

BETWEEN CLEANLINESS AND GODLINESS ...

*How to Minimize Your Mess
and Recycle the Rest*



Stephen Wing

Why Recycle?

We live in a wasteful society, where using something once and throwing it away is a daily habit for millions. Yet if everyone on Earth lived the way we do, it would take four more planet Earths to supply the resources we'd need. And that's not even considering the needs of future generations. But once we're aware that waste is a problem, it's not that hard to change our habits. RECYCLING is a first step each of us can take on the road to a sustainable society.

1. Resource Extraction

Everything we use and throw away comes from the Earth. The raw materials for manufacturing are "extracted" in extremely destructive ways – plastics come from oil drilling and pipelines, paper and cardboard from clearcutting trees, steel and aluminum from mining, and so on, ravaging ecosystems and human communities around the globe.

2. Overpopulation

The Earth is finite and raw materials are limited. As populations grow and more people join the global economy, these resources grow more scarce and more difficult and expensive to extract. Sooner or later, they will run out. Future generations will face shortages unless we conserve the Earth's resources in creative ways today.

3. Toxic Pollution

Trash is toxic. Everything we throw away ends up in a landfill, or worse, a trash incinerator. Landfills leak, contaminating our water supply with toxic chemicals as man-made materials break down. Incinerators spew the same toxins into our air. It's no coincidence that these toxic facilities are always located in low-income communities.

4. Climate Change

Recycled materials require far less energy than using raw materials in manufacturing. Burning fossil fuels for energy is destabilizing the climate and the weather. Recycling paper and glass uses 40% less energy. Recycling steel uses 60% less, recycling plastic uses 70% less, and recycling aluminum uses 95% less energy. Recycling saves energy!

"Industry moves, mines, extracts, shovels, burns, wastes, pumps, and disposes of 4 million pounds of material to provide one average middle-class American's family needs for one year. . . . About 94% of the materials extracted for use in manufacturing becomes waste before the product is manufactured; 80% of what we make is thrown away within six months of production." Paul Hawken, NATURAL CAPITALISM

Why NOT Recycle?

“For most of history,
man has had to fight
nature to survive; in this
century he is beginning to
realize that, in order
to survive, he must
protect it.”

Jacques Cousteau



Introduction

We’ve all seen the viral photos of seagulls and sea turtles tangled in plastic. We’ve heard the statistics about trash disposal— how here in the U.S., we throw away enough each year to fill a convoy of garbage trucks stretching 8 times around the globe, or fill a football stadium to the rim twice a day. Most of us know that trash is a problem, and that landfills are not the answer.

Those who ponder the underlying causes of things are beginning to see that the “solid waste crisis” is rooted in the way our society is organized. What drives our abundant modern economy is not so much supplying our everyday needs as producing a constant stream of corporate profit— which depends on us playing our parts as “consumers” to keep the “consumer economy” humming. The more we buy, the faster the economy grows . . . and the faster the global ecology breaks down.

Millions of us have stepped up to divert disposable packaging from the landfill by recycling glass, paper, plastic, steel and aluminum. We have learned the proper order of the “3 Rs”— Reduce, Re-Use, and only then, Recycle. We have reduced our purchases of disposables, even those that are recyclable. We have started carrying re-usable shopping bags, water bottles, cups, plates, utensils, napkins, even drinking straws. Some have adopted a personal goal of Zero Waste. Some municipalities around the country have set timelines to achieve Zero Waste as well.

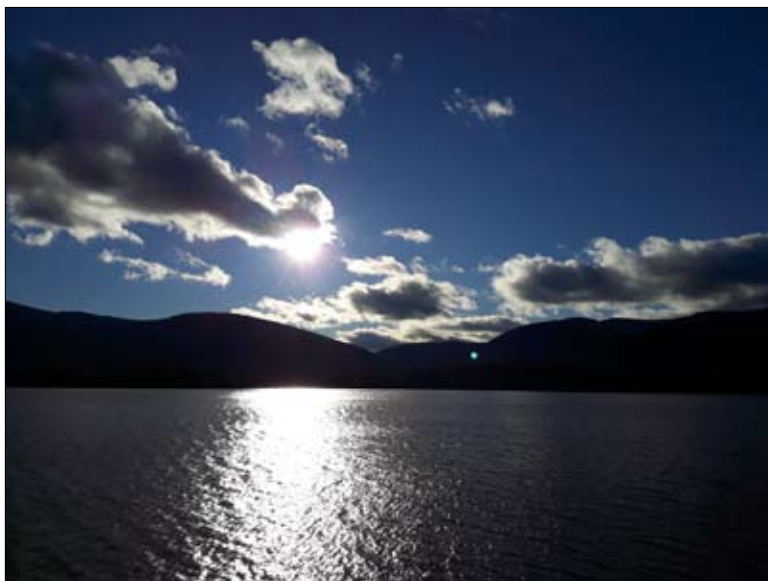
But meanwhile, the corporations that package their goods in single-use disposable containers are raking in billions. Coca-Cola, for example, currently produces over 200,000 plastic bottles per minute. The petroleum industry, which supplies the raw material for virtually all plastics, is relying on increased plastic production to eventually replace its profits from fossil fuels. Plastic production in the U.S. is projected to double by 2040. Advertising and marketing use sophisticated messaging to encourage massive overconsumption— a far bigger driver of ecological breakdown than overpopulation itself.

Individuals clearly cannot bring the solid waste crisis under control just by changing our lifestyles. Even municipalities that run taxpayer-funded recycling programs are only subsidizing the profits of the corporations that produce recyclable waste. In Europe, manufacturers are required by law to take back discarded packaging and worn-out products for recycling—a policy known as “Extended Producer Responsibility.” The European Union and many other nations have taken steps to ban plastic shopping bags and other single-use disposables.

A few U.S. cities and states have begun passing similar laws, and a federal law, the Break Free from Plastic Act, has been introduced in Congress. Naturally these measures face tenacious opposition from well-funded corporate lobbies. It’s clear that preserving a liveable planet for the generations to come will require us to step out of our roles as mere *consumers* into the role of *citizen*: not just citizens of our nation, but citizens of our endangered planet. To solve the solid waste crisis, we will have to look beyond our personal choices and join forces to collectively counter the influence of big money in our democratic process—and the same is true for every other crisis we face, from affordable housing to climate change.

Although it’s virtually impossible for us as individuals to reduce, re-use and recycle our way to Zero Waste, it is still critically important to offset our ecological impact as much as possible. As long as certain necessities are only available in disposable packaging, the most ecologically harmless way to dispose of it is going to be recycling. A plastic bottle you recycle is a bottle that won’t end up in the ocean. And how can we campaign in good conscience for government and industry to move toward a “circular economy” if we are not already doing our part?

As a veteran professional recycler of three decades— and a somewhat obsessive one in private life— in the following pages I will share what I know about landfills and incinerators, recycling and re-using, what is and isn’t recyclable, and the best way to ensure that what you recycle actually gets recycled.



“The time has come . . . to resist the impulse to control, to command, to force, to oppress, and to begin quite humbly to follow the guidance of the larger community on which all life depends. Our fulfillment is not in our isolated human grandeur, but in our intimacy with the larger earth community, for this is also the larger dimension of our being.”

Thomas Berry



Where Does Garbage Go?

LANDFILLS

The U.S. leads the world in trash production— nearly 300 million tons a year, or 5 pounds per person each day, compared to a global average of 1.6— and the numbers are steadily rising. About half of that ends up in a landfill. About a third of what we landfill could have been recycled, primarily paper, or else composted.

These figures include only Municipal Solid Waste (MSW), generated by households and businesses. Landfills also contain a separate category called Construction and Demolition debris (C&D), 90% of which comes from the demolition industry. In 2018, C&D waste in the U.S. totaled 600 million tons, about 75% of which was re-used in some form, and the rest sent to landfills.

The “sanitary landfill” replaced the old-fashioned open-air dump after the Solid Waste Disposal Act of 1965 mandated trash disposal to be standardized, scientifically designed, and regulated by the EPA. Each layer of trash must be covered with a layer of earth in an alternating pattern. Landfills are required by law to be lined with a layer of supposedly impermeable plastic or clay, but the liners routinely leak a toxic chemical soup known as “leachate” which contaminates the local water table.

About 3,000 landfills are currently operating in the United States; 10,000 older ones have been declared full and closed. The average landfill covers 600 acres. As landfills fill up and close, the more densely populated areas in the U.S. are running out of that kind of space. As garbage must be shipped farther and farther for disposal, the cost of landfilling our waste is going up— not only in tax dollars, but in greenhouse gas emissions. By every measure, once government subsidies are accounted for, recycling is cheaper.

Even without accounting for the exhaust fumes of garbage trucks, landfills are a major contributor to climate change. About 30% of MSW in the U.S. is food waste and yard trimmings. As this organic matter breaks down in a landfill, it generates methane—the main ingredient in natural gas. Landfills also produce carbon dioxide at about the same rate, but methane is a far more potent greenhouse gas, trapping at least 30 times



as much heat in the atmosphere. In 2019, landfills produced 15% of the nation's methane emissions, equivalent to the emissions of 12 million homes, making them the third-largest source of U.S. methane emissions. Some landfills are now capturing these emissions to produce their own natural gas.

Landfills are overwhelmingly located in poor and minority areas, both urban and rural, so the smell of decomposing garbage and contamination of groundwater have long been “out of sight, out of mind” for mainstream society.

In recent years, rising awareness of Environmental Justice issues has made the siting of new landfills even more problematic; no one wants one in their back yard, and activist groups have successfully challenged the targeting of poor communities for these and other toxic facilities.

On average, landfills contain twice as much Construction and Demolition debris (C&D) at Municipal Solid Waste from homes and businesses. It is notoriously difficult to recycle, especially the 90% of it that is generated when demolition by explosives or heavy machinery haphazardly mixes building materials together. These can include wood, stone, brick, concrete, steel, aluminum, various plastics, and a blend of miscellaneous other elements. The materials are often weigh too much to separate without the help of heavy machinery. However, if successfully disentangled from one another— or better, reclaimed before demolition begins— many of these materials can be re-used and recycled. Reclaimed lumber, brick, and stone in particular have become highly prized in building, adding an old-time aesthetic to new construction

landfill facts

- ◆ The U.S. currently has more than 2,600 Municipal Solid Waste landfill sites.
- ◆ Each American produces about 4.5 pounds of trash per day.
- ◆ About 728,000 tons of garbage are generated daily in the U.S.
- ◆ In 2017, construction and demolition generated 569 million tons in the U.S., about 75% of it concrete and asphalt.
- ◆ During the holiday season, we generate about 25% more trash— 25 million extra tons.
- ◆ Around one third of landfill space is filled with packaging materials.

INCINERATORS

The practice of burning municipal garbage dates back to the 1880s in the U.S., and continues today under pseudonyms like “thermal treatment facility.” Some trash incinerators produce electricity and are labeled “waste-to-energy” plants, but trash disposal is their primary function. Although credited as “renewable energy” in some states, these are among the least efficient and most toxic sources of electricity. Contrary to the industry’s claims, burning trash for energy releases more pollution than coal or natural gas plants. The myth of “waste-to-energy” cleverly diverts attention from more sustainable methods of both energy production and trash disposal.

The composition of solid waste has changed considerably over the years as the proportion of plastics and other synthetic materials has grown, so today’s incinerators inevitably produce a long list of pollutants with serious health effects. The more lightweight byproducts escape through smokestacks as “fly ash,” to be blown wherever the wind goes. The heavier ones, known as “bottom ash,” are often used as landfill cover, adding their toxic ingredients to the leachate that seeps into local groundwater. Pollution control equipment installed on smokestacks captures some of the fly ash, but not all— and the captured ash must still be disposed of.

The toxic effects of trash incineration include cancer, respiratory illness, cardiac disease, and reproductive and neurological problems. About 80% of active incinerators are sited in communities with significant minority or low-income populations, contributing to the prevalence of environmental injustice across the U.S. In response, some incinerators have been shut down by vocal opposition from community groups.



incinerator facts

- ◆ As of 2019, 72 incinerators were operating in the U.S., burning approximately 16% of our trash, mostly in areas where the population is dense and landfill space limited.
- ◆ Depending on its size, each incinerator burns between a few hundred tons and several thousand tons of trash per day.
- ◆ Three quarters of these facilities are approaching their average life expectancy of 30 years.
- ◆ More than 30 incinerators have closed since 2000, often because of new environmental regulations requiring expensive pollution-control upgrades.
- ◆ In 2018, “waste-to-energy” plants burned 34.6 million tons of trash.
- ◆ Toxic byproducts of trash incineration include acid gases, carbon monoxide, PCBs, dioxins, nitrogen oxides, sulfur dioxides, furans, and heavy metals like mercury, cadmium, and lead.

RECYCLING

The Environmental Protection Agency estimates that around 75% of all household and business waste is recyclable. Across the U.S., municipal curbside services collect our bottles, cans, paper and cardboard and funnel them into a process called “single-stream” recycling, which uses a semi-automated process to sort them in huge plants called “Materials Recovery Facilities,” then ships them off to recyclers. Many smaller communities and rural areas offer drop-off points for recyclables. Yet in 2018, out of a total of 290 million tons, Americans recycled only 32% of our garbage, according to the EPA.

That was the year China stopped accepting shipments of recycling from the U.S.A. because of “contamination”—unrecyclable items tossed into the curbside bin by careless or overly-enthusiastic recyclers. Known in the industry as “wish-cycling,” this is a major headache for recyclers everywhere. Plastic bags, for example, regularly get tangled in the sorting machinery and shut down the line. Too much contamination can send whole truckloads of recycling to the landfill.

Recycling any material can take two possible directions: upcycling and downcycling. Glass, metals, paper and cardboard can all be recycled into materials of the same quality for manufacturing purposes. This is upcycling. Plastic, on the other hand, cannot be recycled without losing quality; recycled plastic most often ends up as clothing, carpet, or lumber, which cannot be recycled a second time. This is downcycling—better than tossing the item in a landfill, but clearly less eco-friendly than recycling other materials.



Just because an item is not accepted by your recycler doesn’t mean it’s not recyclable. It means there is no market for recycling that material, at least in your area. If a technology has been developed and a plant built to recycle it, the cost of shipping it there might still be prohibitive. Unfortunately, the recycling industry is market-based and nothing gets recycled unless someone makes a profit.

Well, almost nothing. In Atlanta, where I live, one major exception is the Center for Hard to Recycle Materials, or CHaRM. Run by a nonprofit called LiveThrive Atlanta, it’s funded by a combination of donations and municipal funding. Four other locations in the U.S. now boast a CHaRM, including Athens, GA, just down the road, as well as Boulder, CO; Arcata, CA; and rural Logan County, OH.

Of course, CHaRM must still find a market for what it accepts, but by subsidizing the cost they have expanded the list of recyclables in my area to include paint, chemicals, styrofoam, mattresses, porcelain fixtures, plastic straws, appliances, window glass— and the list continues to grow. They charge a small fee for items that contain hazardous waste, such as computer monitors and fluorescent bulbs, but recycle most items for free.

TerraCycle is a for-profit company that takes a different approach, working with manufacturers to divert otherwise unrecyclable items from the landfill. In cooperation with a British grocery chain, for example, they are pioneering refillable containers for participating name brands. Each corporate partner funds the recycling of its own products and packaging, a free service for the customer called “Brand Sponsored Collection.” Collectors receive points that add up to corporate donations to schools or nonprofits of their choice.

For products from non-participating companies, customers can purchase a pre-paid “Zero Waste” shipping box. TerraCycle offers boxes in different sizes for a long list of improbable items, from auto parts to cigarette butts, vaping pens to incandescent bulbs. Depending on the item, the boxes cost anywhere from \$46 (for chewing gum, the cheapest) to \$199 (“All-in-One,” for anything on the list). However, most of these boxes have a long waiting list, and the system is expensive and confusing.



Critics charge that TerraCycle’s business model amounts to little more than a greenwashing scheme for the company’s corporate partners. But there seems little doubt that they do recycle what they collect, and the company’s website sells products made from the recycled materials. The company also has a nonprofit arm, TerraCycle Foundation, that assists with river cleanup in developing countries.

A more recent step beyond standard single-stream recycling is the Hefty Energy Bag, from the Hefty garbage-bag company. If the program is available in your area, you’ll fill a bright orange bag with an array of hard-to-recycle plastics and toss it in your curbside pickup bin. Styrofoam, disposable plates, cups, utensils, certain types of bags, and much more are allowed, as long as they are clean, dry, and free of metal linings. According to the program’s website, most of the contents of the bags are burned for fuel, replacing the coal in cement manufacturing— with the usual toxic byproducts of burning plastic. In some places, they undergo a chemical process called pyrolysis which converts them into diesel and other liquid fuels, which release the usual greenhouse gases when burned. And the materials “can also be ground into smaller pieces to make new plastic products”— in other words, they *can* be recycled, though the website is careful not to claim this actually happens. A new company called Ridwell offers curbside pickup of some of the same items, plus some other recyclers won’t touch, such as alkaline batteries and LED bulbs.

Determined recyclers can track down a multitude of options for recycling specific items not allowed in a curbside bin, such as used CDs and printer cartridges. Some options require you to pay for shipping; others require a trip to the recycling kiosk at a big-box chain store. Several handy websites compile tips in a searchable format, such as Earth911.com. See “Recycling Resources” on page 30 for a partial list.

recycling facts

- ◆ Nearly 9,000 curbside pickup recycling programs serve nearly 70 million households, about 60% of the population
- ◆ In 2018, 69 million tons and 25 million tons were composted in the U.S., diverting 94 million tons of trash from landfills and incinerators.
- ◆ In 2020 we recycled only 9% of our plastic, but 31% of our glass, 35% of our aluminum, and 68% of our paper.
- ◆ Most auto repair shops recycle used motor oil, and most tire shops recycle tires.
- ◆ In 2018, the most-recycled products and materials were corrugated cardboard boxes (32.1 million tons), paper and paper products (8.8 million tons), newspapers, magazines and catalogs (3.3 million tons), lead-acid batteries, such as auto batteries (2.9 million tons), major appliances (3.1 million tons), wood packaging (3.1 million tons), glass containers (3 million tons), tires (2.6 million tons), mixed paper containers and packaging (1.8 million tons) and consumer electronics (1 million tons).

general recycling tips

- ◆ Curbside recycling programs do not accept plastic bags of any kind. Empty your recyclables out of the plastic bag you used to carry them out to the curb!
- ◆ Don't "wish-cycle"! A given item is only recyclable if it can be affordably shipped to a plant that recycles it. Contact your municipal recycling program before tossing anything in your bin you aren't positive they accept.
- ◆ Rinse all food or drink containers before recycling. Hot water and soap are unnecessary, but please consider the human beings who will have to deal with your food residue (and the rodents and insects it will attract).
- ◆ Recycling is toxic and energy-intensive, and should be your last resort before the landfill. Reducing and re-using come first!



"You can change the terms,
you can change the allowable
limits, you can do the risk
assessment— all these things—
but in the end, the fact is that
you and I drink that water.
You and I breathe that air.
You and I live here."

Winona LaDuke

“PRE-CYCLING”

As a consumer, you either help preserve the ecosphere or help to break it down with every purchase you make. “Pre-cycling” means using foresight and planning to put sustainability at the top of your shopping list. For example, look for re-usable products, such as rechargeable batteries, rather than single-use disposables.

But a product that is beneficial in itself might come in disposable packaging, and packaging accounts for a full one-third of our trash. Whenever possible, buy items in easily recyclable containers like glass and paper, or no packaging at all. Avoid excess packaging for convenience, such as fresh vegetables wrapped in plastic. When you can, buy in bulk, using re-usable bags and containers, and bring your own shopping bag. Buying items locally made or grown saves shipping energy. And buy recycled: recycled paper, for example. Recycled materials will become common when we create a market for them, and prices will come down.

Individual lifestyle changes will have little effect if they remain isolated examples. Talk to your grocer; write to companies whose products you use. Ask them to be more environmentally conscious in their business practices. Educate yourself further so you can help educate others. And ask your representatives to support legislation like the Break Free From Plastic Act, creating incentives to live more holistically for people you’ll never meet. Systemic change is urgently necessary. That requires acting together *en masse*, as a grassroots movement.



REDUCING & RE-USING

Of the famous “Three R’s,” Recycling is the last resort. Though far less ecologically harmful than manufacturing from scratch, it is still a toxic and energy-intensive industrial process, especially when it comes to plastics. It also reinforces the consumer mindset of “use it up and throw it away,” which is the unconscious foundation of the cultural habits which are driving global ecological breakdown and ultimately threaten the viability of human civilization. Cultivating the other two “R’s,” Reduce and Re-Use, is therefore key to lightening our personal impact.

“Reduce” means not only reducing our purchases of products and packaging we can’t recycle, but also minimizing the amount that we *do* recycle. “Re-Use” is the best way to handle those items we can’t do without, in either a practical or psychological sense. This includes not only buying re-usable or pre-used things, but making sure that the things we no longer need will find new homes rather than ending up either in the trash *or* the recycling. For example, the bubblewrap or packing peanuts you receive in a package will come in handy next time you mail one.

Used but still usable items can be sold or given away to the less fortunate. To recoup some of your original cost, hold a yard sale. Take your books or CDs to a used bookstore or record store and trade them in for cash or credit. Try a consignment store for clothing. If at all possible, find a way to pass your re-usables on to the less fortunate, such as donating to a thrift store in a less affluent neighborhood.

If you have no way to transport an appliance or a piece of furniture, the Kidney Foundation sends out trucks for pickup on regular routes; check with them to see if they have a route in your area. You can also advertise items for sale or giveaway on NextDoor.com—an amazing and empowering tool for connecting with neighbors. Other options include Craigslist, eBay, Facebook Marketplace, and Freecycle. If you have no option but to set an item out on the curb, wait for sunny weather, and use NextDoor’s “curb alert” option.

In some cities, used furniture can be donated to a “furniture bank” to help re-settled refugees or homeless people setting up a home; check the internet for one in your area. You might also find a nonprofit—Atlanta once had two—with the mission of collecting non-functional computers, teaching underprivileged or disabled people to repair them, then donating the refurbished equipment to other nonprofits.

Conversely, shopping the thrift stores and consignment shops is an adventurous way to meet your material needs without adding to the impact of industry and the demand for new products. Craigslist, eBay, Etsy and NextDoor are options too. Whenever

possible, borrow or rent things you don’t need often. And what you buy, share with others.

If something is broken, consider repairing it. Visit iFixit.com for free repair instructions for a host of products. If you’re not handy with tools, check the internet for repair services or send out a call for help on NextDoor. In some places, under the umbrella of “Transition Towns,” people are preparing for “Peak Oil” and other social disruptions by organizing for local self-sufficiency and sustainability. Preserving the arts of repair

is often a major focus for these groups. Some offer classes, others maintain a database of expertise or even a dedicated cooperative work-space where repair is available and various skills are taught.

The most significant impact of the throwaway mind-set is the scourge of single-use disposables. Convenience is addictive, but breaking the habit is simply a matter of paying attention. If you find yourself regularly throwing away plastic shopping bags or water bottles—or recycling them—consider carrying a re-usable substitute in your car, purse, or daypack. Take it as a challenge to replace every disposable in your life with an alternative. If you can’t, is it something you really need? “Reduce” is one step better than “Re-Use” in the hierarchy of the Three R’s.



EVERYDAY RE-USEABLES YOU CAN CARRY ANYWHERE

High-end Zero Waste stores will sell you all the fancy equipment you need to make re-use a lifestyle. But it's easier and cheaper to equip your purse, backpack, or glove box with everything you need to avoid the dilemma of either accepting a disposable option, or opting out. Here are a few low-cost, or no-cost, suggestions:

(1) Handkerchief. Every time I blow my nose or sop up a spill, I am saving trees. At home, we have avoided paper towels for years by maintaining a supply of washable rags made from stained T-shirts and worn-out pajama bottoms.

(2) Shoulder-strap. Empty plastic bottles are abundant. My shoulder-strap ensures that I can carry life-giving water everywhere. It's important to switch bottles fairly often, however; plastic begins to disintegrate as it gets old.

(3) Water bottle. For healthier but slightly pricier hydration, buy one made of stainless steel, as I finally did. My strap fits that one too.

(4) Grocery sack. Some people buy re-usable grocery bags and re-use them religiously. But a "disposable" plastic grocery sack, rolled up tightly and secured with a rubber band, is almost weightless and takes up no room at all in my backpack or pocket. It will last through surprisingly many trips to the store.

(5) Produce and bulk bags. On trips to the co-op or supermarket, I also carry empty bread bags and used ziplocs for bulk items and produce. Why buy expensive re-usable cloth bags?

(6) Plate, mug, spoon. I carry a frisbee and a spoon everywhere in my backpack, and can eat anywhere without accepting disposables . . . in addition to enjoying an occasional game of frisbee. If I were a coffee-drinker, a mug would come in handy too. A complete set of portable dinnerware will cost you a dollar or so at the thrift store.

(7) Empty yogurt container. Any container that seals— and stays sealed— will work just fine for takeout or leftovers. Why settle for styrofoam, or spend good money on Tupperware?

(8) Metal straw. Re-usable straws are now available, some even fashionably bent at the top. Be sure to wash them often; look for one sold with a special skinny bottle-brush for keeping it clean.

What Is Recyclable?

PAPER

Since the invention of papyrus in ancient Egypt, paper has been made from many different materials, including the animal skins once used for parchment. Almost all paper today is made from tree-pulp. This process destroys not only trees but whole forests, complex ecosystems which took hundreds of years to reach maturity.

Lumber and paper companies pay virtually nothing for the privilege of logging our National Forests. Less than nothing, rather, since the U.S. Forest Service spends millions of dollars to maintain a system of logging roads eight times longer than the interstate highway system. The paper industry also privately owns millions of acres of tree farms producing mostly fast-growing pines— pseudo-forests where pesticides and herbicides are routinely sprayed to prevent the natural succession of species that leads to a mature forest. Trees sequester carbon, helping to slow down climate change. But an forest ecosystem left intact sequesters it far more effectively than a tree farm.

Tree farms are harvested every 15 years or so. But paper can be made from other plants that grow much more quickly and can be harvested annually, including bamboo,

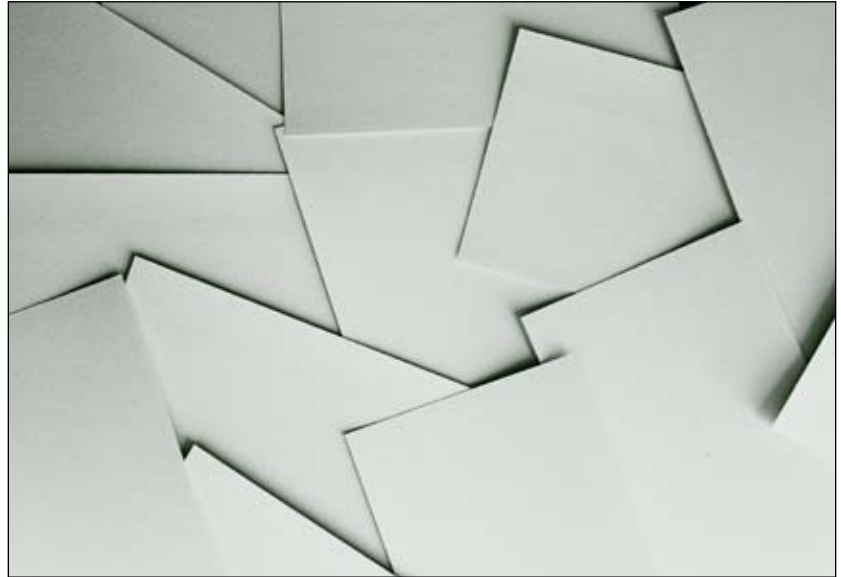
sugarcane, jute, flax, hemp, kenaf, and the wheat-stalks left behind after harvest. Sadly, protecting the paper companies' investment in tree-pulp takes precedence over the future of the planet. In recent years these companies have devastated the forests of the northwest and are now returning to the southeast.



Paper made from plant fibers was first recycled in Japan in the 11th century. The modern paper industry continues this tradition. Paper is produced in huge rolls, then trimmed down to various standard sizes. The waste paper from the trimming process is gathered up and added to the next batch. Almost all paper therefore contains recycled content; “recycled paper” contains additional content contributed by paper users who recycle, specified on the package as a percentage of “post-consumer recycled content.”

paper facts

- ◆ Americans use 85 million tons of paper a year, about 680 lb. per person.
- ◆ The average household throws away 13,000 separate pieces of paper each year, mostly packaging and junk mail.
- ◆ Spending on wrapping paper, tissue paper, and gift bags totaled \$12.7 billion in 2017; most of it is not recycled.
- ◆ The average office worker generates around 2 lb. of paper and paperboard waste per day.
- ◆ Office paper waste is estimated at around 12.1 trillion sheets a year; paper accounts for 50% of business sector waste.
- ◆ Paper makes up about 20% of the U.S. waste stream.
- ◆ It takes 100,000 trees to print the Sunday newspaper each week.
- ◆ 40% of the world's logging industry output is estimated to go into manufacturing virgin paper.
- ◆ One 15-year-old tree yields about 700 paper grocery bags, which at a busy supermarket would be used in less than an hour.
- ◆ Municipal solid waste in the U.S. included 67 million tons of paper and paperboard waste in 2017, a sacrifice of 1 billion trees.
- ◆ Cardboard, a.k.a. chipboard, paperboard, or pasteboard, is only a thicker, stiffer form of paper.
- ◆ The fibers in one piece of paper can be recycled up to seven times. Virgin fibers must be added from time to time, but not necessarily from trees.
- ◆ Recycling paper saves 40% of the energy used in producing it from tree-pulp.
- ◆ Recycling one ton of paper products saves 3.3 cubic yards of landfill space.
- ◆ Recycling 50% of our waste paper would supply 75% of the demand and save 10 million trees a year.
- ◆ Each ton of recycled paper saves an estimated 17 trees, 380 gallons of oil, three cubic yards of landfill space, 4,000 kilowatts of energy, and 7,000 gallons of water. This represents a 64% energy savings, a 58% water savings, and 60 pounds less of air pollution.
- ◆ Those 17 trees, left standing, can absorb 250 pounds of carbon dioxide from the air each year. Burning that same ton of paper would create 1,500 pounds of carbon dioxide.
- ◆ Recycling a single run of the Sunday NEW YORK TIMES would save 75,000 trees. Recycling all of our newspaper would save about 250,000,000 trees a year.
- ◆ The construction costs of a paper mill designed to use waste paper is 50 to 80% less than the cost of a mill that uses new pulp.



paper recycling tips

- ◆ Paper and cardboard can be recycled without removing staples or tape, but paper clips should be saved and re-used.
- ◆ Paper stained with grease, such as a pizza box, is unrecyclable because the oil actually alters the paper's chemistry. But the lid of the pizza box is rarely affected, and can easily be separated from the stained portion for recycling. Often a vegetarian pizza will leave no stain at all.
- ◆ Loose paper should not be left out in the rain; it will mildew as it dries and the mildew smell is permanent.
- ◆ Resist crumpling paper up before recycling; its three-dimensional shape will confuse the sorting equipment, and it may end up with the plastic containers. The sorting process expects paper to be thin, flat, and lightweight.
- ◆ Shredded paper should be bagged to keep it together. If loose, it can contaminate other materials. It is not accepted by all paper recyclers, but can be composted instead.
- ◆ Plastic windows in envelopes and tape on wrapping paper are fine.
- ◆ Padded envelopes lined with bubblewrap should go in the trash; buy envelopes padded with shredded paper.
- ◆ The chlorine bleaching process that makes most paper white creates dioxins; buy oxygen-bleached paper when available.
- ◆ Don't trust paper certified by the "Forest Stewardship Council" to be sourced from "responsibly" or "sustainably harvested" trees. The FSC label has often been used as cover for illegal logging around the world.

CORRUGATED CARDBOARD

The corrugated cardboard industry has a long tradition of recycling. Almost all corrugated boxes have recycled content, and most businesses have a dedicated dumpster for boxes. Before the coronavirus pandemic, the vast majority of boxes received for recycling came from those dumpsters. But since the pandemic's surge in mail-order shopping,

curbside recycling has become the main source of recyclable boxes in some areas.

Mail-order might seem like an energy-intensive way to shop, but since delivery trucks make multiple stops on a route that is optimized for efficiency by GPS, mail-order is often a more climate-friendly option than taking the car. Recycling the box also helps to reduce your carbon impact. Tape and staples need not be removed, but the box must be flattened.



All single-stream curbside pickup programs accept both paper and corrugated cardboard, though they soon part ways for different processes at different recycling plants. Corrugated cardboard recyclers will accept the single-ply brown material known as Kraft paper, used for paper grocery sacks, but want nothing grey or white.

Some corrugated cardboard is very thin, with almost microscopic corrugations, and is easily mistaken for chipboard. If you're not sure, give it the squeeze test. Press tightly between finger and thumb; if you can feel it give, it's corrugated.

HOW TO BREAK DOWN A BOX (Without Knowing Martial Arts)

You don't have to know *aikido*, *ju jitsu* or *tae kwon do* to break down a corrugated cardboard box. It's more like the gentler Japanese art of *origami* – but in reverse. First, examine your box to see what's holding it together, find where it is stapled or glued or taped, and start there. If stapled or glued, just apply enough force to pull it apart. But most boxes are held together by a single strip of tape, and those are the easiest of all once you know the secret.

- (1) Hold box upside-down with taped bottom facing up.
- (2) Grip it at the far end with one hand on either side of the tape and brace it against your belly.
- (3) Press the end panel in with both hands, bending it toward you until it pops free from the tape.
- (4) Grab the tape's free end, twist and pull toward you, peeling it back like a giant zipper.

BATTERIES

It's best to buy rechargeable batteries whenever possible. But all batteries contain valuable metals that can be recovered. Enter your zip code at Call2Recycle.com to find a battery recycling drop-off location near you, or one that accepts them by mail.

battery recycling tips

- ◆ Alkaline batteries, the most common type, no longer contain lead, so it's safe to deposit them in the trash. Recycling them usually requires a fee, but small quantities are accepted at IKEA stores. Ridwell also accepts them.
- ◆ Lead-acid batteries, used to start your car engine, are recycled by most auto parts and repair shops.
- ◆ Lithium-ion batteries, the kind used in electronics, toys, and many appliances, can explode and catch fire when passing through machinery that sorts recyclables. Fires are a frequent hazard at Materials Recovery Facilities and transfer stations. Do not dispose of these in your curbside bin!
- ◆ When rechargeable batteries will no longer charge, you can recycle them at Lowe's, Home Depot, Radio Shack, Ace Hardware, and other stores.

GLASS

Once upon a time, milkmen dropped off milk in glass bottles and collected the empty bottles on their daily route from house to house. The price of a bottle of soda pop or beer then included a bottle deposit, which could be redeemed by turning in the empty bottle for refilling or recycling. Generations of kids in the U.S. grew up collecting discarded bottles and turning them in for a nickel.

Glass is made of silica derived from sand, melted at high temperatures and mixed with different chemicals for different purposes. Glassmaking apparently originated independently in ancient Mesopotamia, Egypt, and India. Glass does not degrade when melted for recycling, so it can be recycled over and over, and it has been recycled since it was invented at least 3,600 years ago.

Ironically, in our modern age of curbside pickup and single-stream recycling, glass recycling has become a problem. When the compactor trucks compress their loads, glass bottles and jars naturally break. Shards of glass damage the mechanical conveyor systems at the plant where the materials are sorted and endanger human workers along the lines. The latest technology isolates the glass at the very beginning of the sorting process, but most single-stream recyclers currently do not accept it.

The market for glass bottles and jars for recycling remains strong, however. Any recycling center that requires glass to be sorted by color is definitely recycling it, since sorted glass brings the best price. Green and brown glass retain their color in future incarnations, but add an unwelcome tint if mixed with clear glass. Sorted food-grade glass is generally recycled into another food-grade bottle or jar. Mixed glass, or “cullet,” is used for fiberglass or crushed to replace gravel in a roadbed.

glass facts

- ◆ It takes around 4,000 years for a glass bottle or jar to decompose.
- ◆ 28 billion glass bottles and jars end up in landfills each year in the U.S.
- ◆ 1.5 million tons of glass are incinerated annually in “waste-to-energy” facilities.
- ◆ Around 10 million tons of glass get recycled each year, or about 33%.



- ◆ Making jars and bottles from recycled glass takes 40% less energy than making them from natural silica (sand).
- ◆ Glass must be recycled 20 times to recoup the climate impact of its original manufacture.
- ◆ “Bottle bills” revive the old bottle-deposit system, refunding your deposit if you return the bottle to the store. Ten states currently have such a bill on the books.
- ◆ One study found that New York state’s bottle bill saved

\$50 million on clean-up, \$19 million on solid waste disposal, \$50-100 million on energy, as well as creating almost 4,000 jobs.

- ◆ The container industry quietly opposes Bottle Bills while loudly voicing its support for recycling.
- ◆ Sophisticated optical scanners can separate shards of broken glass by color, but not every recycling facility has that equipment.

glass recycling tips

- ◆ Drinking glasses, candle glass and perfume bottles are not accepted for recycling because of chemical additives that are unsafe for contact with food.
- ◆ Flat glass, such as windowpanes, contains a different type of additive and is also not accepted by most recycling operations. But it too is perfectly recyclable if you can find a place that recycles it.
- ◆ Glass bottles and jars should be recycled without the lids. The lids are accepted by some scrap metal recyclers, but not all, because of the rubber gasket.



RINSE A BOTTLE OR JAR THE EASY WAY

Like other recyclables, glass does not need to be washed for recycling, only rinsed. This means that no food particles or liquids other than water are visible, though the glass might not be totally clear. The method below works for containers made of either glass or plastic, but depends on a tight seal—or you might get wet. Not recommended for “clamshell” type takeout containers, as they do not seal tightly and may leak on you, or worse.

- (1)** Add water. Container should be 1/4 to 1/3 full.
- (2)** Screw the cap back on firmly.
- (3)** Give it a vigorous shake.
- (4)** Repeat as needed.
- (5)** Dump the water out and recycle.

The amount of water can be fine-tuned. More water adds weight for a more forceful effect when you shake. Less water increases the distance the water can travel, increasing the force of each shake. Somewhere in between is the right amount for each container.

PLASTICS

All plastics are made from a byproduct of fossil fuel production called naphtha, except for a small amount of “bioplastic” made from plant oils. The manufacturing process combines petrochemical molecules into long chains called polymers, which are not found in nature. Hundreds of different polymer resins and resin combinations have been developed for different uses, infused with chemicals like flame-retardants, stiffeners and softeners. The numbers 1 through 6 inside the familiar triangular recycling symbol identify the six most common resins, plus the catch-all “other” category, #7.

All plastics are toxic. When discarded, they gradually disintegrate into tiny particles called microplastics, then even smaller ones called nanoplastics, but the molecular poly-

mer chains never completely disappear. Even bioplastics are made up of these polymer chains that persist in the environment. Plastic has now been added to the list of materials regulated by a United Nations treaty governing shipments of hazardous waste.

The vast majority of plastic waste consists of single-use disposables such as shopping bags, drink bottles, styrofoam cups, take-out containers, flexible pouches, cigarette filters, etc. It's mostly these that have made their way into the rivers and out to sea to



wind up in the “Great Pacific Garbage Patch” and four other vortices of floating plastic around the globe. Plastic particles have now been found in every place researchers have looked, including human tissue.

Plastic recycling began in the 1970s as an industry ploy to deflect criticism from the emerging environmental movement. The triangular symbol was developed to promote the belief that all plastics are recyclable—which in theory they are. But in practice, that wholly depends on market conditions. A specific type of plastic can only be recycled if a specific technology has been developed to process it, if a company somewhere has invested in that technology, and if shipping it to that location is not cost-prohibitive.

Durable plastics obviously have many valuable uses. Single-use disposables could conceivably be replaced by lightweight containers that are re-usable and re-fillable. Governments at all levels around the world have begun to outlaw plastic shopping bags and other disposables. A global grassroots movement is voicing a demand for a “circular economy” that eliminates waste, and an international treaty to curb the plastic problem is in the works. But as climate change pushes a shift to renewable energy, the petroleum industry is relying on increased plastic production to replace the profits of fossil fuels. Billions of dollars have already been invested in new factories, and production of virgin plastic is expected to triple by 2050.

The plastic industry has pledged to phase out disposables, but instead is doubling down on recycling, investing in new technologies that use chemical, biological, or thermal processing instead of the usual mechanical methods. But in the U.S., government subsidies for petroleum still make virgin plastic cheaper than recycled plastic. The best course is to avoid plastic packaging whenever possible, especially the more difficult-to-recycle types, and recycle what you can.

plastic facts

- ◆ It takes around 0.4 gallons of oil to manufacture a pound of virgin plastic.
- ◆ Plastic manufacturers annually generate over a ton of hazardous wastes for every person in the U.S., and more every year. According to the EPA, 5 of the top 6 chemicals responsible for hazardous waste are used in the manufacture of plastic.
- ◆ The average American throws away 60 lb. of plastic packaging a year.
- ◆ Around 5 million plastic bottles are thrown away in the U.S. every hour, around 35 billion annually.
- ◆ Plastic is 8% of our trash. Only 2% of it gets recycled.
- ◆ According to the World Wide Fund for Nature, about 10 million metric tons of plastic ended up in the oceans in 2020 alone.
- ◆ One study suggests that plastic in the ocean affects at least 700 marine species, but in reality, this figure is probably much higher.
- ◆ Approximately 100 million plastic bags are used in the U.S. each year. Many localities worldwide have now enacted plastic bag bans.
- ◆ Recycling plastic emits air pollution and greenhouse gases, so it's best to reuse it several times before recycling, and better still not to buy it.
- ◆ Plastic bags and water bottles may take up to 1,000 years to decompose in a landfill.
- ◆ Multi-material plastic packaging is among the most difficult types of waste to recycle.
- ◆ Recycling plastic saves 70% of the energy required to make it from virgin petroleum or natural gas.
- ◆ Sophisticated optical scanners can separate plastic containers by chemical composition, but not all recycling facilities have this equipment.
- ◆ Recycling plastic degrades its quality, so it can only be recycled once or twice before ending up in the landfill. Recycled plastic is most commonly used for lumber, carpet, or textiles.
- ◆ It takes 14 plastic bottles to create enough fiberfill insulation for a ski jacket, 114 bottles for a sleeping bag.
- ◆ The overall U.S. recycling rate for plastics in 2018 was less than 9%, but for both PET bottles and jars (#1) and HDPE bottles (#2) it was over 29 percent. The other types are rarely recycled, given current technology and infrastructure.



plastic recycling tips

- ◆ Sheet plastics, a.k.a. plastic film, cannot be mixed with hard plastics, but both are recyclable. Many grocery stores accept plastic bags for recycling.
- ◆ Bubblewrap (preferably deflated) can be recycled with sheet plastic. This includes bubblewrap envelopes— the kind without a glued-on paper layer. But again, it's better to re-use bubblewrap than to recycle it.
- ◆ Packaging made of black plastic is difficult for the automatic sorting machines to detect, so it frequently does not get recycled.
- ◆ Plastic bottles should be recycled with the lids on, giving the lid at least a chance of getting recycled, except for the rare plastic bottle with a metal lid.



- ◆ Remove the spray-tops from spray bottles before recycling — or better, mix your own cleaners and re-use the bottles.
- ◆ Motor oil and other automotive products come in recyclable #2 HDPE bottles, but leave a residue that can't be rinsed away. Put them in the trash.
- ◆ Compostable plastics made from plants are cleaner to produce because they do not require petroleum input, but disposal is problematic. They cannot be mixed with other plastics for recycling.

◆ Styrofoam (polystyrene) is technically plastic #6, but can't be mixed with recyclable plastics. Styrofoam sheets and "peanuts" can be re-used for packing. Office Depot and independent "pack & mail" stores often accept peanuts for re-use. Only a few recyclers accept pre-formed styrofoam packing.

CONSTRUCTION & DEMOLITION WASTE (C&D)

C&D waste can include wood, stone, brick, concrete, steel, aluminum, various plastics, and miscellaneous other elements, all haphazardly mixed together. It is notoriously difficult to recycle, especially the 90% of it generated by demolition. However, if successfully separated—or better, reclaimed before demolition begins— many of these materials can be re-used, or at least recycled. Reclaimed lumber, brick, and stone in particular have become highly prized in building, adding an old-time aesthetic to new construction.

- ◆ In 2017, 569 million tons of C&D debris were generated in the U.S.
- ◆ Concrete production is the third largest source of greenhouse gases, after transportation and electricity.
- ◆ Concrete and asphalt make up around 75% of the C&D waste stream.

METALS

Metals are produced at extremely high temperatures, requiring large amounts of fossil fuels. Recycling steel saves 60% of the energy needed to make it out of iron ore; recycling aluminum saves 90% of the energy needed to make it out of bauxite ore— partly due to savings in the mining and transportation of ores. Recycling metals is therefore essential to the fight against climate change. Scrap metals have been recycled since the invention of metal-smelting in ancient times. During World War II, every patriotic household contributed its tin cans and other unneeded metal to the Roosevelt administration's recycling program to produce armaments and vehicles for the war effort.

metal facts

- ◆ Aluminum takes between 200 and 500 years to degrade in a landfill.
- ◆ Americans use and throw away 80 million soda cans a year
- ◆ We throw away enough aluminum in all forms to rebuild the U.S. commercial air fleet every 3 months.
- ◆ Total aluminum thrown away in 2017 was 383 million tons.
- ◆ “Tin cans” are actually made of steel. To prevent rust, they were originally lined with tin, eventually replaced by a layer of plastic.
- ◆ Manufacturing one ton of virgin steel is estimated to take 34,000 gallons of water, and vents massive amounts of greenhouse gases.
- ◆ Steel cans weigh 33% less today than they did 25 years ago.
- ◆ According to the E.P.A., around 10.5 million tons of steel is landfilled each year.
- ◆ About 620,000 tons of aluminum are recycled each year in the U.S.
- ◆ The recycling rate for aluminum cans in the U.S. is around 63.6 percent— 105,800 cans every minute.
- ◆ Processing used aluminum requires about 90% less energy and generates 90% fewer carbon emissions than making new aluminum out of bauxite ore, and is 20% cheaper.
- ◆ The energy saved by recycling a single aluminum could power a television for 3 hours. Throwing away one can wastes as much energy as pouring out half a can's worth of gasoline.
- ◆ The average aluminum can made in the United States contains about 73 percent recycled content, compared with 23 percent for glass bottles and less than 6 percent for plastic.
- ◆ Recycling a ton of aluminum— 75,000 cans— saves enough electricity to power an average home for 10 years.



- ◆ As much as 75% of all the aluminum ever produced is still in use today.
- ◆ About 35% of aluminum containers and packaging get recycled in the U.S. today. For aluminum beverage cans, the recycling rate jumps to over 50%.
- ◆ Both aluminum and steel can be recycled repeatedly without loss of strength or integrity.
- ◆ Steel cans are the most recycled packaging product in the world.
- ◆ Steel is a ferrous metal, easily separated from other recyclable materials by powerful magnets during the sorting process.
- ◆ The use of recycled steel currently saves enough energy to power 18 million homes for a year.
- ◆ In 2018, the EPA estimated the recycling rate for steel cans at about 71 percent— 1.1 million tons. The recycling rate for other items made of ferrous metals, such as appliances and furniture, was just under 28 percent— 4.7 million tons.

metal recycling tips

- ◆ Single-stream curbside programs accept no metals except steel and aluminum cans. Most other metal items are accepted by scrap metal dealers, who will pay by the pound. Copper and aluminum bring the highest price; steel pays the least.
- ◆ Aluminum foil is not accepted by most recyclers or scrap metal dealers, but is perfectly recyclable if clean. Check with your city or county recycling center.



- ◆ Some shiny, flexible plastics look a lot like foil. If you bend it and it stays bent, it's foil. If it unbends on its own, it's plastic.
- ◆ Aerosol spray cans can be recycled with other types of metal cans (in curbside recycling, for example), if they are empty. If not empty, they are considered household hazardous waste.
- ◆ Metal jar lids may or may not be accepted as scrap metal because of the rubber seal. Check with your recycling center.
- ◆ Power cords and other insulated wires are accepted

by most scrap metal dealers. Copper wire should be kept separate from coaxial cable, which is steel and hence less valuable.

CORKS

Corks are made from the bark of cork oak trees, but can only be harvested every 9 years, so it makes sense to recycle the cork stoppers of wine bottles. Recycle them at Whole Foods stores. Beware of the plastic corks designed to look like natural cork! Natural corks with a plastic grip attached must also go in the trash.

TEXTILES

Much of the ecological damage inflicted on the biosphere by human culture is fallout from the profitable cycle of changing fashions in industries from electronics to cars. The original prototype for this wasteful custom was the apparel industry. For centuries an arena for petty competition among the fashionable set, it has now become the source of tons of discarded clothing with every passing year.

“Hand-me-down” clothes and shoes were once routinely passed on to younger siblings in ordinary families across the country, and often then went to the poor. Now they cycle through consignment shops and thrift stores or are shipped to developing countries to clothe the underprivileged. Used clothing is also highly recyclable, when unraveled into its original threads. Natural fibers are sorted by material and color, re-spun and re-woven. A color-matching process results in fabric that does not need to be re-dyed. Fibers not suitable for re-weaving are used for mattress stuffing, carpet pads, home insulation, and more.



Since the invention of nylon, followed by polyester and spandex, clothing has grown into one of the largest markets for plastics. Yet scientists have known since the 1970s that synthetic textiles shed microparticles of plastic each time they are worn, and even more when run through the wash. When dumped into a landfill or burned in an incinerator, they add to plastic's burden of toxic side effects in groundwater and air. But synthetic fibers too can be recycled, eliminating most of their toxic impact. Polyester, for example, is shredded and used for new polyester clothing.

Cotton, the world's most widespread source of fiber for textiles, would be a far more ecologically beneficial alternative to synthetics if it were not so relentlessly soaked in toxic pesticides that contaminate the land, the water, and the work-force wherever it is grown. Organic cotton is still too expensive for most uses, though it can be harmlessly recycled.

Recently, the fashion paradigm has been flipped on its head by the introduction of clothing lines made of recycled plastic, which are among the trendiest current fashions. Some innovative apparel companies have sidestepped the taint of petrochemical sourcing by using bioplastics made from plant oils. But both recycled plastic and bioplastics are still plastic, destined to break down in a landfill. The new cutting edge of ecologically-friendly apparel is plant-based textiles that are both renewable and compostable. In the meantime, there's always the thrift store.

textile facts

- ◆ The average lifetime of a piece of clothing is as little as three years.
- ◆ Up to 60% of the clothing produced today is made of synthetics.
- ◆ Americans dispose of 13 million tons of textiles, about 85 percent of their clothes, each year.
- ◆ An estimated total of 17 million tons of textile waste is generated each year in the U.S., about 6% of our total Municipal Solid Waste.
- ◆ Some clothing can take up to 40 years to decompose in landfill.
- ◆ 95% of textiles can potentially be recycled or re-used.
- ◆ The average recycling rate for all textiles is around 15%.
- ◆ The U.S. accounts for more than 40% of used textile exports annually.
- ◆ Recycling textiles saves water and energy, reduces pollution, and lowers demand for virgin fibers and dyes.

textile recycling tips

- ◆ Goodwill, the Salvation Army, the Kidney Foundation and other established nonprofit thrift store chains sell used clothing to benefit their mission to serve the poor. Donations are tax-deductible.
- ◆ Textile recycling companies like USAgain and Planet Aid maintain drop-off bins in parking lots across the country .
- ◆ Puma and The North Face are among the apparel companies that collect clothing of any brand at their stores for recycling.
- ◆ The Philadelphia-based for-profit company Community Recycling offers postage-paid shipping labels you can use to mail in your donations, as well as an online tracking system that enables you to connect with people in other countries who end up wearing your donated clothes.
- ◆ Local consignment shops will sell your re-usable clothing and split the proceeds with you.

LIGHTBULBS



Old-fashioned incandescent bulbs cannot be recycled, but contain no hazardous materials and can be safely tossed in the trash. Halogen bulbs can, too, but other types contain mercury, including all fluorescents, halide, and sodium bulbs, and are thus categorized as hazardous waste. Compact Fluorescent Lightbulbs (CFLs) can be recycled at Lowe's, Home Depot, and IKEA stores.

The glass and metal components of LED bulbs can be recycled. Most Lowe's, Home Depot, Batteries Plus, and some hardware stores will accept them, along with Ridwell. Check Earth911.com for other options. Holiday string lights are also accepted at some big-box stores such as IKEA or Lowe's. If no drop-off locations for lightbulbs are available in your area, check Earth911.com for mail-in options.

ELECTRONICS (E-WASTE)

Electronic equipment is another area where constant upgrades generate a constant stream of highly toxic waste. Computers, TVs, stereo components, copiers, phones, fax machines and household appliances contain a bewildering array of harmful chemicals such as mercury, lead, beryllium, brominated flame retardants, and cadmium. Fortunately, many of them can be re-used, repaired, refurbished, or recycled. All electronics contain valuable materials that can be recovered, though the process requires strict regulation to protect workers' health. Much of our e-waste ends up shipped overseas, where regulation is lax and hazardous ingredients can contaminate land, water, and people.

e-waste facts

- ◆ E-waste is one of our fastest-growing waste streams, approaching 50 million tons per year planetwide.
- ◆ The average person is estimated to generate around 20 kilograms of e-waste annually in the U.S.
- ◆ In 2017, U.S. consumers generated around 2.8 million tons of electronic waste.
- ◆ As much as 40% of the heavy metals found in landfills comes from electronic products.
- ◆ Discarded electronics in landfills make up 2% of the total trash found there.
- ◆ 14 million tons of e-waste are generated each year in New York City alone.
- ◆ In 2017, 1 million tons of e-waste were recycled in the U.S.
- ◆ Globally, only 10% is recycled.



e-waste recycling tips

- ◆ Check with your municipal government for e-waste collection days.
- ◆ Some items contain hazardous waste, such as TVs and computer monitors. Disposal of hazardous waste is strictly regulated by the EPA, so you might have to pay a fee to recycle these items.
- ◆ Try to reduce your share of e-waste disposal by resisting the temptation of trendy new equipment. Buy refurbished older models, or well-made ones that last and can be repaired if they malfunction; donate working but outdated ones to thrift stores or charities.
- ◆ Visit iFixit.com for free repair instructions for a host of products.
- ◆ Used CDs can be shipped to a company called GreenDisk, along with disquettes, magnetic tape, and other electronics. Look them up at GreenDisk.com.

COMPOST

Composting is nature's original recycling program, employing worms, bacteria, and fungi to break down decaying organic matter into nutrients for new life. Composting your food scraps and yard waste keeps them out of the landfill, where they generate methane, a greenhouse gas with 80 times the climate impact of carbon dioxide. Most cities provide yard waste pickup at the curb and maintain municipal composting operations. U.S. cities composted 26 million tons of yard waste in 2018.



Back-yard composting is an option for people who do not have curbside pickup. It also allows you to dispose of organic matter not accepted at the curb, and to make use of the end product, a rich, fertile soil you can add to your garden. As worms and bacteria go to work to eat, digest and excrete your scraps, the interior of the pile will heat up to a discernible degree. Some enthusiasts use a thermometer to track its progress.

The basic recipe calls for alternating layers of “green” and “brown” materials. “Green” means

rich in nitrogen or protein; “brown” means carbon or carbohydrates. Food scraps are considered “green,” along with grass clippings, weeds, eggshells and coffee grounds. Don’t use weeds that have gone to seed, as the seeds might sprout in your garden. The “brown” category includes dead leaves and needles, straw, wood chips, sawdust, paper, and even dryer lint. Aim for a ratio of 25% “green” to 75% “brown.”

For quicker results, compost piles should be “turned” occasionally with a pitchfork to mix the contents. Many sophisticated composting systems are on the market, featuring plastic bins that rotate with a crank or electric motor.

Experts do not advise adding meat scraps, fats, or dairy products, as they take longer to break down, produce more unpleasant odors, and might attract rodents. It also risks contamination from bacteria like salmonella, which can spread to your garden plants when you add composted soil to your garden. Back-yard compost piles do not generate enough heat to kill these pathogens.

Many compost enthusiasts go further and incorporate the practice of vermiculture into their compost operation—introducing certain species of worms that break down organic material faster and more efficiently. Vermiculture kits are available that you can order online and set up right in your kitchen.

composting facts

- ◆ 80 billion pounds of food are thrown away in the U.S. each year— around 20% of all that is grown and sold.
- ◆ About 94% of the food we throw away ends up in landfills where it rots and releases methane and CO₂.
- ◆ Food waste is responsible for about 8% of global greenhouse emissions.
- ◆ More than \$161 billion is lost each year to food waste.
- ◆ The U.S. is home to about 4,914 industrial composting facilities.
- ◆ The total organic component of Municipal Solid Waste composted in 2018 was 25 million tons, including around 22 million tons of yard trimmings— over 5 times the 1990 amount— and 2.6 million tons of food waste, about 4% of the nation's total food waste.
- ◆ Other methods of reclaiming wasted food were calculated for the first time in 2018. Besides what was composted, around 28% was reclaimed by various methods, including donation to the needy; feeding to animals; generating carbon-neutral methane through anaerobic digestion; conversion to raw materials for products such as bioplastics by biochemical processing; and sewage treatment.
- ◆ “Compostable” bioplastics made from plants are cleaner to produce than petrochemical plastics, but disposal is problematic. They cannot be mixed with other plastics for recycling, do not break down in landfills because of the lack of oxygen, and cannot be composted except in commercial facilities that get hot enough to break them down— most of which do not accept them.

BACK-YARD COMPOSTING THE LAZY WAY

If you have access to a little outdoor space, it doesn't take much to get started with composting. I have not studied the subject, so please consult the internet for expert advice if you are a serious gardener. But here is the method that has worked for me.

(1) Collect some paper sacks of autumn leaves or grass clippings from the curb or your own summer mowing and autumn raking.

(2) Connect an 8 or 10 foot length of fencing wire into a loop.

(3) Use a spade to break up a circular area of soil a few feet across to allow easy access for earthworms, then set up the loop of fencing to enclose it.

(4) Toss kitchen scraps and other organic matter inside and cover with a layer of leaves or grass clippings. This ensures a proper mixture of “green” and “brown” materials, as well as smothering the smell.

(5) When bin is full, tip it over on its side, then tip it again so it is upside-down. Unfinished compost will remain caught in the wire. A pile of finished compost will be left behind, which you can use immediately as garden fertilizer or potting soil. Be sure to break up the soil in the new spot before tipping!

(6) Continue adding organic matter in your compost pile's new location.

RECYCLING RESOURCES

online guidance

- ◆ Earth 911 <https://earth911.com/>
- ◆ I Want To Be Recycled <https://berecycled.org/>
- ◆ Recycle Stuff <https://www.recyclestuff.org/>
- ◆ Resource Recycling <https://resource-recycling.com/recycling/2018/02/06/financial-document-offers-deeper-view-terracycle/>
- ◆ Call2Recycle.org (battery recycling) <https://www.call2recycle.org/>
- ◆ Recycle Coach <https://recyclecoach.com/blog/an-intro-to-e-waste-why-its-a-problem/>
- ◆ iFixit Online Repair Manual <https://www.ifixit.com/>

private-sector recycling

- ◆ TerraCycle <https://www.terracycle.com/en-US/>
- ◆ Hefty Energy Bag <https://www.hefty.com/products/hefty-energybag>
- ◆ Target (cans, bottles, plastic bags, bubblewrap, small electronics) <https://help.target.com/help/> (Search for “Can I recycle items at a Target store?”)
- ◆ IKEA <https://www.ikea.com/ca/en/this-is-ikea/sustainable-everyday/healthy-and-sustainable-living-waste-and-recycling-pub0aa4765d>
- ◆ Batteries Plus (batteries & lightbulbs) <https://www.batteriesplus.com/t/recycling>
- ◆ Lowe’s (plastic bags, CFL bulbs, rechargeable batteries, cellphones, plastic planter pots and cases) <https://corporate.lowes.com/newsroom/stories/fresh-thinking/lowes-answers-your-recycling-faqs-so-you-dont-have-ask> (Scroll to bottom)
- ◆ GreenDisk (CDs, electronics, batteries, printer cartridges, cassettes, film, etc.) <https://www.greendisk.com/gdsite/default.aspx>
- ◆ Ridwell (curbside pickup where available) <https://www.ridwell.com/>

national nonprofits

- ◆ Institute for Local Self-Reliance <https://ilsr.org/>
- ◆ National Recycling Coalition <https://nrcrecycles.org/>
- ◆ Zero Waste USA <https://zerowasteusa.org/>
- ◆ Greenpeace (Break Free from Plastic Act) <https://www.greenpeace.org/usa/congress-support-the-break-free-from-plastic-pollution-act-of-2021/>

global nonprofits

- ◆ Break Free from Plastic <https://www.breakfreefromplastic.org/>
- ◆ Global Alliance for Incinerator Alternatives (GAIA) <https://www.no-burn.org/>
- ◆ TerraCycle Foundation <https://www.terracyclefoundation.org/>
- ◆ Ellen MacArthur Foundation (working for a circular economy) <https://www.ellenmacarthurfoundation.org/>
- ◆ The Ocean Cleanup <https://theoceancleanup.com/>

THE FOUR LAWS OF ECOLOGY

formulated by Dr. Barry Commoner, ecologist and physicist

1) Everything is connected to everything else.

Calling the world our “environment” implies that our surroundings are somehow separate from us. But we could not exist if we were cut off from the air, water and soil that sustain our lives, and everything we do affects the Earth in turn.

There is no real boundary between our bodies and the Earth’s ecosystems. A plastic bottle we throw away today could wind up floating in the ocean thousands of miles away, breaking down into ever-smaller particles – then getting eaten, entering the food chain, and eventually becoming part of a fish we eat for dinner.

2) Everything must go somewhere.

Saying we can throw something “away,” whether it’s a plastic bottle or industrial waste, implies that once it’s out of sight and mind, it’s gone. But the food we eat does not originate at the grocery store, and neither does its packaging. Likewise, that can or bottle or plastic bag does not disappear when we throw it in the trash. It breaks down into its chemical components and becomes part of the mix of man-made elements that is altering the chemical composition of the Earth in unknown ways – a rash and dangerous planetary chemistry experiment.

3) Nature knows best.

The belief that we are “conquering nature” has made us dependent on money and technology. But we can’t eat money. We can’t breathe technology. The human body and “human nature” developed in a natural setting, which is why natural food keeps us healthy and living in community keeps us sane. If we pay attention, we’ll see that nothing goes to waste in nature. Just as manure can fertilize a field, everything we see as “waste” is raw material for something useful – if we take the time to recycle it.

4) There is no such thing as a free lunch.

Living as if the Earth can absorb infinite abuse – runaway resource extraction, toxic pollution, nuclear waste, carbon build-up in the atmosphere – is setting us up for a rude awakening. Someone must pay for the damage caused by our unsustainable lifestyle. To go on living this way is to hope that the bill doesn’t come due while we’re still around to pay it. And if we get our wish, who will get stuck with the bill? Our children. The ones who are trusting us to protect them from harm.

“THE LAW OF UNINTENDED CONSEQUENCES”

Arrogantly assuming we know better than Mother Nature has dug us into a hole technology can’t dig us out of. Any solution based on the old paradigm of “mastering nature” will only dig us deeper. We have to admit that we don’t know enough about the planet’s life-support systems to try to control them for our own ends. The only solution is a change of attitude, learning to cooperate with natural systems rather than trying to dominate them.

“Man did not weave the web of life;
he is only a strand in it . . . Whatever befalls
the Earth, befalls us and our children.”

attributed to Chief Seattle of the
Suquamish and Duwamish nations
in the Pacific Northwest

“We have not inherited the Earth
from our parents; we are borrowing
it from our children.”

attributed variously to Wendell Berry,
David Brower and Ralph Waldo Emerson
(among others)



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