

School Recycling Fact Sheets



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Recycling Program

79 Elm Street
Hartford, CT 06106

(860) 424-3365

www.dep.state.ct.us/wst/recycle/ctrecycles.htm

Arthur J. Rocque, Jr., Commissioner

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Recycling Fact Sheet

On average, each one of us produces 4.4 pounds of solid waste each day. This adds up to almost a ton of trash per person, per year. In a state with over 3 million residents this means we generate close to 3,000,000 tons of municipal solid waste (MSW) each year. *"Where Does All This Trash Go?"*

How we handle our solid waste has changed dramatically over the past 25 years. As recently as 1975, 140 of Connecticut's 169 towns disposed of their trash within their own borders. Today, only two municipalities operate their own landfills to dispose of residential trash. What happened? In the late 1980s and early 1990s, it became apparent that dozens of municipal landfills would have to close. Many had reached their permitted capacity, while others were unable to meet new federal regulatory requirements for modern sanitary landfills. Some even posed a contamination threat to drinking water supplies.



An important step was taken toward changing the way we manage our MSW when Connecticut adopted a solid waste management hierarchy which utilizes first source reduction, then recycling, composting, waste-to-energy and finally landfilling as the preferred methods to handle our trash. To implement this hierarchy, the State legislature passed the Mandatory Recycling Act (PA 87-544) which required recycling of 25% of the state's solid waste stream by January 1, 1991. To meet this goal, 9 items were designated which could not be disposed of and had to be recycled instead. These items include:

glass food & beverage containers	used motor oil
vehicle (lead-acid) batteries	scrap metal
corrugated cardboard	newspaper
metal food & beverage containers	leaves
white office paper (private residences exempt)	

On May 1, 1996, **nickel-cadmium batteries** were added to the list of mandatory recyclables. Instead of being recycled curbside, these batteries are recycled through a take-back program sponsored by retailers and battery manufacturers. As of October 1998, **grass clippings** were banned from solid waste disposal facilities. In the 1993 legislative session, Connecticut's General Assembly passed An Act Concerning The State Recycling Goal, PA 93-423. One of the major provisions of this act is to raise the state's recycling/source reduction goal to 40% by the year 2000. To help achieve this goal, many municipalities have added additional items to their programs including: plastic resins #1 & #2, magazines and junk mail and even textiles. Connecticut's recycling/source reduction rate has reached 25% for FY 1997-98. The rate does not include redeemable deposit containers (CT is a bottle bill state), auto scrap or certain other commercial recyclables.



To facilitate the collection, processing and marketing of recyclable commodities, municipalities were encouraged to join one of 10 recycling regions. Towns belonging to regions send their collected recyclables to one of 6 intermediate processing centers (IPCs)

which are located in Stratford, Hartford, Danbury, Berlin, Willimantic and Groton. At the IPCs, the recyclable materials are prepared for market. Working through an IPC allows communities to take advantage of the economies of scale that a larger facility offers. Companies that purchase the recyclables as a feedstock are assured of a more reliable and consistent supply of materials for their manufacturing process. Some towns have chosen not to join a region. These towns market their own recyclables or utilize a private broker.

After recycling and source reducing as much of our MSW as possible (currently 24.1% or 468 lbs. per capita- an additional 1% is a source reduction credit for home composting and grasscycling), most of the remaining trash is incinerated at one of 6 waste-to-energy facilities located in Hartford, Bristol, Bridgeport, Wallingford, Preston and Lisbon. The energy produced is sold to electric utility companies. The resource recovery process reduces the weight of the refuse by 75%. The resulting ash is landfilled. In 1997-98, 62% of our trash was incinerated, 4.5% was landfilled and 9.4% went out-of-state.

The DEP Recycling Program is actively promoting source reduction through its Environmental Shopping programs which educate consumers about how to reduce waste by not buying overpackaged products, avoiding disposables, and selecting durable, reusable items. Our "Don't Trash Grass!" program encourages homeowners to leave their grass clippings on the lawn, which effectively removes them from the waste stream. Our home composting education program encourages residents to manage yard trimmings and food scraps on their own property. This enables them to produce a valuable soil amendment, compost, and also reduces the need for costly collection programs for these items. Our "Ray Cycle" program provides schools with over 200 assembly programs a year at which a professional performer teaches children about recycling, composting, and buying recycled and reducing waste through interactive songs and lecture.

Closing the Loop-Connecticut buys recycled products. The State of Connecticut has been a leader in taking a proactive role to promote market development for recyclables. Back in 1988, Connecticut's General Assembly charged the Department of Administrative Services (DAS) with preparing and implementing a state plan to increase the purchase of products made from recycled material. Public Act 90-224 requires newsprint publishers and printers to utilize an increasing percentage of recycled fiber in their newsprint. In 1994, CT was one of the first states in the nation to revise specifications for printing and writing paper to incorporate standards specified by Federal Executive Order #12873. In addition, the same legislation directed DAS to adopt EPA procurement guidelines for minimum recycled content for those products for which guidelines exist. These policies acknowledge that recycling is a process, which involves not only collection, but also remanufacturing, and the purchase of products made from recycled materials. All aspects of this process are equally important if we are to close the loop and make the most of our natural resources. For more information, call (860) 424-3365.

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Moving Beyond the Mandate

In accordance with the Mandatory Recycling Act, Connecticut schools must recycle right along with other municipal agencies, residents and businesses. This act has been in effect since January 1, 1991. 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 by law 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;

1. **Evaluate Your Current Recycling Program.** Review your current recycling program. Make certain that you are recycling all of the items required by state law. If you are not, meet with your hauler and custodial staff to get your school in compliance.
2. **Contact Your Municipal Recycling Coordinator.** Your town probably collects items in addition to the 11 mandated by state law. Most towns collect some plastics and many collect magazines, junk mail and/or paper milk & juice containers. Your local coordinator may be able to provide you with information about how you might collect and prepare these items. This may result in avoided disposal costs for your school.
3. **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 load of glass containers at a glass recycling plant may result in rejection of that 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.



1. **Make Waste Reduction a priority.** Reducing waste whenever possible results in even more environmental benefits than recycling. See "Tips on Waste Reduction & Reuse" for some ideas on how you can reduce waste at your school and save money at the same time.
2. **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 tissue 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.
3. **Publicize Program Success.** It is important that everyone have an opportunity to see the results of their efforts. Utilize morning announcements and your school newsletter to let everyone at the school know how they are doing, i.e., how many tons of paper were recycled, revenue from returnable cans, etc.
4. **Make Recycling an Integral Part of Your Curriculum.** This set of fact sheets 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.



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Tips on Waste Reduction & Reuse

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 material 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 would replace thousands of disposable bags over its useful life. Any organization reviewing its 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 have the added benefit of saving money as well. Remember, even small changes can make a big difference!

1. Make double-sided copies whenever possible. This can dramatically reduce paper usage.
2. Instead of making individual copies for everyone, use a routing slip when circulating information to staff, or post notices on a bulletin board in your teachers room.
3. Use reusable envelopes for interoffice mail.
4. If applicable, use electronic mail instead of making hard copies of all communications.



5. Request the removal of your name from junk mail lists by writing to the Direct Mail Marketing

Association, P.O. Box 9008, Farmingdale, N.Y. 11735-9008.

6. If possible, limit the number of subscriptions to periodicals and have classrooms share them. This will reduce both trash and subscription costs.
7. Arrange to have a vendor collect and recharge empty laser toner cartridges. Such cartridges can be recharged several times, saving money and reducing waste generation.
8. Encourage employees and students to reuse paper clips, rubber bands and brass fasteners. These should be removed before recycling white office paper anyway.
9. Use scrap paper for messages. If you have access to a wax binder, you can make your own scrap pads.
10. Require suppliers who deliver products on pallets or in metal drums to take them back.



11. Have your cafeteria switch to reusable utensils and crockery instead of throwaways whenever possible. Investigate the possibility of switching to refillable containers for milk and juice.
12. Encourage students who bring their lunch to use a reusable lunch box and thermos instead of brown paper bags and disposable drink containers.
13. Set up vermicomposting bins in individual classrooms as part of your science program.
14. Replace single-strike film typewriter ribbons with ink impregnated nylon multi-strike ribbons. The multi-strike ribbons last 6-10 times as long as the single strike variety. Do the same for printers that can utilize multi-strike ribbons.
15. Replace ball point or felt tip pens with ones that take refills.

16. Do not purchase envelopes with cellophane windows or self-adhering note pads. If the windows are necessary, purchase the ones that have no covering over the window.
17. Purchase reusable and washable cleaning cloths, aprons, tablecloths, etc., rather than single-use disposable products.
18. Buy institutional sizes of cleaning supplies, food products, beverages, etc. and repackage into smaller, reusable dispensers.
19. Leave your grass clippings on the lawn.

20. Investigate the feasibility of composting for food scraps from your cafeteria.



21. Look at the toxicity of the cleaning products used by your janitorial staff. Substitute less, or non-toxic, alternatives such as citrus based cleaners whenever you can.

You may want to incorporate reuse into special projects or activities at the school. A few examples of this type of project are listed below.



1. Hold a "SWAP DAY". Have students bring in items from home to swap with other children. (Of course parental permission will need to be secured.) Items that would be suitable for this type of program would be books, games or small toys.
2. Collect used greeting cards for ST. Jude's Ranch for Children. The children at ST. Jude's trim the old cards and paste them onto new backs. They then sell the cards as a fundraiser for the organization. Such a project helps to teach the children business skills and raises money for charity. Cards can be sent to: The Card Project, ST. Jude's Ranch for Children, 100 ST. Jude's Street, Boulder City, Nevada 89005.
3. Collect other reusables such as clothing for local charities.
4. 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 otherwise be able to afford.

5. Incorporate the use of reusables into your art program. Host a sculpture contest in which the children make creations from items that would have been recycled or thrown away. This can be fun even without the added incentive of a contest.
6. Incorporate the use of reusables onto your science program by hosting an inventor's fair. Have the children design some useful machine or other contraption from "found" items. You will be amazed at what your students come up with.



7. 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. Invite a bird expert, possibly from your local Audubon Society, to help the children determine or predict which birds they will attract with different types of feeders and seed varieties. Establish a site where these feeders can stay for an extended period of time. Allow the children to observe the feeders at regular intervals and record their observations.

8. Contact local businesses for potential "waste" items, industrial trimmings or "seconds" that can be used in craft projects. There is also a number of groups, such as the Boston Children's Museum, that collect these items and then make them available free or at a very low cost to teachers.

If you would like more information on source reduction and reuse, contact the CT DEP Recycling Office at (860) 424-3365. Revised August, 1999.



PAPER RECYCLING

Paper constitutes the largest single component of the municipal waste stream - over 1/3 by weight. Markets exist for many types of waste paper. When we recycle paper into new paper instead of using new raw materials, we reduce: waste disposal, the need to cut down trees, energy consumption, air and water pollution and greenhouse gas emissions.

Connecticut law requires the recycling of three types of paper: high-grade white office paper (non-residential generators only); old corrugated cardboard; and old newspaper. If you generate large amounts of other types of paper you may want to investigate recycling this material as well to further reduce your disposal costs and maximize environmental benefits. 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.

Waste paper is traded on a worldwide commodity basis through a network of brokers and exporters. The paper market has stringent quality requirements for its approximately 51 grades of paper stock and 33 additional specialty grades. The five categories of paper that are most relevant to general business or school recycling programs are:

- **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 newspaper** as delivered to a household. Newspaper must be clean, dry and stored out of direct sunlight.
- **High-grade white office paper** includes white typing, writing, and copy paper, white scratch paper, tab cards, index cards and computer paper. Prohibited materials include carbon paper and NCR forms, blueprint paper, tape and glue, post-it notes, newspaper, corrugated, tissues and paper cups.
- **Sorted office paper** is similar to high-grade office paper but includes both colored and white paper.
- **Mixed office paper** is recovered from offices and institutions in an unsorted but clean form.

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.

The paper processors listed below have facilities to sort, bale and transport waste paper. Not all processors deal in all grades of waste paper. Paper brokers are in contact with mills and know the baling and quality specifications of paper mills.

Brokers determine who is buying and selling each grade of paper and facilitate sales by arranging transportation and payment. The Connecticut paper brokers know the needs and specifications of the Connecticut mills as well as other northeast, U.S., and international users of waste paper.

List of CT Waste Paper Processors

The following list includes Connecticut waste paper processors of which the Department is aware. This is only a partial listing and by providing it to you, the Department of Environmental Protection is not recommending these companies over any others.

<p>Advanced Recycling 307 White Street Danbury, CT 06810 Contact: Don Arciola (203) 743-0405</p>	<p>Davis Recycling Company 30 Meadow Street Norwalk, CT 06854 (203) 348-1515</p>	<p>Stratford Baling 80 Garfield Ave. Stratford, CT 06615 (203) 377-7491</p>
<p>Automated Material Handling, Inc. 665 Christian Lane P.O. Box 7146 Kensington, CT 06037 Contact: Bob Patterson</p>	<p>Hanna Paper Recycling, Inc. 718 North Colony Wallingford, CT 06492 Contact: Cyle Traner (203) 265-2644</p>	<p>Trash Away 131 Deming Road Berlin, CT 06037 Contact: Peter Lombardo (860) 225-1206</p>
<p>Capital Recycling 123 Murphy Road Hartford, CT 06114 (860) 249-2762</p>	<p>Marcus Paper Co. First Ave. & Wood St. P.O. Box 8986 New Haven, CT 06532 Contact: Michael Zambrov (203) 934-6351</p>	<p>Willimantic Waste Paper P.O. Box 239 Willimantic, CT 06226 Contact: Tom DeVivo (860) 423-4527</p>
<p>City Recycling, Inc. 61 Taylor Road Place Stamford, CT 06906 Contact: Rocky Possidento (203) 324-4090 (203) 327-9778</p>	<p>Ostrinsky, Inc. 731 Parker Street P.O. Box 128 Manchester, CT 06040 Contact: Sandy (860) 643-5879</p>	<p>Connecticut Carting Company 158 Canterbury Bozrah, CT 06331 (860) 887-4811 *corrugated cardboard only</p>

Revised, July 2001

Recycling Bottles & Cans

This information is primarily designed for schools, but is also applicable to businesses with cafeterias, restaurants, or any organization that generates glass or metal food and beverage containers. 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 in Connecticut, your school may want to use the same collection and processing system that serves local residents.



Why recycle glass & metal food containers?

- It is required by state law.
- These items do not burn well, and will thus reduce the efficiency of the waste-to-energy plants where most of Connecticut's trash is processed.



- 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.

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.

Preparing bottles and cans for recycling

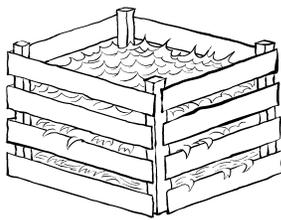
1. **Contact your local recycling coordinator** to find out what system your municipality is using to collect and process bottles and cans. You will want to design your own system accordingly. You may want to collect all of these items "comingled" or do some separation of glass bottles by color. It is important to minimize glass breakage to the extent possible. Most communities in CT also recycle plastic drink containers made from resins #1 & #2.
2. **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.
3. **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.
4. **Remember that municipalities are required by state law to "provide for separation" of recyclables.** It is illegal for your hauler to take trash comingled 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 presegregation 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.
5. **Educate your students and faculty.** As with all recycling efforts, the education process should be ongoing. Utilize your morning announcements and school newsletter to provide regular updates.

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Composting...A Recipe for a Healthy Earth!

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.

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 on your own property, 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 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:

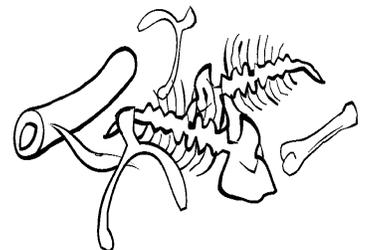
Step 1. Choose the right materials. Anything that was once alive will compost, BUT not everything belongs in a compost pile. In general, do not compost any foods containing animal fats, or plants infected with disease.

DO COMPOST:

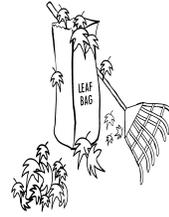
- vegetable scraps
- citrus rinds
- egg, peanut & nut shells
- lettuce leaves
- stalks, stems, vines
- wood ashes
- horse & cow manure
- leaves
- apple cores, fruit peels

DON'T COMPOST

- meat
- fish
- fat
- bones
- poultry
- vegetable oils
- dog or cat manure
- dairy products
- plastic or synthetic fibers



Step 2. Select & prepare a site. First choose a place in your yard 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 in 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. Then, add materials in layers 2-6" thick, alternating between "greens" (food scraps, grass clippings, rotted manure) and "browns" (leaves, straw, woody materials) to help balance the proportion of carbon and nitrogen. The pile should measure at least 3' high x 3' wide x 3' long. Water ingredients and mix well after every two layers. 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.

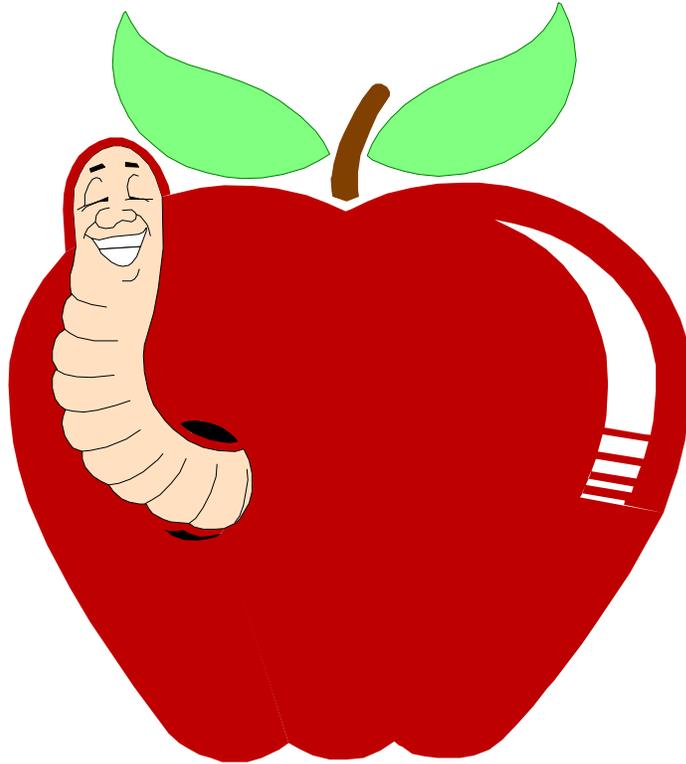


Step 5. Use the compost. Compost is ready to apply after it has cooled. It is good practice to screen the compost through a ½ " screen and return the unfinished materials to the pile. Apply the compost in layers 1-3 " thick and work it well into the ground. It is best not to add more than a pound per square foot of soil.

Composting is a great way to integrate real world situations and environmental issues into your science program. CT DEP has literature, videos, classroom activities, etc. which can assist your teachers to educate their students about the science and practice of composting. Check the Overview of Educational Materials in the Appendix for a complete listing. Check your local library for additional publications on composting.

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Composting in the Classroom with "Red Wiggler" worms



This easy-to-use guide is meant to serve 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 CT DEP Recycling Program at (860) 424-3365.

Introduction

According to U.S. EPA, each one of us generates about 4.4 pounds of trash each day. There is a tremendous cost to both society and the environment to collect and dispose of this waste material. In addition, if we are landfilling or incinerating our wastes, the resources contained in those waste materials are no longer available to us in a useful form. 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.

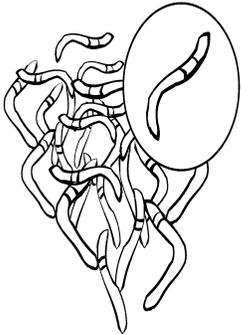
A large part, up to 30%, of what we throw away is "organic" material. This organic material includes yard trimmings, grass clippings, leaves, food scraps and other similar materials. This material need not be considered a waste at all, but instead is a resource that can be incorporated back into our gardens and lawns to improve soil tilth and moisture retention, and to add nutrients. These nutrients are returned back to natural systems when we follow practices such as grasscycling 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.

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 3 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. Plans to make your own have also been included. Two pounds of redworms can consume up to 3-5 lbs. a week of coffee grounds, egg shells, tea bags, 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. It is helpful to have a reference book on hand for instructions, troubleshooting and ideas on classroom activities. (A listing of resources is included in this fact sheet.) 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.

There are a number of nature centers that maintain vermicomposting systems as part of their educational programs. Many have outdoor

composting demonstration sites as well. Contact DEP at (860) 424-3365 for names of facilities in your area.

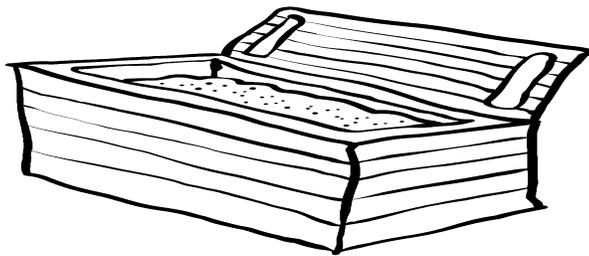
Most Commonly Asked Questions About Vermicomposting

- 1. 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 that DEP staff has observed in classroom bins.
- 2. 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.
- 3. 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.
- 4. 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 before you put them in the bin should help prevent fly larvae from finding their way into the bin.

5. **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 lifecycle 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!

6. **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. Temperatures that differ significantly from this range can kill the worms.



DEP 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 CT DEP for a complete listing.

Worm Composting Bin

Worm Composting is a suitable composting option for 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.

Materials	Tools
<ul style="list-style-type: none">• One 4x8 foot sheet of 1/2" exterior plywood• One 12 foot length of 2x4 lumber• One 16-foot length of 2x4 lumber• 16d galvanized nails (1/2 pound)• 6d galvanized nails (2 pounds)• two galvanized door hinges• (optional) one pint of clear varnish• (optional) plastic sheets for placing over and under the bin• one pound of worms for every 1/2 pound of food wastes produced per day• Bedding for worms: peat moss, brown leaves, moistened, shredded newspaper or moistened shredded cardboard	<ul style="list-style-type: none">• Tape measure• Skill saw or hand saw• Hammer• Sawhorse• Long straight edge or chalk snap line• Screwdriver• Drill with 1/2 inch bit• Eye and ear protection• Work gloves• (optional) paint brush

Building a Worm Composting Bin

1. Measure and cut the plywood as shown, so that you have one 24x42 inch top, one 24x42 inch base, two 16x24 inch ends, and two 16x42 inch sides.
2. Cut the 12-foot length of 2x4 lumber into five pieces: two 39-inch pieces, and one 20-inch piece.
3. Lay the five pieces on edge on a flat surface to form a rectangle, with the long pieces on the inside and the 20-inch length centered parallel to the ends. Nail the pieces together with 16d nails at each joint.
4. Nail the 23x42 inch pieces of plywood onto the frame with 6d nails every 3 inches.
5. Cut four 1-foot lengths from the 16-foot length of 2x4 lumber. (Save the remaining 12-foot piece.) Take the two 16x42 inch pieces of plywood and place a 1-foot length flat against each short end and flush with the top and side edges. Nail the 2x4s in place using 6d nails.
6. Set the plywood sides up against the base frame so that the bottom edges of the 2x4s rest on top of the base frame and the bottom edges of the plywood sides overlap the base frame. Nail the plywood sides to the base frame using 6d nails.
7. To complete the bin, nail the 16x24 inch pieces of plywood onto the base and sides at each end.
8. To reinforce the bin, stagger nails at least every 3 inches wherever plywood and 2x4s meet.
9. Drill twelve 1/2-inch holes through the plywood bottom for drainage.

10. To build lid frame, cut the 12-foot piece (from the 16-foot length) of 2x4 lumber into two 45-inch pieces and two 20-inch pieces. Lay the pieces flat, forming a rectangle with short pieces inside.
11. Lay the 24x42-inch piece of plywood on top of the lid frame so that the plywood is 1 1/2 inches inside all the edges of the frame. Nail the plywood onto the frame with 6d nails.
12. Attach the hinges to the inside of the back of the bin at each end (on the 2x4), and the corresponding undersides of the back edge, of the lid frame, so that the lid stands upright when opened.
13. The unfinished bin should last for at least five years; finishing the bin with varnish or polyurethane will protect the wood and prolong the life of the bin. Two coats of varnish with a light sanding between coats should be sufficient. If pressure-treated lumber is used, the bin will last years longer.
14. Find a good location for the bin. It can be placed anywhere, as long as the temperature is more than 50° and 77°F (13°-25°C). Garages, basements, and kitchens are all possibilities, as well as the outdoors in warm weather (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 by placing it in a 5-gallon bucket and adding water to achieve a 75% water content, by weight. Weigh the dry material and multiply by three to determine the weight of the water to add. If the material cannot be weighed, or if it is already wet, add enough water to dampen all the bedding. Excess moisture will drain off most materials when they are placed into the composting bin; however, peat moss may hold too much water. 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 8 inches of moistened bedding to the bottom of the bin. Place worms on top of the bedding, and leave the lid off for a while. The worms will work down into the bedding, 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. Small amounts of meat scraps can be added in the same way. 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.

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Other Sources of Information

Beaver River Associates, P.O. Box 94, West Kingston, RI 02892, (401) 782-8747 E-mail riwiggler@aol.com. A source of bins, low-cost insert kits, castings, classroom activities and general information.

Can-O-Worms, a stacking worm bin system available from Happy D Ranch (www.happydranch.com), Yelm Earthworm and Castings Farm (www.yelmworms.com), and Can O Worms Alaska (www.can-o-worms-alaska.net).

“Composting in the Classroom”, *Scientific Inquiry for High School Students*, Nancy M. Trautman & Marianne E. Krasny and “It’s Gotten Rotten”, a 20-minute video for high school students, and “Composting: Truth or Consequences”, a 20-minute video for the general public. Cornell University Resource Center, 7 Business & Technology Park, Ithaca, N.Y. 14850. (607) 255-2090/2080/7660 or visit www.cfe.cornell.edu/compost/schools.html.

“Composting to Reduce the Waste Stream”, *A guide to Small Scale Food and Yard Waste Composting*, Natural Resource Agriculture and Engineering Service, Ithaca, N.Y. Telephone (607) 255-7654 or E-mail nraes@cornell.edu.

CT Valley Worm Farm, P.O. Box 206, Enfield, CT 06082 (860) 559-6158. A source of worms, bins and other information.

Flowerfield Enterprises, 10332 Shaver Road, Kalamazoo, MI 40024 (616) 327-0108, or visit www.wormwoman.com. A source of videos (Wormania! & Worm Bin Creatures); publications, “*Worms Eat My Garbage*” (how to), “*Worms Eat Our Garbage*” (classroom) and “*The Worm Café*” (mid-scale); bins, worm and other information.

Manchester Worm Farm, 480 North Main Street, Manchester, CT 06040 (860) 647-8067. A source of worms, bins, publications and other information.

Weedfree, P.O. Box 923637, Sylmar, CA 91392-3637 (800) 854-1244. A source of worms, bins and other information.

Wheeler’s Landscaping, 12 Reder Rd., Northfield, CT 06778. (888) 38-WORMS or (860) 283-4776. A source of worms, castings, bins and other information.

Worm Lady (Nora Eldridge), 76 Prospect Street, Colchester, CT 06415 (860) 537-1809. A source of worms, bins and other information.

WORM WORLD, 26 Ihnat Lane, Avella, PA 15312 (724) 356-2397. A source for redworms, castings, compost units and educational sessions.

CT DEP does not endorse one supplier, publisher, bin type, etc., over any other. Please contact the individual businesses for pricing information. Revised July, 2001.

Plastics Recycling



Plastics Recycling is newer than the recycling of the more traditional materials such as glass, steel, aluminum or paper. New innovations in technology have changed the face of plastics recycling dramatically over the past few years. However, as new types and colors of plastic containers are introduced to the market, plastics recycling efforts will need to continue to evolve. Although plastics make up only 9% 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.

- 1. What is plastic?** The word "plastics" comes from the Greek word "plastikos", which means "to form". Almost all plastics begin as fossil fuels- mainly petroleum, natural gas and coal. Plastics 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.
- 2. 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. All other 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. State law in CT requires that the symbol be present on plastic bottles.
- 3. Are plastics recyclable?** All six thermoplastic resins are at least potential candidates for recycling because they can be heated and

reformed. 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 CT 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.

4. **Why can't manufacturers just substitute another resin for the resins that are hard to recycle?** In some cases this is possible. For example #1PET is replacing #3PVC in a number of applications such as cooking oil containers and bottles for household cleaners. However, this isn't always possible as each of the six thermoplastic resins has certain properties that make it especially well suited for certain types of applications, but not others. For example, PET is ideally suited as a container for carbonated beverages because it serves as an effective barrier to oxygen, thus keeping carbonation in. PP is widely used for films to package food because it is 500 times more effective than PET in keeping moisture away from a product.
5. **Are degradable plastics better for the environment?** In Connecticut, trash-to-energy plants incinerate over 62% of our trash to produce energy. Of the remainder, 24% is recycled and 14% is landfilled or sent out of state. Even for the small percentage that is landfilled, biodegradability is not necessarily beneficial. Even organic substances degrade very slowly in the water and oxygen-deprived environment of the modern sanitary landfill.
6. **Can technological improvements help plastics recycling?** Some improvements in technology have enabled manufacturers to use less plastic to accomplish the same function, a process called "lightweighting". This reduces the natural resources used to manufacture the plastic and the weight of the material that needs to be disposed or recycled. Improvements have been made in the mechanical sorting of plastics. Although not in wide use yet, these methods offer great promise to

reduce the cost of separating one resin from another- a process now often done by hand.

7. **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 fiberfill. 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.

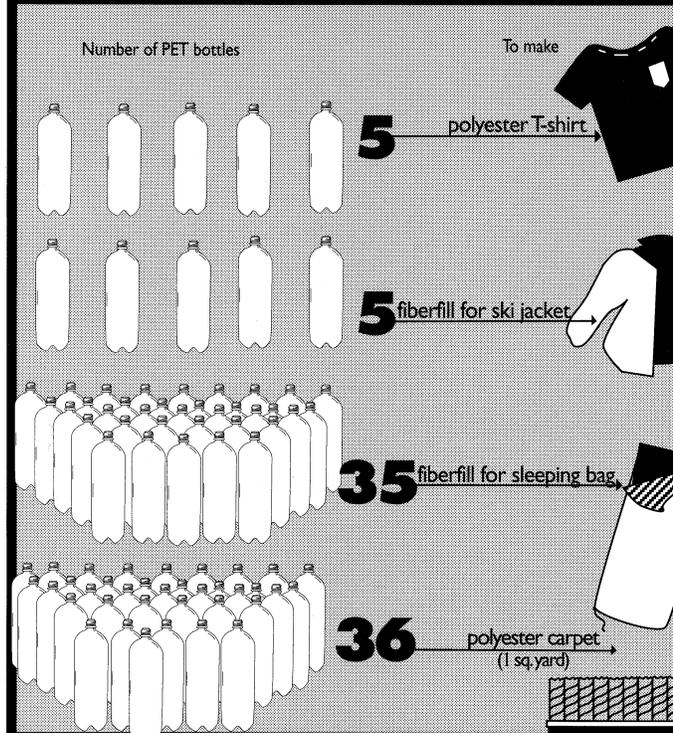
8. Summary of the different resins and some common applications.

<i>Plastic Container Code System for Plastic Bottles</i>		
Code	Material	Typical Products
#1 PETE	Polyethylene terephthalate	Soft drink & some water bottles, household cleaners
#2 HDPE	High-density polyethylene	Milk jugs, shampoo & detergent containers
#3 V	Vinyl/Polyvinyl chloride (PVC)	Vegetable oil bottles
#4 LDPE	Low-density polyethylene	Dry cleaning & bread bags
#5 PP	Polypropylene	Yogurt cups
#6 PS	Polystyrene	Carry-out containers
#7 Other	All other resins and layered multimerial	Microwaveable serving ware

9. **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.

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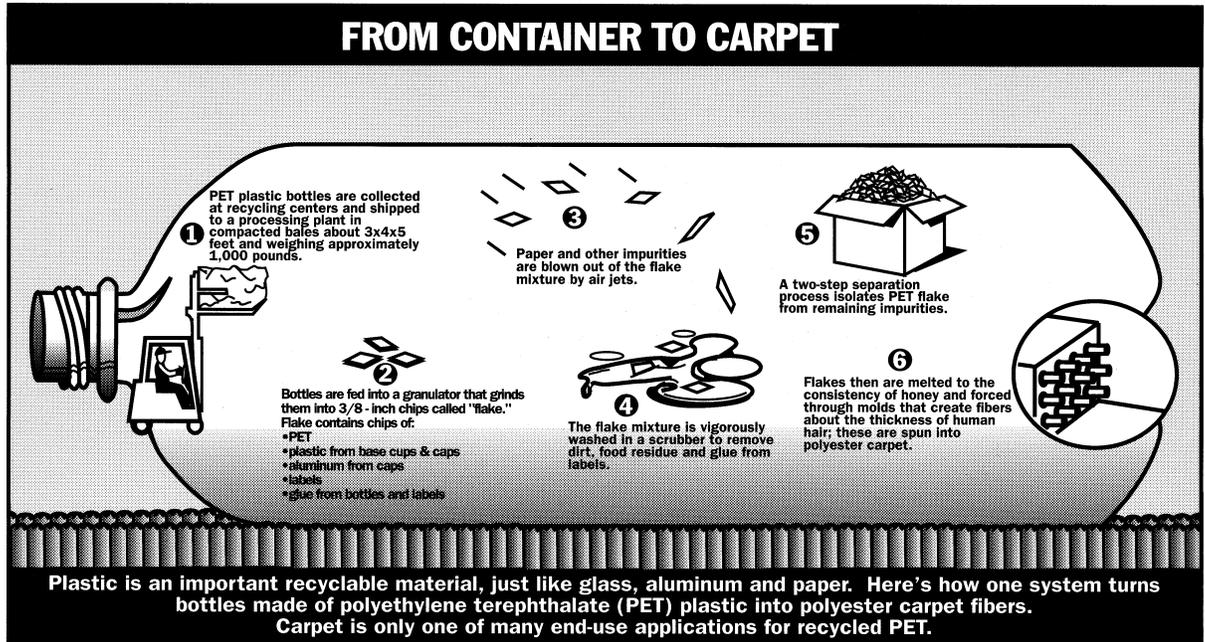
TODAY, A BOTTLE. TOMORROW. . .



Those PET bottles you drop in your recycling bin will be made into dozens of useful recycled items, from new bottles to T-shirts to carpet. Ever wonder how many bottles it takes to make a new product?

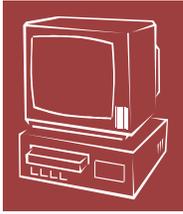
Courtesy of National Association for Plastic Container Recovery (NAPCOR)

FROM CONTAINER TO CARPET

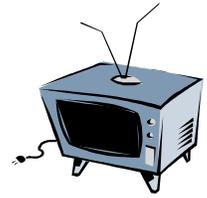


Plastic is an important recyclable material, just like glass, aluminum and paper. Here's how one system turns bottles made of polyethylene terephthalate (PET) plastic into polyester carpet fibers. Carpet is only one of many end-use applications for recycled PET.

Courtesy of National Association for Plastic Container Recovery (NAPCOR)



Computer and Television Recycling



Why Recycle Electronics?

Computers, televisions and other electronic equipment are one of the fastest growing portions of our waste stream. As new electronic equipment becomes faster, cheaper and more efficient, more and more of these materials, especially computers, will find their way from the desktop to the bottom of the closet. A recent study estimates that America discard 12 to 14 million computer systems each year. By 2005, that number may increase to 45 million annually.* (Wisconsin Department of Natural Resources PUB WA-420 99)

Computers and televisions are only one component of the consumer electronics waste stream that also includes televisions, VCRs, radios, telephones and small appliances. Careful disposal of these items is important because some electronics contain hazardous components that can include leaded glass from computer monitors and televisions. Materials such as beryllium, mercury, cadmium, nickel, zinc, silver and gold can be found in printed circuit boards. Other substances such as cadmium may be contained in batteries and mercury may also be present in relays and switches. Because of the presence of these materials, it is important that we are careful how we dispose of these items. Electronics recyclers disassemble computers and other items into their various component parts, which can be reused in new products or recycled for their useful material.

Before You Buy

When you purchase a new computer, keep the environment in mind by asking the following questions:

- Does the company have a take-back program? If so, are there any restrictions?



- Does the company use recycled materials to manufacture its product? If so, you want to consider preferences in purchasing these products.
- Are leasing options available? You may want to consider this option if you replace your equipment often.

- Does the company have a recycling program? If the answer is yes, is there a cost to the consumer and is local collection service available?

Recycling Opportunities

Many corporations now make arrangements for a computer recycler to take their old computer equipment that is not suitable for a donation program.

Although electronics originating from private residences are exempt from hazardous waste regulations, the careless disposal of these items is still a concern because the metals present in these materials can concentrate in the ash remaining after trash combustion. Connecticut incinerates almost all of its municipal solid waste at six resource recovery facilities. To address this issue, municipalities have started holding collection days for their residents.

In November 1998, Connecticut's first collection of consumer electronics was held in Stamford. A total of 14 tons of material were collected from 97 participants. In 1999, 8 collections were held throughout CT and a total of over a 120 tons of used electronic equipment was collected. To find out if your community will be participating in a collection event in the near future, call your local municipal recycling coordinator.

Options for Reuse

If you have a computer that **is still in good working order**, you may be able to donate it to a school, or to an organization that distributes computers to schools. Some organizations provide technology not only to schools, but will also provide equipment to non-profits and/or public agencies that provide services to the needy, the unemployed or the disabled.



Each organization that promotes electronics reuse has very specific requirements regarding the equipment that they accept, so call first to find out if your used equipment is a good fit with that organization's needs. If your computer is an older model that may not meet the needs of today's school system, but still works well, you may want to consider donating it to a local nursery school where speed and issues such as internet access are not an important consideration.

Reuse Organizations

National Cristina Foundation
181 Harbor Ave.
Stamford, CT 06708
Phone: 203-967-8000
Fax: 203-406-9725

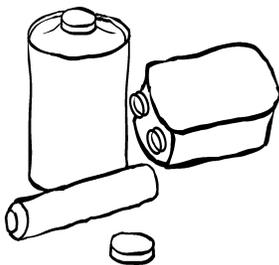
Revised, Oct. 2003



Battery Recycling

Household Batteries, commonly known as dry cell batteries, are comprised of an anode, a cathode, and an electrolyte. The anode is the positive terminal, the cathode is the negative terminal, and the electrolyte is the chemical solution through which the electrons flow from anode to cathode, creating an electric charge. Various metals are used in the cathodes and anodes. The following summary provides general information on the chemistry and disposal options for household batteries.

Nickel Cadmium Batteries (Ni-cads) consist of a nickel cathode, a cadmium anode, and an alkaline solution for an electrolyte. These batteries are rechargeable and are found in traditional cylindrical battery sizes as well as in a wide variety of battery packs. The battery packs are used in items such as cordless telephones, video cameras, hand-held vacuums and cordless power tools. Cadmium is a toxic metal that can pose a threat to human health and the environment.



Nickel cadmium batteries are a mandatory recyclable in the Connecticut. The Rechargeable Battery Recycling Corporation (RBRC) is an organization of battery manufacturers which has established a collection and recycling program for their Ni-cads. The program is financed by the RBRC. The battery manufacturers buy back the cadmium after it is processed to use in the next generation of batteries. Ni-cads can be recycled at a number of participating retail collection points including most Radio Shack and Walmart stores. For information on where to recycle nickel cadmium batteries in your area, call 1-800-8BATTERY.

Alkaline and Zinc Carbon 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. These two types of batteries represent about 70% of the battery market. In the past, mercury was added to prevent corrosion and the creation of hydrogen gas. Recent laws have restricted the levels of mercury allowed in alkaline and zinc-carbon batteries. Today, alkaline batteries on the market are required to have zero-added mercury.

There are limited opportunities for recycling alkaline batteries. The main barrier to recycling of such batteries has been the presence of mercury. With the advent of zero-added mercury, the economics of recycling alkaline batteries should be more favorable and we may begin to see more recycling facilities. The benefits of recycling batteries lie in the energy savings of recapturing a product compared with mining a virgin resource. An efficient way to collect and recycle alkaline batteries is through a manufacturer-sponsored program similar to the one established by the RBRC for Ni-cads. The RBRC has begun research on a system to collect and recycle all batteries including alkaline and zinc-carbon.

While batteries manufactured today are required to have zero-added mercury, there is still a significant number of older batteries which contain mercury. Batteries manufactured before 1992 should be managed through a household hazardous waste collection. Newer batteries can be disposed in the regular trash if there is no local recycling option available. INMETCO, a metals reclamation facility in Pennsylvania recycles alkaline and zinc carbon batteries (724) 758-2000.

Mercuric Oxide Batteries are button cells used for hearing aids, cameras, and pagers. They have a zinc anode, a mercuric oxide cathode, and an alkaline solution for the electrolyte. They contain approximately 33% mercury by weight. In 1996, the "Federal Battery Management Act" banned mercuric oxide button cells.

Silver Oxide Batteries are button cells commonly used for watches, calculators and hearing aids. They contain a zinc anode, silver oxide cathode and an alkaline solution for the electrolyte. They also contain mercury to prevent the formation of gas. These batteries are recyclable because of the value of the silver. Most jewelry stores will recycle the silver oxide battery when you bring your watch in to have the battery replaced. Otherwise, it can be disposed of at a household hazardous waste collection. The difficulty in recycling silver oxide batteries is that they are similar in appearance to other button cells. Sorting batteries is labor intensive, potentially dangerous and requires familiarity with the various types of batteries. Silver oxide button cells are good candidates for mercury reduction. Several states have placed limits on the amount of mercury allowed in button cells.

Lithium Batteries are button cells used primarily for cameras and contain a lithium anode and various types of cathodes and electrolytes. Lithium batteries are currently not being recycled. Lithium is a highly reactive metal and, when collected with other button cells, may present a hazard if not fully discharged. A fully discharged lithium battery converts the lithium into various lithium compounds that are inert and non-toxic. Unlike other button cells, lithium batteries do not contain mercury. If a lithium battery is fully discharged, it is safe to dispose in the regular trash.

Zinc-Air Batteries are button cells used primarily for hearing aids. They have a zinc anode, oxygen from the atmospheric air that acts as the cathode and an alkaline solution as the electrolyte. They contain about 1% mercury by weight that serves as a gas suppressant. There is currently no recycling option for zinc-air batteries. The best option is to bring them to a household hazardous collection day.

Revised June, 1999.

Household Hazardous Waste

What is household 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. Although households are not subject to these same regulations, they do generate wastes that can be harmful to sanitation workers when disposed in the trash, effect the functioning of septic systems and waste water treatment plants when poured down the drain, or contaminate ground and surface waters if dumped on the ground.

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

Ignitable- example; gasoline

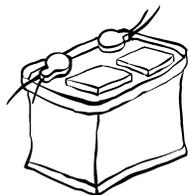
Reactive- example; drain cleaners

Toxic- example; paint strippers

Corrosive-example; muriatic acid



Other common household products that exhibit one of the above characteristics include: oven cleaners, mothballs, metal polishes, paint thinners, pool chemicals, pesticides and adhesives. Used motor oil is a mandatory recyclable in Connecticut and should be recycled through your local waste oil collection program. Lead-acid batteries are also a mandatory recyclable and should be recycled through your local collection program or brought back to the store when you purchase a replacement battery.



Toxic Reduction/Waste minimization Although proper disposal is important, household hazardous waste collection days represent a substantial expense for your municipality. It is better for your municipal 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; baking soda and vinegar to keep your drains clog-free; or natural cleaners such as Borax.

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 a neighbor who can use it or a local non-profit 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.

Bring unusable product to a household hazardous waste collection day.

Most communities in Connecticut offer at least one day a year when they will sponsor a collection for their residents for these materials. Many offer multiple days if residents are willing to travel to neighboring communities. Increasingly, towns are joining permanent household hazardous waste collection facilities. Permanent facilities offer more opportunities for collection, frequently at a reduced cost. They can also provide an opportunity for product exchanges and ongoing public education. Contact your town hall to learn how often these materials are collected in your community.

When participating in a town-sponsored collection day, try to keep products in their original containers so that the operator can identify them. The container should be tightly closed and not cracked or leaking. Businesses are currently prohibited from using household hazardous waste collections to dispose of their wastes.

Revised August, 1999



Mercury in Schools

Mercury is a toxic metal that has historically been used in high school 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 from school curriculums and safely manage existing supplies.

Health Impacts

Mercury exposure can occur through inhaling mercury vapors, or drinking water and eating fish contaminated with mercury and mercury compounds. Mercury is toxic to the central nervous system and internal organs. Mercury can cause harm even at low exposures. At high exposure levels, mercury may damage the brain and kidneys. Symptoms of mercury poisoning include tremors, changes in vision or hearing, headaches, irritability, and behavioral changes. The EPA has determined that methyl mercury and mercuric chloride are possible human carcinogens.



Mercury passes easily across the placenta and exposure to developing fetuses can cause brain damage, mental retardation, seizures, blindness and an inability to speak.

Connecticut's Fish Consumption Advisory

Connecticut, along with 39 other states across the country, has issued a fish consumption advisory due to mercury contamination. Bacteria convert inorganic mercury from natural and manmade sources into methyl mercury. The methyl mercury is taken into the food chain with the greater concentrations observed in the larger fish. This occurs through a process known as bioaccumulation. Residents are advised to limit their fish take from all freshwater bodies in Connecticut. At risk groups, defined as children under six, pregnant women and women planning to become pregnant, are advised not to eat any fish from Lake McDonough, Dodge Pond, Silver Lake in Berlin and Lake Wyassup.

Mercury in Schools

There have been a number of recent school spill incidents in Connecticut involving mercury. These spill incidents have led to lawsuits, arrests and large cleanup costs.

Recent school mercury spill incidents

In August 1999, a barometer stored in a trailer with some textbooks was broken. It was not discovered for several days. The mercury most likely vaporized during the hot summer days and then precipitated back onto the books at night. The books had to be destroyed and replaced, the trailer floor had to be removed. The

bill so far has been about \$200,000. The insurance company thus far has refused to cover the costs.

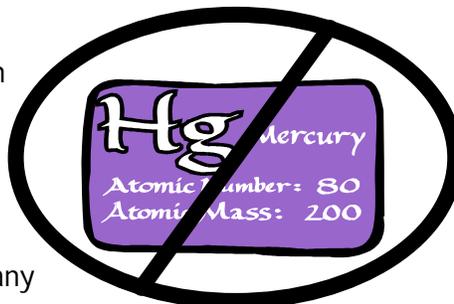
In October of 1997, a student took mercury from the unlocked desk of a science teacher. She gave some of it to a friend and the two spilled the mercury at their homes. Both homes had to be remediated. Carpet and other belongings were destroyed. The remediation bill alone was \$11,000 at one of the houses. The parents of the girl, whose friend removed it from the science teacher's desk, have sued the school district and the town for \$15,000 for injuries that were "severe, painful and permanent in nature."



Other schools have been evacuated and children tested for mercury exposure after spill incidents involving broken thermometers. Several schools surveyed said they don't have insurance coverage for such incidents, or that the deductible was so high that they paid for cleanup out of their own budget.

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 high school classroom. Schools should hire a licensed hazardous waste handler to cleanout any mercury, mercury compounds, mercury barometers and any 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 the Connecticut Department of Environmental Protection's Oil and Chemical Spill Response Division at (860) 424-3338. For larger spills, the area around the spill should be evacuated and well ventilated.

Smaller spills, such as broken fever thermometers can be cleaned up. Use a piece of cardboard to push the beads of mercury into an envelope. An eyedropper can be used to pick up remaining beads. Place the envelope in a sealed plastic bag and dispose through a licensed hazardous waste vendor. Schools may want to consider stocking a mercury spill kit. For a list of spill kit suppliers, contact the DEP at (860) 424-3242.

Connecticut Recycles Day



Connecticut Recycles Day is part of a national recycling awareness event that started in 1997. Held yearly on November 15, the purpose of the day is to increase public participation in local recycling programs and to increase awareness of the related issues of reducing waste, reuse, composting and buying products made from recycled materials.

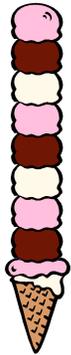
How Do I Participate? Individuals are asked to make a written pledge to increase their recycling, start composting, buy recycled products or engage in a similar activity. Since 1997, over 30,000 Connecticut residents made pledges to increase their recycling or buy recycled products. These pledges are sent in to a central location and automatically entered in a prize drawing for exciting prizes both at the state and national levels.

At the state level prizes have included grocery store gift certificates, mountain bikes, adirondack chairs made from recycled plastic, luggage made from recycled soda bottles and more. A group of prizes has also been available to under 18-year-old entrants. These prizes are given to the school of the winner and have included: computers, recycled playground equipment, recycling services, supplies of recycled paper, gift certificates to the DEP bookstore and scholarships to DEP training programs for teachers.

For the first several years that America Recycles Day was celebrated the national grand prize was a house made almost entirely of recycled materials. In 2001, the prize changed to three (3) packages of dozens of products made from recycled materials including clothing, compost bins, paper products, and much more.

The other component of the America Recycles Day celebration has been to encourage towns, non-profits and businesses to hold recycling-related events. Since 1997, over 500 events have been held in Connecticut to celebrate ARD. Events included composting demonstrations, recycled product displays, collections of reusables for the needy, book swaps at schools and environmental fairs. Many events focused on raising awareness about buying products made from recycled material as this has been the national theme for several years. To be included as an America Recycles Day

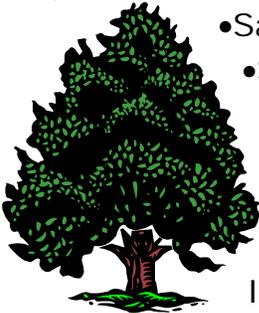
event in Connecticut your program must be held between September 1 and November 20.



Special programs for schools include a "green school" contest. Sponsored by the Connecticut Recyclers Coalition, the purpose of the contest is to recognize schools with model recycling programs. Southeast School in Mansfield was the 1998 winner. The 1999 winners were Bishop Woods Elementary School, New Haven; Eastern Middle School, Greenwich and Waterford High School. The year 2000 winners were Doolittle Elementary School, Cheshire; Sacred Heart Middle School, Norwich & Stonington High School. The students received a school-wide free ice cream party as a prize and the schools all received a plaque to recognize their achievement.

New programs for the year 2001 include a design-a-bookmark contest and distribution of 100 free "Teacher's Recycling Kits". These kits contain videos, books, a paper-making kit, a recycling game and samples of toys and office products made from recycled materials. Each kit also includes a booklet of classroom activities.

Why is recycling so important? Because when we make products from recycled materials instead of always using new raw materials we:



- Save natural resources
- Save energy
- Reduce disposal costs
- Reduce harmful emissions to our air & water
- Save money & create jobs.



In short, everyone's a winner when you recycle!

Connecticut has a Steering Committee that spends the entire year planning for America Recycles Day. Our statewide effort is chaired by the Connecticut Recyclers Coalition. If you would like to participate in this effort, call CT DEP's Recycling Office at (860) 424-3365 or visit www.dep.state.ct.us or www.americarecyclesday.org.

July, 2001

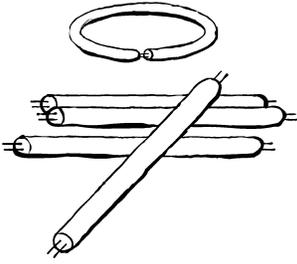
Fun Field Trips!



Giving your students the opportunity to actually see how recycling happens at processing facilities will help them to understand the importance of recycling, allow them to relate what you have taught them to the real world, and may even suggest some career possibilities. In addition, a day out of the classroom can be fun and exciting for teachers and students alike. We are very fortunate in Connecticut to have three education centers attached to facilities with recycling centers. There are only a handful of such facilities in the entire country. These facilities employ trained educators and provide age-appropriate programs.

The following list provides the contacts for trash museums and other potential sites for recycling-related trips. Please call each facility directly to get more information about program tours and program availability. It is suggested that you call well in advance of the desired program date.

1. Children's Trash Museum, Southwestern Connecticut Regional Recycling Operating Committee (SWEROC), 1410 Honey Spot Rd. Ext., Stratford, CT 06497 (800) 455-9571.
2. Connecticut Resources Recovery Authority (CRRA) Visitors Center, 211 Murphy Road, Hartford, CT 06114 (860) 247-4280.
3. SCRRRA Recycling Education Center, 741 Flanders Rd., Mystic 06355 (860) 887-6368.
4. National Plastic Center and Museum, 210 Lancaster Street, Leominster, MA 01453 (978) 537-9529 Programs, exhibits & all aspects of plastic science



5. Manchester Worm Farm, a vermicomposting facility that offers tours at its Manchester location for teachers only. For more information call James Plourde at (860) 647-8067.

6. Northeast Lamp Recycling, a fluorescent lamp recycling facility. Tours are available for 3rd grade and up. Call (860) 292-1992 and speak to Ray Graczyk to discuss tour availability.

7. Your local transfer station or municipal composting site, This will vary greatly from one community to the next. Your town may have a registered composting site where leaves from your municipality are made into compost. Your town may also have a transfer station or recycling drop-off site where recyclables are prepared for market. To find out if these facilities are available in your community, call your local recycling coordinator or your town hall.

Revised July, 2001

A number of performers are available locally who provide recycling-related shows. CT DEP does not recommend one performer over any other, nor is this meant to represent a complete listing of all possible performers. The information is provided to you as a public service. To find out more about program content, cost and availability, please call these performers directly.

Jack Golden, Garbage is My Bag, P.O. Box 933, Greenfield, MA 01302 (413) 774-3563.

Grumbling Gryphons, Children's Theater Troupe, Cream Hill Road, West Cornwall, CT 06796 (860) 672-0286

Barbara Herson, Earthtunes, 16 Linder Terrace, Newton, MA 02458 (617) 964-7463, www.earthtunes.org.

Keith M. Johnson, "Let's Talk Trash!" (Pre-K -3rd), 25 Wildwood Ave., Providence, R.I. 02907 (800) 730-6676.

Scholastic's The Magic School Bus ® "RECYCLES", contact Strawberry Productions, G.P.O. Box 12, Chicopee, Massachusetts 01021 (413) 592-4184 or www.strawberryproductions.com.

Bill Shontz, "Green Up!", P.O. Box 1345, Brattleboro, VT 05302 (802) 254-5270.

Dennis Waring, Music from found & throw-away items, P.O. Box 465, Middletown, CT 06457 (860) 347-5354.

Timothy Wenk, "The Magic of Recycling", P.O. Box 500, Stockbridge, MA 01262 (800) WENK123 or (800) 936-5123.

Revised July, 2001

Fun Recycling Facts

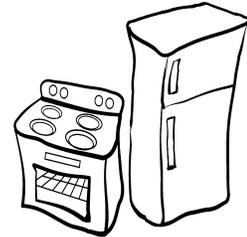
Your recycling efforts accomplish much more than just reducing the amount of trash that you throw away. Recycling provides many environmental benefits such as saving energy and natural resources, and preventing the pollution that can occur during the extraction and processing of new raw materials. Please use these fun facts on posters, in school newsletters, etc. so that the students at your school will have a more complete understanding of the benefits of recycling.

♥The overall recycling rate of steel products in the U.S. is 66%.

♥Using scrap metal instead of iron ore to make new products reduces air pollution by 86%, reduces water pollution by 76%, and saves 74% of the energy and 40% of the water.

♥Virtually all steel products produced in the U.S. have some post-consumer content, usually a minimum of 25%

♥Steel has no memory, so a steel can could be made into a car, which could then be recycled into a refrigerator, which could be made into a child's wagon and so forth.



♥Aluminum is made from bauxite ore. Because the U.S. has very limited reserves of this metal, we must import 85-90% of the bauxite that we use. From an economic perspective, recycling aluminum is important because it can help decrease our trade deficit.

♥The turn around time for a aluminum can is only six weeks. This means that the can you recycle today can be back on store shelves, filled with your favorite beverage, in only a month and a half.

♥Recycling aluminum saves 95% of the energy required to produce it from virgin materials.

♥Each one of us produces approximately 4 ½ lbs. of trash per day.

♥It takes 1330 lbs. of sand, 433 lbs. of soda ash, 433 lbs. of limestone, 151 lbs. of feldspar, and 15.2 Btus of energy to produce just one ton of glass.

♥It takes 1,050 recycled milk jugs to make a 6-foot plastic park bench.

♥A recycled fleece jacket uses 25 soda bottles as a raw material.

♥About 50% of the polyester carpet produced in the U.S. is made from recycled #1 PET plastic.

♥Two lbs. of red worms, *Eisenia foetida* , can consume 3-5 lbs. of food scraps per week.

♥A ½ acre lawn in New England can produce over 3 tons, or nearly 260 bags of grass clipping each year.

♥Turf experts agree that grass clippings do not produce thatch because they are 80% water and decompose quickly.

♥Recycling 1 ton of aluminum saves the equivalent of 2, 350 gallons of gasoline.

♥Used paper and paper products make up the largest proportion of our trash-about 40%.

♥In fiscal year 1997-98, Connecticut's reported recycling rate was 24%.

♥About 35% of the world's commercial wood harvest is used to produce paper.

♥About 1/3 of all trash is some form of packaging.

♥In 1972, it took almost one pound of aluminum to make 21.75 cans. Today, through lightweighting, a process which uses less material to make a new can, 1 pound of aluminum makes 30.13 cans - a 30% increase.

♥It takes approximately 3688 pounds of wood, 28 billion Btus of energy, 216 pounds of lime, 76 pounds of ash, 360 pounds of salt cake, and 24,000 gallons of water to make just one ton of virgin, bleached paper.

♥One gallon of recycled oil can produce the same amount of motor oil as 42 gallons of crude oil—while requiring only about a third of the energy.

♥ The federal government's policy of purchasing only copier paper made from 30% recycled content will result in 450,000 to 500,000 fewer trees cut down annually for paper production and 16,000 tons of carbon absorbed annually by the trees that remain standing.



Revised August, 1999.

Close the Loop!

For recycling to be successful, it is essential that each one of us not only separates materials for recycling, but also purchase products 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. 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 plastic bottles

carpeting; T-shirts, fleece jackets & hats; fiberfill for gloves, jackets & sleeping bags

#2 HDPE
milk & water jugs

envelopes, protective wear,
new containers

plastic grocery bags & sawdust

composite lumber used for
playgrounds, decks, fencing
outdoor furniture

white office paper

white office paper (request
30% post-consumer
content)

Item Recycled

Examples of New Products

magazines, catalogues & junk mail

tissue products

steel cans

any steel product

aluminum cans

aluminum cans or door/window frames

corrugated cardboard

linerboard for new boxes

newspapers

newspapers, egg cartons

all paper mix

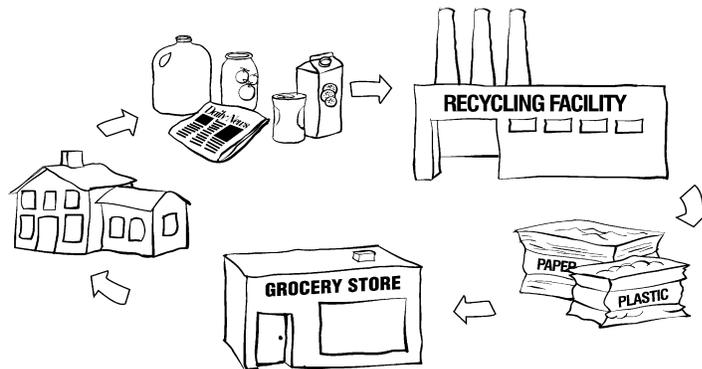
cereal or cookie boxes

glass bottles

more glass bottles, fiberglass insulation, tiles

clothing

carpet backing, soundproofing in cars or wiping rags.



Revised August, 1999

APPENDICES



CT Recycling Program Resources

The following materials are available through the DEP Recycling Program, 79 Elm Street, Hartford, CT 06106. Because we are constantly adding new materials, be sure to ask if anything additional is available when you call (860) 424-3365. Unfortunately, we are unable to provide multiple copies for requests from out-of-state.

Printed materials

One page fact sheets-*single copies only*

Recycling Fact Sheet

Brochures -*large quantities available*

Don't Trash Grass! This 3-color brochure instructs homeowners in gardening practices that enable them to leave their grass clippings on the lawn. Mowing techniques, fertilizer application and watering practices are discussed. Only single copies available

Turning Your Spoils to Soil This 3-color brochure instructs homeowner's on the "how-to's" of home composting. It discusses bin types, the biology of composting and uses for the finished material.

Don't Stick Us With Your Sharps! This brochure educates the home user of needles and syringes about safe, responsible disposal of these items (Spanish version available)

Posters

"Recycling Together Makes Our Earth Spin!" Full color poster featuring student artwork. The back lists ways to celebrate America Recycles Day, the benefits of recycling and other information.

"Don't Stick Us With Your Sharps!" This full-color poster depicts an actual plastics sorting line at an Intermediate Processing Center for recyclables. The text describes safe disposal of used needles and syringes generated by home users.

Children's Material's

Recycling/Waste Reduction Classroom Activities. From the A-Way With Waste curriculum (Washington State Department of Ecology). Teacher's activities are cross-referenced by discipline. Grades K-6 or 7-12.

Recycle-It's Part of Life! This is a combined student/teacher handout. One side features a scene of people reducing, reusing, recycling, composting and grasscycling that can be colored by the student. The back features a series of four activities for teachers to use to integrate recycling into the classroom.

School Recycling Fact Sheets A 62-page set of fact sheets on recycling in the school setting. Ideas for field trips, classroom activities, places to find additional resources and much more are included.

General Information

Connecticut Recycles Model Graphics Package A set of camera-ready artwork for newsletters, flyers, truck stickers, newspaper ads and other recycling promotional materials.

City Cycle A 123-page manual describing how to establish a recycling program, with special emphasis on multi-family & commercial buildings.

CT Recycles White Office Paper Manual A 40-page manual including step-by-step instructions on how to start a white office paper program. (*This document is under revision.*)

Business Recycling Fact Sheets A packet of information on recycling in the workplace. (*This document is under revision.*)

Compost Connections A series of fact sheets on organics recycling. Topics include a listing of state registered leaf composting sites, plans to make your own bins, a listing of companies that produce home compost bins and more.

Managing Household Hazards A series of fact sheets dealing with issues related to household hazardous waste collection and recycling of special materials such as batteries and fluorescent bulbs.

Audio visual

To purchase any of the following videotapes, please indicate the title of the tape(s) that you would like and send a check or money order payable to the Connecticut Department of Environmental Protection to: CT DEP Recycling Program, 79 Elm Street, Hartford, CT 06106. These tapes are also available on loan from DEP, the main branch of your local library and the free rental shelf at Blockbuster video stores.

Connecticut Recycles introductory video. An 11-minute video that introduces the audience to the state recycling program and describes how an intermediate processing center works, how recyclables are collected and processed, etc. Although this video has historical value, it **does not** provide an up-to-date description of current programs.

Leaf Composting: Windrows of Opportunity The basics of establishing a large-scale, municipal, leaf-composting site in a 15-minute video. Includes technical information on leaf collection, site selection, operation and management and the biological process of composting. May be purchased for \$10.

Don't Trash Grass! An 11-minute video that outlines lawn care practices which enable homeowners to leave their grass clippings on the lawn. May be purchased for \$10.

Home Composting: Turning Your Spoils to Soil A 17-minute video on how to start a composting program at home including: what makes compost work, how to manage a compost pile and uses for finished compost. May be purchased for \$10.

DEP has an extensive lending library of tapes from various sources. These may be borrowed for a 2-week period. Although there is no rental fee, the borrower must pay return postage. A sampling of titles is listed below. Call DEP (860) 424-3365 for an updated listing. Items in the lending library cannot be sent out of state.

Connecticut Recycles Day-Be A Part of It! Produced in 2000, this 15 minute video not only introduces the viewer to the America Recycles Day

celebration, but it also covers all aspects of how recycling and solid waste disposal works in CT. It includes a visit to our local trash museums, a transfer station, and an ash landfill. It also features footage from a trash-to-energy facility and spotlights businesses and schools that have great recycling programs. Suitable for a family audience.

Bottom of the Barrel, produced by the Children's Television Workshop. Learn the many ways that we use oil, where it comes from and the environmental impacts of its use. Grades 2-6, 30 minutes.

Closing the Circle, produced by the Environmental Defense Fund featuring JoAnn Woodward. This video takes the viewer through a local grocery store pointing out how shoppers can recognize and purchase products made from recycled materials. There is footage from inside plants that make recycled products. High school to adult. A nice video for civic groups or cable access T.V. 30 minutes.

Compost: Truth or Consequences, produced by Photosynthesis Productions and the Cornell Waste Management Institute. Composting basics are presented in a fun and informative format. Special emphasis is given to problems that can occur. 4th grade to adult, 15 minutes.

Garbage with Bill Nye the Science Guy, created for Walt Disney Productions. A fun, fast-paced look at garbage in nature and in our homes. Suitable for 2nd grade to middle school, 23 minutes.

Get On Board, produced for the America Recycles Day Steering Committee. A promotional video introducing this national recycling holiday. Suitable for all ages, but especially nice for civic groups or schools planning events, 5 minutes.

Life After the Curb-Recycling Processes, produced by Cornell University. A fun and fascinating look at what happens to materials collected for recycling and how they are made into new products. Suitable for grades 2-12, 20 minutes.

Recycling - A Capitol Idea, produced by the Capitol Region Council of Governments. Describes the mechanics of how recycling works in the

Hartford area from curbside pick up to new product manufacture. Suitable for Middle School through adult audiences, 11 minutes.

Recycle It Right, produced by the City of Keene, New Hampshire. This fun and fast-paced video focuses on all aspects of the recycling process. It also shows a group of young children practicing source reduction as they plan a party for a friend. Suitable for grades 1-6, 15 minutes.

The Rotten Truth, produced by the Children's Television Workshop. This classic video follows a young girl who visits a landfill, tours the Museum of Modern Garbage and much more. Suitable for grades 1-6, 30 minutes.

Worm Bin Creatures: *Alive Through a Microscope*, distributed by Flowerfield Enterprises. In this video, busy little worm bin creatures amuse and entertain as they search for food and shelter. Suitable for all ages, 30 minutes.

Yes, I Can!, produced by the Steel Recycling Institute. This video follows the adventures of several recyclables as they avoid disposal and get recycled into new products. Suitable for K-3, 15 minutes.

Your Toxic Trash, produced for public television. An interesting and informative look at household hazardous waste issues and solutions. Suitable for middle school through adult. A nice video for local cable access stations, 30 minutes.

Outreach Programs-Please note that staff time is limited for outreach programs, so book well in advance of the desired program date; at least 2 months or more is suggested. Outreach programs are available at no cost to CT Schools.

Michael Learns to Recycle A flannel board presentation for preschool through K.

The Living Compost Pile An interactive play in which children learn about composting by pretending to be all of the elements in a compost pile. Preschool-2nd grade.

Close the Loop-Amazing Recycled Products An up-close and personal look at products made from recycled materials, with discussion of how recycling benefits the environment through energy savings, preventing pollution, saving natural resources and more. Dozens of products made from the things that we recycle every day are featured. Suitable for 3rd grade to adults.

In service workshops for teachers are also provided on request.

Traveling Displays

The displays listed below are available on loan to schools, non-profit groups, towns or businesses. Each is a tri-fold tabletop display board. The displays fold up and will fit in the back seat of most cars. They are suitable for family audiences. You must reserve the displays in advance and be able to pick up and drop off the display at DEP offices on Elm Street in Hartford.

America Recycles Day- A striking display that informs the viewer about this national recycling awareness day. It also provides information on special programs unique to the Connecticut Recycles Day program such as our poster and green school contests. An 8-foot table or larger is required for this display.

How Recycling Benefits Connecticut- This colorful tri-fold display provides information on how recycling saves energy, trees, water and other natural resources. It also educates the viewer on how recycling benefits the economy.

The Art of Recycling This display educates the viewer about how commonly recycled materials are made into new products. It includes a life-size Frankenstein wearing clothes made from recycled materials. This display should be manned.

Recycling-Food for Thought This display focuses on organics recycling. It has a panel on home composting, one on grasscycling and one on vermicomposting.

Loan Box

Fashion Show Loan Box Produced in cooperation with the Connecticut Recyclers Coalition, this loan box is designed to assist students at the middle and high school levels to put on their own fashion show featuring clothing and accessories made from recycled materials. It contains 2 videos, a sample script, many clothing items, and a timetable and tip sheet. It can also be used as part of a recycling lesson. Although there is no fee to borrow the box, a refundable \$50 deposit is required. The deposit will be returned in full as long as all items are returned undamaged.

CT DEP reserves the right to limit quantities of materials provided, depending on the supply available. If you have any questions, or would like to place an order, please contact the DEP Recycling Program at (860) 424-3365, fax (860) 424-3365

STATE OF Connecticut
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Recycling Program
79 Elm Street
Hartford, CT 06106-5127
<http://dep.state.ct.us>

Arthur J. Rocque Jr., Commissioner

Connecticut Source Reduction and Recycling Program

Technical Assistance- Phone (860) 424-3365, Fax (860) 424-4081.

Elsie Patton	Program management, legislative issues
Judy Belaval	Recycling/solid waste database management; recycling markets, small business recycling
K.C. Alexander	Composting (backyard & municipal leaf); commercial & institutional food waste; grass general permit; source-separated composting
Carey Hurlbut (424-3248)	Beneficial use permits, recycling of special wastes; operator certification
Frank Gagliardo	Enforcement, bulky waste recycling, C&D recycling, green building
Tom Metzner	Grants administration, household hazardous waste, battery recycling, mercury issues, electronics recycling & recycling general permits

Sources for More Information

Aluminum Association, Inc.
900 19th St., NW, Suite 300
Washington, D.C. 20006
(202) 862-5100
www.aluminum.org

American Forest & Paper Association
1111 19th St. NW, Suite 800
Washington, D.C. 20036
(202) 463-2420
www.afandpa.org

American Plastics Council
1300 Wilson Blvd., Suite 800
Arlington, VA 22209
(703) 253-0700
www.plasticsresource.com

Aseptic Packaging Council
2111 Wilson Blvd., Suite 700
Arlington, VA 22201
(202) 478-6158
www.aseptic.org

Can Manufacturer's Institute
1625 Massachusetts Ave., NW
Washington, D.C. 20006
(202) 232-4677
www.cancentral.com

Cornell University Resource Ctr.
7-8 Business & Technology Park
Ithaca, N.Y. 14850
(607) 255-7660
www.cce.cornell.edu/publications/catalogue.html

U.S. EPA, Region I
1 Congress St., Suite 1100
Boston, MA 02114
(617) 918-1068
www.epa.gov

Glass Packaging Institute
515 King Street, Suite 420
Alexandria, VA 22314
(703) 684-6359
www.gpi.org

Keep America Beautiful, Inc.
1010 Washington Blvd.
Stamford, CT 06901
(203) 323-8987
www.kab.org

Conservatree
100 Second Ave
San Francisco, CA 94118
(415) 721-4230
www.conservatree.org

Nat. Assoc. for PET Container Recovery
2105 Water Ridge Parkway, Suite 570
Charlotte, N.C. 28217
(704) 423-9400
www.napcor.com

National Recycling Coalition
1727 King St., Suite 105
Alexandria, VA 22314
(703) 683-9025
www.nrc-recycle.org

National Wildlife Federation
11100 Wildlife Center Drive
Reston, VA 20190
(703) 438-6000
www.nwf.org

Steel Recycling Institute
680 Anderson Drive,
Foster plaza, Building #10
Pittsburg, PA 15220-2700
(412) 922-2772
www.recycleroom.org
www.recycle-steel.org

REGIONAL RECYCLING COORDINATORS/CONTACTS

<p>Recycling: Mary Ellen Kowalewski <u>CAPITOL</u> Region Council of Govts. 241 Main St. Hartford, CT 06106 (860) 522-2217/Fax:724-1274 Email: mkowalewski@crcog.org</p>	<p>Recycling: *Tim Wentzell <u>MID-NORTHEAST</u> Regional ROC 630 Governor's Hwy. South Windsor, CT 06074 (860) 289-2296 (phone & fax) Email: wentzellpe@aol.com</p>
<p>Recycling: Laurel Stegina <u>CENTRAL NAUGATUCK Valley</u> Council of Governments 20 East Main St. Waterbury, CT 06702 (203) 757-0535/Fax:756-7688 Email: cogcnv@cogcnv.org</p>	<p>Recycling region has disbanded <u>NORTHEASTERN CT</u> Council of Govts. 125 Putnam Pike, Route 12; PO Box 759 Dayville, CT 06241 (860) 774-1253 Fax: (860) 779-2056 Email: necog@snet.net</p>
<p>Recycling: *Amy Cabannis <u>CONN. RIVER ESTUARY</u> Regional Planning Agency P.O. Box 778 Old Saybrook, CT 06475 (860) 388-3497/Fax:395-1404 Email: crerpa@snet.net</p>	<p>Recycling: *Winston Averill <u>SOUTHEASTERN CT</u> Regional RRA 741 Flanders Road Mystic, CT 06355 (860) 536-6765/Fax: 860-572-8148</p>
<p>Recycling: Bob Palmer <u>HOUSATONIC</u> Resources Recov. Auth. Old Town Hall, Route 25 & 133 Brookfield, CT 06804 (203) 775-6256/Fax:740-9167 Email: rpalmer@hrra.org</p>	<p><u>SOUTHWEST CT</u> Regional ROC Dept. Of Public Works 1410 Honey Spot Rd. Ext. Stratford, CT 06497 (203) 381-9571; 800-455-9571/Fax:377-1930</p>
<p>Recycling: *Rick Lynn <u>LITCHFIELD HILLS COUNCIL</u> of Elected Officials 42 North St., Town Hall Goshen, CT 06756 (860) 491-9884/Fax:491-3729 Email: lhce01@esslink.com</p>	<p>Recycling: *Mark Bobman <u>TUNXIS</u> Recycling Operating Committee 43 Enterprise Drive Bristol, CT 06010 (860) 585-0419; 225-9811/Fax:585-9875 Email: mac.bobman@snet.net</p>

* Indicates regional coordinator

Prepared by Conn. DEP Recycling Program
 Updated 02/03 (ac)

RECYCLING REGION LISTING BY TOWNS

<p>CAPITOL/MID-STATE Canton Cromwell East Granby East Hampton East Hartford East Windsor Ellington Enfield Farmington Glastonbury Granby Haddam Hartford Hebron Newington Rocky Hill Simsbury South Windsor Suffield Vernon West Hartford Wethersfield</p> <p>CENTRAL NAUGATUCK Beacon Falls Bethlehem Middlebury Naugatuck Oxford Southbury Thomaston Watertown Woodbury</p> <p>ESTUARY Chester Clinton Deep River Essex Killingworth Old Saybrook Westbrook</p> <p>HOUSATONIC Bethel Bridgewater Brookfield Danbury Kent New Fairfield New Milford Newtown Roxbury Sherman</p>	<p>LITCHFIELD HILLS Barkhamsted Colebrook Goshen Harwinton Litchfield New Hartford Norfolk North Canaan Salisbury Sharon Torrington Winchester</p> <p>MID-NORTHEAST Andover Ashford Bolton Chaplin Columbia Coventry Eastford Mansfield Tolland Union Willington Windham</p> <p>NORTHEAST Canterbury Griswold Hampton Killingly Lisbon Plainfield Pomfret Putnam Scotland Sterling Thompson Voluntown Woodstock</p>	<p>SOUTHEAST Colchester East Haddam Groton Ledyard Montville New London North Stonington Preston Sprague Stonington Waterford</p> <p>SOUTHWEST Bridgeport Darien East Haven Easton Fairfield Greenwich Milford Monroe New Canaan Norwalk Orange Shelton Stamford Stratford Trumbull Weston Westport Wilton Woodbridge</p> <p>TUNXIS Berlin Bristol Burlington Meriden Morris New Britain Plainville Plymouth Prospect Southington Warren Washington Wolcott</p>	<p>INDIVIDUAL TOWN PROGRAMS Ansonia Avon Bethany Bloomfield Bozrah Branford Brooklyn Canaan Cheshire Cornwall Derby Durham East Lyme Franklin Guilford Hamden Hartland Lebanon Lyme Madison Manchester Marlborough Middlefield Middletown New Haven North Branford North Haven Norwich Old Lyme Portland Redding Ridgefield Salem Seymour Somers Stafford Wallingford Waterbury West Haven Windsor Windsor Locks</p>
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CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

MANDATORY RECYCLING REGULATIONS

Section 22a-241b-1 Definitions

"Cardboard" means corrugated boxes and similar corrugated and kraft paper materials which have a minimum of contamination by food or other material.

"Glass Food Container" means a glass bottle or jar of any size or shape used to package food products suitable for human or animal consumption.

"Intermediate Processing Center" means a facility which can recycle an item or items and market or deliver for reuse the resulting material product or products. Such facilities may be owned by public or private entities or combinations thereof and may offer service on a state, regional, municipal or submunicipal level.

"Leaves" means the foliage of trees.

"Local Processing System" means a facility or technique authorized by a municipality and acceptable to the Commissioner which can recycle an item or items and market or deliver for reuse the resulting material product or products.

"Market" means to sell or deliver a recyclable item to a consumer who will reuse it or dispose of it for reuse in a material product.

"Metal Food Container" means an aluminum, bi-metal, steel, tin-plated steel, or other metallic can, plate or tray of any size or shape used to package food products suitable for human or animal consumption.

"Newspaper" means used or discarded newsprint which has a minimum of contamination by food or other material.

"Office Paper" means used or discarded high-grade white paper and Manila paper including, but not limited to, paper utilized for file folders, tab cards, writing, typing, printing, computer printing, and photo-copying, which is suitable for recycling and which has a minimum of contamination. For the purposes of sections 22a-241b-1 to 22a-241b-4, office paper generated by households is excluded.

"Recycle" for the purposes of sections 22a-241b-1 to 22a-241b-4, means to separate or divert an item or items from the solid waste stream for the purposes of processing it or causing it to be processed into a material product, including the production of compost, in order to provide for disposition of the item or items in a manner, other than incineration or landfilling, which will best protect the environment. Nothing in this definition shall preclude the use of waste oil as fuel in an oil burner.

"Regional Processing Center" means an intermediate processing center which is authorized by a group of municipalities or designated by the Commissioner which can recycle an item or items and market the resulting material product or products.

"Scrap Metal" means used or discarded items which consist predominantly of ferrous metals, aluminum, brass, copper, lead, chromium, tin, nickel or alloys thereof, including, but not limited to, white goods and metal food containers.

"Storage Battery" means lead acid batteries or other batteries used in motor vehicles such as automobiles, airplanes, boats, recreational vehicles, tractors and like applications.

"Waste Oil" means crankcase oil that has been utilized in internal combustion engines.

Section 22a-241b-2 Items to be recycled

- (1) The following items are required to be recycled by each municipality within three months of the availability of service to the municipality by a regional processing center or local processing system: (A) cardboard, (B) glass food containers, (C) leaves, (D) metal food containers, (E) newspaper, (F) office paper, (G) scrap metal, (H) storage batteries, (I) waste oil, and (J) nickel-cadmium batteries /7-19.
- (2) After January 1, 1991, no approval to landfill or incinerate the items specified in subdivision (a) (1) of this section may be granted by the Commissioner pursuant to subsection (b) of section 22a-241b-4.

Section 22a-241b-3 Management and enforcement plans for solid waste facilities

Within three months of the adoption of this regulation, the owner or operator of each solid waste facility shall submit for the Commissioner's approval, pursuant to section 22a-209-4(f) of the Regulations of Connecticut State Agencies, an amended operation and management plan for the solid waste facility. Such plan will make provision to ensure that items required to be recycled will not knowingly be accepted by the solid waste facility except as provided for in section 22a-241g of the Connecticut General Statutes and subsection (b) of section 22a-241b-4. Such plan shall reflect the relevant requirements of Chapter 446d of the Connecticut General Statutes and shall include, but not be limited to, systems to notify facility users concerning the requirements of the recycling program, penalties for noncompliance, and methods for handling recyclable items which are delivered to the solid waste facility. Plans shall be specific to the facility but shall be coordinated with plans of other solid waste facilities and collection systems which may transfer waste to the facility.

Section 22a-241b-4 Municipal requirements

(a) Planning Requirements.

- (1) Prior to January 1, 1991, a municipality shall be deemed to be in compliance with these regulations if it is participating in a regional planning process for recycling approved by the Commissioner or is implementing a recycling plan developed in accordance with the provisions of section 22a-241c of the Connecticut General Statutes, and approved by the Commissioner in accordance with subsection (c) of section 22a-227 of the Connecticut General Statutes. Such plan shall at a minimum include a program and schedule to ensure that service will be available by January 1, 1991, for the recycling of each item designated in section 22a-241b-2, or such other date as provided for by subsection (b) of this section. The plan shall also include interim target dates for recycling items specified in section 22a-241b-2, for which service is currently available or can be anticipated to become available prior to January 1, 1991. Such plans shall be coordinated with the plans prepared by solid waste facilities in accordance with section 22a-241b-3 and shall describe the methods of public information and enforcement that will be utilized to ensure that the recycling program is implemented.
- (2) In reviewing a plan required by subdivision (a)(1) of this section or when issuing an order pursuant to sections 22a-241d through 22a-241e inclusive of the Connecticut General Statutes, the Commissioner shall determine when service is available to a municipality and shall deem such service acceptable after considering the status of facilities and systems designed to recycle items. In determining the availability and acceptability of service, facilities and systems, the Commissioner shall consider the following factors: both positive and negative impacts on public health and the environment; severe economic impacts on the municipality, if any; the economic stability of the service; the availability of markets or alternate disposal methods; the capacity to provide service to the municipalities; the date on which service will be available; and the technical viability of the system or facility.

(b) Exceptions.

- (1) Except as provided in section 22a-241f of the Connecticut General Statutes and subdivision (a)(2) of section 22a-241b-2, any municipality or regional authority may apply to the Commissioner for approval to landfill or incinerate one or more of the items listed in section 22a-241b-2 for a period

to be determined by the Commissioner. The Commissioner shall consider such applications based on, but not limited to, the following factors: the availability of markets; the availability of local processing systems; the availability of regional processing centers; the desirability of alternate utilization techniques; any negative impacts on public health or the environment associated with recycling of the item or items; and severe economic impact.

After consideration of the application, the Commissioner shall issue a proposed decision in the matter. Such decision shall specify the approved items, if any, any conditions the Commissioner may require, the municipality or municipalities to which the exception applies, and the time period for which the approval is granted. The Commissioner shall publish in the Connecticut Law Journal a notice of the proposed decision on each such application.

- (2) Any municipality, regional authority, or group of twenty-five or more persons which is aggrieved by the Commissioner's proposed decision and which requests a hearing within 30 days of the date of publication of the proposed decision may be granted a hearing. Following such hearing the Commissioner shall issue a final decision in the matter. Such decision shall specify the approved items, if any, any conditions the Commissioner may require the municipality or municipalities to which the exception applies, and the time period for which the exception is granted. Any party to the hearing who is aggrieved by the final decision of the Commissioner may appeal the decision to the Superior Court as provided for in section 4-183 of the Connecticut General Statutes.
 - (3) Except as provided in section 22a-241f of the Connecticut General Statutes and subdivision (a)(2) of section 22a-241b-2, the Commissioner may on his or her initiative determine that one or more of the items specified in section 22a-241b-2 should be landfilled or incinerated for a period to be determined by the Commissioner in order to best serve the public interest. Such determination shall be based on but not limited to the following factors: the availability of markets; the availability of local processing systems; the availability of regional processing centers; the desirability of alternate utilization techniques; impacts on public health or the environment associated with recycling of the item or items; and severe economic impact. The Commissioner shall publish in the Connecticut Law Journal a notice of the proposed exception. Such notice shall specify the proposed items, any conditions the Commissioner may require, the municipality or municipalities to which the exception applies, and the time period for which the exception is granted.
 - (4) Any municipality, regional authority, or group of twenty-five or more persons which is aggrieved by the Commissioner's proposed exception, and which requests a hearing within 30 days of the date of publication of the proposed decision, may be granted a hearing. Following such a hearing the Commissioner shall issue a final decision in the matter. Any party to the hearing who is aggrieved by the final decision of the Commissioner may appeal the decision to the Superior Court as provided for in section 4-183 of the Connecticut General Statutes.
- (c) Reporting Requirements. Each municipal authority, regional recycling authority, or intermediate processing center shall keep a record by recyclable item of the amount of solid waste recycled through municipally or regionally sponsored programs and shall submit this information to the Commissioner by the first day of July of each year. The quantity of solid waste recycled shall be reported on forms provided by the Commissioner. Such forms shall provide for the measurement of quantities of each item listed in section 22a-241b-2 by generating municipality or recycling region, in the appropriate volume or weight unit and to an accuracy that the Commissioner deems acceptable for compliance with the purposes of the solid waste management plan of the state.

Statement of purpose: These regulations are required by section 22a-241b of the Connecticut General Statutes, and are intended to provide for the recycling of certain portions of the solid waste generated in the State.

Effective date: This regulation became effective on February 28, 1989.

(Please note that Nickel-Cadmium Batteries & grass clippings are also mandated recyclables)

Make Your Own Recycled Paper



Overview- *By making their own recycled paper, students will discover how a paper mill recycled used paper to make new paper. They will also learn that paper is one of many products that is manufactured from renewable forest resources.*

Level- Grades 1-8

Subjects - Science, Social Studies, Language Arts, Visual Arts

Skills- Observing, Organizing, Information, Comparing & Contrasting

Materials- Scrap paper (notebook paper, copy paper, and used paper bags work well, avoid paper with glossy finishes or newsprint); a wooden frame around 5" X 7" or 8" X 10"; nylon or wire screen; staples; a plastic basin at least 2.5 gallons in capacity, that is larger than the frame; newspaper for blotting; blender; sponge; strainer; towels for cleaning up water (optional: colored paper, dried flowers, herbs).

Time - Preparation: 30 minutes Activity: two 50-minute periods (The paper you make will need to dry overnight)

Preparation - the papermaking process is a wet one, so plan to use a work space that won't be harmed by moisture and have students wear an apron or smock, or old clothing. Assemble your materials. Tightly staple or tack the nylon screening to the wooden frame, making a "deckle, " which is the surface on which you will layer the pulp.

Background

Paper is a mat held together by a fiber's roughness and can be made from recycled paper, cotton, flax, or wood. Paper comes from trees, which are a renewable resource. Most of the trees used for paper are planted and harvested for that purpose. More than half of the fiber used for paper comes from paper which has been collected for recycling and from residues left when lumber and other wood products are made. Recycling paper is easy and can help extend the value and utility of resources. However, no matter how much paper we recycle, new trees will still be needed for paper products because paper cannot be recycled indefinitely. Each time paper goes through the manufacturing process, the fibers deteriorate. After repeated recycling, (about four to six times) the fiber is no longer suitable for papermaking.

Doing the Activity

1. Introduce the activity by discussing each phase of the recycling loop. Ask students if they know what happens to paper that is collected for recycling. Explain that during this activity, they will discover how a paper mill recycled used paper to make new paper.
2. Remove any plastic or staples from the scrap paper and have students tear it into small pieces (approx. 1-inch squares). Fill the blender halfway with warm water, then add a handful of the small pieces of paper. Blend at medium speed until you no longer see pieces of paper, and the pulp has a soupy consistency. You can blend in a piece of construction paper for color.
3. Fill a large basin half way with warm water. Pour the pulp mixture into the large basin. Mix the pulp and water thoroughly.
4. Slide the deckle into the basin. Holding the deckle under the water, gently move it back and fourth to get an even layer of pulp on the screen.
5. Lift the deckle out of the mixture, keeping it flat. Allow it to drip until most of the water has drained off. You should have a uniform layer of pulp mixture on the screen. (At this point, students can place dried flowers or herbs on the pulp.) Press the pulp gently with your hand to squeeze out excess moisture. Soak up any excess water dripping beneath the deckle with a sponge.
6. Place newspaper on a flat surface and turn the screen paper-side-down on it. Lift the screen gently, leaving the paper.
7. Cover the paper with another layer of newspaper and blot. Remove the top layer of newspaper, and let the paper dry overnight. Gently peel off the paper.
8. When you're finished making paper, collect the leftover pulp in a strainer and throw it out, or freeze it for future use. Don't pour the pulp down the drain!
9. To conclude the activity, discuss these questions: How is the new paper different from the old paper that you recycled? Why do you think recycling paper is important? How can you use your new paper?



Adapted from the activity "Make Your Own Paper," from the project learning Tree PreK-8 Environmental Education Activity Guide, with permission. (c) American Forest Foundation, 2000. For information about more environmental education activities, please visit www.plt.org.