OPEN YOUR EYES TO LITTER—VOLUME 2
OUR LITTERED PAST
A TEACHER'S GUIDE

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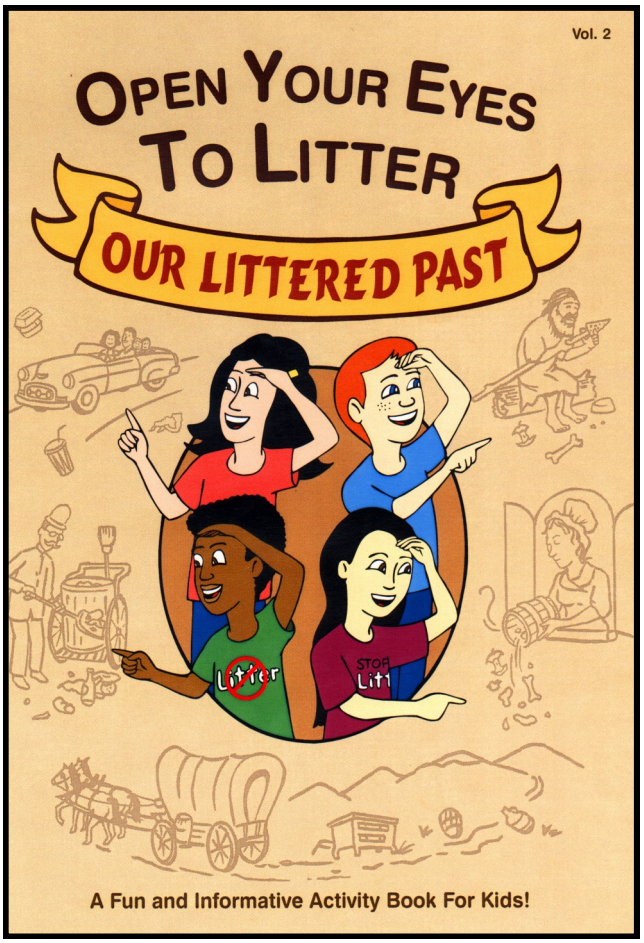

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Empowering Pennsylvanians to keep
our communities clean and Beautiful.

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Table of Contents

OPEN YOUR EYES TO LITTER—Vol. 2

Our Littered Past

OVERVIEW

This second volume of **OPEN YOUR EYES TO LITTER** — **Our Littered Past** provides students and teachers with a look at how people through the ages have dealt with their litter and wastes. Although this booklet can be used successfully on its own, we recommend that it be tied into a longer, multi-disciplinary theme involving many resources. This will help provide a larger context for discussion and activities. Some suggestions are:

- A **Litter/Recycling/Earth Month Theme**
- Tie it to a **Social Studies** topic already in your curriculum—
    - **Oregon Trail**
    - **Ancient Civilizations (Rome, Greece, China)**
- Use it as part of a **Science** Theme such as **Watershed Study**
- Use it as a core for **Language Arts** topics such as **research, letter writing, essay writing, interview skills and public speaking**
- This book provides many opportunities for **Technology/Computer** connections such as **Internet research, computer skills, website creation**, etc.
- Use in conjunction with activities related to earning **Scout badges**
- Use as 2-3 week theme for **latchkey or after-school programs**.

Although this book was designed for use in grades 4-6, it can certainly provide successful results with some younger and many older age groups. Each page is the entry point for a variety of open-ended discussions to help students realize dealing with our waste has been a problem ever since people have been living in communities. The goal of this book is to not only share our history, but to focus students on being part of the solution. Each one of us can make a difference. And collectively we can initiate positive change.

Our experience is that the more hands-on, real life activities you involve your students in, the more they integrate their own personal connection with the environment and understand that one person can make a difference. If you live in an area that has a Keep Pennsylvania Beautiful affiliate, the folks there can be a valuable resource. The Keep Pennsylvania Beautiful home office offers support for anyone in a county where there is not an affiliate. Visit our website for a list of affiliates **www.keeppabeautiful.org**.

If this booklet inspires your group or students to embark upon a cleanup or adoption, be sure to **emphasize common sense to students and build safety** into all activities. Encourage parents and volunteers to accompany students involved in research out in the community. Use gloves where necessary and don't have students go anywhere alone.

Suggested Strategies

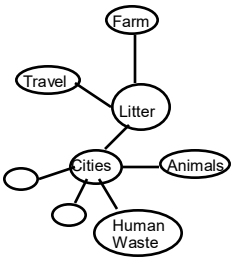
Regardless of the age group with which you are working, we suggest beginning your Litter Study with a **K-W-L activity**. Using three large sheets of chart paper, label one, Things We **KNOW,** the next, Things We **WANT** to Know, and the third, Things We **LEARNED**. Use the first two lists at the very start of your theme. This will make you aware of the knowledge your students bring to this study, so that you aren't needlessly re-teaching and you learn which students have knowledge that they could present as a mini-lesson. (Or perhaps get their parents in as a speaker with expertise!) The second list helps you and the students focus on the specific questions they have and the direction your children's research will take. This will be valuable information to use when locating resource materials, speakers and special projects. It can also be added to, as your theme progresses. The third list can be used as a culminating activity that brings together all the knowledge that each student, small group and speaker brought to the learning experience.

Things We **KNOW**

Things We **WANT** to Know

Things We **LEARNED**

WEBBING ~~= Another valuable technique which works well~~ with all age groups, is to **create a Web at the beginning of your theme**. Draw a circle on chart paper or the blackboard and write your theme title in the middle. Encourage the children to brainstorm related topics or questions they have about the theme and add them as arms to the web. Use straight lines radiating out from the center circle with the related word in a circle, just like the one in the center. Group connected topics together as fingers off the arms, such as all science-oriented items, all creative art projects, and all research or social studies areas. This can be displayed and added to throughout your study. Guiding your children through this learning process helps them to make connections between topics and understand that real-life learning isn't separated into "courses."



Although there are specific activities suggested for certain pages in "Our Littered Past", the ~~primary learning strategy recommended here is~~ **student research and sharing**. We have included a basic list of topics and encourage you to let students work in small groups or pairs to select a couple of topics that interest them (or the teacher may assign one and let students pick one) and prepare presentations to the rest of the class. In our research for both the book and the resources, the "things we learned along the way" were equally as important as the "topic" we were researching. There are lots of interesting facts about waste, waste disposal and the introduction of plumbing to manage this disposal that kids find fascinating.

The **Trash Timeline and History, Waste Management and Illegal Dumping Laws, Resource List**, and **Glossary** are here to complement your own classroom's research and investigation. They can be taken out of this guide, copied, and used as a teaching tool or as a beginning point for student research. The Internet and municipal and state agencies are also invaluable resources. The glossary (See page 63) gives you a working vocabulary and source for spelling words and writing assignments.

We suggest you use outside speakers and local experts whenever possible. Older folks and grandparents who remember the "way it was" can make a huge impact on kids. Quilt makers, repairmen, flea market vendors, landfill representatives, waste haulers, antique collectors (old bottles, cans and tools are especially interesting), papermakers, county recycling coordinators, road adopters, etc., can make a lasting impression on our youth when they are asked to make a presentation.

TEACHING SUGGESTIONS

Where to Start

- We began our research into this project by viewing *The History Channel's* DVD - **Garbage**. It may be available through your library but can be ordered online at **www.historychannel.com** for $24.95 plus shipping and handling. Go to the Store and click in garbage as the keyword. Or call 1-888-423-1212. We suggest that you view this wonderful teaching tool and decide if it is appropriate for your class. It's a great starting point and gives lots of background information.

- We also recommend inviting one or two speakers into the classroom during this time. If your county has a Keep Pennsylvania Beautiful affiliate, they can share lots of info and materials. The Department of Environmental Protection has speakers on a variety of relevant topics. Landfill managers, local government officials, waste haulers, farmers, antique bottle collectors, quilters, seniors, etc. are also possibilities for speakers. (see Resources)

- **Our Littered Past** is focused on grades 4-6. This is a great age to begin investigative/ research skills. We recommend having pairs or small groups of students choose topics and go online to discover what they can about ancient civilizations and other relevant topics. In addition to honing their computer/research skills, they will be finding out LOTS along the way that will complement this study. In researching this booklet, we discovered MANY interesting facts to share with each other. Students could create mini-reports and share what they learned with each other.

Suggested Research Topics

Archaeology

Litter

Fossils

History of Plumbing

Native Americans

Ancient China

Ancient Rome

Ancient Palestine

Middle Ages

Plague

Colonel George Waring, Jr.

Rag pickers

History of Municipal Water and Sewage

History of glass

Papermaking

Throw Away Society

Litterbug

Lady Bird Johnson—Beautification Program

Pennsylvania Resource Council

Earth Day

Ocean Dumping

Gaylord Nelson

Adopt-A-Highway Programs

PA CleanWays

Adopt-A-Forest Programs

Adopt-A-Beach Programs

History of cans

History of plastic

Rachel Carson

Silent Spring

Page 1 **SOCIAL STUDIES** — Find out what your students know about archaeology and archaeologists. Has anyone ever dug up or found an arrowhead or pot shard? Are there any historical sites in your area where archaeologists have discovered information about the past?
Invite an archaeologist or archaeology teacher to speak to your classroom about what they do and how they do it.

The book Rubbish! written by modern day landfill archaeologists, William Rathje & Cullen Murphy, is filled with eye-opening facts and lots of information gleaned from examining the things we throw away today.

Page 2 **SCIENCE —** Discuss what it means "when nature litters." How does it take care of itself? Have students (or you) bring in a scoop of "litter" from the forest floor and examine it. Try to identify as many items as possible.

Introduce the "Life Cycle" of something. Have pairs of students choose a living thing and illustrate and explain its life cycle.

S&T 3.5.4. Grade 4
A. Identify the composition of soil as weathered rock and decomposed organic remains.

What are some of the things that people litter? Discuss the difference between intentional and accidental litter. Make a list of the problems litter causes and its negative consequences.

Page 3 **ACTIVITY PAGE** — In each box decide when the item is litter and circle it. After students have done this page have them each make one or two boxes of their own showing some item they have seen in different environments—one of them with the item as litter.

RESEARCH PROJECT — Talk about how litter affects us and our environment. Have students choose an environmental topic (see below) to research and present their report about how it is affected by litter.
Examples of research topics could include a local waterway, park, public arena or outdoor music location, sports field, residential area, lake or pond, hiking or bike trail, or airport. Other topics include cities, crime statistics, health, farmers, animals, birds, plants, business owners, tourists, taxes, hikers/runners/walkers, and kids. Let students suggest topics. Include pictures (hand drawn as well as photos) and create a "When is a soda can, candy wrapper or any of these other items, not litter?" display.

E&E 4.8.4 Grade 4
C. Explain how human activities may change the environment.

Brainstorm a LITTER LIST with your students. Keep track of all the different kinds of litter they spot. Post it in your classroom and encourage students to add to it throughout your Litter/Earth Month/Recycling Theme.

Throughout

Brainstorm another list — WHERE LITTER IS FOUND. Post it as well, and encourage additions to it throughout your theme. Are some locations more common litter sites than others? This can be a great graphing activity/class book. Share the list with others at school, take to other places (retirement homes, libraries, town offices, etc.). Take turns bringing home to share with families.

R, W, S & L 1.8.5. Grade 5
A. Select and refine a topic for research.
B. Locate information using appropriate sources and strategies.

WRITING — Form small groups and have students share how

litter has affected them or their environment in some way. Have students close their eyes and picture this littered scene or the incident where litter affected them. Use this as the starting point for a writing activity. Using the picture created in their mind, now guide students to use words to help someone else SEE the littered area that affected them and FEEL their feelings about it. Putting what they SEE and FEEL into words can be very powerful. Emphasize descriptive words and sharing feelings. Encourage their creativity by using poetry, essay, or short story, etc.

R, W, S & L 1.4.5. Grade 5
A. Write poems, plays, and multi-paragraph stories
- Include detailed descriptions of people, places and things.

Page 4 Talk about the things archaeologists find that give us clues to the past. What are some items that DON'T decompose? Much of what we know of early civilizations, both at home and abroad, has come from studying what archaeologists have dug up. You might want to have an interested small group (or speaker) present a mini-lesson on archaeological finds from your local area. Also, in many areas, curbside garbage pickup was not available until the 1950's. Find out when curbside pickup was first available in your area and discuss how trash was disposed of prior to that time. Encourage students to ask grandparents and other older folks.

RESEARCH — Fossils: How they are formed and what can we learn from them?

MAKE plaster of Paris fossils using insects, leaves, etc. Bury the fossils, broken pot shards and/or arrowheads in a large tub of dirt and have students carefully dig for clues to the past.

Have fun finding the hidden objects in the two pictures.

Page 5 **SOCIAL STUDIES —** On a globe or world map, locate where early civilizations were found. Why do you think they were formed where they were? How would the ways they handled their trash affect the land there? There are wonderful websites with this info on them. Try **www.ancienthistory.about.com** or just use the phrase ancient history with your favorite search engine— **www.google.com** is a good one!

Page 6 **MATH —** Have students use their math skills to determine the change in height of a home in Troy over five centuries, ten centuries and 15 centuries. (4.7 feet change per century)

Geography 7.1.6. Grade 6
B. Describe and locate places and regions.

Page 7 Compare Ancient Rome's attitude towards litter with today's attitude. Does economics play a role in which parts of a town, county, or state are kept clean, in where landfills and recycling centers are located, or whether there is mandatory trash pickup?

Math 2.2.5. Grade 5
A. Create and solve word problems involving addition, subtraction, multiplication and division of whole numbers.

RESEARCH — Have students find out what daily life in Ancient Rome was like at that time.

Page 8 Compare Ancient China's attitude towards litter with today's attitude. Do we share the belief that "man and nature be in one"? What degradable wastes do we recycle? What non-degradable wastes do we repair, reuse or recycle?
Learn about **composting**. Call your County Conservation District

Throughout

R, W, S & L 1.6.5. Grade 5
Participate in small and large group discussions and presentations.

or Penn State Agriculture Extension office to see if they will present a compost demonstration for your class.
Start a composting program at your school or provide information for students to share with their families at home.

R, W, S & L 1.6.5. Grade 5
Participate in small and large group discussions and presentations.

Page 9 Compare the Ancient Middle Eastern attitude towards litter with today's attitude. Do we consider littered, unclean places to be unholy? Do some people? What role did religion play for the people in Palestine?

Geography 7.3.6. Grade 6
B. Describe the human characteristics of places and regions by their cultural characteristics.

Page 10 **RESEARCH —** Learn about the history of plumbing. Find out what people living in castles did with their waste. Discuss how discarding waste out the window would be a problem. What types of waste were thrown out?
Answer:

- personal waste from chamber pots and washing
- food scraps, bones, dirty water from cooking and cleaning

Could people do that today?

Throughout

Page 11 Look at all the people, animals and buildings/businesses in this picture. List as many situations as you can involving the interaction between the people, animals, buildings/business and waste in this scene.

R, W, S & L 1.4.5. Grade 5
A. Select and refine a topic for research.
B. Locate information using appropriate sources and strategies.

WRITING — Have your students choose one of the people, animals or buildings in this picture and write a short article, conversation or story about what it would be like to be in that village at that time. What would you be doing (or what purpose would you serve), what would be going on around you, what would you need to look out for or take advantage of, and what would you want to have happen? ex. The horse, the woman carrying the bread, the church.

Look at the woman in the front walking with her arm around her daughter. What might she be worried about? *(protecting her child from walking through the garbage and mess in the street, avoiding the running, sometimes fighting animals, watching out for waste being thrown from windows)* Why would her children be afraid of these animals? *(they might get run over or attacked by them)* Why were animals allowed to roam the streets? *(to eat the garbage)* What is the difference between wild and domestic animals? How did animals come to be domesticated? Research to find information about the earliest pets.

R, W, S & L 1.4.5. Grade 5
B. Write multi-paragraph informational pieces.

- Include cause and effect.

Page 12 **HISTORY** — Ask students to sing the song "Ring Around the Rosie." Share with them that some historians think this song was written about the black plague. The "rosies" were the raised, round, red spots that people got on their bodies, the posies were to hide the smell, the ashes were the remains of the clothing burned to prevent the spread of the disease and falling down was their own death/sickness if they caught the disease. Have kids do their own search for other interpretations. Just type "ring around the rosie" in the search line of a search engine—we use the **www.google.com** and **www.about.com** search engines a lot!

SCIENCE—Learn more about the role of the flea in the Black Death by logging onto **www.insecta-inspecta.com/fleas/**

bdeath/. See if you can find other sites that give you information about the impact disease-carrying fleas and rats have had on humans throughout the ages.

Page 13 Have fun with the puzzle.

Page 14 **HISTORY/SOCIAL STUDIES** — Compare England's attitude about using their rivers as trash receptacles with Pennsylvania's attitude during that same time period. Research the history of the Susquehanna, Delaware, Allegheny, and Monongahela Rivers. What were the people of Pennsylvania throwing into their rivers?

E & E 4.5.5. Grade 7
A. Explain benefits and harmful effects of pests.

SCIENCE — Discuss water pollution. Research the introduction of municipal water and sewage systems. Research ocean dumping around the world.

Page 15 Rag pickers were valuable people who performed a needed task in the 1800s. **Waste and Want** by Susan Strasser describes this well. She shares information gleaned from the diary of a Vermont man who used rag pickers or peddlers, to sell his tin ware and to collect goods he could then sell to manufacturers.

E & E 4.3.4. Grade 4
B. Describe how people can reduce pollution.

HISTORY/SOCIAL STUDIES — Explore the history of papermaking. Make a timeline with pictures and 'recipes' showing the different processes and materials used in papermaking from Ancient civilizations to the present. Try to find out the environmental impact of these different processes.

E & E 4.3.4. Grade 4
B. Identify how human actions affect environmental health.

MAKE PAPER — Make paper in your classroom using a blender and old paper. **http://gort.ucsd.edu/preseduc/papermak.htm** is a good website to learn how to do this. Invite a local "crafter" of paper in to share their techniques.

E & E 4.2.4. Grade 4
D. Identify use of reusable products.
Understand the waste stream.

FIELD TRIP — If possible, visit a paper manufacturer (or write to one for info). What kinds of paper do they make? Ask about different steps in the process. Do they use recycled paper?

From Waste and Want by Susan Strasser—pg. 69

"Marillo Noyes, a manufacturer of tin ware, hired as many as twenty-two salaried peddlers at a time over the years, providing them with wagons and horses from his stables. Noyes supplied his employees, as well as the independent peddlers he served as a wholesaler, with a wide range of products—pins and needles, bolts of cloth, tin-plated iron dishpans—that they sold house to house. With the exception of the tinware made in his own shop, he purchased these goods in large quantities from the factories that make them. He wholesaled them also to general stores and dry-goods merchants in towns, usually shipping merchandise by rail and sometimes using his peddlers as salesmen and collection agents.

Noyes also obtained many goods *from* his peddlers, who brought them from households, and sometimes from stores, along their routes. A few of these goods (like eggs and butter) he sold at retail, but most (like rags and rubber) he marketed to factories for use in industrial processes. Among his papers, now at the Harvard Business School's Baker

Library, are printed lists for what Noyes called “barter,” although he and his peddlers in fact assessed value at prespecified rates handwritten on the printed forms.

Many of the materials on the barter lists are farm products—grown, caught, or prepared by rural men and women: fruit, flax, mustard seed, woolen yarn, beeswax, butter, eggs, feathers, bristles, hair, horns, bones, and the skins of deer, sheep, calves, bear, mink, raccoon, and even house cats. Noyes sold most of the animal products to manufacturers. Paper mills, for example, cooked horns, hoofs, and scraps of hide to make sizing, the glaze or filler used on porous paper. All kinds of factories bought fat to render for lighting and lubricating.

Also on Noyes’s barter lists are many used products of previous manufacturing processes: old brass, lead, silver, gold, and other metals; rubber; glass; and above all, rags of many specified colors, fabrics and qualities. These, too, he marketed to factories for use as raw materials. Just as he both shipped to and received from his peddlers. Noyes also acted as both customer and supplier to manufacturing concerns. Some factories sold him buttons, thread, silver spoons, and bolts of gingham cloth, while others bought and processed the many materials that his traveling peddlers took in exchange for their wares. The small memorandum books that Noyes carried with him throughout his business career recount his work in distributing his barter to factories —an enterprise apparently much more time-consuming (or more interesting to him) than the particulars of buying manufactured goods for resale. He was constantly searching for new outlets for the barter he took in, hoping to find manufacturing concerns that might pay higher prices, and he was always looking for new sources of sacks and bags to contain the rags and rubber.”

SOCIAL STUDIES — Discover how the Revolutionary War impacted the colonies’ need for paper, metal goods, cloth and clothing, and certain food items. What did this have to do with increased waste and pollution and/or reuse and conservation?

S & T 3.6.7 Grade 7
C.

- Explain basic material processes that manufactured objects undergo during production (e.g. separating, forming, combining).
- Explain the relationships among the basic resources needed in the production process for a specific manufactured object.
- Analyze manufacturing steps that affect waste and pollutants.

Page 16 **HISTORY/SOCIAL STUDIES** — Research different tribes of Native Americans. Find out how each one viewed the environment and what they did with their wastes. The Lewis and Clark journals share that these explorers were able to smell certain tribes miles before they came to their villages.
We are all familiar with the story of the Indians helping the Pilgrim settlers learn how to grow corn by putting a dead fish in the hole with the seed. Leftover food scraps can have other uses as well. Discuss **composting** and how decayed leaves, grass and vegetable food scraps can make valuable nutrients to improve and fertilize gardens and soil. The Pennsylvania Department of Environmental Protection (DEP) website, **www.dep.state.pa.us** can be of help here, too.

Vermiculture can also be introduced. Worm castings are used by many people as rich compost for gardening and by mushroom farmers to grow mushrooms. Worm bins can be ordered through **www.wormwrld.com** or can be constructed in your classroom with plastic tubs, shredded paper, food scraps and red worms.

Geography 7.3.6. Grade 6
C. Describe the human characteristics of places and regions by their settlement characteristics.

Pgs. 17-18 Have fun doing this page!

Throughout

S & T 3.6.7. Grade 7
A.
- Identify the environmental, societal and economic impacts that waste has in the environment.

HISTORY — Look at each group of settlers as they start out on their journey. Follow their path and then look at them again at the end of their journey. Has anything changed? What do you think happened on their journey? Choose one person in one group and pretend you are them. Write four to six journal entries that chronicle some of the most memorable, painful or exciting experiences that you and your family and/or fellow travelers had during your travels.

Pgs. 19-20 **HISTORY** — Have students research the history of New York City and present mini lessons to their classmates. Include the words garbage, trash or waste disposal in their search. Here are some suggested sites:
www.jhu.edu/~gazette/janmar95/jan0395/trash.html
www.johnmccrory.com/bags/history/history1.html
http://environmentalchemistry.com/yogi/environmental/wastehistory.html This is a mini book review with good info.

R, W, S, & L 1.4.5. Grade 5
A. Write poems, plays and multi-paragraph stories.
- Include detailed descriptions of people, places and things.

Have students **RESEARCH** and report on Col. George Waring, Jr. Encourage them to dress up and role-play the information they discover—have students include their friends and create a play.

Page 21 Encourage kids to use their **MATH** skills to learn the answer!

Page 22 **One man's trash is another man's treasure.**

Throughout

R, W, S & L 1.4.5. Grade 5
B. Write multi-paragraph informational pieces.

This would be a great time to invite speakers who could share some 'old time' experiences and/or skills with your class. Many students are used to throwing away anything that is broken or unwanted.
Brainstorm a list of what things the immigrants might have reused or repaired and how. Do any of your students have parents or grandparents that reuse certain things? Brainstorm how you and your students can reuse some of your own items that are no longer wanted or needed.

R, W, S & L 1.6.5 Grade 5
A. Listen to others.
- Ask pertinent questions.

R, W, S & L 1.6.5. Grade 5
D. Contribute to discussions.

SOCIAL STUDIES — The immigrants who came to the United States over the years were used to conserving, reusing, mending, and fixing their belongings. Not everyone today mends, fixes, composts, or reuses. Share "trash treasures" that your children's families have found or been given and then either reused or repaired. Help children to understand that just because something is broken or they don't want it anymore, it doesn't have to go into the trash. Entire agencies exist to find good uses for items others don't want or need any longer – Goodwill, The Salvation Army, church rummage sales, consignment shops, second-hand stores, yard sales, and flea markets. Non-profit groups collect unused food from restaurants and transport it to soup kitchens and food pantries to feed hungry people.

Organize a class or school flea market. Collect items no longer

wanted (with parent's permission!), price (decide on something reasonable – everything less than $1) and have a fundraiser for your class project, school library, or to pay for a special theme-related presenter. Some schools do this monthly to give different classes the experience and responsibility of organizing, working on, and receiving the $ from these events.

Organize a **SWAP** (again, with parent's permission!). Collect items of similar value, such as used books or games, and for every item you bring in, you may take a "new" one home.

RESEARCH - Find out what your school or classroom does with its waste, such as paper, boxes, books, food, desks, chairs and trash. Is there a way your class could have a positive impact on this?

If you have a Keep Pennsylvania Beautiful affiliate in your county, ask to use the Litter IQ Board, an interactive electronic display board that creates litter awareness, in your classroom or school for a week or so.

Geography 7.3.3. Grade 3
A. Identify the human characteristics of places and regions by their population characteristics.
B. Identify the human characteristics of places and regions by their cultural characteristics.

RESEARCH/SCIENCE - Have interested students do research to find out how long it takes other common household items to biodegrade.

SOCIAL STUDIES - Invite an "antique bottle hound" to talk to your class about their finds in old dumps. Many old farms had dumps on them where families discarded lots of household items. (Up until the 1970's, the Penn State Extension Office offered farmers guidelines for disposing their own trash on their own lands.) We've all learned a lot about the environment—even the experts!

Pgs. 23-24 Have kids test their knowledge of the past to match the 'old time' item to its 'new, more convenient' replacement.

There's fascinating **RESEARCH** here. Have small groups look up the history of vacuum cleaners, telephones, refrigerators, washing machines, automobiles, etc. Present mini lessons to their classmates. Encourage students to bring in any of these items (and parents or grandparents) to share as well.

S & T 3.2.4. Grade 4
D.
- Recognize and explain basic problems.
- Identify possible solutions and their course of action.
- Try a solution.
- Describe the solution, identify its impacts and modify if necessary.
- Show the steps taken and the results.

Page 25 See Page 9 of the Teacher's Guide.

Compare scrap drives to recycling today. How is it the same, how is it different?

Share Pennsylvania's Recycling Law. Log on to the Department of Environmental Protection's website at **www.dep.state.pa.us** to find out lots more and locate recycling information. (See *In Your Neighborhood* for more info on laws.)

Is your school mandated (required) to recycle? (Call your local municipality.)
Does your school have a recycling policy? (The DEP site can

help.)
Is this mandate being implemented?
Does your community provide recycling opportunities for the residents?
Does your family recycle? What items? Are there other opportunities to recycle such as taking newspapers to a local farmer for bedding, or taking lawn clippings and leaves to a compost center?

Throughout

R, W, S & L 1.4.5. Grade 5
B. Write multi-paragraph informational pieces.

Invite your county recycling coordinator to share information on local recycling laws and programs.

R, W, S & L 1.6.5. Grade 5
A. Listen to others.
- Ask pertinent questions.

Discuss **closing the loop**—the **reduce, reuse, recycle and buy recycled** circle which helps us manage our waste.
Here are some websites to help:
http://facilities.ucsb.edu/Projects/Recycling/
www.rpa100.com/
www.ciwmb.ca.gov/Recycle

R, W, S & L 1.6.5. Grade 5
D. Contribute to discussions.

Pgs. 26-27 These are great pages for your students to research! Look up the history of cans, throw away society (there are some great activities on this one), history of glass, history of plastic, history of paper, history of interstate highways, history of roadside picnic areas, etc. Have students make a timeline showing when these different materials were first created and then commonly used. Here are some suggested websites:
www.plasticbag.com/environmental/history.html
www.americanplasticscouncil.org
www.plasticbottle.com
www.glassonline.com/
www.cancentral.com

E & E 4.9.4. Grade 4
A. Know that there are laws and regulations for the environment.
- Explain how the recycling law impacts the school and home.
- Identify and describe the role of a local or state agency that deals with environmental laws and regulations.

Make another timeline listing the "beginning dates" of fast food items with which kids are familiar. Help them to understand that with the industrialization of the world, people began to have much more free time—they didn't have to spend all day just surviving (cooking, providing housing, hunting or growing food, making clothing). They could now buy prepared food and have much more leisure time. Much of the packaging and containers of these "prepared" items end up as trash.

E & E 4.3.4. Grade 4
B. Identify how human actions affect environmental health.
- Describe how people can reduce pollution.

See above

Suggested websites:
www.globaled.org/curriculum/ffood.html
www.foodtimeline.org
http://dmoz.org/Recreation/food/fast_food/

Divide group into pairs. Have them list as many "throw away or disposable" items as they can in one minute. Then discuss how these items could be changed to prevent the throw away waste?

See **composting** on page 7 of TG.

SCIENCE —Learn about nature's recyclers. Worm bins are available to schools for learning about vermiculture and what wonderful recyclers worms are. Watching these little critters

turn lunch scraps and newspaper into valuable planting medium is like magic. Some science catalogs offer bins at a very reasonable cost or try the science/environmental education department of a local college. They are also available through Worm World at **www.wormwrld.com** or your local recycling coordinator. They often have materials available to share with teachers. It's amazing what is out there if you just ask!

Introduce the concept of **watersheds** to your students. Whenever rain falls, snow melts, or people put something on or into the ground, eventually it drains into the nearest creek or stream, which flows into a river, which then flows into the ocean. Help them to understand the impact humans have on the plants and animals in a watershed. To learn more about Pennsylvania's watershed associations (POWR) log onto **www.pawatersheds.org**.

SCIENCE—Encourage children (with a parent, if younger) to **examine a stream** or river nearby. List the types of litter they see. How do they think it got there? What effect does it have on the water? If the water is clear, how much trash is visible on the streambed?

S & T 3.2.4. Grade 3
C. Recognize and use the elements of scientific inquiry to solve problems.
- Design an experiment.
- Conduct an experiment.

How do waterways become polluted? *(Storms, litter, drainage pipes, etc.*) What items are visible? How did they get there? Are waterways only polluted by the trash you can see? *(Discuss non point source pollution—how precipitation perks through the ground and whatever is dumped on it—and ends up in streams and groundwater.)*

E & E 4.1.4. Grade 3
E. Recognize the impact of watersheds and wetlands on animals and plants.

Invite a **DEP waterway specialist** to share their expertise with the children. (See Resources for the DEP office in your region.) Many schools in PA have students and teachers trained to test water samples. Take samples from several locations and test. Discuss your results.

E & E 4.3.4. Grade 3
A. Identify different areas where health can be affected by air, water or land pollution.
- Identify actions that can prevent or reduce waste pollution.

Explore **ecosystems** with your students. What are they?

Talk about the kinds of plants, animals, and nonliving things in the **ecosystem** where you live. Explore how they depend upon each other.
Are ecosystems only what we can see?
What happens when something from outside (like litter or illegal dumping) impacts that ecosystem?

Explore what educational programs your local **watershed association** (see **POWR** website—pg 13 of TG) may offer. Many of them have wonderful programs to share with your students or offer teacher training so that you can become more knowledgeable about watersheds.

Page 28 Have fun using all you learned in "Our Littered Past" to complete this crossword.

Have students make their own crossword puzzles using the facts, data and vocabulary they have researched and shared with each other.

Page 29 Learn more about the litterbug and Pennsylvania Resource Council by logging onto their website **www.prc.org.**

Contact your local municipality and/or check your phone book to find out what organizations are working together to make your community a cleaner, healthier place. Talk to watershed associations, Keep Pennsylvania Beautiful affiliates, local service clubs (Rotary, Lions, Kiwanis), Scouts, or citizen groups to find out what they are doing and if you can get involved.

Page 30 Do a search to learn about Lady Bird Johnson. Find out what made her a special friend to those who care about the environment. Search the history of billboards and junkyards. Encourage a discussion about the pros and cons of billboards and junkyards. Find out if your community or the state of Pennsylvania has any rules about them. Some states or local governments ban billboards along certain roads and require junkyards to be screened by large fences. Do any of your students drive by these sites often? How are they affected? Ask if students have noticed any roadside plantings of wildflowers in their travels. They are especially prominent along major highways, and recently local groups and the Western Pennsylvania Conservancy have helped volunteers to beautify entrances to communities and some intersections with gardens and plantings. Type in Adopt and Beautify on the search line of PennDOT's website—**www.dot.state.pa.us**. The Western Pennsylvania Conservancy site, **www.wpconline.org/flower_power/index.html**, will give you information on school and community gardens.

Page 31 There has ALWAYS been an Earth Day for the students of today. Have them research the history of Earth Day, **http:// earthday.envirolink.org/history.html**. Find out what's happening in Pennsylvania and their own community. Find out what's happening nationally by checking out **www.earthday.net**. Encourage students to get involved and make a difference in their school, home or community!!!

Page 32 The Keep Pennsylvania Beautiful (KPB) program is the largest state-administered volunteer effort in the nation. Did you know that PennDOT spends about $8.5 million annually in personnel and material costs to remove roadside litter? If you are interested in adopting a state maintained highway visit PennDOT's website at http://www.dot.state.pa.us/Internet/ Bureaus/pdHwyBeau.nsf/infoAdoptHighway?readform

Encourage students to learn more about the Keep Texas Beautiful effort by going to **www.ktb.org**. The slogan for the Texas cleanup effort is "Don't Mess With Texas." Have students try to find out what the cleanup slogans are for as many other states as they can.

Page 33 Where do students see adopt-a-highway signs? Find out what the adoption options are in their community. Find out what the adoption options are in OTHER communities—adopt-a-beach, adopt-a-forest, adopt-a-park, etc.

Invite Keep Pennsylvania Beautiful staff to share their experience helping to organize local road adoptions or community cleanups of illegal dump sites. They have some programs especially designed for kids. The Fugitive Tire Program helps organized, pre-registered youth groups, such as Scouts, church groups and clubs, clean up trashed tires from their neighborhoods and roads, while learning about the environment and earning a bounty for each tire they capture. Similar groups can also clean up and adopt a road, street, or block that they care about for regular litter removal. Signs identifying the group and the adoption are placed at either end of the area and the group agrees to maintain it for at least two years.

Use technology throughout this theme to research and expand learning.

S & T 3.7.4. Grade 4
C. Identify basic computer operations and concepts.
D. Use basic computer software.
E. Identify basic computer communications systems.

The Keep Pennsylvania Beautiful adoption program helps caring groups adopt most locally maintained roads and complements PennDOT's Adopt-A-Highway program which offers adoption of state-maintained roads.

Learn more about Keep Pennsylvania Beautiful programs by logging onto their website at **www.keeppabeautiful.org**. Go to "About Us/Affiliate Network" to find out if there is a Keep Pennsylvania Beautiful affiliate in your county. The folks who administer county activities have lots of educational materials for kids and adults alike and are available for presentations. Many affiliates have their activities listed so that if you wanted to participate, information on specific activities is available.

NEXT STEPS

- Use the following Resources to supplement teaching suggestions and to give students a starting place for research of their own.
- Partner with a Language Arts, Science, Environmental Ed., Computer and/or Social Studies teacher to maximize time by learning required skills through a Theme (Our Littered Past) approach. By reading, writing, speaking, researching, experimenting with and learning the history of our litter and trash, students can accomplish a lot. This cross curriculum approach gives students a hands on experience in the connectedness of learning.
- Pairing students to research suggested topics or topics of their own choosing and then giving mini lessons to the class can also greatly expand the range of related information covered during this time.
- We encourage including at least one or two outside experts into your classroom. These people bring real life experience to your students and can answer many questions on these topics.

Background Information on Littering and Illegal Dumping

In order to understand and appreciate the problem of littering and illegal dumping in our communities, it is helpful to know some of the background about how people have dealt with their solid waste throughout the ages. The history of how people have collected and disposed of their waste over the last several hundred years is very interesting and offers great variety. Although much has changed over the years, one of the most lasting truths about the waste issue is that much has stayed the same. Until the effects of trash become a problem or hardship, "out of sight, out of mind" is a comfortable way for people to think about it.

Early Civilizations

The early Roman civilization had developed a fairly complex sewage and water supply system; however, their garbage was usually dumped into the Tiber River or into large pits on the city's outskirts. The Romans knew that garbage attracted rats and rats could spread disease, so in order to prevent sickness that could wipe out great numbers of their people, they kept their wastes outside the city walls. The Greeks were greatly influenced by the Romans and their culture reflected the same patterns of waste disposal.

Middle Ages

Waste management took a turn for the worse following the fall of the Roman Empire. In the 15th and 16th centuries, English castles had "privies," (small rooms featuring a wooden or stone seat placed over a vertical shaft that led to a moat, barrel or pit.) The moats surrounding castles were filled with the various wastes produced by the people living there. They collected rain water and became a breeding ground for disease. These filthy moats also became effective barriers that kept the enemies of the castle at a distance. Poorer people, who didn't have castles, simply threw their wastes into the street.

Industrial Revolution

In England and much of Europe during the Industrial Revolution, many people moved to the cities and into crowded and unsanitary living conditions. In order to be polite, people tossing waste water and the contents of their chamber pots out windows onto the street below were supposed to shout "Gardez L'eau" (literally "watch out for the water"). This saying remains a part of British vocabulary today in the use of the word "loo," slang for toilet. Things got so bad in England that in 1848 a Public Health Act was passed mandating some kind of arrangement for every house, whether it be a flush toilet, a

Did You Know?

- About 12 million scrap tires are generated each year in PA. That's about 1 per person. Approximately 19 million scrap tires remain in large stockpiles scattered throughout the state. 17 million tires have been cleaned up within the past four years.
- There are 54 permitted landfills accepting municipal solid waste in PA and six waste-to-energy facilities where trash is incinerated for the production of energy.
- Paper can potentially be recycled up to seven times before the fibers begin to deteriorate and most recycled paper can be substituted for non-recycled paper.

Source: PA Department of Environmental Protection, 2000

privy or an ash pit. The Act did little to solve the problem, for soon after the streets were cleaned up, the rivers started to reek. The Thames River quickly gained a reputation as a "cesspool," and in the hot summer of 1859, the smell from the river was so pungent that Parliament had to be suspended. Disease, cholera in particular, was a problem.

Native Populations

Early man and many native populations spent much of their time on the basic necessities of life. Providing food for their families by hunting, gathering or gardening, building adequate shelter, and making clothing were activities that consumed huge amounts of their lives. Life was based around survival, and there were few extras. When an animal was killed, every part was put to good use and nothing was wasted. The meat was smoked and stored to provide food throughout the year. After the hides were dried and stretched, they were used to make clothing, bedding, shelter, and cooking implements. The bones, sinew, some internal organs and antlers were all used to create needed supplies for their survival. Any unused parts were returned to nature for other animals to eat. Nothing was wasted.

Generally, many of these native societies around the world had a great respect for the land, water and animals on which they depended. Never taking more than was needed, finding ways to completely utilize what was taken, and then giving back to nature by practicing waste minimization was a way of life for them.

Colonial America

Most early settlers from Europe or the Colonies who ventured into unknown territories could take only a limited amount with them - whatever they could carry with them on a ship, pack on a horse, or load into a wagon. When things wore out, they were repaired, patched, or rebuilt. The old adage "Make do, or do without" was probably heard often in these early days. The settlers had few "extras." When wagons broke down and couldn't be repaired or horses died and the wagons lost their means of power, the settlers piled whatever furniture, clothing and supplies that couldn't be carried on their backs or packed onto their remaining horses by the side of the trail. Others following behind could then pick up the discards if they were able to transport them.

Stories of the old West describe trails lined with stoves, anvils, furniture, spoiling food, the remains of butchered animals, and human waste. One account promises that newcomers would be able to *smell* their way to the Rockies in 1849 and 1850!

According to the U.S. Environmental Protection agency, **each American generates 4.3 pounds of trash each day**, for a total of 200 millions annually nationwide. Less than 1/4 of it is recycled.

Source: MSNBC.com, December, 2000

Early settlers, like the Native Americans already here, used rivers, woods and shrubs to fulfill their toilet needs and threw their garbage into dumps, usually over a bank not too far from their homes. Through the investigation of these early dumps, we have learned that only what truly couldn't be used was thrown out. Broken dishes and bottles, worn out leather items, clam shells (if the dump was near the ocean), and unusable metal items have all been found there. In many places, food waste and/or fish was buried in garden plots to enrich the soil. This early form of composting was taught to the settlers by the Indians.

During Colonial times, in towns and later in cities, people emptied their pots and garbage out their doors and windows, just as they had in England. Streets in these areas often had running streams of garbage, waste and mud. As early as 1700, ordinances were passed to prevent people from throwing waste in the street.

1800's

Never before in history did the middle class have the ability to purchase items that were now made in mass quantities in factories. Previously, prized possessions and house wares were handcrafted. Now, people could buy what they wanted from their general store or through mail order catalogs, like Sears and Roebuck and Montgomery Ward.

Refuse disposal until the mid-19th century can be described as citizens throwing waste out of doors or into waterways. As people moved to towns and cities, dumps were required to be outside the city gates. Until the garbage piled up outside the city gates became a problem, either because it hindered access to and from the city, caused a severe smell or spread highly contagious diseases, not much was done about it. In 1874, English concerns for the unsanitary handling of wastes prompted the invention of a process for incinerating or burning of municipal waste called the "The Destructor." In the United States, the first municipal solid waste incinerator was in use on Governor's Island in New York by 1885. By 1914, over 300 such incinerators were in use throughout the U.S. and Canada.

Ocean Dumping

Ocean dumping had been a common method of waste disposal around the world. Not only household garbage, but hazardous wastes, obsolete ammunition, scrap metal and boats have been disposed of in the oceans. Barges from U.S. coastal cities routinely carried trash out into the open ocean and dumped it. It wasn't until 1988 that the U.S. banned the dumping of industrial and sewage wastes into the ocean.

Sea dumping of wastes has been a common practice in the waters surrounding Australia, from the first European settlement until a couple of decades ago. During

DID YOU KNOW?

- If you heaped up all the trash thrown away in the U.S. each year, it would cover at least 1,000 soccer fields with piles of waste 30 stories high. (1)
- Every day, Americans use 100 million steel cans. (2)
- America's daily use of computer paper could go around the world 40 times. (3)
- American consumers and industry throw away enough aluminum to rebuild our entire commercial air fleet every three months. (Kimball, pg. 3)
- The collection and recycling of paper provides five times as many jobs as the harvesting of virgin timber. (3)

Sources

(1) Skidmore, Steve, 1991. What a Load of Trash! The Milford Press, Inc., Brookfield, CT.
(2) Kimball, Debi. 1992. Recycling in America: A Reference Hand-book. ABC-CLIO, Inc., Santa Barbara, CA.
(3) McHarry, Jan. L994. The Great Recycling Adventure: a lift flap look at old things made new. Turner Publishing, Inc., Atlanta, GA.

the 1920's there was considerable public concern about pollution washing up on beaches in the Australian cities of Sydney, Melbourne and Adelaide. Ships routinely discharged loads of garbage just off the coast. Some of this waste included parts of butchered animals, organic refuse, municipal waste and ashes. For the past sixty years, sea dumping has been regulated by legislation with increasing restriction on the type of material dumped. However, some ocean dumping is still permitted by some countries.

Modern Legislation

As cities developed more successful ways of dealing with municipal waste, people became used to putting out their trash, having it picked up at the curb and then not worrying about it. Municipal trucks and local haulers carried the trash to dumps. In the early 1900's each town or city had its own dump, usually over a steep bank on the edge of town, where the trucks were unloaded and machinery compacted the trash. It wasn't until 1965 that the federal Solid Waste Disposal Act was signed, funding research and grants into the solid waste issue. And in 1970, the first federal guidelines for dealing with solid waste were issued. "Town Dumps" were banned and sanitary landfills were developed to more safely "bury" our waste. April 22 of that year was also our country's first Earth Day, bringing education and awareness to everyone about what they can do to treat our earth responsibly.

As recently as the 1940's and 50's, the U.S. Cooperative Extension Service advised farmers to find a ravine on their property where they could dispose of the large amounts of trash that farms produced. In later years they were encouraged to occasionally cover the dump with dirt. Sometimes these farm dumps were set on fire to dispose of the burnable items and reduce the size of the dump. It wasn't until pesticides and farm chemicals deposited in these dumps began to leach into nearby waterways that they were prohibited and alternative methods for disposing of waste encouraged. Some of the money from the "Superfund" created to deal with our country's toxic waste dumps is now making its way into the hands of these farmers to help with the costs of cleaning up their farm dumps. However, in many rural areas, the habit of using a burn barrel to dispose of burnable trash and then pitching the rest over a bank is ingrained and hard to break.

As people became more aware of the negative effects of careless trash disposal, the government passed new laws. The federal government and the states said how waste should be transported, how landfills should be built to protect the environment, and then classified types of waste and disposal methods for specific kinds of waste.

Large waste companies built bigger and more expensive landfills with plastic liners to protect the groundwater, while

DID YOU KNOW?

Waste Generation Facts

Year	Million Tons
1960	88
1994	214
1997	217
1999	230

Environmentally Sound Strategies for Municipal Solid Waste

1. Source Reduction (including reuse)
2. Recycling and Composting
3. Disposal in Combustion Facilities and Landfills

Currently, Waste In the US is:

- 28 % recovered and recycled or composted
- 15% burned at combustion facilities
- 57% disposed in landfills

What is Recycled?

- 42% of all paper
- 40% of all plastic drink bottles
- 55% of all aluminum beer and soft drink cans
- 57% of all steel packaging
- 52% of all major appliances

The per capita discard rate (after recovery for recycling, including composting) was 4.6 pounds per person per day in 1997, up from 3.1 pounds per person per day in 1996.

Source: U.S. EPA, (**www.epa.gov**) 2002

the local unlined municipal dumps serving smaller populations were closed. Suddenly the cost of setting your bags of garbage at the curb for pickup greatly increased.

One of the valuable lessons that first Earth Day in 1970 gave us was information on what we could do to lessen the amount of trash that we put in the waste stream. Reduce, Reuse and Recycle became the chant of those early environmentalists. The federal goals requiring us to recycle increased percentages of our waste (in 2005, 35%), stimulated many states and municipalities to start mandatory recycling programs for some of their citizens. Whatever trash gets diverted from our landfills, the longer the landfills will last. Lots of people regularly separate steel and aluminum cans, glass and plastic bottles and newspapers, and take them to a drop-off center or place them at the curb. In some rural areas, newspapers are shredded by farmers who use them for animal bedding.

HOLIDAY WASTE

- The Cygnus Group notes that approximately 2.65 billion Christmas cards are sold each year in the U.S.—enough to fill a football field 10 stories high or circle the planet 10 times.
- The annual trash from gift-wrap and shopping bags alone, the group says, totals about 4 million tons.

- If every household reused just two feet of ribbon each year, the resulting 38,000 miles of ribbon could tie a bow around the Earth.
- If everyone wrapped just three gifts in reused paper, enough paper to cover 45,000 football fields would be saved.
- If everyone sent one fewer card, 50,000 cubic yards of paper would be saved.

Source: MSNBC.com, December, 2000

Trash Timeline and A History of Waste Management

12,000 B.C.
Egyptians use the first **glass**, in the form of beads.

10,000 B.C.
Garbage becomes an issue as people first begin to establish permanent settlements.

1500 B.C.
The first **jars and bottles** are made out of **glass**.

400 B.C.
Athens, Greece, organizes the **first municipal landfill** in the Western world and requires waste disposal at least one mile from city walls. Virtually anything considered unwanted waste is left in the dump.

105 A.D.
Paper is invented in China by Ts'ai Lun.

200
The **first sanitation force** is created by the Romans. Teams of two men walk along the streets, pick up garbage, and throw it into a wagon.

1000-1400 A.D.

Parisians cast garbage out their windows. Although several attempts are made at effective collection and disposal, eventually the waste grows so high beyond the city gate that it becomes an impediment to Paris' defense. In general, people slowly become aware of waste as a health hazard. Public resistance to new regulations is strong, however, and primitive collection and disposal methods dominate.

About A.D. 1000
People in Turkey recycle marble building facings into cemetery headstones.

1031
The Japanese use wastepaper to make new paper — the first recorded occurrence of **paper recycling**. The Chinese probably employed the process earlier.

1131
Paris prohibits swine (pigs) from running loose in the streets.

About 1150
The **first European paper** probably is manufactured in Spain. Recycled rags are used as virtu-

American Waste Statistics

Municipal Waste Generated
- 1997 - 340 million tons
- 1999 - 390 million tons

That is nearly a 50 million ton increase in two years!!

Source: Biocycle "*The State of Garbage in America"* JG Press, Emmaus, PA

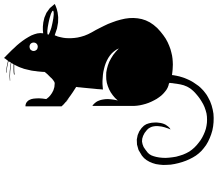
PA Imports Trash!!

Pennsylvania imports more trash than any other state in the U.S. — almost 8 million tons in 1999.

Source: Biocycle "*The State of Garbage in America"* JG Press, Emmaus, PA

ally the only source of paper fiber for the next 700 years in the West.

1348
The **Black Death** epidemic reaches Europe from Asia, caused in part by garbage tossed into unpaved streets and vacant spaces which attracted rats. Fleas that traveled on the backs of infected rats quickly spread the disease to humans. Millions of people died.



1388
Reacting to waste disposal methods that involve simply throwing garbage out of windows and doors, the **English Parliament bans waste disposal in public waterways and ditches**.

Laws are developed requiring that garbage be taken outside of the city gates, but 12 years later in Paris, **garbage** has piled up so high outside the gate that it actually **interferes with the defense of the city**.

1400-1750

People generally throw away garbage in random, unorganized ways. Cities pass laws against the most unsanitary practices, but it does little good.

1400
The **waste** from Paris is piled so high outside the city gates that it **interferes with the city's defenses**.

A new regulation in Paris requires anyone who brings a cart of sand, earth, or gravel into the city to leave with a load of mud or refuse.

1551
The **first recorded use of packaging**: German papermaker Andreas Bernhart begins placing his paper in wrappers labeled with his name and address.

1608
Glass was part of the first cargo ever shipped from the American shores, and a **glass factory was established in Jamestown, Virginia.** Not only was it America's first factory, but glass was America's first industry--created a dozen years before the arrival of the Pilgrims in 1620.

1642
Scrap use comes to North America as the **first iron furnace** is built in Saugus, MA.

1646

Jenks Iron Works in Lynn, Massachusetts, receives permission to buy the colony's guns and melt them down.

1657
Residents of New Amsterdam (New York) are among the first to **pass laws prohibiting the throwing of trash into the streets,** but street conditions remain the homeowners' responsibility.

1690
The Rittenhouse family establishes America's **first paper mill** on the banks of Wissahickon Creek near Philadelphia. It makes paper from recycled cotton and linen as well as used paper.

1750-1870

The Industrial Revolution begins in England. It represents a landmark increase in the amount of waste generated. Waste collection first emerges as a city service, although collection occurs largely by scavenging. In the United States, cities are smaller and space and natural resources are more plentiful. But Americans have the same habit as the English of throwing garbage into the streets. The streets reek of waste. By the mid-19th century, several cities pass ordinances against indiscriminate dumping of refuse and the free roaming of animals, but those measures aren't enough to curb the waste problem. Waste collection and disposal methods remain primitive.

There has always been garbage…..

American colonists declare their independence from England and they turn to recycling for materials to support the Revolutionary War effort.

"...the feast of fat things that come reeking under one's nose at each special puddle of festering filth that Center Street provided in its reeking, fermenting, putrefying, pestilential gutter! I thought I should have died of the stink, rage and headache before I got to 21st Street."

- a journal description of a New York City street, 1852

Late 1700's
Ragpickers, men with horse-drawn carts, make trips into rural areas to barter for worn-out farm implements and other items, including rags and bones, that have resale value.

1757
Benjamin Franklin starts the **first street cleaning program** in North America in Philadelphia.

1776
The **first metal recycling** occurs **in America** when patriots in New York City melt down a statue of King George III and make it into 42,088 bullets.

1785
The **first cardboard box** made **in America** is manufactured in Philadelphia by Frederick Newman.

1792
Benjamin Franklin uses slaves to carry Philadelphia's waste downstream.

1800
Matthias Koops obtains a patent in England for a paper de-inking process. The following year, Koops builds the first commercial mill in the West to use materials other than cotton and linen rags to make paper.

1810
The **tin can** is patented in London by Peter Durand.

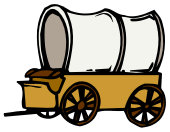
1834
Charleston, WV, enacts a **law protecting garbage-eating vultures** from hunters.

1840's
Peddlers in America, primarily immigrants, **begin collecting and recycling** anything with resale value.

1850's
Pioneers heading west abandon personal belongings along the way and junk dealers scavenge the materials along the trails.

1858
The **Mason jar** is invented, allowing fruits and vegetables to be preserved.

1860
More than 500 paper mills are operating in the U.S., using cloth rags as their primary source of fiber.



Private scavenging companies and municipal crews begin working together to clean up New York. They **remove 15,000 horse carcasses from the city streets** (city horses have rough lives pulling street cars; their average life expectancy is only two years!)

1861-1865
During the Civil War, both the North and South urge citizens to donate all old metal objects. In the South, this need is critical due to the North's control of iron making.

1865
Newspapers begin to describe the availability and price of scrap.

An **estimated 10,000 hogs roam the streets of New York City**, gorging on garbage.

1866
New York City's Metropolitan Board of Health declares war on trash, forbidding the throwing of dead animals, garbage or ashes into the streets.

1868
Chemist John Hyatt saves thousands of elephants, which were

RECYCLING FACTS

- Recycling reduces the risks of air and water pollution from manufacturing processes. Recycling paper cuts air pollution by about 75%. Substituting steel scrap for virgin ore reduces air emissions by 85% and water pollution by 76%.
- Every ton of recycled steel saves 2,500 pounds of iron ore, 1,000 pounds of coal, and 40 pounds of limestone.
- Every pound of steel recycled save 5,450 BTU's of energy, enough to light a 60-watt bulb for over 26 hours.
- Recycling a ton of glass saves the equivalent of nine gallons of fuel oil.
- Recycling used aluminum cans requires only about 5% of the energy needed to produce aluminum from bauxite. Recycling just 1 can saves enough electricity to light a 100-watt bulb for 3 1/2 hours.
- A ton of paper made from 100 percent recycled paper saves the equivalent of 4100 KWH energy, 7000 gallons of water, 60 pounds of air emissions, and 3 cubic yards of landfill space.

Source: PA Department of Environmental Protection Agency, 2000.

killed for their ivory tusks, by inventing celluloid for billiard balls. The balls sometimes spark on collision and even explode, requiring a search for improvements that lead to **the invention of plastics**, an industry that Hyatt can be said to have founded.

1870-1902

The industrial city emerges in America, characterized by mounds of putrefying garbage. It lands in the streets and waterways. People dump garbage, slag, ashes and scrap metal on vacant land. Industries dump animal waste in open pits or empty lots. The proliferation of horses leads to an excess of manure and carcasses. By the 1890's the U.S. recognizes "**the garbage problem**." It is considered a health issue, not just a nuisance. Cities debate contracting with private companies or establishing a municipal service.

1874
Concerns about unhealthy sanitary conditions in England prompt a new invention in Nottingham—**"The Destructor" provides the first systematic incineration of municipal solid waste** (MSW). **Curbside recycling begins** for the first time in the United States **in Baltimore**.

Late 1800's
A revolution in the steel making industry takes place as the open hearth furnace gradually replaces the Bessemer process. The advent of the open hearth and later the electric furnace results in a **dramatic rise in demand for scrap**.

1885
The **first garbage incinerator in the U.S. is built on Governor's Island, New York**. By 1914, 300 incinerators are located in the U.S. and Canada.

1887
The **American Public Health Association appoints a Committee on Garbage Disposal**, to determine the extent of the refuse problem in the U.S. The committee spends ten years on its assignment.

1880's-1890's
Garbage often is dumped near "least desirable" neighborhoods. Protests from residents there are largely ignored.

1888-1913
A survey shows selected American cities generate 860 pounds of garbage per capita, compared with 450 pounds for English cities and 319 for German cities.

1890
The **Boston Health Department proclaims burning waste to be the "best and safest" means of disposal**. But because of

PA RECYCLING FACTS

- Curbside and drop-off recycling has become a way of life for 10 million Pennsylvanians.
- In 1999, we achieved a recycling rate of 32.6%, well on our way to our goal of 35% by 2003.
- In PA, 3,247 recycling and reuse businesses employ 81,322, with an annual payroll of $2.9 billion.
- More than 10 million residents, or at least 85% of the state's population, have access to recycling.
- Twelve of the 67 counties exceeded the state's 35% recycling goal in 1999. These counties were responsible for 57% of the state's recycling.

Source: PA Department of Environmental Protection, 2002

the high cost of commercial incinerators, the department recommends burning waste in home kitchens.

1890's
Sanitary engineers become more prominent in addressing waste management, **applying a more organized, scientific approach**. Civic organizations increasingly try to raise public consciousness about the refuse problem.

1895
Col. George E. Waring Jr. is appointed street cleaning commissioner of New York City. He develops the first practical, comprehensive system of refuse management in the U.S. Among his other reforms and innovations, he is the first to attempt to separate refuse on a large scale, to allow the city to recover and resell some of the materials and allow street crews to handle them more easily. His plan requires everyone to keep organic waste, rubbish and ashes in separate containers and begins the city's first municipal recycling program. In 1898 he takes over from "scow trimmers," who rummage through dumping scows (headed for the ocean) for materials with resale value, and establishes the first rubbish-sorting plant in the U.S. The city's recycling operation was closed in 1925 due to complaints about odors, and ocean dumping gradually resumed until it was outlawed again in the 1980's.

1895
King C. Gillette, a traveling salesman, tires of sharpening his razor and creates the **disposable razor blade**.

1896
The Vienna or Merz system of **extracting oils and other by-products through the compression of city garbage** is introduced in Buffalo, NY. The reduction process gives cities a disposal method that provides recoverable and resalable materials from waste.

1902-1924

1902
Municipal solid waste collection, i.e. **curbside pickup, becomes the norm in cities**— 79% of the U.S. cities surveyed by the Massachusetts Institute of Technology provide it. Trash is taken to the "town dump."

1903
Corrugated paperboard containers find use commercially.

1904
The nation's first major **aluminum recycling plants** open in Chicago and Cleveland.

The U.S. allows permit mail, which opens the door for **direct mail advertising**.

And lastly, at the World's Fair in St. Louis, a gold medal is awarded for the first successful scrap handling magnet. Within two years, **magnets are used throughout the scrap industry**.

1905
The publication Engineering News notes that experiments involving the plowing of waste into the land in and around St. Louis might offer opportunities for the systematic **burying of garbage**.

The **Williamsburg Lighting Plant** is constructed on Manhattan's Lower East Side and **incorporates waste recycling and incineration**.

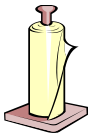
1907
The **first paper towels** are developed.

1908

Paper cups replace tin around the U.S. in vending machines, in public buildings and on trains. **America also becomes the leading producer of paper and paper products** (about 640,000 tons) **and the leading consumer** (38.6 pounds per capita). To meet increasing demand and the fear of deforestation, the U.S. steps up imports of rags and wastepaper. By 1916 the U.S. produces 15,000 tons of paper per day, using about 5,000 tons of old paper.

Manufacturers develop means to remove printer's ink from old newspapers through a defibering process, while other processes turn old paper into cardboard and pasteboard.

1909



Kraft paper pulp is first made in the U.S.

1910
A gas cutting torch is first used in a scrap yard in Lebanon, PA.

1912
Cellophane (clear plastic) is invented by Swiss chemist Dr. Jacques Brandenberger, which encourages the use of plastic packaging.

1914
Source reduction of waste is on the wane because people consider it too costly and it affects too little of the waste stream. Incineration also struggles in the U.S. because of problems adapting the English model.

1916
Cities begin **switching from horse-drawn to motorized refuse collection equipment**.

PA RECYCLES!!

- **PA Act 101** of 1988 requires commercial, institutional and municipal establishments located in Pennsylvania's mandated municipalities to **recycle high-grade office paper, corrugated paper, aluminum, and leaf waste**. In addition, establishments must recycle any other materials included in the municipality's recycling ordinance.
- PA Act 101 encourages municipalities to establish leaf composting programs and provides recycling grants to help offset costs. More than 80 municipal leaf composting facilities are in operation in PA.
- In 1995, volunteers directed a recycling program at Penn State University's Beaver Stadium, and after six home games they recycled 28 tons of paper and other materials, reducing the total waste by 32%.
- 58% of Pennsylvania's 67 counties are working in partnership with Penn State Extension county offices to offer backyard composting bins to residents.

Source: PA Department of Environmental Protection, 2002

A shortage of rags and wastepaper caused by WW I prompts the U.S. Department of Commerce to encourage citizens to save those materials for mills.

Dr. Thomas Jasperson obtains a U.S. Patent for the production of paper from de-inking recovered fiber around the same time.

1917
Experimentation takes place with turning waste into energy, such as steam, electricity, liquid or solid fuels, alcohol or fuel bricks. The methods have little impact because existing energy sources are cheap. Also, in response to wartime shortages, the **U.S. Government establishes the Waste Reclamation Service**, which stresses the value of waste.

1920's

Population growth begins spreading out; society becomes more **consumer and service-oriented**, and **generates** significantly **more waste**. The U.S. Government becomes more deeply involved in the affairs of the city. Filling in wetlands with garbage, ash and dirt becomes popular.

1924
Farm use (fertilizers, animal feed) is **the most popular form of waste disposal** at 38 percent in a survey of U.S. cities, followed by incineration at 29 percent and dumping at 17 percent.

Municipal collection of waste rises to 63 percent of cities in the U.S. Census, compared with 24 percent in 1880.

In addition, the **Kleenex facial tissue** is introduced.

1930-1950

1930's
Enclosed collection vehicles begin replacing horse-drawn waste carts.

1934
Dumping of municipal waste at sea becomes illegal. Industrial and some commercial wastes are immune from the law.

1935
The **first beer can** is produced by Krueger's Cream Ale in Richmond, VA. Over the next six months, company sales increased 550% because customers loved the convenience.

The **first sanitary landfill is built in Fresno, CA**. Closed in 1987, the landfill is now on the Superfund list of the nation's most polluted sites.

You and Your School Can Make A Big Difference!!

EPA's WASTEWISE PROGRAM

Alden Central School

Alden Central School, a K-12 school in Alden, NY, implemented a comprehensive waste reduction program at all campus buildings: high school, middle, intermediate and primary education buildings and the grounds department. Students and 250 staff members:

- Eliminated 400 pounds of polystyrene cafeteria trays and dishes by switching to reusable products
- Composted 850 pounds of cafeteria waste and 100 pounds of yard trimmings for use as mulch on building grounds.

WasteWise Accomplishments

- Waste Prevented 2,450 lb.
- Recycling Collection 2,900 lb.
- Recycled-Content Purchases 2,250 lb.

1939-45
Wartime shortages **increase the demand for reusing tin, rubber, aluminum, paper, fats and other materials to help the war effort.**

1943
The **aerosol can** is invented by two researchers at the U.S. Department of Agriculture.

1944
Dow Chemical Company invents **Styrofoam**.

1946
Sanitary landfills become a preferred disposal alternative to open dumping.

Late 1940's
The popularity of **electric arc furnaces** for steel production increases. These furnaces produce fewer emissions and much less pollution.

1948
Fresh Kills landfill is opened in Staten Island, NY. It later becomes the world's largest city dump. Fresh Kills and the Great Wall of China are the only man-made objects visible with the naked eye from space.

1950-1970

1950's
In-house garbage disposal units become popular. In some cities, it's estimated that 25-30 percent of all garbage is ground up.

1953
The anti-litter association **Keep America Beautiful** forms.

Also, Swanson's introduces the first successful **TV dinner**. **Convenience food** of all kinds increase rapidly in popularity during the 1950s.

1958
The group that eventually becomes the **National Solid Waste Association** forms.

1959
The American Society of Civil Engineers publishes a **standard guide to sanitary landfilling**. It suggests compacting the refuse and covering it with a daily layer of soil to fight odors and rodents.

It takes 36 two-liter bottles to produce one square yard of carpet.

(Source: www.erie.oh.us/)

One pound of newspaper can be recycled to make six cereal boxes, six egg cartons or 2,000 sheets of writing paper.

(Source: www.erie.oh.us/)

Among the 20 Most Industrially Advanced Nations

The U.S.:

- Ranks only 15th in paper recycling efforts
- 19th in glass recycling
- 96% of U.S. plastic and 50% of its paper goes into landfills
- Mexico recycles more glass than the U.S.

E/The Environmental Magazine March April 97

1960's
Plastic begins getting extensive use **as packaging**. Pop tops or **pull tabs on beverage cans** become popular.

Municipal collection and disposal increases over private collection in the late 1930s, but begins to lose ground in the 1960s. Private firms become more attractive to replace city services, offering cost savings and improved service. Regional agencies begin to emerge to meet increasingly complex problems.

Interest in waste-to-energy as a diversion alternative develops in the U.S.

1961
A city ordinance in Los Angeles eliminates the sorting of recyclables after Sam Yorty successfully runs for mayor with that as his campaign promise.

The Governmental Refuse Collection and Disposal Association forms. In 1991, the group changes its name to the **Solid Waste Association of North America**.

Proctor & Gamble begins test-marketing the disposable diaper.

1962
Rachel Carson's book **Silent Spring** is published. It carefully outlines the deadly result of using the pesticide DDT and becomes the bible for the environmental movement.

1965
Aluminum cans for beverages are introduced.

The **Solid Waste Disposal Act** (SWDA), the nation's first federal solid waste management law—authorizes research and provides for state grants. It states that while state, regional, and local authorities primarily should be responsible for waste management, the federal government will provide financial and technical assistance. But the act has no regulatory authority.

1968
President Johnson commissions **the first comprehensive survey of solid waste** since cities began keeping garbage records in the early 1900's. Cities collect and dispose of 140 million tons of solid waste.

The U.S. aluminum industry begins **recycling discarded aluminum** products, from beverage cans to window blinds.

1969
Rubber reclaiming drops to 8.8 percent from 19 percent in 1958.

FUN FACTS ABOUT PET

- Recycling a ton of PET containers saves 7.4 cubic yards of landfill space.
- The first PET bottle was recycled in 1977.
- The average household generated 34 pounds of PET bottles in the year 2000.
- Fourteen 20 oz. PET bottles yield enough fiber for an extra large T-shirt.
- It takes 14 20 oz. PET bottles to make one square foot of carpet.
- Half of all polyester carpet manufactured in the U.S. is make from recycled plastic bottles.
- It takes 63 20 oz. PET bottles to make a sweater.
- It takes 85 20 oz. PET bottles to make enough fiberfill for a sleeping bag.
- The PET bottle was patented in 1973 by chemist Nathanial Wyeth (brother of distinguished American painter Andrew Wyeth.)

Source: NAPCOR Corporation
information@napcor.com

Seattle institutes a **new fee structure for garbage pickup**, which incorporates a base rate and an additional fee for garbage above a certain amount.

Also, a small collection company, American Refuse Systems Inc. merges with equipment distributor Browning-Ferris Machinery Co. to form **Browning-Ferris Industries, Inc**.

1970-1985

1970
The enactment of the **Clean Air Act** leads to the closing of many incinerators.

The **first Earth Day** focuses attention on environmental concerns. Recycling's chasing arrows logo is introduced on that day.

The **U.S. Environmental Protection Agency** (EPA) is created.

Congress passes the **Resource Recovery Act**. It shifts the emphasis of federal involvement from disposal to recycling, resource recovery, and waste-to-energy.

There are an estimated 15,000 authorized land disposal sites, but as many as 10 times that number of unauthorized dumps. A study in the mid-1970s states that **94 percent of the landfills surveyed did not meet the minimum requirement for a sanitary landfill**.

1970's
Resource recovery becomes increasingly popular in some circles, but others say it's not viable because it's not economically profitable.
Compactor trucks comprise a majority of all collection vehicles.

The **EPA Office of Solid Waste** gets the authority to study solid waste, award grants and publish guidelines.

1971
Oregon passed the **nation's first bottle bill** as an anti-litter law. The law resulted in a dramatic reduction in beverage container litter and gained widespread public support. Four years after implementation, the bottle bill had a public approval rating of 90 percent.

The **U.S. Environmental Protection Agency** is created. It is charged with the mission "to protect human health and to safeguard the natural environment."

Waste Management, Inc. is formed.

1972
The first **buy-back centers for recyclables** are opened in Washington State. They accept beer bottles, aluminum cans, and newspapers.

ANALYZE THIS!

A study at two University of Michigan dining rooms revealed that when napkins came from dispensers at the beginning of the cafeteria line, customers took an average of 3.3 napkins at every meal. When the napkin dispensers were placed on tables in the dining room, each person used an average of only 1.4 napkins per meal.

Source: *Inform Reports, Fall/Winter 1997*

A **bottle made from PET** (polyethylene terephthalate) is patented by chemist Nathaniel Wyeth (brother of Andrew Wyeth, the American painter).

1973
The **paper recycling rate drops** to 17.6 percent from 35 percent in 1944.

1974
The **number of incinerator plants drops to 160**, from 265 in 1966 and 600-700 in 1938.

The **first city-wide use of curbside recycling bins** occurs in University City, MO, for collecting newspapers.

Mid-1970's
The **EPA** proposes a drastic cutback in the federal solid waste program so the government can **focus on hazardous waste**, but the agency backs off after several public sector groups protest.

1975
The number of **private garbage hauling companies increases**. The percent of waste collected by private companies as opposed to municipalities is reported to be 66%.

1976
Congress passes the **Resource Conservation and Recovery Act** (RCRA) which requires all dumps to be replaced with "sanitary landfills." The enforcement of this act will increase the cost of landfill disposal and make resource-conserving options like recycling more appealing. It stands today as the primary piece of federal solid waste legislation and essentially replaced and built upon the Resource Recovery Act.

The **Toxic Substances Control Act** is passed, which helps prevent the dumping of hazardous chemicals in landfills.

Three people from Bartlesville, OK, get a patent on a method for **purifying and reusing lubricating oils**.

1977
PET soda bottles begin replacing glass.

1978
The U.S. Supreme Court rules that garbage is protected by the Interstate Commerce Clause, so **states can't ban shipment of waste from one state to the other**.

Also in 1978, 200 families are relocated from **Love Canal** (they did not begin returning until 1989) after it was determined that Hooker Chemical and Plaster Corp. had put 21,000 tons of chemical waste there 25 years earlier. They covered it up and then sold the property to the Niagara Falls

A REASON TO COMPOST

Grass, leaves, and other wastes from lawns and backyard gardens account for an estimated 18% of the annual municipal waste stream. The percentage and composition of yard wastes varies widely from season to season. During the summer, grass can comprise up to 50% of municipal waste. Leaf waste can account for as much as 60-80% in the fall.

Using leaves, grass clippings, and other organic matter, you can make a ton of compost at home in an area only four feet square.

Source: PA Department of Environmental Protection, 2002

Recycling one aluminum can saves enough energy to power a television for three hours.

(Source: http://www.cancentral.com/funFacts.cfm)

Board of Education, which placed a school and playground on the site. Lawsuits for damages continued into the mid-1990's. The Love Canal incident is cited as a prime cause in the creation of the **Comprehensive Environmental Response and Reliability Act**, also known as **Superfund**, in 1980.

1979
The EPA issues landfill regulations that **prohibit open dumping**.

1980
Per capita production of waste reaches 8 pounds per day, up from 5 pounds in 1970 and 2.75 pounds in 1920.

1984
Reauthorization of RCRA and amendments to the Hazardous and Solid Waste Act call for **tougher federal regulation of landfills**.

1985-1999

1985
First Adopt-A-Highway program started in Texas to address litter along state-maintained roads.

1986
Rhode Island becomes the first state to pass mandatory recycling laws for aluminum and steel cans, glass, newspaper, and soda bottles (PET) and milk jugs (HDPE) plastic.

The city of **San Francisco meets its goal of recycling 25% of its commercial and residential waste**.

The **Fresh Kills Landfill on Staten Island, NY becomes the largest landfill in the world**.

1987
A Long Island garbage barge known as **Mobro 4000** leaves a New York port on March 22 with 6,000 tons of garbage bound for a southern landfill. The barge is rejected by the states of Louisiana, Alabama, Mississippi, Florida, and New Jersey, as well as Belize and Mexico. After a journey of 173 days, the load, mostly paper, is ultimately incinerated near the Long Island landfill from which it had originally been taken. The trip of the Mobro is followed on television and in newspapers and creates the impression that the U.S. does not have enough places to dump garbage.

The Institute of Scrap Iron and Steel and the National Association of the Recycling Industries merge to create the **Institute of Scrap Recycling Industries**.

1988
The EPA estimates that more than 70 percent, or at least **14,000 of the landfills operating in 1978 have since closed**

because they didn't meet new higher landfill standards.

In an effort to divert waste from landfills, Assistant EPA Administrator Winston Porter sets a **U.S. recycling goal of 25%** to be met in the next four years. The goal is met in 1996.

Medical waste washes up on eastern U.S. beaches. One result is the **Medical Waste Tracking Act**, a two-year plan to set up procedures to track these hazardous wastes.

The **Plastic Bottle Institute develops a material-identification code system for plastic bottle manufacturers**. (This is our current #1-6 system.)

1989
Arizona archaeologist **William Rathje recovers corn-on-the-cob intact after 18 years in an Arizona landfill**, indicating that just because we put biodegradable trash in a landfill, doesn't mean it will decompose and become smaller in size. People had thought that as food wastes decomposed in landfills, it would allow us to increase their capacity.

Laws requiring recycling to be an integral part of waste management **have been enacted by 26 states**.

1990
Nationwide, **140 recycling laws have been enacted.**

McDonald's announces plans to stop the use of polystyrene packaging of its food due to consumer protests.

1990's
Consolidators like Recycling Industries Inc., Philip Services Corp. and Metal Management Inc. emerge in the scrap business, changing the face of a family-run industry.

1992
Federal Resource Conservation and Recovery Act (RCRA) establishes minimum standards for landfills, designed to make them safer. These standards include location, facility design and operating criteria, and closure and post closure care requirements, financial assurance, ground water monitoring, and corrective action. Because of the cost of meeting these requirements, 10,000 small municipal landfills are consolidated into an estimated 3,500 new, safer landfills, some of which are "megafills" that can handle up to 10,000 tons of waste a day. The new landfills are outfitted to prevent air and water pollution and limit the spread of disease by scavengers.

1994
The U.S. Supreme Court holds in its review of C&A Carbone v. Clarkstown, NY, that flow control, **the practice whereby municipalities can direct the disposal of waste to designated facilities, is unconstitutional**.

1995

ID Code for Plastics

1 = PET = Polyethylene Teraphthalate
Common uses: soft drink bottles, some fruit juices, alcohol beverage bottles

2 = HDPE = High density polyethylene
Common uses: milk jugs, distilled water, grocery bags, laundry and dish detergent, motor oil, bleach and lotion

3 = V = Vinyl/Polyvinyl Chloride
Common uses: vegetable oil bottles, mouthwash, salad dressings

4 = LDPE = Low density Polyethylene
Common uses: bags for dry cleaning, bread, produce and trash and for food storage containers

5 = PP = Polypropylene
Common uses: battery cases, dairy tubs, cereal box liners, bottle caps & lids, disposable diaper linings

6 = PS =polystyrene
Common uses: yogurt cups, clear carryout containers, vitamin bottles, spoons, forks and knives, hot cups, meat and produce trays, egg cartons, clamshell carryout food containers

7 = Other types of plastics
Plastics with a seven (7) are made from a type other than the six most common types listed above or they can be made from multiple layers of different types of plastics.
Common uses: squeezable ketchup bottles, most chip snack bags, juice boxes (individual servings).

New York City law officials move to break the mob-controlled waste-hauling cartel in the city with indictments of 17 people, four trade associations and 23 companies.

1996
An attempt to pass a solid waste flow control bill in the
U.S. House of Representatives **fails**.

1997
EPA increases America's recycling goal to 35% by 2005.

1998
Seven years of consolidation of solid waste companies

THE U.S.

- Has ***only 5%*** of the world's population, yet generates ***19%*** of its waste
- Uses 20% of the world's metals
- Uses 24% of the world's energy
- Uses 25% of the world's fossil fuels

E/The Environmental Magazine March April 97

DID YOU KNOW?

For each full bag of garbage that we take to the curb, the primary resource industry creates the equivalent of 71 full bags of waste.

OR

1 full bag of household garbage

=

71 full bags of waste produced by the primary resource industry

(Source: Recycling Council of Ontario)

reaches its peak when the largest in the U.S., Waste Management, merges with the number three company, USA Waste, whose management takes over the new Waste Management.

1999
The new number three hauler, Allied Waste Industries Inc., agrees to buy the number two company, Browning-Ferris Industries, in a deal worth more than $9 billion.

2000
Biocycle and Zero Waste America, a nonprofit organization, estimate that Americans recycled 33 percent of the waste they generated, and that .66 tons of waste were disposed per person.

2001
Biocycle and Zero Waste America estimate that Americans disposed .98 tons of trash for each citizen and 32 percent of the waste generated was recycled.

2002
The Fresh Kills Landfill on Staten Island was reopened to accept the 1.2 million tons of debris from the World Trade Center following the September 11 terrorist attacks.

Sources:

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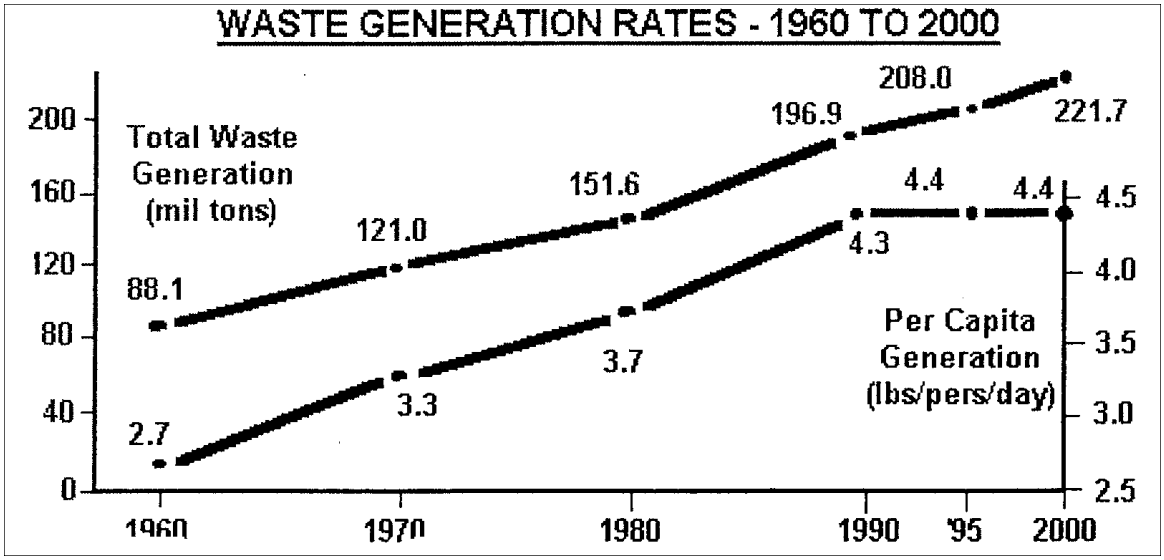


Increased Waste Generation

There are several related issues that lie at the root of our waste problem:

- Increased population
- More mobility
- Advanced technology

With an increase in population and more advanced technologies, people are more mobile and use more disposable products, and there are more people generating waste.

World population has grown by 1.98 billion (3.698 billion in 1970, 5.675 in 1995). Just this increase of 1.98 billion is equal to the entire population of the world in 1929. In the last 25 years the U.S. population has increased by some 60 million, which was the entire U.S. population of 1886! The world population in 1950 was 2.6 billion. In 2000, our population stands at 6 billion worldwide.

More people travel farther and more often than earlier generations. In 1995, 200 million vehicles were registered in the U.S. People traveling to and from work spend many hours in their cars each day, often eating snacks and drinking beverages. Many families eat one or two meals on the run, at the game or in the car. Keeping our cars free of litter and trash has become a weekly task for most of us.

New technology has given rise to changes in our packaging of products. Packaging is designed for convenience, protection of the product and to promote product sales, typically not with biodegradability or conservation in mind. Many items we use regularly are designed to be disposable or single use: disposable diapers and razors, and individual serving size containers. The fast food we eat is packaged in cans, bottles, polystyrene, paper and plastic containers. Think of all the packaging that we discard each day.

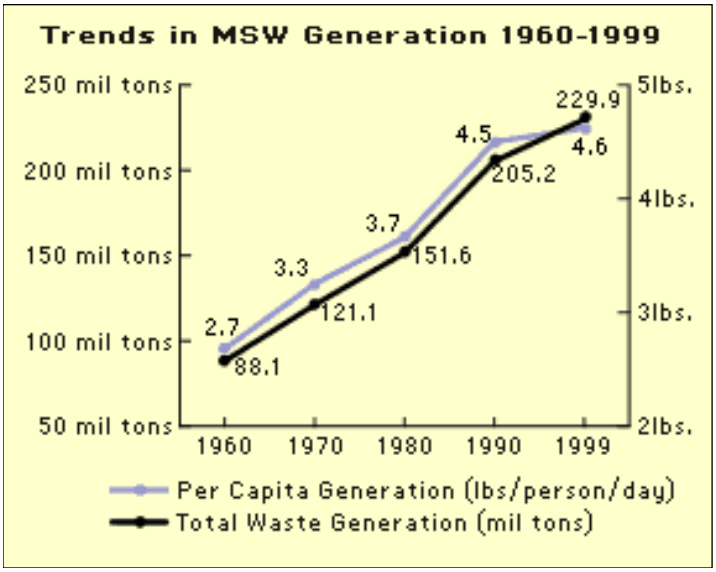
Lack of education, awareness and concern for the environment has allowed many people to become wasteful overconsumers. We have limited natural resources so that at some point, production and use will have to be limited as well.

With more waste being generated, more waste is escaping proper disposal. Litter and illegal dumping have become major problems receiving more public attention.

WHAT ABOUT THIS!

- Americans have increased their use of paper during the past 30 years. In 1997, **the average American used 739 pounds of paper**, almost twice as much as in 1960, according to the Environmental Defense Fund.
- **Containers and packaging** comprise a large percentage of the American waste stream, **72.4 million tons** annually.
- During the 5-week period between Thanksgiving and Christmas, waste generation in the U.S. increases 20%, according to Use Less Stuff, published by the Cygnus Group.

Source: MSNBC.com, December, 2000



Source: U.S. Environmental Protection Agency, 2000

Waste Management and Littering and Illegal Dumping Laws

Laws are made by people at the local level by borough, township, city, and county officials, at the state level by legislators, and at the federal level by Congress. Federal laws affecting the environment, such as water and air quality and waste management, are enforced by the U.S. Environmental Protection Agency. These laws are like an umbrella covering all 50 states. The states then make laws conforming to the federal laws, but they may be stricter, depending on local issues and environmental concerns of the people.

In Pennsylvania, the legislature enacted the **Pennsylvania Municipal Waste Planning, Recycling, and Waste Reduction Act**, known as Act 101, in 1988. The act came on the heels of federal regulations passed about the same time that regulate waste hauling, handling of municipal solid waste, hazardous waste, and new laws on the construction of landfills. Those new laws resulted in the closure of many landfills located just outside of individual communities, because they were not lined and did not comply with the new regulations. Numerous landfills were then constructed with liners to better protect groundwater.

Pennsylvania's Act 101 places the responsibility of collection of municipal waste with municipalities, cities, boroughs, and townships. Counties must adopt waste management plans and provide for disposal capacity for waste generated by people in each county. Typically, capacity is assured through contracts between county officials and landfills or waste-to-energy facilities, which incinerate trash.

The act also set new standards for recycling in Pennsylvania, requiring all communities with 5,000 or more people and a population density greater than 300 people per square mile to recycle at least three items. Schools, institutions, commercial establishments, and businesses in those communities are also required to recycle. The act set 25 percent of the waste stream generated by Pennsylvanians as a recycling goal. When the goal was met, the state legislature then adopted Act 57 of 1997 which set a new goal of 33 percent.

To help communities set up recycling programs, Act 101 imposed a $2 per ton fee on each ton of trash disposed at Pennsylvania landfills or incinerators. The fee, reauthorized by Act 57, is used to fund grants to counties and municipalities for recycling programs. Funding for these Growing Greener Grants, as they are called, was approved again in 2002 by upping the tipping fee to $4 for each ton of trash disposed at Pennsylvania landfills or incinerators.

Communities that are required to recycle, known as mandated communities, adopted local laws, or ordinances, to make local requirements for their recycling programs. Local ordinances also may determine how trash is collected at the curb, may prohibit open burning and dumping on private and public property, may require permitting or licensing of waste haulers, and may provide for contracting with waste haulers.

While some local governments prohibit littering and illegal dumping through ordinances, the activities are also prohibited by a number of state laws. Local police or code enforcement personnel may enforce the local laws. Pennsylvania State Police, Game and Fish Commission officers, or Department of Environmental Protection staff may enforce state laws.

Penalties for violating local, state, or federal laws, may include the following:

- Paying fines
- Going to jail
- Having your vehicle taken away from you
- Having to pay for site cleanup or security
- Taking ownership of your property
- Taking away your licenses or permits
- Requiring you to perform community service activities

Some of the fines and penalties collected are used for litter or illegal dumping prevention programs. For example, some fines collected may be placed in accounts used to pay citizens as reward money, or the money can be earmarked for illegal dump cleanups. Sometimes judges require people found guilty of breaking these laws to perform environmental community service projects such as trash cleanups or beautification projects.

Federal Environmental Laws

National Environmental Policy Act of 1969
NEPA is the basic national charter for protection of the environment. It establishes policy, sets goals and provides means for carrying out policy.

Clean Air Act 1970
The Clean Air Act is the comprehensive Federal law that regulates air emissions from area, stationary, and mobile sources. This law authorizes the U.S. EPA to establish National Ambient Air Quality Standards to protect public health and the environment.

The goal was to set and achieve standards in every state by 1975. The Act was amended in 1977 to reset goals (dates) since many areas of the country had failed to meet the deadlines. The 1990 amendments to the Clean Air Act were intended to meet unaddressed or insufficiently addressed problems such as acid rain, ground-level ozone, stratospheric ozone depletion and air toxins.

Federal Insecticide, Fungicide, and Rodenticide Act 1972
The primary focus of FIFRA was to provide federal control of pesticide distribution, sale and use. Anyone using pesticides must take exams for certification, register when purchasing them and follow strict guidelines when using them, so they will not cause unreasonable harm to the environment.

Endangered Species Act 1973
The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. Species of plants and animals are listed and the law prevents any action that results in the "taking" of a species, or adversely affects their habitat. The regulation of pesticides is included in this law.

Safe Drinking Water Act 1974
This act was established to protect the quality of drinking water in the U.S. This law focuses on all waters, whether above ground or underground sources.

Resource Conservation and Recovery Act 1976
RCRA (pronounced "rick-rah") gave EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of non-hazardous wastes.

The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned or historical sites.

The federal Hazardous and Solid Waste Amendments (HSWA) (pronounced "hiss-wa") are the 1984 amendments to RCRA that required phasing out land disposal of hazardous waste. Some of the other mandates of this strict law include increased enforcement authority for EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program.

Toxic Substances Control Act 1976
This act was designed to give EPA the ability to track the 75,000 industrial chemicals currently produced or imported into the U.S. EPA screens these chemicals and can require testing of those that may pose an environmental or human-health hazard. It also tracks the thousands of new chemicals produced every year.

Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) 1980
This law created a tax on the chemical and petroleum industries to allow Federal authority to respond to releases of hazardous substances that may endanger public health or the environment. Over five

years, $1.6 billion was collected into a trust fund for cleaning up abandoned or uncontrolled hazardous waste sites.

Emergency Planning and Community Right-to-Know Act 1986
EPCRA was enacted by Congress as the national legislation on community safety. This law was designated to help local communities protect public health, safety, and the environment from chemical hazards.

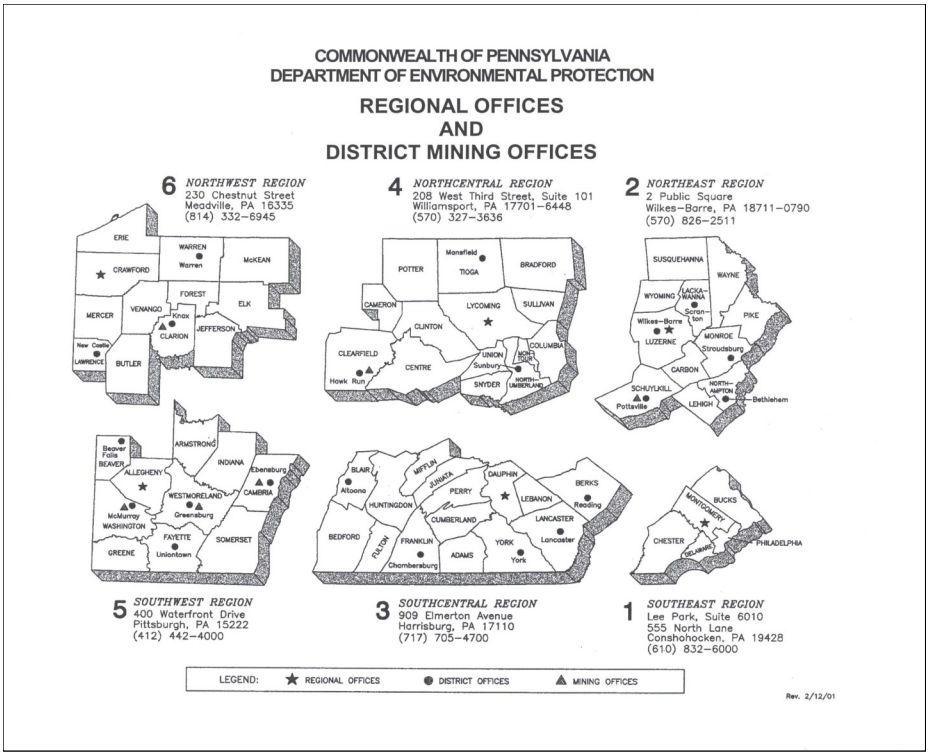
Oil Pollution Act 1990
OPA strengthened EPA's ability to prevent and respond to catastrophic oil spills. A trust fund financed by a tax on oil is available to clean up spills when the responsible party is incapable or unwilling to do so. The OPA requires oil storage facilities and vessels to develop plans for what to do if there was a spill.

Pollution Prevention Act 1990
The Pollution Prevention Act focused industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use. Opportunities for source reduction are often not realized because of existing regulations, and the industrial resources required for compliance, focus on treatment and disposal. **Source reduction** is different and more desirable than waste management or pollution control because it gets to the root of the problem.

Pollution prevention also includes other practices that increase efficiency in the use of energy, water or other natural resources, and protect our resource base through conservation. Practices include recycling, source reduction, and sustainable agriculture.

KEEP PENNSYLVANIA Beautiful

Look on our website **www.keeppabeautiful.org** to find out if there is a Keep Pennsylvania Beautiful affiliate in your county. Invite them to speak to your class about littering, illegal dumping and other topics dealing with solid waste, recycling, and community stewardship.



DEPARTMENT OF ENVIRONMENTAL PROTECTION—REGIONAL OFFICES

When you reach the regional office, ask to speak with the person who schedules education programs for schools. It is usually the education specialist or community relations person.

SOUTHEAST REGIONAL OFFICE, CONSHOHOCKEN *Bucks, Chester, Delaware, Montgomery & Philadelphia counties*	(484) 250-5808 Comm. Rel. (484) 250-5808 Education
NORTHEAST REGIONAL OFFICE, WILKES-BARRE *Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne & Wyoming counties*	(570) 826-2511 Comm. Rel. (570) 826-5493 Education
SOUTH CENTRAL REGIONAL OFFICE, HARRISBURG *Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry & York counties*	(717) 705-4931 Comm. Rel. (717) 705-4706 Education
NORTH CENTRAL REGIONAL OFFICE, WILLIAMSPORT *Bradford, Cameron, Centre, Clearfield, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga & Union counties*	(570) 327-3659 Comm. Rel. (570) 327-3653 Education
SOUTHWEST REGIONAL OFFICE, PITTSBURGH *Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington & Westmoreland counties*	(412) 442-4182 Comm. Rel.
NORTHWEST REGIONAL OFFICE, MEADVILLE *Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango & Warren counties*	(814) 332-6816 Comm. Rel. (814) 332-6848 Education

[4] Resources

Pennsylvania Resources

GreenWorks.TV is a monthly television program produced by The Environmental Fund for Pennsylvania. It showcases individuals, communities, businesses and government bodies that are taking innovative, positive steps to help preserve and protect the environment in PA. You can view highlights of current and past shows on their website **www.greenworks.tv.**

Keep Pennsylvania Beautiful is a non-profit organization with comprehensive programs that address littering, illegal dumping, graffiti abatement, providing alternatives for hard-to-dispose items such as tires, appliances, batteries and HHW (household hazardous waste); education (school programs and educational materials); and, beautification opportunities. They also have a local adoption program for roads not maintained by the PA Department of Transportation. Additionally, there are opportunities for groups and individuals to adopt trails, waterways, blocks and parks. County affiliates exist across the state. Reach them toll free at 877-772-3673 or 724-836-4121 or at their website **www.keeppabeautiful.org**.

Lake Erie/Allegheny Earth Force is part of a national, youth-driven, nonprofit educational organization headquarted in Alexandria, VA, with six regional offices across the country. Using their Community Action and Problem Solving (CAPS) protocol, local youth provide long-lasting solutions to environmental problems they have identified in their own communities. Their web site **www.earthforce.org** lets you find out what community change students are currently working on. Their regional site at 301 Peninsula Drive, Suite 5 in Erie offers training and technical assistance for teachers in Western Pennsylvania. Their phone in Erie is (814) 835-8069 and in Pittsburgh (412) 431-4449.

Pennsylvania Center for Environmental Education (PCEE) is an environmental education clearing house for the state of Pennsylvania. They have a directory of environmental organizations, an events calendar, and a job listing among other offerings. They can be reached at **www.pcee.state.pa.us**.

The **Pennsylvania Association for Environmental Educators**, a nonprofit organization promoting and supporting environmental education activities throughout Pennsylvania, has its website at **www.paee.org**. Their mailing address: 1206 AG Center Drive, Pottsville, PA 17901.

The **Pennsylvania Department of Conservation and Natural Resources (DCNR**) educational programs, interpretive programs, and teachers' workshops in state parks are outlined at **www.dcnr.state.pa.us/stateparks/education/education.htm**. Their award-winning Watershed Education Program for sixth through 12th graders to learn about Pennsylvania's natural resources is available through **www.state.pa.us**, PA Keyword, "Watershed Education." The program enables teachers or civic group leaders to attend workshops hosted at area state parks by park environmental educators. Teachers and their students are encouraged to pick a waterway and focus their studies on its historical, cultural and geological features, while also noting physical, chemical and biological features or parameters. The program addresses many of the new statewide educational standards, and DCNR recently received approval from the Department of Education to offer professional education hours to teachers who participate in watershed-education training. Contact Terri Kromel at (717) 783-4356 or tkromel@state.pa.us.

The **Pennsylvania Department of Education** website for environmental education can be reached via the Department of Environmental Protection (DEP) website at **www.dep.state.pa.us/dep/deputate/enved/Ed_ecology.htm**. Patricia Vathis is the director of the Office of Environment and Ecology and can be reached by writing, Department of Education, 333 Market St., Harristown 2, Harrisburg, PA 17108-1167; or by phoning (717) 783-6994.

Pennsylvania Department of Environmental Protection (DEP) has a website especially for educators at **www.dep.state.pa.us**. There are a variety of links to other Pennsylvania resources, as well as recycling lesson plans and a section on using computers in environmental education. The

department's Environmental Education and Information Center, located on the first floor of the Rachel Carson State Office Building in Harrisburg, is open from 7:30 a.m. to 4 p.m. daily. Contact Helen Olena at the center for additional information on the environmental education grants program.

Pennsylvania Department of Transportation (PennDOT) — Each state has a Department of Transportation that offers transportation programs and services to its citizens. Pennsylvania's offers an adopt-a-highway program, a beautification program, and an adopt and beautify program in which community groups and youth can get involved. You can access them through their website at **www.dot.state.pa.us.** PennDOT also administers the **Keep Pennsylvania Beautiful (KPB)** program, the largest state-administered volunteer effort in the nation. KPB is a two-fold program that combines education and action. PennDOT sends informational material into schools to explain the harm that litter causes and the benefits of a clean environment. The program includes an annual litter cleanup day in April, which is recognized as Keep Pennsylvania Beautiful month.

The **Pennsylvania Environmental Education Grants Program** is described at **www.dep.state.pa.us**. For more information, phone Helen Olena at (717) 772-1828. Grants of up to $10,000 are available annually to schools, teachers, and non-profits administering approved environmental programs.

The **Pennsylvania Organization for Watersheds and Rivers (POWR)** is dedicated to the protection, sound management, and enhancement of the Commonwealth's rivers and watersheds and to the empowerment of local organizations with the same commitment. Log onto **www.pawatersheds.org** to find out what watershed organizations are in your area, order a watershed map or join a River Sojourn. Sojourns are educational, multi-day canoeing and float trips along many of Pennsylvania's waterways.

Find out more about the Litterbug at the **Pennsylvania Resources Council** website at **www.prc.org**. PRC was founded in 1939 as a nonprofit citizens group and serves as a link between industry, government and grassroots organizations seeking solutions to environmental issues. They provide information on waste reduction and recycling and work to protect our scenic beauty by fighting litter and visual pollution.

Planet PA.org is a green website for kids developed by the **Environmental Fund for PA**. Learn what's "hot" news, find out about recycling, play games, watch videos and order free stuff. There's even a section for teachers! Log on at **www.greenworks.tv/kids/index.htm**

National Resources

Antioch New England Institute is a great source to receive information on many environmental topics that have great concern. They also offer videos, information and free brochures. Call them at (603) 357-3122 or explore their website at **www.anei.org**. Look under resources for teachers to get information on books, curriculum, environmental clubs, games and other website connections. Great site for students and teachers. The AskERIC connection can help both teachers and students with any questions they may have.

The **Container Recycling Institute** has lots of current info on who is recycling what. They have great links to other sites, and because they are an advocacy group, let you know what current issues they are working on and how you can get involved. Call them at (202) 263-0999 or log on at **www.container-recycling.org**.

Earth's 911 is a public and private partnership for the environment. Their mission is to empower the public with specific resources in their community to improve the quality of life. Reach them at 1-800-CLEANUP or at their website, **www.earth911.org,** to locate information about your community. They also have a kids' section.

The **Environmental Defense Fund** is an established green organization with a global environ-

mental focus. Features news, alerts and guides for green living. Log on at **www.environmentaldefense.org** for information on recycling and pre-cycling.

The Environmental Health Clearinghouse has information available to the public on air pollution and health, toxic air and the effects of pollution on children, everything you ever wanted to know about the problems of the environment. For more information and free brochures call Environmental Health at 1-800-643-4784 or explore their website at **www.infoventures.com**.

Envirolink, a comprehensive resource for individuals, organizations, and businesses working for social and environmental change, can be found at **www.envirolink.org**. It includes educational resources, links to government resources and organizations, and grant writing assistance.

E: The Environmental Magazine, the only independent, environmental magazine in the U.S., has great information on some of the hottest environmental issues like air pollution, health problems, air quality, and consumer products. For more information on how you can subscribe to learn about these issues and receive information call (203) 854-5559 or explore their website at **www.emagazine.com.**

The **Environmental Protection Agency** has information related to all types of environmental problems from clean air to hazardous waste. To receive free brochures and information on how to become active with saving the environment call (202) 260-2090; or search their website at **www.epa.gov** and go to their kids pages where you can explore a wide range of environmental topics including waste and recycling, what's happening in your neighborhood, watershed and state, and environmental club projects. You can also find **detailed info on each region** with local contacts and relevant websites.

Green Teacher is a publication chuck-full of information on environmental concerns, ideas for teachers to implement, as well as actual examples of EE teachers in action. The resource is loaded with green info and websites. Find out more about them at **www.greenteacher.com**.

The Environmental Defense Fund's **Green Adviser** offers the best advice from green groups on environmentally friendly products, diet, green places and recycling. Log on at **www.greenadviser.org/home.cfn.**

Keep America Beautiful is a national program which provides individuals and communities strategies on preventing litter and illegal dumping. They offer tips, facts and information on what you and your group can do to make a difference. Check them out at **www.kab.org.** Additionally, there is a website for the City of Toledo, Ohio, which offers their program and strategies at **http://recycle.utoledo.edu/KTLCB/history.htm.** It is a wonderful example of how a community has made practical solid waste information available to its citizens, both children and adults. It includes information on street and road adoption programs, composting, fall leaf collection, household hazardous waste collections, awards, and upcoming events.

The **National Center for Environmental Decision-making Research** is a very helpful site with a very long name. It is designed to guide those wanting to make good, responsible decisions about a whole variety of environmental issues through the entire process. It helps you to identify the objectives you want to achieve and the things you need to consider to accomplish that goal. You can reach them at (423) 974-3939 or log onto their website at **www.ncedr.org/guides/litter**.

Iron Eyes Cody is the Native American actor who, starting in 1971, starred in a series of now-famous Keep America Beautiful public service ads. His face and famous "tear," as pictured in KAB's public service announcements, are credited with awakening the environmental consciousness of an entire generation of Americans to the problems posed by litter and other forms of environmental pollution. Iron Eyes Cody died on January 4, 1999, but his legacy will live on.

The purpose of the **National Resources Defense Council** is to safeguard the Earth: its people, its plants and animals and the natural systems on which all life depends. Their website **www.nrdc.org** gives you information on the many environmental topics they research and defend from negative legislation and

action. There's a great link to Rachel Carson and her book **Silent Spring** at **www.nrdc.org/health/pesticides/hcarson.asp**. In 1962, she carefully described how the pesticide DDT entered the food chain and accumulated in the fatty tissues of animals and human beings and caused cancer and genetic damage. There's also a kids section on their home page entitled The Green Squad where you can learn how to do an assessment of you school and take steps to make it a greener, healthier environment.

The **Rotten Truth About Garbage** "takes an in-depth look at the complex issues surrounding solid waste. This on-line exhibition is organized into four major sections: Garbage?, There's No "Away", Nature Recycles, and Making Choices." Log on at **http://astc.org** then click on archived exhibitions and Rotten Truth.

Scorecard is an environmental information service provided by The Environmental Defense Fund. Enter your zip code to find out what pollutants are released into your community and who is responsible. **www.scorecard.org**

The **Sierra Club** is devoted to protection of the earth's ecosystem and natural environment. To find information on the latest environmental topics like pollution, call (415) 977-5500 or explore their website at **www.sierraclub.org**. Click on search and enter the topic you want information on. The Sierra Club also has a list of activist guides, and picture books to read and help you better understand the importance of the environment. Note: **www.sierraclub.org/pa/** takes you to their Pennsylvania site.

Virtual Recycling provides tons of information about the whole process of recycling, from production of items, packaging, and distribution. This site is produced in Manitoba, Canada, and is used by students and teachers in the U.S. and United Kingdom, as well as Canada. It offers a chance for you to share what your school is doing with others. Includes links to other sites. Reach them at **www.virtualrecycling.com.**

PRINT RESOURCES

Waste and Want—A Social History of Trash
Susan Strasser
Metropolitan Books, Henry Holt and Company, New York 1999
This provides wonderful background material on the needs of people and the availability of goods and services for them.

Recycling in America second edition
Debra L. Strong
ABC-CLIO, Inc., Santa Barbara, CA 1997
This book is one in the Contemporary World Issues series and addresses vital issues in today's society. It provides a good starting point for research and contains an overview of the subject; a detailed chronology; biographical sketches; facts and data and/or documents and other primary-source material; a directory of organizations and agencies; annotated lists of print and nonprint resources; a glossary; and an index.

Rubbish! The Archaeology of Garbage
William Rathje and Cullen Murphy
Harper Collins Publishers 1992
William Rathje is the premier archaeologist of modern day garbage. His findings and observations are fascinating and can teach us a lot about ourselves.