

WHAT IS WASTE RECYCLING ?

Materiali raccolti dalla Prof.ssa Gabriella Gasperini nell'ambito del Progetto di
EDUCAZIONE AMBIENTALE



your cool facts and tips on waste management

What is Waste?

Kinds of Waste

Sources of Waste

Waste disposal

Recycling

Paper Recycling

Aluminum Can Recycling

Glass Recycling

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Introduction – all about waste.

Waste has been a major environmental issue everywhere since the industrial revolution. Besides the waste we create at home, school and other public places, there are also those from hospitals, industries, farms and other sources. Humans rely so much on material things and they all (almost) end up as waste. And hey – where does the waste end up?

What is waste (trash, garbage, rubbish, refuse)

What is the difference between trash and garbage?

- **Trash:** Solid waste from places like your attic, backyard or study. Trash items include paper and card boxes and the like.
- **Garbage:** This is waste from kitchen and bathroom. They also include waste from cooking food and from food storage facilities.

Waste are items we (individuals, offices, schools, industries, hospitals) don't need and discard. Sometimes there are things we have that the law requires us to discard because they can be harmful. Waste comes in infinite sizes—some can be as small as an old toothbrush, or as large as the body of a school bus.



Everyone creates waste, although some people are very environmentally conscious and create very little. Likewise, some countries do a very good job creating less waste and managing the rest. Others are pretty horrible and have created huge environmental problems for the people and animals living there.

Did you know?

Europe creates about over 1.8 billion tonnes of waste each year. This means each person creates about 3.5 tonnes on average.

Did you know?

In 2010, Americans generated about 250 million tons of trash and recycled and composted over 85 million tons of this material, equivalent to a 34.1 percent recycling rate (see Figure 1 and Figure 2). On average, we recycled and composted 1.51 pounds out of our individual waste generation of 4.43 pounds per person per day. —EPA, USA.

All over the world, communities handle their waste or trash differently. Some common methods of managing their waste include landfilling, recycling and composting. Other communities strongly embark on waste reduction and litter prevention/control aimed at reducing the production of waste in the first place. Some communities also engage in waste-to-energy plants and hazardous waste disposal programs. ([More on waste recovery here](#))

Now, let us get into a bit more detail.

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Types of waste

Generally, waste could be liquid or solid waste. Both of them could be hazardous. Liquid and solid waste types can also be grouped into organic, re-usable and recyclable waste.

Let us see some details below:

● Liquid type:

Waste can come in non-solid form. Some solid waste can also be converted to a liquid waste form for disposal. It includes point source and non-point source discharges such as storm water and wastewater. Examples of liquid waste include wash water from homes, liquids used for cleaning in industries and waste detergents.

● Solid type:

Solid waste predominantly, is any garbage, refuse or rubbish that we make in our homes and other places. These include old car tires, old newspapers, broken furniture and even food waste. They may include any waste that is non-liquid.

● Hazardous type:

Hazardous or harmful waste are those that potentially threaten public health or the environment. Such waste could be **flammable** (can easily catch fire), **reactive** (can easily explode), **corrosive** (can easily eat through metal) or **toxic** (poisonous to human and animals). In many countries, it is required by law to involve the appropriate authority to supervise the disposal of such hazardous waste. Examples include fire extinguishers, old propane tanks, pesticides, mercury-containing equipment (e.g, thermostats) and lamps (e.g. fluorescent bulbs) and batteries.

[\(More on hazardous waste here\)](#)

● Organic type:



Organic waste comes from plants or animals sources. Commonly, they include food waste, fruit and vegetable peels, flower trimmings and even dog poop can be classified as organic waste. They are biodegradable (this means they are easily broken down by other organisms over time and turned into manure). Many people turn their organic waste into compost and use them in their gardens.

● Recyclable type:

Recycling is processing used materials (waste) into new, useful products. This is done to reduce the use of raw materials that would have been used. Waste that can be potentially recycled is termed "Recyclable waste". Aluminum products (like soda, milk and tomato cans), Plastics (grocery shopping bags, plastic bottles), Glass products (like wine and beer bottles, broken glass), Paper products (used envelopes, newspapers and magazines, cardboard boxes) can be recycled and fall into this category.

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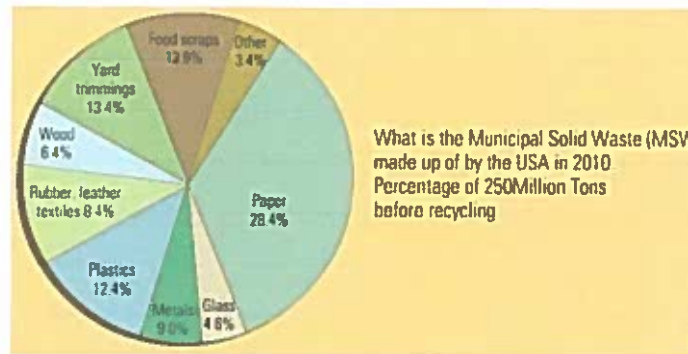
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Sources of waste

● Municipal sources of waste:

This includes trash or garbage from households, schools, offices, market places, restaurants and other public places.

They include everyday items like food debris, used plastic bags, soda cans and plastic water bottles, broken furniture, grass clippings, product packaging, broken home appliances and clothing.



● Medical/Clinical sources of waste:

Medical/clinical waste, normally refers to waste produced from health care facilities, such as hospitals, clinics, surgical theaters, veterinary hospitals and labs. They tend to be classified as hazard waste rather than general waste.

Items in this group include surgical items, pharmaceuticals, blood, body parts, wound dressing materials, needles and syringes

● Agricultural sources of waste:

Typically, this is waste generated by agricultural activities. These include horticulture, fruit growing, seed growing, livestock breeding, market gardens and seedling nurseries.

Waste items in this group include empty pesticide containers, old silage wrap, out of date medicines and wormers, used tires, surplus milk, cocoa pods and corn husks.

● End-of-life Automobiles:



When cars are all old and not working again, where do they end up? Many people just leave them to rust in the fields, but there is a better way to deal with them. In many cities, these vehicles are sent to the plant, where all the removable parts are taken out for recycling. The rest is flattened up and shredded into pieces for recycling. The last bits that cannot be used again is sent to a landfill.

● Industrial sources of waste:

Since the industrial revolution, the rise in the number of industries manufacturing glass, leather, textile, food, electronics, plastic and metal products has significantly contributed to waste production. Take a look at the things in your home, every item there was probably manufactured and possibly, waste was produced as a result.

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● Construction/demolition sources of waste:

Construction waste is that resulting from the construction of roads and building. Sometimes old buildings and structures are pulled down (demolished) to make space for new ones. This is particularly common in old cities that are modernizing. This is called demolition waste.

Waste items include concrete debris, wood, earth, huge package boxes and plastics from the building materials and the like.

● Electronic sources of waste:

This is waste from electronic and electrical devices. Think of DVD and music players, TV, Telephones, computers, vacuum cleaners and all the other electrical stuff in your home. These are also called e-waste, e-scrap, or waste electrical and electronic equipment (WEEE)

Some e-waste (like TV) contains lead, mercury, cadmium, and brominated flame retardants. These are harmful to humans and the environment. It is therefore important that the right authorities ensure the proper disposal of such waste.

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How is waste treated and disposed off?

Waste management simply means the collection, transport, processing or disposal, managing and monitoring of waste materials to minimize its' consequences on humans and environment.



There are several methods of managing all the various types of waste. Some of these methods cause additional harm to the environment, but not doing anything is not an option.

Let us see below two common ways of managing waste:

● **Incineration method of waste management:**

This simply means burning waste. This method is common in countries with limited landfill space. Incineration chambers can be small for domestic use, but there are large ones for municipal use as well. It is great for treating waste with contamination (like those from hospitals) and hazardous waste from factories, but the method produces too much carbon dioxide ([see our air pollution lesson](#)). Modern incineration processes are more efficient and release less dioxin than home fireplaces and backyard barbecues. This method is very common in Denmark, Germany and the Netherlands. This method is effective, but expensive.

● **Sanitary Landfills as waste disposal:**

Generally, this term means a large piece of land away from living places where all the waste from a town is deposited. But there is more to landfills. Proper landfill management involves sorting out all the waste (waste separation), and sending only the waste that cannot be recycled and composted to the site.

Proper landfills, are also lined at the bottom to minimize the leakage of soil pollutants and other toxins from getting into the water table. This method is effective, but expensive and difficult.

In many towns, sorting is not done, and all the waste (paper, food, diapers, glass) is mixed up and deposited. That is a problem because, glass, and plastics take thousands of years to decompose. Additionally, the landfills soon become full, smelly and unsafe for the environment.

Proper waste management is not cheap, but it is something we all have to get involved and discuss it. The effect of not getting involved can be catastrophic to our health and environment. [Read about waste source reduction here](#)

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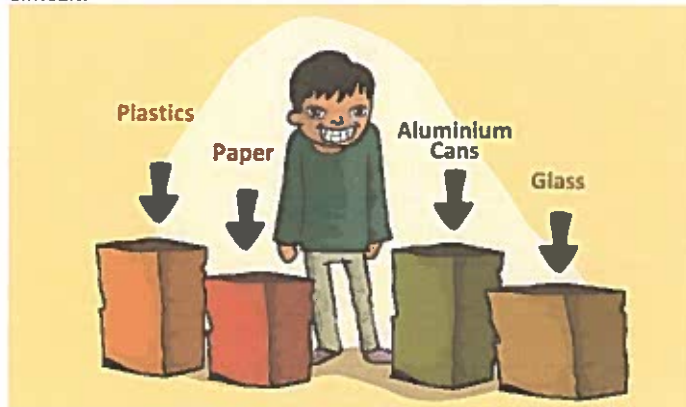
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What is Waste Recycling?

Recycling is processing used materials (waste) into new, useful products. This is done to reduce the use of raw materials that would have been used. Recycling also uses less energy and is a great way of controlling air, water and land pollution.

Effective recycling starts with household (or the place where the waste was created). In many serious countries, the authorities help households with bin bags with labels on them. Households then sort out the waste themselves and place them in the right bags for collection. This makes the work less difficult.



Waste items that are usually recycled include:

Paper waste:

Paper waste items include books, newspapers, magazines, cardboard boxes and envelopes. [Click here to see how paper is recycled.](#)

Plastic waste:

Items include plastic bags, water bottles, rubber bags and plastic wrappers.

Glass waste:

All glass products like broken bottles, beer and wine bottles can be recycled. [Click here to see how glass is recycled.](#)

Aluminium waste:

Cans from soda drink, tomato, fruit cans and all other cans can be recycled. **Did you know:** Recycling just 1 ton of aluminum cans conserves more than 207 million Btu, the equivalent of 36 barrels of oil, or 1,665 gallons of gasoline. —EPA [Click here to see how aluminum cans are recycled.](#)

When these are collected, they are sent to the recycling unit, where all the waste from each type are combined, crushed, melted and processed into new materials.

Importance and benefits of waste recycling

Recycling helps protect the environment:

This is because the recyclable waste materials would have been burned or ended up in the landfill. Pollution of the air, land, water and soil is reduced.

Recycling conserves natural resources:

Recycling more waste means that we do not depend too much on raw (natural) resources, which are already massively depleted.

Recycling saves energy:

It takes more energy to produce items with raw materials than from recycling used materials. This means we are more energy efficient and the prices of products can come down.

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Recycling and composting more than 85 million tons of MSW saved more than 1.3 quadrillion Btu of energy, the equivalent of over 229 million barrels of oil.

Recycling creates jobs:

People are employed to collect, sort and work in recycling companies. Others also get jobs with businesses that work with these recycling units. There can be a ripple of jobs in the municipality.

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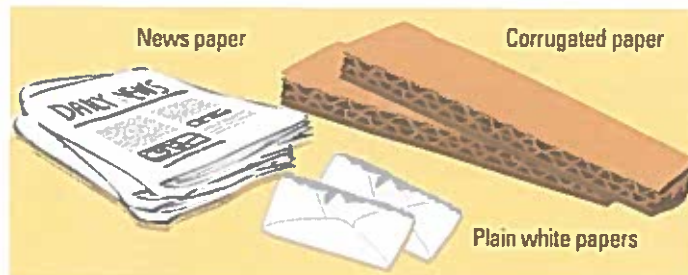
Here is how paper waste is recycled:

Collection, transportation and storage:

The biggest task for paper recycling companies is probably the collection, transporting and sorting of waste paper.

This is because we always add paper to other waste items and get them contaminated with food, plastics and metals.

Sometimes collected paper is sent back to the landfills because they are too contaminated for use. Try to keep waste paper in separate grades at home or in the office —example, do not mix newspapers and corrugated boxes up.



All paper recovered is sent to the recycling center, where it is packed, graded, put into bales and sent to the paper mill. At the mill, all the paper is stored in a warehouse until it is needed.

Repulping and Screening (say re-pal-pin and skree-nin):

From the storage shelves, they are moved into a big paper-grinding machine called a *vat (pulper)*. Here the paper is chopped into tiny pieces, mixed with water and chemicals and heated up to break it down into organic plant material called *fibre*. After, it is screened to remove contaminants such as bits of plastic and globs of glue.

Deinking (say dee-in-kin):

This involves 'washing' the pulp with chemicals to remove printing ink and glue residue. Sometimes, a process called *floatation* is applied to further remove stubborn stains and stickies. Floatation involves the use of chemicals and air to create bubbles which absorb the stickies in the pulp.

Refining, Bleaching and Color Stripping:

Refining involves beating the recycled pulp to make them ideal for paper-making. After refining, additional chemicals are added to remove any dyes from the paper. It is then bleached to whiten and brighten it up.

Paper making:

At this stage, the pulp is ready to be used for paper. Sometimes new pulp (*virgin pulp*) is added to give it extra strength and smoothness. Water is added to the pulp and sprayed onto a large metal screen in continuous mode. The water is drained on the screen and the fibres begin to bond with each other. As it moves through the paper-making machines, press rollers squeeze out more water, heat them dry and coat them up.

They are then finished into rolls.

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Aluminum recycling

In recent time, there has been a massive improvement in recycling aluminum cans. In 2003, Americans recycled 62.6 billion aluminum cans. Those cans, placed end-to-end, could make 171 circles around the earth. Every minute, an average of 105,800 aluminum cans are recycled. That is how important can recycling has become. But what is involved here? Here is it...

Collection:

Local councils provide special can recycling containers (bins) that are clearly marked. This helps people to know what to place in them. Cans include soda, fruit and vegetable cans. Trucks come for these at pick up spots to the recycling centers. Cans may also be metallic or steel, but people do not know the difference.

Preparation:

At the collection center, a huge magnet is rolled over them as they move on the conveyor belt to pull out all the metal and steel cans. Only the aluminum cans are washed, crushed, condensed in to 30-pounds briquettes for other companies for further processing. The rest is also sorted and sent to their appropriate recycling centers.

Melting:

The crushed cans are loaded into a burning furnace, where all printing and designs on the cans are removed, melted and blended with new (virgin) aluminum. The molten (liquid) aluminum is poured into moulds and made into bars called *ingots*.

Sheets:

The ingots are then fed into powerful rollers, which flatten them into thin sheets of aluminum of about 25.4 in thickness. These thin sheets are rolled into coils and sold or sent to can-making factories. They use the aluminum coils to prepare cans and containers for other food and drink manufacturers. It is estimated that cans collected at collection points take up to 60 days to be appear in the shops again as new cans containing your favourite soda, juice or food.

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How is glass recycled?

Recycling glass starts in your home. There is a reason why many local councils provide different containers for green, brown, plain glass and even glass from broken windows. The reason is that they are all made very differently and mixing them can create huge problems at the recycling center.

Collection:

Many cities have collection spots. Trucks may also pick them up from your home, or you may be required to drop them off at a point in your town. In all cases, try to do what the authorities have suggested. So, be sure you know the various glass types that are collected from your home. Always wash and separate them into the required grades for collection.

Cleaning and Crushing:

The glass is transported to the processing plant where contaminants such as metal caps and plastic sleeves are removed. Different grades are treated separately. Clean glass is then crushed into small pieces called *cullet*. Cullet is in high demand from glass manufacturers. It melts at a lower temperature and it is cheaper than raw glass materials.

Ready for use:

The cullet is then transported to glass-making factories. Here, it is mixed with sand, soda ash and limestone. It is heated at very high temperature and melted into liquid glass. This liquid is then poured into moulds that give glass its shape.

Glass is used for many things—depending on what grade they were recycled from. A few items made of recycled glass include fibre-glass, countertops, bottles and jars.

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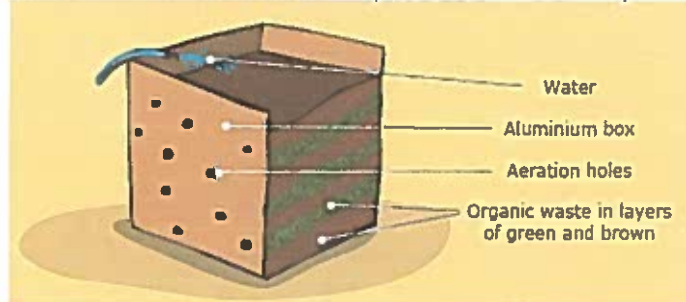
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Composting

With the right conditions (*air and moisture*), organic waste such as food and plant materials can be decomposed by bacteria, fungi, worms and organisms. Decayed organic matter is *humus*. Yard waste such as grass and flower clippings can also be composted.

Composting comes in two kinds: *bin/pile composting and worm composting (vermiculture)*.

Bin/pile composting is easier for many households because one does not have to be too careful with what to put into it. Here is what you need:



- Get an old bin or box (1 cubic yard), or you can buy one from the shop. Ensure that you punch holes around it to help with aeration.
- Prepare your organic waste matter. Make sure you cut them into pieces (about 1inch in size). Do not throw in big chunks of the waste. Make sure you separate the organic waste into brown and green parts. Brown parts include waste like wood chips, saw-dust, yard waste shreds, straw and hay, dry leaves and shredded paper. Green parts include grass trimmings, fruit and veggie scraps, green leaves and livestock manure.
- Put the waste in the box in layers, 50% green, 50% brown.
- Mix and add some water every 7 days.

In a couple of weeks, the compost will be ready. It will look dark-brown and smell just like soil.

There are other larger composting units used in schools and some restaurants. These have larger cylindrical chambers of about 8-10 feet in length. Waste items are usually layered in the chamber, dry leaves on food waste layers. The content of the cylinders are turned regularly for aeration to speed up the composting. It takes about 2-3 weeks for the composting to complete.

Commercial composting units are a lot more sophisticated, as they are tested for color, pH, odor, moisture, and other related characteristic that appeal to compost buyers.

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Aluminum Can Recycling

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You have a role

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your cool facts and tips on Waste management

Effects of poor waste disposal.

Imagine we all throw garbage, junk and rubbish away anyhow. Imagine there was no authority to supervise waste management activities from all the sources mentioned earlier. Imagine we all just sent our rubbish to the landfill, or just dumped them in a nearby river. What do you think will happen? A disaster!

Environmental Effects

- **Surface water contamination:**

Waste that end up in water bodies negatively change the chemical composition of the water. Technically, this is called water pollution. This will affect all ecosystems existing in the water. It can also cause harm to animals that drink from such polluted water.

- **Soil contamination:**

Hazardous chemicals that get into the soil (contaminants) can harm plants when they take up the contamination through their roots. If humans eat plants and animals that have been in contact with such polluted soils, there can be negative impact on their health.

- **Pollution:**

Bad waste management practices can result in land and air pollution and can cause respiratory problems and other adverse health effects as contaminants are absorbed from the lungs into other parts of the body. ([Pollution is fully covered here](#))

- **Leachate**

Liquid that forms as water trickles through contaminated areas is called Leachate. It forms very harmful mixture of chemicals that may result in hazardous substances entering surface water, groundwater or soil.

Economic Effects

- **Municipal wellbeing:**

Everyone wants to live and visit places that are clean, fresh and healthy. A city with poor sanitation, smelly and with waste matter all over the place do not attract good people, investors and tourists. Such cities tend to have poor living standards.

- **Recycling revenue:**

Cities that do not invest in recycling and proper waste control miss out on revenue from recycling. They also miss out on job opportunities that come from recycling, composting and businesses that work with them.

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your cool facts and tips on Waste management

Play your part!



Efficient and effective waste management is best achieved at household levels.

If every person gets involved, we can have a powerful effect on our environment in a positive way.

Many times, people want to do the right things but they feel they are alone, and their actions will not make any difference — **YES IT WILL!!**

There are millions of great teens like you who appreciate the magnitude of the waste problem and are doing the right things to help. But we can do more and get others who are not doing well to do better.

Here is what you can do:

Reduce creating waste

The next time you change the waste-bin bag, take a look inside it. Is there anything that could have not ended up there? Probably. Try cutting the waste you produce at home into half. For example,

- Use proper towels and ceramic plates at home instead of paper towels, disposable spoons and paper plates.



- Get your own shopping bag instead of bringing home plastic bags each time you go grocery shopping.
- Use old post package boxes to send parcels instead of buying new ones. [More on waste reduction](#)

Re-use things that end up as waste

There are things that can be used over and over again: package boxes, gift wrappers, clothing, furniture and even playing toys. If even you have outgrown them, you can give it out to someone who has a need for it. Do not be too quick to throw them away.

You can also consider sorting out the waste for recycling and composting. These are covered in detail here: [Recycle](#) | [Composting](#)

Lead or join an environmental society

Some people live in communities that have no litter collection and waste collection programmes. This is a good time to start or join a society that can push for this kind of service.

Our research for the Waste lesson included these sources:

1. EIONET, What is waste? scp.elonet.europa.eu/themes/waste/#types
2. Environment Agency UK, Waste, www.environment-agency.gov.uk/business/topics/waste/default.aspx
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6. Think Cans, www.thinkcans.net/
7. The Institute of Grocery Distribution, www.igd.com/our-expertise/Sustainability/Packaging-waste/3517/Energy-Recovery-and-Disposal/
8. Waste Management, encyclopedia.kids.net.au/page/wa/Waste_management
9. NIH, Reduce, Reuse, Recycle, kids.niehs.nih.gov/explore/reduce/index.htm
10. LADPW, Backyard Composting: ladpw.org/epd/sg/bc.cfm

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