.

### Status Reports

Status reports on the success of your recycling program should be included on a regular basis to staff and students. Use statistics give them an idea of how much has been saved by recycling. Everyone likes feedback on how they are doing.

### Orientation

Be sure to include information on your recycling program as part of new employee or student orientation.



## APPENDIX F - NY RECYCLES!

NY Recycles is our way of promoting recycling and buying recycled in New York State. Various educational waste reduction, reuse, recycling, composting and buy recycled events will take place throughout the year and will lead to a celebration of ***New York Recycles!*** on **November 15**. *New York Recycles!* is part of a national event - America Recycles Day.



### How Do I Participate?

#### New York Recycles! Poster Contest

<http://www.dec.ny.gov/education/32506.html>

New York Recycles is our way of promoting recycling and buying recycled in New York State. The twelve New York State winners receive the honor of having their artwork in a calendar which will be distributed throughout the State. The schools with winning entries will also receive a recycled content tote bag filled with educational materials and videos. The 2012 NY Recycles! Poster Contest Rules will be available on our website soon.

#### New York Recycles Green Schools Challenge

<http://www.dec.ny.gov/chemical/43349.html>

The New York Recycles Schools Challenge is sponsored by the New York State Department of Environmental Conservation and the State Department of Education to recognize those schools that are working towards responsible solid waste management by developing waste reduction, reuse, recycling, composting and/or buy recycled products and packaging programs. Information on the 2011-12 New York Recycles School Challenge is on our website.

#### Green Schools

<http://www.dec.ny.gov/chemical/8803.html>

This website will help you on your journey to become a Green School! The focus of this webpage is a comprehensive solid waste management program; however, here are areas to consider that will help further your transformation to a Green School.

**Fill out a Pledge Card** - By filling out the pledge card, you promise to try to recycle more, buy products and packaging made from recycled materials and are entered into a State drawing. (All pledge cards are recycled after the drawing... you will not have your name sold to a mailing list!!)

**Sponsor an event** - It's easy and you can contact us at (518) 402-8706 or visit our website [www.nyrecycles.org](http://www.nyrecycles.org) for more information!!

#### Other Event Ideas

- Have speakers representing recycling-related businesses or facilities come to events to tell students about recycling and closing the loop when buying recycled.
- Encourage and coordinate campus stores to purchase recycled-content products, i.e. paper and rechargeable batteries.

- Buy recycled content products or supplies, such as recycled content copier or printer paper, toilet paper, or refilled toner cartridges for laser printers or add more to those you are already buying.
- Set up meetings with purchasing agents to talk about buying recycled-content products.
- Provide information on how to purchase products and be prepared to answer questions and dispel myths about various products.
- Organize a campaign to write letters to local newspapers or government officials to encourage waste reduction, reuse, recycling, composting and buying recycled.
- Promote through local newspapers what your school is doing to recognize New York Recycles!.
- Print New York Recycles! Pledge cards on recycled content paper or the back side of single sided scrap copies and distribute them to students, staff and professors.
- Have an on-line pledge form - even better as a waste reduction measure.

### Example Pledge Card

**New York Recycles!**  
Pledge Card and Entry Form

Here is how I am renewing my commitment to recycling in the coming year.  
(Check all appropriate boxes)

I will recycle at home, work and school.  
 I will buy recycled-content products and packaging.  
 I will purchase environmentally friendly products.  
 I will try composting at home.  
 I will return my deposit cans & bottles.  
 I will encourage others to reduce, reuse and recycle.



Please enter me in the NY State Drawing to promote recycling and buying recycled that will be held on or about December 1.  
One entry per person. No purchase necessary.  
Your name will be kept confidential and will not be sold to a mailing list.

Name \_\_\_\_\_

Daytime Phone ( \_\_\_\_\_ ) \_\_\_\_\_  
Please include your Area Code

Please check here if you are under the age of 18 Printed on 100% post-consumer recycled content paper  
For contest rules, write to the address below or check out our website [www.nyrecycles.org](http://www.nyrecycles.org)  
Return entry form by November 20 to: NY Recycles! ,625 Broadway, Albany, NY 12233-7253

## APPENDIX G - COMPOSTING & VERMICOMPOSTING

Organic materials make up between 25-30% of the waste stream. Organics include items such as grass clippings, yard trimmings, leaves, food scraps, etc. Actually, most of these materials need not be considered waste at all. They can easily be transformed into a useful soil amendment through a process called composting. Check out our website - <http://www.dec.ny.gov/chemical/8801.html>

These nutrients are returned back to natural systems when we follow practices such as grasscycling (see our website - [www.dec.ny.gov/chemical/8816.html](http://www.dec.ny.gov/chemical/8816.html)) or composting. When these practices are adopted by individual residents in the community, they have enormous potential to reduce costs as they eliminate/reduce the need for expensive disposal programs. The potential benefit to the environment is also great as the potential adverse environmental impacts of commercial disposal (such air and water quality impacts from incineration or landfilling) are avoided.

### What is composting?

Composting is a biological process during which microorganisms, bacteria and insects break down organic materials such as leaves, grass clippings, and certain kitchen scraps into a soil-like product called compost. It is a form of recycling, a natural way of returning needed nutrients to the soil.

### Why compost?

By composting kitchen scraps and yard trimmings, you can avoid the high costs of commercial collection and processing programs for these items. Composting is practical, convenient and is often easier and cheaper than bagging these materials for shipment to a transfer station. Composting has many additional benefits. When you compost, you return organic matter to the soil in a usable form. Organic matter improves plant growth by helping break heavy clay soils into a better texture, by adding water and nutrient-holding capacity to sandy soils and by adding essential nutrients to any soil. Improving your soil is the first step toward improving the health of your plants. If you have a garden, a lawn, shrubs or even planter boxes, you have a use for compost.

### How do I compost?

Composting is easy. To compost successfully, you do not need any specialized equipment or a biology degree. You can compost in your own school yard by saving yard trimmings and certain food scraps, preparing them properly and then placing them in a compost pile. Just follow these simple guidelines:

### Yardwaste Composting

**Step 1. Choose the right materials.** Anything that was once alive will compost, BUT not everything belongs in a compost pile. In general, do not compost any foods containing animal fats, or plants infected with disease.

**DO COMPOST:** Vegetable & fruit scraps, citrus rinds, egg, peanut & nut shells, stalks, stems, vines, wood ashes, horse & cow manure, leaves, apple cores, etc.

**DON'T COMPOST:** Meat, fish, fat, bones, poultry, vegetable oils, dog or cat manure, dairy products, plastic, synthetic fibers, etc.

**Step 2. Select & prepare a site.** First choose a place that receives about equal amounts of sunlight and shade during the day, then decide how you wish to compost. There are many different ways to prepare a compost pile.

- Use no enclosure at all. Simply pile the materials up, keeping them in a fairly dense heap.
- Assemble wooden stakes and chicken wire into a simple round enclosure for the pile.
- Construct a wooden bin with old lumber or pallets.
- Make hole in the sides and bottom of a garbage can and use it as a bin.
- Fashion a three-sided enclosure by placing cinder blocks on top of each other, leaving the front open.
- Purchase one of many commercial bins available at hardware and garden stores.

**Step 3. Prepare the compost materials and build a pile.** Begin by cutting or shredding the ingredients into small pieces, the compost process goes faster! Then, add materials. Water ingredients and mix often. The pile should be kept moist but not soggy, about the consistency of a wrung-out sponge.

- With any compost system, turning the pile periodically is essential to maintain the air supply to the organisms breaking down the material.
- As the compost materials decompose, heat is generated. Don't be surprised to see steam rising from the pile, especially when it is turned. This means that the conditions for bacterial action are at their best. If your compost pile is properly prepared, contains no animal fats and is turned periodically, it will not attract pests or create odors.

**Step 4. Test whether the compost is ready.** Decomposition will be complete anywhere from two weeks to two years, depending on the materials used, the size of the pile, and how often it is turned. Compost is ready when it has turned a dark brown color and no longer resembles the original materials.

**Step 5. Use the compost.** Compost is ready to apply after it has cooled. It is good practice to screen the compost through a screen and return the unfinished materials to the pile. Apply the compost in layers 1-3" thick and work it well into the ground. It is best not to add more than a pound per square foot of soil per year.

Composting is a great way to integrate real world situations and environmental issues into your science program. NYSDEC has literature, videos, classroom activities (ask for "RW Goes To School"), which can assist your teachers to educate their students about the science and practice of composting.



## Vermicomposting



This serves as an introduction to vermicomposting (composting with "red wiggler" worms) for the classroom teacher. The serious vermicomposter will also want to consult the various reference materials listed in this handout. For more information about vermicomposting and other recycling related issues call the NYSDEC at (518) 402-8706.

Incorporating lessons on composting and vermicomposting into your science program is a great way to educate your students about data collection, scientific observation, decomposition, nutrient cycles, natural biological systems, food webs, etc. It also offers an opportunity for them to learn a practical way that they, as individuals, can make a positive impact on the environment.



Although setting up an outdoor composting demonstration site may be an option for some school systems, not everyone has sufficient space on school property to dedicate an area for this practice. Setting up a worm composting bin, a practice called vermicomposting, is an easy way to teach about the recycling of organic material. Using worms has several advantages over an outdoor system. Because it is indoors, weather and siting considerations are not an issue. Also, the small size of the bin makes measuring easy. Also, vermicomposting can be practiced in any setting, so your students will learn that it is possible to compost without having a large yard or garden. Worms make ideal classroom pets because they are quiet and can go up to three weeks without being fed. Best of all, your worms will reproduce so you will be able to donate worms to other classrooms at your school. Everyone is going to want some because (and this probably won't surprise you)... KIDS LOVE WORMS!

### Getting Started

All that you will need to begin are 2 lbs. of redworms (*Eisenia foetida*), most commonly referred to as "red wigglers", a plastic or wooden container approximately 2' x 2' wide and 1' deep, some shredded newspaper or white office paper and a handful of topsoil or compost and you're ready. You will need to moisten the bedding with water to create the proper environment for the worms. Specially designed containers are available for purchase or you can make your own. A number of sources for commercially produced bins are listed in this handout. Two pounds of redworms can consume up to 3-5 lbs. a week of coffee grounds, egg shells, tea bogs, apple cores, stale crackers, banana peels, wilted lettuce and other vegetable scraps. Do not add any animal products, dairy items, fats or oils. These items will cause the bin to develop unpleasant odors.

There are a number of inexpensive reference materials available on this topic. We strongly suggest that you purchase or borrow some of these materials from your local library before you begin. The entire setup for a classroom, including reference materials, a commercial bin and worms can cost as little as \$100. If you make your own bin, it can cost considerably less. You may also want to see an active vermicomposting system before beginning your own. Local Cornell Cooperative Extension offices may know of local vermicomposting systems you can look at.

## **Most Commonly Asked Questions About Vermicomposting ...**

**Won't the bin smell bad?** A well-maintained vermicompost bin should not have an unpleasant or strong smell. An "earthy" odor is typical of a healthy system. If your bin does smell, it may need to be cleaned (harvest the vermicompost and give the worms new bedding), or you may be overloading the system with too much food. This is the most common mistake in classroom bins.

**How often does the bin need to be cleaned?** We have found through maintaining our own bin that the bin usually needs to be cleaned every four months. This will vary depending on how much food you have added, how many worms you started with, etc. If most of the bedding is no longer recognizable, then it probably needs to be changed. Do not wait too long as a dirty bin could become toxic to your worms.

**Won't the worms escape?** If you find large numbers of worms crawling out of the bedding and up the sides of the bin, the bedding is probably too wet and the worms need oxygen. You may want to clean your bin at this point or add some dry bedding. Worms will not normally leave a well maintained bin. They have everything that they need: food, warmth, darkness and the company of other worms.

**What about fruit flies or other bugs?** A variety of organisms in addition to worms are a natural part of a vermicomposting system. Most never leave the bin. Fruit flies tend to present the biggest nuisance. A number of steps can be taken to prevent a fruit fly problem from arising. Make certain that you have deep enough bedding to bury the food completely. Do not overload the bin! If items are not beginning to decompose within a few days, stop feeding until the worms catch up. It is helpful if you cut up food items into small pieces, as they will decompose more quickly. Also, rinsing the skin of banana peels or microwaving them for 30 seconds before you put them in the bin should help prevent fly larvae from finding their way into the bin.

**What will my students learn?** A vermicompost bin offers numerous opportunities to integrate math and science on a daily basis. Added food can be weighed and recorded. The time that it takes for individual food items to decompose can be observed, as can worm food preferences. You will also have an opportunity to see worms at different stages of their life cycle. Cocoons, the worm egg sac, are visible to the naked eye. You can study the worm life cycle and learn about the important role that this type of worm plays in natural systems. You can examine some of the compost under a microscope. When the bin is cleaned, the total weight of the harvested vermicompost can be compared to the weight of the food added and the weight of the water and bedding used at bin start-up.



Once you have finished vermicompost, you will have the opportunity to utilize this material in plant growth experiments. Your children will also learn the important lesson of how nature recycles nutrients so that they can be used over and over again. These are only a few of the ways that this activity can enrich your classroom. We know that you will think of many more!

**What do I do with the worms at the end of the school year?** You can "liberate" the worms. That is, set them free in your garden or outdoor compost pile. Of course, then you will need to purchase worms again in the fall. If you do decide to maintain the bin over the summer, exercise some caution in your selection of storage site. The ideal temperature range for worms is between 50-70 degrees F.

NYSDEC has an extensive list of brochures, videos, fact sheets, classroom activities, etc. that can assist you to integrate composting into your classroom activities at any grade level. Please contact us for a complete listing.

### **Worm Composting Bin**

Worm Composting is a suitable composting option for classrooms, apartment buildings or other homes with no yard space. The worms stay in the bin and eat household scraps, and the bin gives off little odor.

Find a good location for the bin. It can be placed anywhere, as long as the temperature is between 50 degrees and 77 degrees F (13 degrees -25 degrees C). In warm weather, it can go outdoors (not in direct sunlight). Make sure to place the bin where it is convenient for you to use. It is wise to place a plastic sheet under the bin.

### **Adding the worms**

Moisten the bedding material. It should be like a sponge, squeeze it and a few drops should drip off. It is a good idea to put wet bedding material into the bin outdoors and wait until all the water has drained out before setting the bin up indoors. Add about eight inches of moistened bedding to the bottom of the bin. Place worms on top of the bedding, and leave the lid off for awhile. The worms will work down into the bedding to get away from the light.

### **Adding Your Wastes**

Dig a small hole in the bedding and add your vegetable and fruit scraps. Then cover the hole with bedding. Do not add any inorganic or potentially hazardous materials, such as chemicals, glass, metal, or plastic.

### **Maintaining Your Composting Bin**

Keep your compost pile moist, but not wet. If flies are a problem, place more bedding over material over the wastes, or place a sheet of plastic over the bedding. As an alternative, try placing some flypaper inside the lid. Every three to six months, move the compost to one side of the bin, and add new bedding to the empty half. At these times, add food wastes to the new bedding only. Within one month, the worms will crawl over to the new bedding and the finished compost on the "old" side can be harvested. New bedding can then be added to the "old" side.