

Reducing Solid Waste

Objectives

- ▶ Identify three ways you can produce less waste.
- ▶ Describe how you can use your consumer buying power to reduce solid waste.
- ▶ List the steps that an item must go through to be recycled.
- ▶ List two benefits of composting.
- ▶ Name one advantage and one disadvantage to producing degradable plastic.

Key Terms

source reduction
recycling
compost

If landfills and incinerators can pollute the environment and are expensive to operate, what else can we do to safely reduce solid waste? This section examines ways to reduce solid waste through producing less waste, recycling, and changing the materials and products we use. All of these techniques help reduce waste before it is delivered to landfills or incinerators. This method of reducing solid waste is known as source reduction. **Source reduction** is any change in design, manufacture, purchase, or use of materials or products to reduce their amount or toxicity before they become municipal solid waste.

Reducing Solid Waste

If we produce less waste, we will reduce the expense and difficulty of collecting and disposing of it. Many ideas for reducing waste are common sense, such as using both sides of a sheet of paper and not using unneeded bags, napkins, or utensils at stores and restaurants.

Buying Less As a consumer, you can influence manufacturers to reduce solid waste. If you buy products that have less packaging and products that last longer or that can be used more than once, manufacturers will produce more of those products to satisfy the demand of the consumer. For example, you can buy products such as dish towels instead of paper towels, as shown in **Figure 11**. You can also buy rechargeable batteries instead of regular batteries to help reduce solid waste.

Until about 1965, nearly all bottled beverages were sold in bottles that were designed to be returned to stores when empty.

The empty bottles were then collected, washed, and refilled at bottling plants. Today, there is a demand for disposable bottles rather than for refillable bottles. If consumers began to use more refillable bottles, beverage manufacturers would begin producing the refillable bottles, similar to those used in the past.

Lasting Longer Manufacturers could also reduce waste and conserve resources by redesigning products to use less material. A return to products that last longer and that are designed to be easily repaired would both save resources and reduce waste disposal problems.



Figure 11 ▶ You can help reduce solid waste by purchasing items that have less packaging. Purchasing items that last longer, such as dish towels, can also reduce solid waste.

Recycling

In addition to reducing waste, we need to find ways to make the best use of all the materials we throw away. **Recycling** is the process of reusing materials or recovering valuable materials from waste or scrap. Making products from recycled materials usually saves energy, water, and other resources. For example, 95 percent less energy is needed to produce aluminum from recycled aluminum than from ore. About 75 percent less energy is needed to make steel from scrap than from ore. And about 70 percent less energy is needed to make paper from recycled paper than from trees.

Recycling: A Series of Steps When most people think about recycling, they probably think of only the first step of bringing their bottles, cans, and newspapers to a recycling center or putting these things at the curb in specially marked containers. However, as shown in **Figure 12**, recycling actually involves a series of steps that must happen for recycling to work.

First, the discarded materials must be collected and sorted by type. Next, each type of material must be taken to a facility where it can be cleaned and made ready to be used again. For example, glass is sorted by color and is crushed, and paper is sorted by type and made into a pulp with water. Then the materials are used to manufacture new products. Finally, the new products are sold to consumers. If more people buy products made from recycled materials, there will be an increase in the demand for these products. This demand encourages manufacturers to build facilities to make recycled products. When such facilities are built, it becomes easier for communities to sell the materials they collect from residents for recycling.



FIELD ACTIVITY

Is It Really Recyclable?

Conduct a survey of the plastic containers in your household that are recyclable. Note the number of plastic containers found in your household. Now look at the number printed on the bottom of each container. The plastics industry has established a system of designating which plastics are recyclable. Types 1 and 2 are most commonly recycled by most communities. Type 4 is less commonly recycled, and types 3, 5, 6, and 7 are most likely not to be recycled. In your **EcoLog**, record the total number of plastic containers for each type of plastic that you find in your household. How many Type 1 and Type 2 plastic containers did you find in your household?

Figure 12 ► **The steps of recycling** include ① collecting and sorting discarded materials by type, ② taking the materials to a recycling facility, ③ cleaning the discarded materials so that they can be shredded or crushed, and ④ reusing the shredded or crushed material to manufacture new products.



Table 2 ▼

Benefits of Composting
<ul style="list-style-type: none">• keeps organic wastes out of landfills• provides nutrients to the soil• increases beneficial soil organisms, such as worms and centipedes• suppresses some plant diseases• reduces the need for fertilizers and pesticides• protects soil from erosion

Composting Yard waste often makes up more than 15 percent of a community’s solid waste. None of this waste has to go to a landfill. Because yard waste is biodegradable, it can decompose in a compost pile. Many people also put fruit and vegetable trimmings and table scraps in their compost piles. The warm, moist, dark conditions inside a large pile of biodegradable material allow bacteria to grow and break down the waste rapidly. Eventually the material becomes **compost**, a dark brown, crumbly material made from decomposed plant and animal matter that is spread on gardens and fields to enrich the soil. Compost is rich in the nutrients that help plants grow. More benefits of composting are listed in **Table 2**.

Some cities collect yard waste from homes and compost it at a large, central facility. Although most city composting facilities in the United States collect only yard wastes, several European cities also collect and compost food wastes in municipal facilities. Composting can also be an effective way of handling waste from food-processing plants and restaurants, manure from animal feedlots, and municipal sewage sludge. If all biodegradable wastes were composted, the amount of solid waste going to landfills could be reduced.

CASE STUDY

Paper or Plastic?

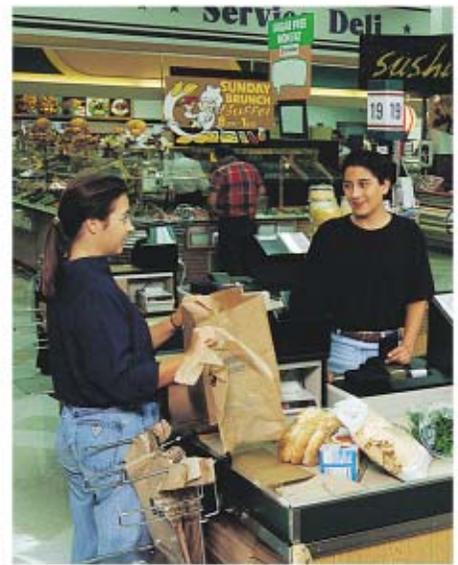
The following question may sound familiar: Do you want paper or plastic? If you have ever stood in the checkout line of a grocery store, it probably is. Almost every grocery store today offers a choice between either paper or plastic bags for sacking grocery items. Many people make their choice based on convenience. But what is the best choice for someone who is concerned about the environment?

On the surface, it may seem that paper is the better choice. Paper comes from a renewable resource—trees—and is biodegradable. Plastic, on the other hand, comes from petroleum or natural gas, which are usually considered nonrenewable resources. In addition, plastic bags are not biodegradable.

Upon closer examination, however, the decision may not be as simple as it seems. Removing large numbers of trees from forests to manufacture paper can disrupt woodland ecosystems. Plus, a tremendous amount of energy is required to convert trees into pulp and then manufacture paper from the pulp.

To make the best decision about which product is better for the environment, the following questions should be considered.

- How much raw material, energy, and water is needed to manufacture each bag?
- What waste products will result from the manufacture of each bag, and what effect will those wastes have on water, the atmosphere, and land?
- ▶ Making an educated decision at the grocery store will help reduce solid waste.
- Can recycled materials be used in the manufacture of the bag? If so, to what degree will the use of recycled materials reduce the amount of raw materials, energy,



Changing the Materials We Use

Simply changing the materials we use could eliminate much of the solid waste we produce. For example, single-serving drink boxes are made of a combination of foil, cardboard, and plastic. The drink boxes are hard to recycle because there is no easy way to separate the three components. More of our waste could be recycled if such products were no longer made and if all drinks came in recyclable glass, cardboard, or aluminum containers.

Recycling other common household products into new, useable products could also help eliminate solid waste. For example, newspapers can be recycled to make cardboard, egg cartons, and building materials. Telephone books, magazines, and catalogs can also be recycled to make building materials. Used aluminum beverage cans can be recycled to make new beverage cans, lawn chairs, aluminum siding for houses, and cookware. Used glass jars and bottles can be recycled to make new glass jars and bottles. Finally, plastic beverage containers can be recycled to make nonfood containers, insulation, carpet yarn, textiles, fiberfill, scouring pads, toys, plastic lumber, and crates.



- and water used and wastes produced in making the bag?
- How will the bag decompose, and what will the environmental impact be if it is incorrectly disposed of?

Although several studies have analyzed these questions, most have been conducted by parties with a vested interest, such as plastic or paper manufacturing companies. As you might expect, the studies done by plastic manufacturers conclude that plastic bags have the least environmental impact, while studies done by paper producers conclude that paper bags have the least environmental impact. Often, these researchers fail to study all of the important factors listed above.

But the plastic versus paper debate has caused both industries to improve the way their products affect the environment. For example, paper bags recently outsold plastic bags because they were considered

- ▶ A reusable canvas shopping bag may be the best response to the paper-or-plastic question.

stronger, better for reusing or recycling, and less harmful in a landfill.

Then, new technology allowed the plastics industry to gain a larger market share. By incorporating recycled plastic into the bags, manufacturers improved the image of plastic bags.

Therefore, the debate continues and environmentally conscious people are still wondering which is better. Right now there seems to be no right answer. However, the following are environmentally sound options.

- Carry your groceries in bags brought from home (paper, plastic, or canvas bags).
- Choose the bag you are most likely to reuse in the future.
- If you have only one or two small items do not use a bag.



CRITICAL THINKING

1. Identifying Relationships

Explain how environmentally conscious shoppers have helped improve paper and plastic bag manufacturing in this country.

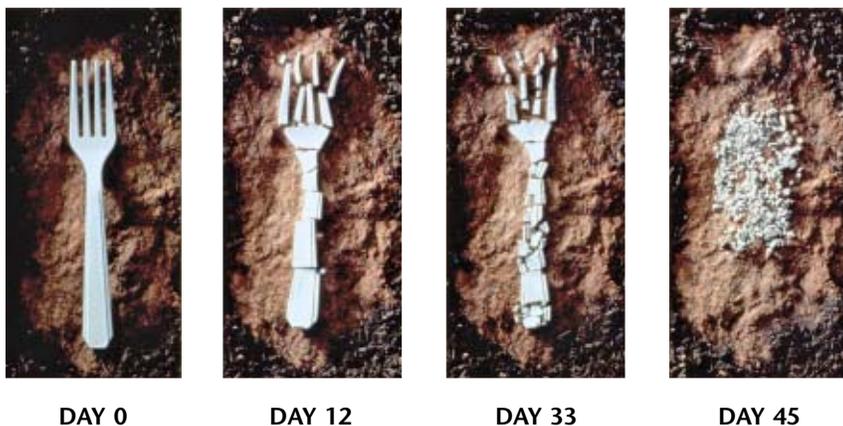
2. Understanding Concepts

Why should a person care which bag he or she is given at the grocery store?

Degradable Plastics As you read earlier, most plastics are not biodegradable. To make plastic products more appealing to people who are concerned about the environment, several companies have developed new kinds of plastics that they say are degradable. One type, called *photodegradable plastic*, is made so that when it is left in the sun for many weeks, it becomes weak and brittle and eventually breaks into pieces.

Another type of degradable plastic, called *green plastic*, is made by blending the sugars in plants with a special chemical agent to make plastic. Green plastics are labeled as green because they are made from living things and are considered to be more environmentally friendly than other plastics. The production of green plastics requires 20 to 50 percent less fossil fuel than the production of regular plastics does. The fork in **Figure 13**, is made of green plastic. This plastic has been engineered to degrade within 45 days of being thrown away. When this plastic is buried, the bacteria in the soil eat the sugars and leave the plastic weakened and full of microscopic holes. The chemical agent then gradually causes the long plastic molecules to break into shorter molecules. These two effects combine to cause the plastic to eventually fall apart into small pieces.

Figure 13 ► Green plastics made from living things are biodegradable. The plastic fork below has been engineered to degrade within 45 days of disposal.



Problems with Degradable Plastics The main problem with these so-called degradable plastics is that although they do break apart and the organic parts can degrade, the plastic parts are only reduced to smaller pieces. This type of plastic can help reduce the harmful effects that plastic litter has on animals in the environment, because the plastic pieces will be too small to get caught in their throats or around their necks. However, the small pieces of plastic will not disappear completely. Instead, the pieces of plastic will be spread around. So, these biodegradable plastics can remain in landfills for many years, just as regular plastics can.

SECTION 2 Review

- Name** three things you could do each day to produce less waste.
- Explain** how buying certain products can help reduce solid waste.
- Describe** the steps it takes to recycle a piece of plastic.
- List** two benefits of composting.

CRITICAL THINKING

- Analyzing Methods** What are the advantages and disadvantages to producing degradable plastics?
- Demonstrating Reasoned Judgement** Read the Case Study in this section and decide which type of bag you would choose the next time you go shopping. Explain why you made this choice. What are other uses of the bag you chose? **READING SKILLS**