

CHAPTER

1

Recycling

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Grade Range								
K	✓	✓						
1	✓	✓						
2	✓	✓	✓	✓	✓			
3			✓	✓	✓	✓		
4					✓	✓	✓	✓
5					✓	✓	✓	✓
6					✓	✓	✓	✓
Subjects Covered								
Math				✓		✓	✓	
Science				✓	✓	✓	✓	
Language Arts			✓					✓
Social Studies	✓			✓				✓
Art		✓	✓		✓		✓	✓
Health								
Skills Used*								
Communication	✓		✓	✓		✓		✓
Reading				✓				
Research						✓	✓	✓
Computation						✓	✓	
Observation/Classification	✓			✓		✓		✓
Problem Solving				✓				✓
Motor Skills		✓	✓		✓		✓	

*See Glossary of Skills for more details.

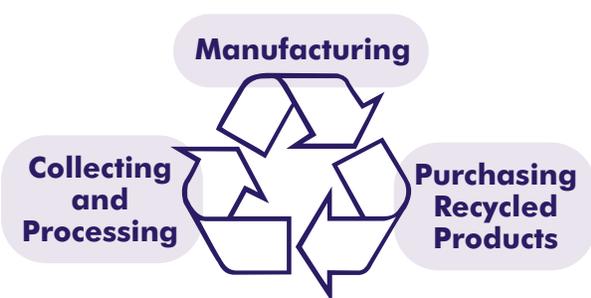
Recycling

What Is Recycling?

Recycling is a series of activities that includes the collection of items that would otherwise be considered waste, sorting and processing the recyclable products into raw materials, and remanufacturing the recycled raw materials into new products. Consumers provide the last link in recycling by purchasing products made from recycled content. Recycling also can include composting of food scraps, yard trimmings, and other organic materials. (See the Teacher Fact Sheet titled *Composting* on page 109 for more information.)

How Does Recycling Work?

Many people already recycle items like paper, glass, and aluminum. While these efforts are a vital part of the process, the true recycling path continues long after recyclables are collected from household bins or community drop-off centers. Collecting, processing, manufacturing, and purchasing recycled products creates a closed circle or loop that ensures the overall success and value of recycling.



Collection

How and where recyclables can be collected vary by community. Some communities collect from residences, schools, and businesses; four primary methods are used:

- **Curbside collection programs** are the most common. Residents set recyclables, sometimes

Key Points

- The latest numbers show that the recycling rate in the United States has reached an all-time high—in 1997 the country recycled 28 percent of its municipal solid waste.
- Recycling includes collecting materials and sorting and processing them into recycled raw materials to be remanufactured into new products.
- Recycling can only be effective if people buy recycled-content products.
- Recycling reduces the use of virgin materials, reduces the pollution and energy used in manufacturing and processing, saves landfill space, and creates jobs and revenue.
- New methods for the recycling and reuse of certain items, such as computer and electronic equipment, are being developed to prevent waste and save additional materials and energy.

sorted by type, on their curbs to be picked up by municipal or commercial haulers.

- **Drop-off centers** are locations where residents can take their recyclables. These centers are often sponsored by community organizations.
- **Buy-back centers** are local facilities where recycled-content manufacturers buy their products back from consumers to remanufacture the used products into new products.



- **Deposit/refund programs** require consumers to pay a deposit on a purchased product. The deposit can be redeemed when the consumer brings the container back to the business or company for recycling.



Processing

After collection, some recyclables are “processed” and prepared for delivery to manufacturing facilities. Processing usually includes making sure the materials

Follow A Plastic Bottle Beyond the Bin...

After a plastic soda bottle is collected in a recycling bin, it is sorted and transported to a materials recovery facility. There it is cleaned and fed into a granulator that chops it into uniform-sized pieces, called “flakes.” A manufacturer then purchases the flakes and melts them, squeezing the plastic into thin spaghetti-like strands and chopping those strands into small pieces called “pellets.” These plastic pellets are further stretched and squeezed into thin fibers that can be remanufactured into items like clothing, bags, bins, carpet, plastic lumber, hospital supplies, housewares, packaging, shipping supplies, toys, and more. Consumers then complete the recycling loop by purchasing and using these new recycled-content products.

are sorted properly and that contaminants (i.e., nonrecyclables) are removed. Recyclables are then usually sent to a materials recovery facility (MRF, pronounced “murph”) to be further sorted and then processed into marketable commodities for remanufacturing. Recyclables are bought and sold just like any other commodity, and

prices for the materials change and fluctuate with the market. Each MRF has individual requirements about what materials it will accept, but most accept newspapers, aluminum cans, steel food cans, glass containers, and certain types of plastic bottles.

Manufacturing

Once cleaned and sorted, the recyclables move to the next part of the recycling loop—manufacturing. More and more of today’s products are being manufactured with recycled content.

- Recycled cardboard and newspaper are used to make new boxes, papers, and other products such as tissues, paper towels, toilet paper, diapers, egg cartons, and napkins.
- Recycled plastic called PET, which is found in soft drink, juice, and peanut butter containers, is used to make new products such as carpets, fiberfill (insulating material in jackets and sleeping bags), bottles and containers, auto parts, and paint brushes. Another kind of recycled plastic, HDPE, which is used in milk, water, detergent, and motor oil containers, can be remanufactured into trash cans, bathroom stalls, plastic lumber, toys, trash bags, and hair combs. Numbers imprinted on the plastic product indicate from which type of plastic the product has been manufactured and how it can be recycled. Not all communities recycle all types of plastic.
- Recycled glass is used again and again in new glass containers as well as in glassphalt (the roadway asphalt that shimmers in sunlight), road filler, and fiberglass.
- Recycled aluminum beverage cans, one of the most successful recyclables, are remade into new cans in as little as 90 days after they are collected. Recycled aluminum cans also can be used in aluminum building materials.
- All steel products manufactured in the United States contain 25-30 percent or 100 percent recycled steel, depending on the manufacturing process used.

Recycling in the United States Throughout History

Although in recent years the United States has witnessed a major increase in public participation in recycling programs, industrial and commercial recycling has always made sense economically. In fact, recycling played an important role in America's success in both world wars. See the time line below for a brief glimpse of recycling throughout history.

Late 1800s to Early 1900s

- Before the days of mass production, the economic climate required people to routinely repair, reuse, and recycle their material possessions.
- Scrap yards recycled old cars, car parts, and metal goods.
- The paper industry used old rags as its main source of fiber until the late 19th century.
- Retailers collected used cardboard boxes for recycling.

1914–1918 and 1939–1945 (WWI and WWII)

- Patriotism inspired nationwide scrap drives for paper, rubber, and other materials to help the war effort.
- Many farms melted down and recycled iron or metal pieces of rusted machinery for warships, vehicles, and other military machines.
- People even saved grease from meat they cooked, which was used to make munitions.

1960s

- Interest in recycling waned as America's peacetime economy soared. Rising incomes and widespread, affordable, mass-produced goods created the "disposable" society.

1970s

- Environmental awareness rejuvenated the nation's interest in recycling.
- U.S. Environmental Protection Agency (EPA) was established December 2, 1970.
- The first Earth Day was held in 1970, significantly increasing recycling awareness. In the years following, 3,000 volunteer recycling centers opened and more than 100 curbside collection programs were established.
- EPA and some state agencies developed guidelines, technical assistance, and targets for local efforts.

1980s

- The national spotlight fell on monitoring trash due to increased awareness of pollution resulting from poor waste management.
- Federal, state, and local governments became more and more involved in waste management.
- Waste management firms began to offer recycling programs in connection with proposals for new incinerators or landfills.

1990s

- Industry expanded the range of products made from recycled materials instead of virgin raw materials.
- National recycling rate reached double digits (28.2 percent in 1998).

2000s

- EPA has set a national recycling goal of 35 percent by 2005.

Recycling Facts

- By recycling 1 ton of paper, we save: 17 trees, 7,000 gallons of water, 380 gallons of oil, 3 cubic yards of landfill space, and enough energy to heat an average home for 6 months.
- Manufacturers can make one extra-large T-shirt out of only five recycled plastic soda bottles.
- Americans throw away enough aluminum every 3 months to rebuild our entire commercial air fleet.
- When one ton of steel is recycled, 2,500 pounds of iron ore, 1,400 pounds of coal, and 120 pounds of limestone are conserved.
- Recycling aluminum cans saves 95 percent of the energy required to make aluminum cans from scratch.
- The amount of aluminum recycled in 1995 could have built 14 aircraft carriers.

(Sources: Weyerhaeuser Company, 1999; Steel Recycling Institute, 2000; American Forest and Paper Association, 2000; R.W. Beck, 1997; The Can Manufacturers Institute, 1997; Anchorage Recycling Center, 2000; Recyclers' Handbook by Earthworks Group, 1997; EPA, 1997)

159 for more information.) In 1997, this country recycled 28 percent of its waste, a rate that has almost doubled over the past 15 years. Of that 28 percent, here is the breakdown of what the United States recycled that year:

As individuals, businesses, and governments in the United States have increasingly assumed responsibility for wastes, recycling, reuse, and composting have all undergone a phenomenal surge in popularity and success. Analysts project that Americans will be recycling and composting at least 83 million tons—35 percent of all municipal waste—by 2005.

Purchasing Recycled Products

The market for recycled materials is the final part of the recycling loop. Recycled products must be bought and used in order for the entire recycling process to succeed.

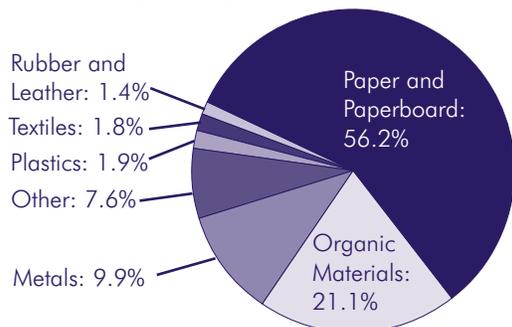
Recycling and composting activities divert about 62 million tons of material from landfills and incinerators. (See the Teacher Fact Sheets titled *Landfills* on pg. 155 and *Combustion* on pg.

What Are the Benefits of Recycling?

When each part of the recycling loop is completed, the process helps both the environment and the economy. Recycling prevents materials from being thrown away, reducing the need for landfilling and incineration. In addition, the use of recycled materials to manufacture new products prevents pollution caused by the manufacturing of products from virgin materials. Also, using recycled materials for manufacturing decreases emissions of greenhouse gases that contribute to global climate change. Since the use of recycled materials reduces the need for raw material extraction and processing, energy is saved and the Earth's dwindling resources are conserved.

Recent studies indicate that recycling and remanufacturing account for about one million manufacturing jobs throughout the country and generate more than \$100 billion in revenue. Many of the employment opportunities created by recycling are in areas where jobs are most needed.

Materials Recycled in the United States



Source: EPA, 1998

Recycling in Action

For recycling to work, everyone has to participate in each phase of the loop. From government and industry, to organizations, small businesses, and people at home, all Americans can easily make recycling a part of their daily routine. Below are some ways for individuals to get involved in recycling:

- Learn about and participate in a community recycling program. Know the collection schedule or drop-off location as well as which items are acceptable. Get involved by volunteering with a homeowner's association or community organization to educate neighbors about the recycling program.
- Empty all fluids and remove all lids from bottles and cans when recycling and do not contaminate recycling containers with trash.
- Participate and encourage colleagues to recycle in the containers provided in your school. Initiate a recycling program in your school if one does not exist.
- Make the effort to find recycling opportunities for items, such as plastic packaging, that are not included in your local recycling program.
- Use recyclable products and encourage others to do the same.

What Are the Challenges of Recycling?

Despite its success, the potential of recycling in this country is not yet fully realized. Some plastics, for example, such as bottles and containers, are recyclable in almost any community, but others, such as plastic "peanuts"

used in packaging, usually can not be included in curbside or drop-off recycling programs. These items still end up in the trash because it is not profitable to collect the tons needed for remanufacture into new products.

In addition, the costs of collecting, transporting, and processing recyclables can sometimes be

Is Your School Waste Wise?

WasteWise is a voluntary EPA partnership program that helps businesses, governments, and institutions reduce waste and save money. Since the program began in 1994, WasteWise partners have reduced their municipal solid waste by more than 26 million tons! In 1998 alone, partners saved an estimated \$264 million. Partners include many large corporations, small and medium-sized businesses, hospitals, tribes, and state, local, and federal governments, as well as 87 schools, school districts, colleges, and universities in more than 30 states.

The following are examples of the accomplishments of a few WasteWise partners in the education field. Alden Central School of New York, which educates children from K-12, implemented a comprehensive waste reduction program in all campus buildings. Students and staff eliminated 450 pounds of polystyrene cafeteria trays and dishes by switching to reusable products. They also composted 900 pounds of cafeteria food scraps and 150 pounds of yard trimmings for use as mulch on building grounds. Sligo Adventist School of Maryland also implemented several innovative waste prevention activities including the reduction of more than 1 ton of drink boxes by switching to bulk juice dispensers. Eastern Illinois University reduced the amount of computer paper used on campus by 10 percent and reused 13 tons of office supplies through an internal exchange among employees.

To find out how your school can join the WasteWise program, please call 800-EPA-WISE (372-9473), e-mail at ww@cais.net, or visit the Web site at www.epa.gov/wastewise.

higher than the cost of disposing of these materials as waste. The average cost to process a ton of recyclables is \$50, while the average value of those recyclables on the market is only \$30. Processors often compensate for this discrepancy by charging a set fee for each ton of material they receive or by establishing ongoing contracts with communities or haulers. Efforts to better manage waste and recycling programs are under development. Many communities across the country implement financial incentives to encourage people to recycle. Residents are charged a fee based on the amount of solid

waste they throw away. The more a household recycles, the less garbage it throw outs, and the lower the collection fee it pays.

Finally, recycling facilities are not always a welcome addition to a community. As with other waste management operations, recycling facilities are often accompanied by increased traffic, noise, and even pollution. Community leaders proposing the location for a recycling facility can encourage the NIMBY (Not in My Backyard) sentiment.

Additional Information Resources:

Visit the following Web sites for more information on recycling and solid waste:

- U.S. Environmental Protection Agency (EPA): <www.epa.gov>
- U.S. EPA, Office of Solid Waste site on recycling: <www.epa.gov/epaoswer/non-hw/muncpl/reduce.htm>
- U.S. EPA, Office of Solid Waste WasteWise Program site: <www.epa.gov/wastewise/index.htm>
- U.S. EPA, Office of Solid Waste site on global climate change and recycling: <www.epa.gov/mswclimate/index.htm>
- U.S. EPA, Office of Solid Waste, Kid's Page: <www.epa.gov/wpaoswer/osw/kids.htm>
- U.S. EPA, Region 9 Office's Recycling Site for Kids: <www.epa.gov/recyclecity>
- National Recycling Coalition: <www.nrc-recycle.org>
- Institute for Scrap Recycling Industries: <www.isri.org>
- American Plastics Council: <www.plastics.org>
- Steel Recycling Institute: <www.recycle-steel.org/>
- Aluminum Association: <www.aluminum.org>
- Glass Packaging Institute: <www.gpi.org>
- American Forest and Paper Association: <www.afandpa.org>
- Institute for Local Self-Reliance: <www.ilsr.org>
- Rechargeable Battery Recycling: <www.rbr.org>
- Polystyrene Packaging Council: <www.polystyrene.org>

To order the following additional documents on municipal solid waste and recycling, call EPA toll-free at 800 424-9346 (TDD 800 553-7672) or look on the EPA Web site <www.epa.gov/epaoswer/osw/publicat.htm>.

- *Characterization of Municipal Solid Waste in the United States*
- *Planet Protectors Club Kit* (EPA530-E-98-002)
- *A Resource Guide of Solid Waste Educational Materials* (www.epa.gov/epaoswer/general/bibligr/educat.htm)
- *A Collection of Solid Waste Resources—CD-ROM*

Buying Recycled

What Is “Buying Recycled?”

“Buying recycled” means purchasing items that are made from **postconsumer** recycled content—in other words, materials that were used once and then recycled into something else. This process is also known as “**closing the loop.**”

Consumers “close the loop” when they purchase products made from recycled materials. After an item has been collected for recycling, sorted and processed, and remanufactured into a new product, it still has one more critical step to undergo: purchase and reuse. If no one buys **recycled-content products**, the entire recycling process is ineffective.



How Can People “Close the Loop?”

Consumers hold the key to making recycling work. Many manufacturers are already making the use of recycled materials a part of

Key Points

- Buying recycled-content products encourages manufacturers to purchase and use recycled materials.
- Buying products with “postconsumer” content closes the recycling loop.
- Not all recyclable products can be recycled in every community.
- Buying recycled products saves energy, conserves natural resources, creates jobs, and reduces the amount of waste sent to landfills and incinerators.
- Today’s recycled-content products perform just as well, cost the same or less, and are just as available as their nonrecycled counterparts.
- New products containing recycled materials, from construction materials to playground equipment to computers, are constantly being developed.

A Recycled Product Shopping List

More than 4,500 recycled-content products are already available in stores, and their numbers are rapidly growing. Some of the everyday products people regularly purchase contain recycled-content. Here are some items that are typically made with recycled materials:

- Aluminum cans
- Cereal boxes
- Egg cartons
- Motor oil
- Nails
- Trash bags
- Comic books
- Newspapers
- Paper towels
- Carpeting
- Car bumpers
- Anything made from steel
- Glass containers
- Laundry detergent bottles

their official company policy. By buying recycled-content products, consumers can encourage this trend, making each purchase count toward “closing the loop.” Purchasing recycled-content goods ensures continued availability of our natural resources for the future.

The first step in buying recycled-content products is correctly identifying them. As consumers demand more environmentally sound products, manufacturers are encouraged to highlight these aspects of their merchandise. While this trend is good, shoppers should be aware of the various uses of “recycled” terminology. To help consumers decipher product claims about recycled content, the

Federal Trade Commission has issued guidelines to ensure that products are properly and clearly labeled. Here are some basic definitions:

- **Recycled-content products** are made from materials that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process or after consumer use. Recycled-content products also include products made from used, reconditioned, and remanufactured components.
- **Postconsumer content** indicates that materials used to make a product were recovered or otherwise diverted from the solid waste stream after consumer use. If this term is not noted, or if the package indicates a total recycled content with a percentage of post-consumer content (e.g., 100 percent recycled, 10 percent postconsumer), the rest of the material probably came from excess material generated during normal manufacturing processes. These materials were not used by a consumer or collected through a local recycling program.

- **Recyclable products** can be collected, separated, or otherwise recovered from the solid waste stream for use in the form of raw materials in the manufacture of a new product. This includes products that can be reused, reconditioned, or remanufactured. These products do not necessarily contain recycled materials and only benefit the environment if people recycle them after use. Not all communities collect all types of products for recycling, so it is really only recyclable if your community accepts it.
- **Products wrapped in recycled or recyclable packaging** do not necessarily contain recycled content. They can be wrapped in paper or plastic made from recycled materials, which is a good start, but the most environmentally preferable packaging is none at all.

Consumers must remember to read further than the recycling symbol or the vague language to find specific and verifiable claims. When in doubt about the recycled content of an item, asking the store clerk will not only help to inform the consumer, but also raise the store clerk's awareness of shoppers' interest in environmentally preferable products.

Buy-Recycled Facts

- Aluminum cans contain an average of 50 percent recycled postconsumer content, while glass bottles contain an average of 30 percent.
- How many recycled plastic soda bottles does it take to make...?
 - 1 XL T-shirt.....5 bottles
 - 1 Ski jacket filler.....5 bottles
 - 1 Sweater27 bottles
 - 1 Sleeping bag.....35 bottles
- Manufacturers in the United States bought \$5 billion worth of recycled materials in 1995.
- One 6-foot-long plastic park bench can be made from 1,050 plastic milk jugs.

(Sources: Aluminum Association, 2000; Glass Packaging Institute; Recyclers' Handbook by Earthworks Group, 1997; Anchorage Recycling Center, 2000; American Plastics Council, 1999; National Recycling Coalition)

What Are the Benefits of Buying Recycled?

Important advantages to buying recycled content products include:

- **Waste and Pollution Prevention:** Manufacturing products with recycled-content generally creates much less waste and pollution, ranging from truck emissions to raw material scraps.
- **Resource and Energy Conservation:** Making a new product from recycled-content materials generally reduces the amount of energy and virgin materials needed to manufacture the product.

- **Economic Development:** The Institute for Local Self-Reliance in Washington, DC, estimates that nine jobs are created for every 15,000 tons of solid waste recycled into a new product. These jobs range from low-skilled to high-skilled positions, including materials sorters, dispatchers, truck drivers, brokers, sales representatives, process engineers, and chemists.
- **Money Savings:** Products such as re-refined motor oil, retreaded tires, and remanufactured automotive batteries will often cost less than their virgin material counterparts.

What Are the Challenges of Buying Recycled?

Many people incorrectly assume that products made from recycled content, or used material, are inferior in quality to entirely new products. The challenge is to correct that misconception and convince businesses and consumers of the reliability of recycled-content products. According to the California Department of Conservation and the California Integrated Waste Management Board, in 1996, 97 percent of corporate purchasing agents reported that they were pleased with the performance of their recycled-content products. Though each product's quality and reliability must be judged individually, no evidence exists that recycled-content products are inferior to their virgin material counterparts. Initially, some recycled-content products were less available and harder to find than virgin products, but today, every major national store chain and nearly all small chains or independent retailers carry recycled-content products at competitive prices.

What Are Some Emerging Trends?

A wider variety of recycled-content products are being produced every day. Some newly available items include electronic equipment, such as computers and printers, made from recycled parts; tape measures made from reconditioned

and recycled parts; kitty litter made from recycled drywall; recycled-content plastic office products; and innovative clothing and accessories made from recycled tire inner tubes.

Buying Recycled in Action

Consumers hold the power in their wallets and on their shopping lists. Whether buying items for home, school, or work, consumers must think about the environment and the future as they consider products and brands. Below are activities that will help promote buying recycled:

- Buying recycled-content products personally and encouraging the use of recycled products at school.
- Teaching children about “closing the recycling loop” by organizing a tour of a local facility that manufactures recycled-content products, such as steel products.
- Organizing an exhibit of recycled-content products.
- Asking local stores to stock more recycled-content products.
- Looking for products that usually contain recycled materials, such as steel, glass, aluminum, egg cartons (paper), and cereal boxes.
- Purchasing remanufactured products and equipment, like toner cartridges, office furniture, auto parts, re-refined oil, or retreaded tires.
- Purchasing products that can be recycled in local communities.



Additional Information Resources:

Visit the following Web sites for more information on buying recycled products and solid waste:

- U.S. Environmental Protection Agency (EPA): <www.epa.gov>
- U.S. EPA, Office of Solid Waste site on buying recycled: <www.epa.gov/epaoswer/non-hw/reduce/wstewise/purchase.htm#purchase1>
- U.S. EPA, Office of Solid Waste site on recycling and buying recycled: <www.epa.gov/epaoswer/non-hw/muncpl/reduce.htm>
- King County, Washington: <www.metrokc.gov/oppis/recyclea.html>
- Green Seal: <www.GreenSeal.org>
- The American Plastics Council: <www.plasticsresource.com>
- The Official Recycled Products Guide: <www.recyclingdata.com>
- The Global Recycling Network: <www.grn.com>
- The Environmental News Network's Marketplace: <www.enn.com/marketplace/index.htm>
- Pennsylvania Resource Council's Recycling and Solid Waste Center: <www.prc.org/recctr.htm>
- Buy Recycled Business Alliance: <www.nrc-recycle.org/brba/index.htm>

To order the following additional documents on buying recycled and solid waste, call EPA toll-free at 800 424-9346 (TDD 800 553-7672) or look on the EPA Web site <www.epa.gov/epaoswer/osw/publicat.htm>

- *The Consumer's Handbook for Reducing Solid Waste* (EPA530-K-96-003)
- *A Collection of Solid Waste Resources*—CD-ROM

EPA's WasteWise Program helpline (800 EPA-WISE) has additional resources available. These resources include information on the following:

- State Buy-Recycled Contacts
- *Buy Recycled Guidebook*



Recycling Rangers



Objective

To help children recognize the similarities and differences among common recyclable items.



Activity Description

Students play a sorting game and put different recyclables into the appropriate bin.



Materials Needed

- Four recycling bins
- Recyclable materials listed in the box below



Key Vocabulary Words

Paper
Plastic
Glass
Metals



Duration

1 hour



Skills Used

Communication
Observation/classification



Activity

Step 1: Set up the four bins in the classroom and label them “Paper,” “Glass,” “Plastic,” and “Metals.” Make a pile of all of the recyclable items on the floor and ask the students to gather around them in a circle.

Step 2: Explain to students that by the end of the lesson they will become “Recycling Rangers” and learn how to recycle different items. Discuss with the students how different “garbage” items can be recycled into new products. Note that it is important to separate these items into different categories before they are used to make new products. Refer to the Teacher Fact Sheet titled *Recycling* on pg. 73 for background information on the recycling process.

Step 3: Ask the students to look at the different recyclable materials and discuss how they are alike and how they are different. Ask them

Recyclable Materials

- Cardboard
- Newspapers
- Magazines
- Plastic soda bottles
- Plastic milk containers
- Glass jars or bottles
- Aluminum cans
- Steel food cans
- Other materials recycled in your community

Note: All materials should be cleaned and all sharp lids or edges should be removed or taped over to avoid injury.

to compare the colors, textures, and weight of the different objects. When handling the glass bottles, take great care not to accidentally break the containers. Also, note that some metal containers have sharp edges that can cause injury to the children.

Step 4: Moving through the pile one item at a time, ask the students to identify the material that each item is made from. Then, choose a student volunteer to place the item in the appropriate bin. For the older children, ask the student volunteer to also name another product that is made from that same material. If a student, for example, is holding a glass jelly jar, he or she could note that soda bottles are also made of glass.

Step 5: After the lesson is concluded, encourage students to go home that night and share what they learned with their parents.



Assessment

1. Ask students to name some examples of recyclable items.
2. Have students explain why it is important to sort the different recyclable items.
3. Ask students what kinds of materials recyclable items are made from.



Enrichment

1. Select a few objects from the lesson, ensuring a good mix of shapes and sizes. Ask the children to trace outlines of the objects and then color them in. Put the pictures up on the classroom wall to create a recycling art gallery.
2. Organize the class into teams of four children and give each group a different recyclable item. Ask the students to make a new object from the recycled items such as a crayon holder or paper plane.



Follow That Bottle!



Objective

To show students the various steps involved in recycling.



Activity Description

While coloring, students will follow the path of the bottle in the *Follow That Bottle!* worksheet.



Materials Needed

- Copies of the *Follow That Bottle!* worksheet for each member of the class
- Crayons



Key Vocabulary Words

Recycling
Processing
Manufacturing
Factory



Duration

1 hour



Skills Used

Motor skills



Activity

Step 1: Using the storyline in the *Follow That Bottle!* worksheet, discuss the life of a recyclable item, such as a plastic bottle, after it is placed in the recycling bin. Explain that items such as bottles, cans, and newspapers can be made into a new product—either the same kind of product or a completely different product—if they are recycled and not thrown away. (Refer to the Teacher Fact Sheet titled *Recycling* on pg. 73 for background information.)

Step 2: Read and then distribute the *Follow That Bottle!* worksheet and instruct the students to follow the bottle by coloring it with crayons as it is used, recycled, remanufactured, and made into a new product. As the students color, ask them what they think is happening in each section of the picture. Ask them, for example, if anyone has been to a factory or if they recycle at home.

Step 3: After talking about the life of the bottle, students can color the rest of the story board.



Assessment

1. Have students explain what happens to a plastic bottle, or other recyclable, after it is placed in a recycling bin.
2. Ask students to describe their own recycling experiences. Do they use a bin?



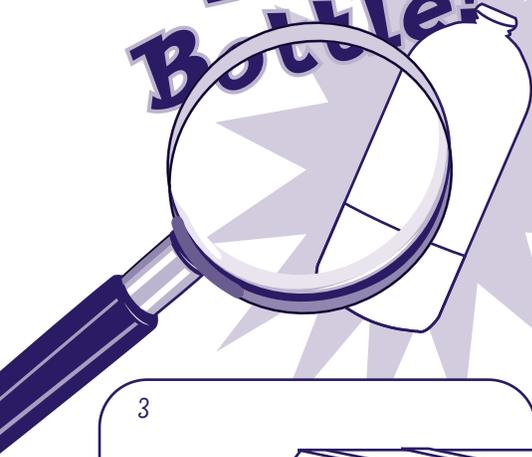
Enrichment

1. Instruct the students to draw a picture of themselves as they recycle common products.
2. Have students sort and separate recyclables from lunch for one week to get a sense of the items that can be recycled in your community. Prepare separate bins for each recyclable.
3. Ask students what happens to the plastic bottle if it does not go in the recycling bin.

Student Handout

Name: _____

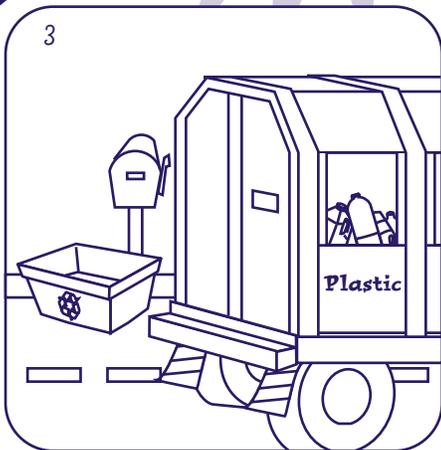
Follow That Bottle!



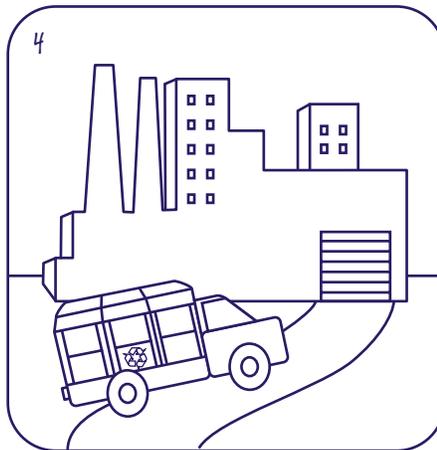
1 Billy drinks a soda.



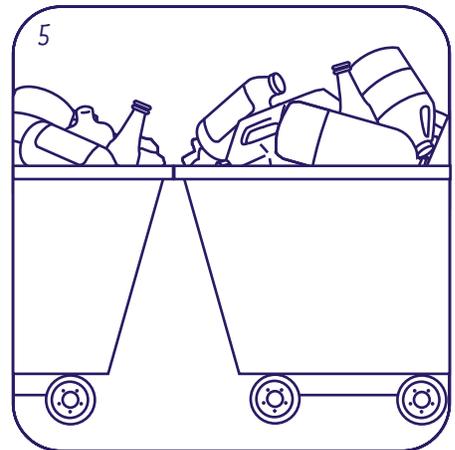
2 When he is finished, he puts the empty bottle in the recycling bin.



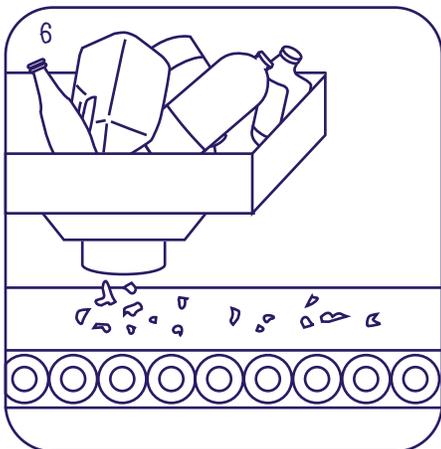
3 A truck comes to pick up the recycled bottles.



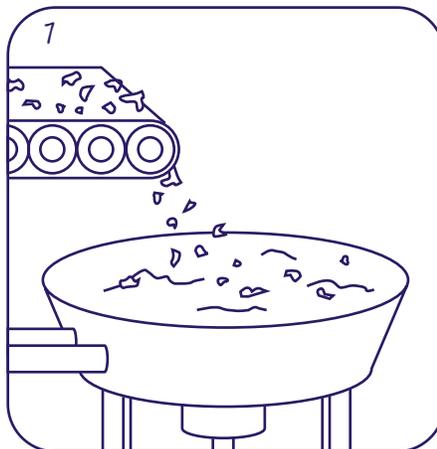
4 The truck takes the recycled bottles to a factory.



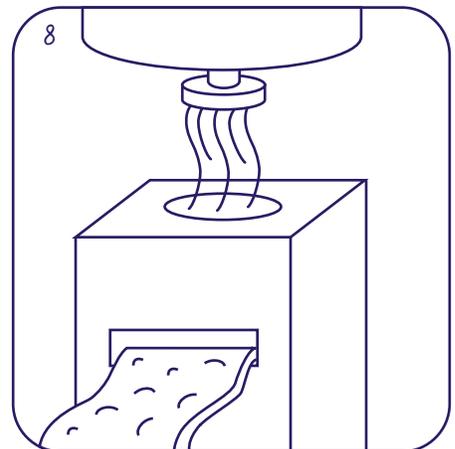
5 The bottles get separated by color.



6 The bottles are ground up into little pieces.

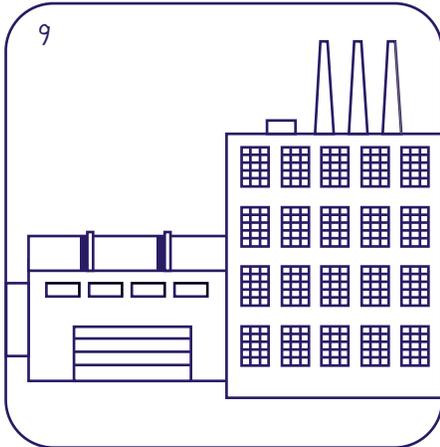


7 The little plastic pieces are melted...



8 ...and made into pieces of thread.

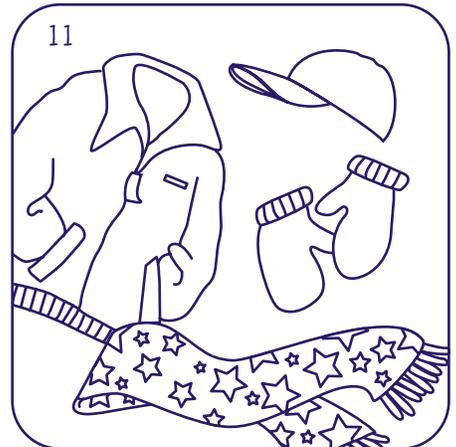
Student Handout



In another factory...



...the plastic thread is used to make clothing.



Jackets, scarves, gloves, and blankets can be made from recycled soda bottles...



...and are sold in stores.



Billy's favorite jacket is made from the soda bottles he recycled!

Take-Home Recycling Kit

Suggestion for Teachers: You might want to find out what materials are collected for recycling in your community before beginning this activity.



Objective

To teach students the value of recycling and encourage them to discuss recycling with their families.



Activity Description

Students will assemble a take-home recycling kit.



Materials Needed

- *Recycling Facts* handout for each member of the class
- Old magazines and newspapers
- Used cardboard
- Construction paper
- Markers and/or paint
- Glue
- Scissors
- Any other arts and crafts supplies available



Key Vocabulary Words

Recycling
Processing



Duration

2 hours



Skills Used

Communication
Motor skills



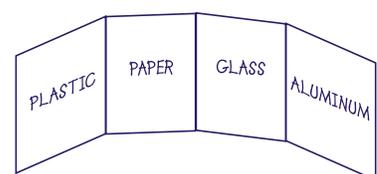
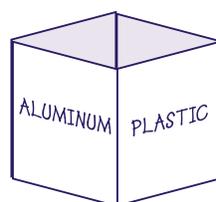
Activity

Step 1: Explain how recycling works and the important role we all can play by recycling items instead of throwing them away. (Refer to the Teacher Fact Sheet titled *Recycling* on pg. 73 for more information.) Review the information on the following *Recycling Facts* handouts with the students, pointing out the economic and environmental benefits of recycling.

Step 2: Have each student cut the old cardboard boxes into four 8 1/2- by 11-inch pieces and glue different colored sheets of construction paper to each side of the cardboard. Connect each piece of cardboard with tape to

form a placard that can stand on a table. Instruct the students to label each cardboard piece with one of the following recyclables: aluminum, glass, plastic, and paper (see examples below).

Step 3: Instruct the class to cut out or draw the appropriate recyclable for each cardboard placard using the magazines, newspapers,



language
arts



art



Journal Activity

Ask students to interview their family members about recycling practices and views on recycling. Ask students to write a short article on their families' current views and how their recycling kit changed those views or practices.

markers, and paints. Ask students to write information about recycling on each placard. Optional recycling facts are included on the attached handout and might assist students in this task.

Step 4: When the students are finished decorating their placards, ask them to take them home and affix them where their family keeps its recyclables or its trash to encourage families that don't already recycle to start. Ask students to share the information they learned about recycling with their parents. Explain how the placards serve as friendly reminders of the importance and benefits of recycling.



Assessment

1. Ask students to list the ways recycling helps the environment and why these benefits are important.
2. Ask students what role each of us can play in recycling.



Enrichment

1. If your community recycles, but the majority of the class' families do not recycle at home, have the students practice a "recycling pitch" to their parents using their placards and other facts about the benefits of recycling. Also, students could develop a commercial using their placards and draw a story board of it or create a skit that is then videotaped.
2. Make signs for the classroom or school recycling bin. Ask students to put cans, bottles, or other items from their lunches in the recycling bins in the classroom or school. When the bins are full, take them to a collection facility and use the money to buy treats for the class.
3. Organize a tour of a recyclables processing facility or a manufacturing plant that uses recycled materials.

Recycling Facts



Paper

- A used newspaper can be recycled and remanufactured into a new newspaper in less than 4 weeks.



- Americans recycled 60,000 tons of phone books in 1995.
- By recycling or reusing 1 ton of paper, we save 17 trees, 7,000 gallons of water, 380 gallons of oil, 3 cubic yards of landfill space, and enough energy to heat an average home for 6 months.

- Americans recycled 47 million tons of paper in 1999.

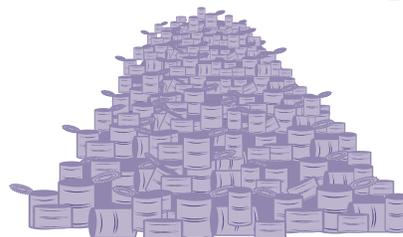
Plastic

- Using only five recycled plastic soda bottles, manufacturers can make one extra-large T-shirt.
- Milk jugs can be made into all different types of plastic objects, from park benches to boardwalks.
- Recycled plastic soda bottles can be made into "fleece" sweaters, long underwear, stuffing for sleeping bags, and other items.



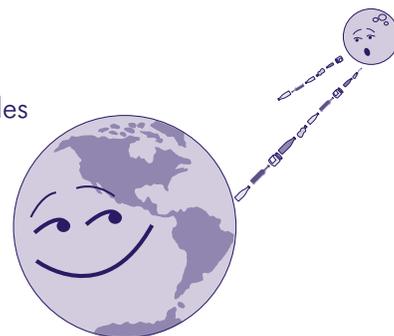
Aluminum

- Recycling aluminum cans saves 95 percent of the energy required to make aluminum cans from scratch.
- Since 1972, Americans have earned \$10 billion from recycling aluminum cans.
- Every minute, an average of 127,093 aluminum beverage cans are recycled in the United States.
- The amount of aluminum recycled in 1995 could have built 14 aircraft carriers



Glass

- If all the glass bottles and jars recycled were laid end-to-end, they would reach the moon and make it more than halfway back to Earth.
- Every day, Americans recycle 37 percent of all glass jars and bottles.
- Americans throw away enough glass bottles and jars every 2 weeks to fill both of the World Trade Center's 1,350-foot towers.
- Every ton of new glass produced results in 27.8 pounds of air pollution, but recycling glass reduces that pollution by 14 to 20 percent.



Sources: National Recycling Coalition; EPA; Weyerhaeuser Company, 1999; American Forest and Paper Association; American Plastics Council, 1994; Coca-Cola Co., 1995; Glass Packaging Institute, 2000; Can Manufacturers Institute, 2000; EPA, 1997.

Making Glass From Scratch



Objective

To teach students about the processes and resources used in the manufacture of glass and to introduce how recycling glass is good for the environment.



Activity Description

Students make a glass-like substance using sugar and water.



Materials Needed

- 1 cup sugar
- 1/4 cup water
- Hot plate and sauce pan or hot pot (to boil water)
- 8-inch square sheet of glass or a cookie sheet
- Newspaper
- Assorted glass objects



Key Vocabulary Words

Glass
Heat
Energy
Natural resources
Reuse
Recycle
Resource
Minerals
Raw materials



Duration

45 minutes



Skills Used

Communication
Reading
Observation/classification
Problem solving



Activity

Step 1: Discuss how glass is made (i.e., that sand, soda and lime are heated together at high temperatures), emphasizing the heat and energy required during the manufacturing process. Explain to students that glass containers can be remelted or “recycled” to make new glass containers, saving valuable resources in the process. (Refer to the Teacher Fact Sheets titled *Products* on page 25 and *Recycling* on page 73 for background on the manufacturing process.) During the discussion, allow students to touch a variety of different glass objects (e.g., beverage container, jelly jar, vase). Ask them to describe the colors, shapes, and textures of the different items.

Step 2: Begin the glassmaking exercise by heating the water. Tell students you are going to make “pretend” glass using sugar in place of the actual raw material, sand. Let students examine the sugar and describe it in terms of its color, texture, and shape. Point out the similarities between the sugar and sand. Have students describe the water and how it changes as the heat begins to make the water boil (e.g., after the sugar has melted it will look like a brown liquid). Point out the heat energy involved in making the water boil as well as the steam that is produced. Next, pour the sugar into the boiling water. Tell students to pretend the sugar is sand (minerals) from the ground.



math



science



social studies

Step 3: Stir the mixture vigorously over the heat until the sugar is dissolved (about 5 minutes). Ask students to describe the changes in the sugar and water. Tell them this is how glass looks before it cools.

Step 4: Put several layers of newspaper under a sheet of glass or a cookie sheet. (If you are worried about handling glass, use a cookie sheet—although students will not be able to see through it.) Carefully pour the mixture onto the sheet of glass and allow it to cool (about 15 minutes).

Step 5: Hold up the sheet of “glass” so students can see through it. By allowing it to set overnight, the “glass” will become frosted. The next day, ask students to describe the changes that occurred overnight and why (e.g., the water evaporated leaving sugar crystals behind).

Step 6: As an optional exercise, illustrate glass recycling by scraping the dried “glass” back into the pan (pretending it is small pieces of crushed, recycled glass), adding water, and reboiling the mixture. More sugar will need to be added to repeat the procedure. Ask students which resources were replaced when the crushed glass was used to make the new glass (minerals, energy).



Assessment

1. Ask students what materials are used to make virgin (nonrecycled) and recycled glass bottles. Older students may illustrate the process, labeling the natural resources used to make glass and show which ones are replaced when recycled glass is used as a raw material.
2. Have students describe how recycling glass is good for the environment.



Enrichment

1. Perform a molding glass exercise. For this project, you will need one wide-mouth glass jar per group of four to six students, and one stiff straw or glass tubing, balloon, and rubber band per student. To begin, divide the class into small groups of four to six students and give each group a wide-mouth jar. Next, give each student a straw or glass tubing, balloon, and rubber band. Assist students in attaching the balloon to the straw with the rubber band. Ask students to take turns putting the balloon into the jar and blowing it up until it takes the shape of the jar. Explain that this process illustrates how glass is molded into a jar or other shape during the manufacture of glass containers.
2. Bring samples of handmade glass to class and show students the bubbles in the glass formed by a person blowing air into the hot glass mixture. Point out the irregularities that identify the glass as handmade. Visit a glass blower, if possible. These individuals often participate in local crafts festivals or similar events.
3. Ask students to look around their homes for glass products that could be recycled to make new glass. Ask students to make a list of the items and bring the list to class. Have students share their lists and then discuss which items can and cannot be used for recycling (for example, items not commonly accepted for recycling are lightbulbs, mirrors, windows, etc.).

Handmade Recycled Paper Planters



Objective

To show students how easy it can be to make products from recycled items.



Activity Description

Students will make planters from recycled paper.



Materials Needed

- Large stack of newspapers
- Scissors
- Three to five 2-gallon buckets
- Water
- Egg beaters
- Magnifying glass
- Plant seeds for each student
- Planting soil
- Paper drinking cups



Key Vocabulary Words

Recycle
Fibers
Decompose
Pulp
Virgin materials
Resources



Duration

2-3 hours



Skills Used

Motor skills

Note: Try to reuse a cup-shaped container instead of using paper drinking cups. For example, you could use reusable plastic drinking cups, plastic planter molds, or milk containers.



Activity

Step 1: Introduce the concepts of recycling and decomposition to the class. Explain that making items from recyclables rather than virgin materials benefits the environment by saving natural resources. (Refer to the Teacher Fact Sheets titled *Recycling* on page 73 and *Natural Resources* on page 5 for background information. The *Composting* fact sheet on page 109 contains information on decomposition.)

Step 2: Discuss with the class how paper is made. Explain that most paper is made from only trees, while other paper is made from a combination of trees and old newspaper or

used office paper (in addition, a small percentage of paper is made from other fibrous materials such as cotton, papyrus, or rags). Discuss how when recycled paper is used to make new paper, less trees need to be cut down. Help students explore the environmental implications of this.

Step 2: Have each student cut up two full pages of newspaper into 1/2- to 1-inch square pieces.

Step 3: Ask a few student volunteers to fill the buckets 1/3 full with paper and the remaining 2/3 with water (1 part paper to 2 parts water).



science



art



Journal Activity

Ask students to write a story about their seedling's journey from its first days in the planter to when it takes root in the ground outdoors.

Step 4: Let the mixture sit overnight. By the next day, the newspaper fibers will be soft and ready to pulp.

Step 5: On the second day, have students take turns pulping the fibers with the hand beater until the paper and water look like mush. Explain that the pulping process breaks down the fibers into a form that can be bonded together again to make recycled paper. Have students look at the pulp with a magnifying glass to see the loose wood fibers.

Step 6: Give each student a plastic cup-shaped container. Instruct them to mold the pulp to the inside of the cup, squeezing out as much of the water as possible. The pulp should be 1/4- to 1/2-inch thick on the inside of the cup.

Step 7: Let the pulp dry completely over the next 3 days.

Step 8: After the pulp has dried, take the handmade recycled paper cup out of the drinking cup.

Step 9: Give each student a seed and instruct them to plant it in the cup using the planting soil. Keep the planters in the classroom and have the students care for the plants. Discuss how much sunlight and water their plants need.

Step 10: Send the students home with their planters when the seedlings have sprouted and are ready to be planted in the ground. Instruct the students to place the whole cup with the plant in it into the ground.

Students in an urban setting could either plant their seedlings in a local park or decorate their planters and donate the seedlings to a local nursing home. (Students also could give a presentation on recycling to the elderly when they drop off their planters.)

Step 11: Discuss how the planter will decompose in the soil and the plant will take root in the ground. Explain that they have just completed the recycling loop by sending the nutrients from the paper cup back into the soil.



Assessment

1. Ask students where paper comes from.
2. Ask students to explain how making paper from used paper benefits the environment.
3. Ask students how and why the planter will decompose in the ground.



Enrichment

1. On the blackboard or as a handout, work with the students to diagram and label all of the steps that occur in making paper from recycled materials versus making paper from only virgin materials. Discuss the differences.
2. Instead of sending the students home with the seedlings, start a garden at the school and tend it regularly with the class.
3. Have students discuss what else they can do to reduce the number of trees being cut down to make paper.

Recycling—Sorting It All Out



Objective

To help students test and better understand the properties of different recyclable materials.



Activity Description

Students rotate to different stations to evaluate recyclable items and learn how to sort them into different categories.



Materials Needed

- Recyclable items listed below
- Magnets
- An aquarium tank or other large container filled with water
- Rocks or other items that vary in density
- Balance scale
- Scissors
- Tablespoon of sand
- Copies of the *Sorting Statistics Worksheet*
- Calculators (optional)



Key Vocabulary Words

Sorting
Recyclables
Magnetism
Density
Mass
Matter



Duration

1 hour



Skills Used

Communication
Research
Computation
Observation/classification



Activity

Step 1: A day or two before the lesson, ask students to bring in different recyclable items from home or collect items left over from lunch. See the box at right for the list of materials to request. Be sure to clean these items before the lesson and remove any sharp edges. Store these items in a utility closet or some other storage room at the school until you are ready to conduct the lesson.

Step 2: To begin the lesson, discuss how waste is reduced by recycling. Explain how after recyclables are collected from businesses and homes, they are sent to a facility where they are sorted into different categories of materials. Explain that it is important for recyclers to tell

Recyclable Items

Steel food cans
Aluminum soda cans
Plastic detergent bottles
Plastic milk jugs
Newspapers
Magazines
Notebook paper
Cardboard boxes

the difference between materials because they end up being recycled into different products. (Refer to the Teacher Fact Sheet titled *Recycling* on page 73 for more information on this process).



math



science



Journal Activity

Ask students if they can think of an innovative way to sort recyclables? Ask them to describe or draw their invention.

Step 3: Organize three different stations throughout the classroom.

Station One should include the steel and aluminum cans, a magnet, and an information sheet about magnetism. This sheet should explain that magnets are pieces of iron or steel that can attract other metals.

Station Two should include the plastic items and a large container (e.g., an aquarium) filled with water, along with scissors and a few heavy and light objects. You should prepare an information sheet explaining that density refers to how compact an object is. As an example, note that a bowling ball is much more dense than a foam rubber ball of the same size because the bowling ball is more compact and made of heavier material.

Station Three should include the paper items and a scale. An information sheet should explain that mass refers to the amount of matter in an object. You can weigh an object on a scale to determine its mass.

Step 4: Once the stations are set up, hand out worksheets, break the students up into groups of three, and explain that students should rotate from station to station in their groups and fill out their worksheet as they go. Students can discuss answers within their groups.

Step 5: At Station One, have students experiment with the magnet and the different cans to discover that some of the cans are attracted to the magnet while others are not. At Station Two, students should compare the density of various plastic items. Students can compare the density of other items with plastic, and can cut up plastic into pieces to see how density is affected. At Station Three, students can place various paper items on the scale and record the different weights.

Step 6: Discuss the questions from the worksheet. Students should understand that recycling sorting facilities use magnets to separate the steel cans from the rest of the collected recyclables. They should also understand that density is important because it can be used to identify and separate different items. Recycling sorting facilities use sinking/floating exercises to sort plastics from other materials, such as crushed glass, since plastic containers float. Students should also understand that sorting facilities use scales to weigh the recyclable materials they receive so they know how much material is being recycled.



Assessment

1. Ask students to explain magnetism. Ask them why only some objects are attracted to magnets. Which ones?
2. Ask students to explain density and how to test for it.
3. Ask students what mass means. Have them explain how to test something to determine its mass.
4. Have students list some of the techniques that sorting facilities use to separate different recyclables.



Enrichment

1. Visit a local recycling materials recovery facility to see firsthand how the different recyclables are sorted.
2. Ask students to draw their own recycling sorting facility. Ask them to start with a pile of recyclables at one end and show how the different recyclables would be separated (e.g., magnets, conveyor belts) as they move through the facility. Ask them to decide whether their diagram will only involve machinery or whether it will involve people to sort some of the items. Ask them to label each of the different stations in the facility and describe how each station works.

Sorting Statistics



Name:

Station One

1. How many steel cans are at Station One? Use the magnet to find out. Now, multiply that number by the number of students in your classroom. If you recycled 56 percent of these cans, approximately how many would that be? As a nation, we recycled 56 percent of our steel cans in 1998.

2. How would magnets help workers at a recycling sorting facility?

3. Suppose you have 10 aluminum cans—5 containing recycled aluminum and 5 with no recycled content (made from bauxite, the primary ore). Next, suppose it takes 5 watts of energy to make a can with recycled aluminum and 100 watts to make a can from bauxite. How much energy does it take to make the 5 recycled-content cans? How about the 5 nonrecycled cans? Note that it takes 95 percent less energy to make an aluminum can from recycled aluminum versus making one from scratch.

4. Calculate the aluminum can recycling rate for Anywhereville, USA, given the following information:

- 1,938 pounds of aluminum cans were recycled
- 3,370 pounds of aluminum cans were produced
- There are an average of 33.04 cans per pound

Number of cans recycled:

Number of cans produced:

Recycling rate:

Student Handout

Station Two

1. Does the size and shape of an object affect its density? Test a few different types of plastic objects in the water and record your results. You can cut up some plastic and try some other objects for comparison—record all results.

2. How is testing for density helpful to a recycling sorting facility?

3. Note that the following formula is used to determine the density of an item: $\text{density} = \text{mass (grams)}/\text{volume (centimeters}^3\text{)}$. Now, assume a piece of garbage—a popcorn bag—has a mass of 12 grams and a volume of 5 centimeters³. What is its density?

4. Note that water has a density of 1.0 g/cm³. Items that have a density of less than 1 float in water, while those that are more than 1 sink. Do plastic bottles have a density greater or less than 1?

Station Three

1. Describe the characteristics of the different types of paper. How are they similar? How are they different? Consider color, texture, glossiness, thickness, etc.

2. Assuming you recycle 7 newspapers a week, 365 days a year, how many newspapers do you recycle per year?

3. Using the scale at Station Three, weigh a newspaper to determine its mass. Using your answer from question 2, what is the total mass (in pounds) of the newspapers you recycle each year? In tons? (There are 2,205 pounds in a ton.)

4. Assuming that each ton of paper recycled saves 17 trees, how many trees have you saved by recycling your newspaper each year?



Designing the Ultimate Can Crusher



Objective

To help students understand simple machines and manipulate materials and tools to build their own machine.



Activity Description

Students work in teams to design and construct a machine to crush aluminum cans. Students then vote for the best design.



Materials Needed

- Construction items listed in the box below
- Hammer
- Saw
- Screwdriver
- Pliers
- Wire cutters
- Ruler and/or measuring tape



Activity

Step 1: Several days before the lesson, ask students to bring in different construction items from the list to the right. Be sure to store these items in a safe place at the school where students cannot access them and hurt themselves. Also, note that this lesson will work best in a shop room or similar area with plenty of open space and room for students to work.

Step 2: To begin the lesson, introduce the concept of simple machines—levers, pulleys, etc. Next, explain how simple machines are used in the recycling process. Recycling facilities use machines, for example, to crush aluminum cans



Key Vocabulary Words

Recycling
Recyclables
Compaction



Duration

Set-up/design: 1 hour
Construction: 1 to 2 hours



Skills Used

Research
Computation
Motor skills



math



science



art

Construction Items

Aluminum cans
Rope
Wire
Hinges
Screws
Nails
Wood scraps
Bricks
Blocks
Other construction items



Journal Activity

Ask students to describe the most challenging part of designing their can crusher. Ask them how they overcame this challenge.

to make them easier to store and ship since they require less space when crushed (Refer to the Teacher Fact Sheet titled *Recycling* on page 73 for more information on this process).

Step 3: Divide the class into small groups of four or five students.

Step 4: Place a few aluminum cans on the floor. Ask a volunteer to crush the cans with his or her foot. Have students identify what is involved in crushing a can. Ask them to describe what happens to the can.

Step 5: Have students examine all of the construction materials brought to class. Explain that the job of each group is to use these materials to design and construct a can crushing machine. Each group should use at least one “simple machine” in their construction.

Step 6: Tell students that they should begin the project with a design phase. You may want to spend several class periods on this stage. Ask students to work together to draw a diagram for how their can crusher would work. Have them make a list of all of the items they will need for their machine. Make sure these items are already in the classroom or can be brought from home. Ask students to write instructions for how they will build their can crusher. Encourage them to take measurements and be as detailed as possible.

Step 7: Review each group’s designs carefully to ensure they are reasonable given the materials required and time frame of the assignment. Ask each group to explain to you how their machine will work.

Step 8: Conduct a safety lesson regarding the appropriate use of the tools. Ask students to use caution and remember that the tools are not toys.

Step 9: Under close adult supervision (you might need adult volunteers to help), ask students to begin the construction phase. It may take several class periods for students to complete their can crushers. Have students follow their directions carefully and encourage them to ask questions throughout the process.

Step 10: Once all of the machines are constructed, tell students that it is time to test them. Ask each group of students to demonstrate to the class how their can crusher works. Allow other students to ask questions.



Assessment

1. Ask students to explain why it is important for recycling facilities to crush the aluminum cans.
2. Ask students why it is important to develop a detailed design first rather than immediately building a machine.
3. Have students explain why it is important to test the machine.
4. Have students explain how the machine makes crushing cans easier than doing it by hand.

After everyone has demonstrated their crushers, have each student rank each project on a scale of 1 to 10 for each of several categories, such as: total cost of materials, ease of use, efficiency, size, safety, effectiveness, time to construct, etc.



Enrichment

1. Organize a recycling drive for aluminum cans at your school. The can crusher contest can be used to draw attention to the drive. The can crushers designed by the students can be used to help store the cans more easily before they are taken to a recycling center.
2. Invite a local recycling coordinator or recycling professional to your class to talk with students about what he or she does. Ask the visitor to bring in pictures of baled, crushed recyclables as well as samples of recycled products, if possible.

Let's Go Eco-Shopping!



Objective

To teach students how to identify and evaluate environmental attributes of products and assess their environmental impacts.



Activity Description

Research school supplies and determine which products have the most positive environmental attributes.



Materials Needed

- Five products with environmental claims on labels (such as a cereal box made with recycled content or an aluminum can with a recyclable symbol)
- Index cards or small pieces of cardboard (approximately five)
- *Product Review Worksheet* (one for each student)



Key Vocabulary Words

Postconsumer-recovered material
content
Life cycle
Environmental attribute



Duration

2 hours



Skills Used

Communication
Research
Observation/classification
Problem solving



Activity

Step 1: Bring in five products with environmental claims and examine them with the class. List the attributes on the chalkboard and discuss them (refer to the Teacher Fact Sheet titled *Buying Recycled* on page 79). For example, many paper products are manufactured with environmental attributes such as those listed in the “Environmental Attributes for Paper” sidebar. Discuss product manufacturing (refer to the Teacher Fact Sheet titled *Products* on page 25) and its potential impact the environment. Discuss how changing some

Environmental Attributes for Paper

Preconsumer content
Postconsumer content
Recyclability of packaging
Recyclability of product
Reusability of item

of the practices involved in product manufacturing can increase or diminish a product’s environmental impact.

Step 2: Divide students into groups of approximately five students.



language
arts



social
studies



art



Journal Activity

Have students pretend they are in charge of buying school supplies for their school. Ask them what kinds of environmental attributes they would consider when purchasing supplies.

Step 3: Assign each group one school supply product that could possess environmental attributes (e.g., binders with recovered-content plastic coating, paper clips with recovered plastic, and pencils with recovered-content wood).

Step 4: Have each student in each group visit a store individually and research his or her assigned product. Give students copies of the *Product Review Worksheet* and instruct them to answer the questions while visiting the store.

Step 5: After visiting stores, have students regroup to discuss the results. Each group should pick one brand that they think represents the most environmentally sound product. Let students have their own group discussions and then conduct a class discussion. Start the discussion by writing each group product on the chalkboard. Under each product, list the associated environmental attributes each group discovered. Discuss each attribute, concentrating on what attributes are most important and why. Have the students number the attributes in order of importance, starting with number 1 as the most important attribute.

Step 6: Have students break into their smaller groups again to revisit their choice of the most environmentally sound product. Have the students use the environmental attribute information on the board to answer the following question: Do you think the product you initially chose is still the most environmentally sound product? If not, have them review their product research again and choose the most environmentally sound product.

Step 7: If possible, purchase each of the products the groups decided are most environmentally sound. This should end up involving between five and seven products total.

Step 8: Take the new products with environmental attributes and create a display either in the classroom or elsewhere in the school. Let students get creative with display ideas (e.g., place them on a cloth, include inflatable beach-ball globes or other environmental symbols). Place an index card or small piece of poster-board next to each product explaining the environmental attributes it contains. Also create a title poster that explains the contents and purpose of your display. Each student could sign the title poster to show his or her participation in the project.



Assessment

1. Ask students to think about their shopping habits. Before today's lesson, ask them if they consider environmental attributes when purchasing products. Ask them if they will in the future. Have them list what kinds of attributes they will pay the most attention to.
2. List a few environmental attributes on the chalkboard and ask students to identify the most important and explain its importance.
3. Ask students to suggest environmental attributes to consider when purchasing some products other than those already researched (e.g., beverages, paint, food items).



Enrichment

1. Discuss product lifecycle stages: manufacturing, use, and disposal (refer to the Teacher Fact Sheet titled *Products* on page 25) with students. Assign students to select one of the products examined in this activity and draw a colorful flow chart of the steps involved in manufacturing, use, or disposal of the item.
2. Have students write and perform a 30-second advertising spot for a product with environmental attributes. If equipment is available, record each spot on videotape. Discuss how and why each advertisement was or was not effective.
3. Have students write and design a marketing brochure that emphasizes a product's environmental attributes. Instruct students to develop the brochure targeting consumers. The brochures should explain why a consumer might purchase this item over a competing company's product.
4. Pretend that students have been selected to run a new company that evaluates marketing claims on environmental attributes and rates the environmental impact of different products. Have students suggest appropriate names for the company and vote to choose one. Break students into groups of approximately five students and give each group a piece of paper and art supplies (crayons, paint, markers, etc.). Instruct them to design a symbol or logo to represent each environmental attribute their company's products possess. This symbol will be appear on product packaging to advertise the company's environmental awareness. Again, the class can vote on its favorite symbol of an environmental attribute.
5. When visiting stores, have students record the cost of products with and without environmental attributes. Have students evaluate their research and perform a cost comparison.
6. Using the actual product, have students present their product research to the class by acting out a shopping experience in a skit. Tell students to be creative in role-playing. The group does not need to be one big family on a shopping trip. They can role play anyone—a store clerk, another customer, a representative of the company that manufactures the product, even the President of the United States. Instruct students to discuss the environmental attributes of products and practice comparison shopping in the skits.

Name: _____

Product Review Worksheet

1. Are there any brands of your product that advertise environmental attribute claims? If so, how many different brands are available?

2. Which brand offers more environmental attributes?

3. What attributes do you think are the most important and which products have those attributes?

4. After reviewing all of the brands, which one would you purchase and why?

5. What are the costs of the different brands?

