



# REDUCE REUSE RECYCLE

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## Note from Mr. Majid Al Mansouri

It is He, who made you trustees of the earth,  
And exalted some in rank over others.  
In order to try you  
By what He has given you  
Indeed your Lord's retribution is swift  
Yet He is forgiving and kind.



Verse from Holy Quran –Surat Al Ana'am

Ayah 165 (6:165)

Climate change today is threatening our planet and in fact our very survival on earth .All countries and governments are concerned as we humans have contributed to this malaise. To find solution to any problem, we must first fully comprehend it. Hence Environment Agency – Abu Dhabi (EAD) in association with The Energy Research Institute (TERI) is adapting and bringing this save planet series of books on Climate change to children in the UAE with a hope that students as future custodians of our environment learn about what ails our mother earth, how each one of us impact the environment through our actions, so that they are in a position to make appropriate decisions on matters that affect the health of our planet.

Climate change is expected to have direct and indirect impacts on earth. Scientists predict that we would lose nearly one third of our biodiversity, Sea levels would rise flooding low lying areas, face severe fresh water shortages , desertification , health issues such as increased incidences of infectious diseases, heat strokes, forest fires, hurricanes and extreme and strange weather patterns to name some .

While governments are trying to fathom this new reality and looking at ways and means to tackle this global issue, it is becoming clearer to all, that only a concerted and collaborative action from each and everyone can actually help save this unique planet. United Arab Emirates too is aware of its responsibility and that is why despite being a country which is endowed with vast reserves of petroleum, a non renewable resource, and the one which contributes to climate change, it is working hard to establish the first carbon neutral city MASDAR in the coming few years and invest more on developing the renewable source of energy in the country. In addition, the country is also aiming to educate its future generation, through imbibing sound knowledge, imparting skill and helping to develop right attitude towards the environmental issues so as to prepare them to face any eventualities in the future.

We hope these books would be read by all students and would help them to understand the issue of climate change and the role that they can play in helping to save this unique planet.

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# Waste not, want not

**If you think we were the first ones to come up with keep-it-clean campaigns and recycling, think again! We are certainly not the first ones to fuss about cleanliness nor the only ones to recycle waste.**

**Early humans used things found in the environment, and after they were done using or consuming them, they made new things out of them. Man ate the meat of animals and shaped the leftover bones into tools and weapons. And, thus, humans began 'recycling', or using trash and waste to make new materials from old ones.**

## Recycling, an old art!

When humans moved from hunting and gathering in the early days of their existence to farming, they took care of their trash intelligently. Ash from fires, wood, bones, bodies, and vegetable waste were all buried in the ground as they helped improve the soil.

**R**ecycling has been traced to the ancient Greek civilization. In fact the first garbage dump was set up in Athens in 400 BC. Way back in 2000BC, even people in China were practising this as a method of disposing of waste.

**2000 BC**

*The Chinese disposed of waste material by burying it in the soil.*

**400 BC**

*Ancient Greeks built garbage dumps almost two kilometres away from the city.*

**AD 1000**

*The Japanese have been recycling paper for almost a thousand years.*

**AD 1969**

*John McConnell came up with the idea of Earth Day.*

In AD 1031, the

Japanese used waste paper and re-pulped it to make new paper. In 1690, people in America

were turning cotton rags into paper, and in 1776, they melted down a statue to make bullets! However recycling really

came to prominence during World War II. A lot of effort was made to

recycle things due to extreme shortages of materials, especially metals. Recycling metals was seen as a task of great patriotic importance.

## Paris, a stinking city!

In the Middle Ages, garbage and trash in Paris found its way to the streets. Everything, from household to human waste, was dumped on roadsides or over the city wall. Larger items were tossed into the River Seine. While animals feasted on the 'goodies', the rest of it lay there to rot. Needless to say, it raised quite a stink!



# All that rubbish!

Whether you call it trash, rubbish, garbage or junk, any item that people have no use for and they throw out, is generally known as 'waste'. Waste is made up of different things. Rubbish, or trash, is the mixed waste that comes from people's homes. It is made up of food, paper, and packaging materials. Scrap and junk are metal waste. Fallen and trimmed leaves and branches from trees make up garden waste.

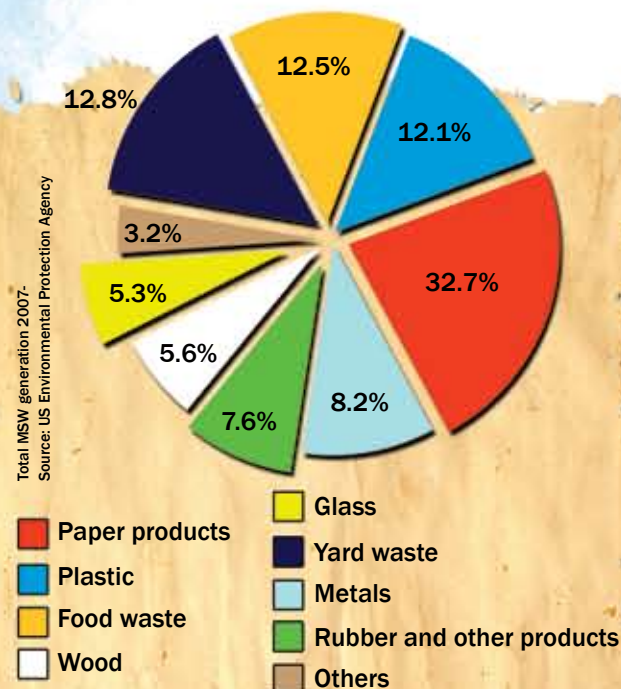
## Where did that come from?

Waste is created by individuals, families, schools, offices, towns, cities, and countries. The amount and kind of waste that is generated by people depends on the part of the world they live in, what they buy and use, and the work they do. On an average, around the world, each person makes about two kilograms of waste per day.

Each child who takes lunch in a disposable bag to school, adds about thirty kilograms of garbage in a school year. That's probably more weight than the child can put on in ten years!



## What people throw away in the US before recycling



About 8 per cent of the trash in most countries is burned in special chambers called incinerators. This reduces the quantity of waste by 60%–90%.



Only 10%–20% of the trash is recycled in countries around the world.

## Solid waste

Waste from homes, businesses, and schools is called municipal solid waste (MSW). It could be a plastic toy, a metal knife or a newspaper. It could also be a worn-out belt, a juice carton, a chocolate wrapper or an old T-shirt. In countries such as the US and Australia each person creates about seven hundred kilograms of waste every year. In India, one person in a large town creates about 180 kilograms of waste every year, while in a small town, a person adds about thirty-six kilograms each year.

## Where does it go?

Have you ever wondered where your garbage goes? Most people only want that the stinking trash leave their homes and is out of their sight. However, now it has become important for everyone who makes trash to know how their rubbish is damaging planet Earth.

In most countries, trash is either burned in an incinerator or buried in a landfill. Microbes, or bacteria, in the soil eat away the garbage and help break it down slowly over many, many years.





# The three-point formula

**With more people living on the planet today, there is more waste than there ever was. And, with about 75 per cent of the planet's garbage ending up in landfills, the piles of rubbish are never really far from us. However, there are three smart ways to get rid of garbage and to protect the environment at the same time—reduce, reuse, and recycle.**



## Recycling

Recycling involves reprocessing of materials into new ones. Milk cartons, glass bottles, aluminium cans, and newspapers are some of the materials that can and should be recycled. There are generally three levels of recycling. The first level recycles the product into a new one using the same material, for example, glass products like bottles into new glass products like containers. At the second level, old products such as cardboard boxes are turned into a different yet similar product like cereal boxes. The third level of recycling turns the discarded product into an unexpectedly new one, for example, burning old car rubber tyres to produce electricity!



# Chasing the loop

**The recycling logo is probably one of the most recognizable symbols around the world today. The Americans celebrated the first Earth Day in April 1970. For the event, school and college students were invited to design a logo for paper recycling. Gary Anderson's design won him the contest. His recycling symbol represented a Mobius loop that was made of three arrows in the shape of a triangle. Each arrow was drawn twisting and turning itself and chasing the other.**

## Symbol of meaning

The three arrows stand for the three steps that make up the recycling process. The first step is the collection of recyclable material—either from a person's doorstep or from a nearby collection centre. The collected material is then sorted and cleaned and sold to centres that make new products out of them. This is the second step. Finally, the new products are sold to people. When we buy recycled products, we close the 'loop'. This is the third step.

## One of a kind...we think so!

The Mobius strip has only one side and one edge! To make a Mobius strip, twist one end of a strip of paper and glue the ends together. And what good are Mobius strips? Some computer printer ribbons are in the form of a Mobius strip so that the printer can use both sides of the ribbon!



## Learning the loop

The original Mobius loop meant that the product had been recycled and had been made from 100 per cent waste material. Today, there are many colours, numbers, and codes that have been added to the loop. Sometimes, the three arrows are printed on a green, black or blue background or on no background at all. They can also appear with or without a circle. The arrows are also shown anti-clockwise or reversed-out. The symbol often appears with a percentage number.



**The Mobius loop is supposed to be used only on things that can be recycled or that are made of recycled material. Recycling symbols are usually stamped on cardboard boxes, paper or metal products or plastic bottles and containers. These are some symbols you may see on things you buy.**



The reversed Mobius loop is found on products that contain recycled material. The recycled material can be as much as 100 per cent to as little as 5 per cent recycled.

This product can be recycled.



This aluminium can is recyclable.

This is recyclable steel.



This carton or box is made from 100 per cent recycled paper board.





## Less is more!

**When people buy products, they also take home its packaging, which eventually becomes waste. A bottle of shampoo goes to the trash can after the shampoo is used up. Choosing items with the least amount of packaging or packaging that can be reused or recycled, is a smart way of reducing waste.**

### Prevent it!

There are many ways to reduce waste. Precycling is one of them, and it involves preventing waste even before it happens. Everyone can precycle. It can be done at school, at home, and at work. It simply requires people to think before they buy at stores.

To become 'precyclers', people must buy long-lasting and reusable items in bulk, such as buying a large pack of butter or buying a set of four soaps. Avoiding excess packaging means there is less of it to throw out.

Choose your buys carefully. The packaging of products such as cornflakes can be recycled.



### Save it all!

Reducing waste also means saving natural resources. Using cold water for washing and bathing and fixing leaky taps saves water. Turning off lights when not needed, running dishwashers and washing machines only when full, and using compact fluorescent lamps (CFLs) and solar panels help save electricity.

Reducing waste also brings down pollution and greenhouse gases that are the major causes of global warming.

The less we use the more we save!

### 'Reduce' at school

Start a 'waste reduction week'.

- **Monday Reduction Day** – Set goals to reduce the trash at school.
- **Tuesday Zero-Garbage Day** – Hold a competition to see which class makes the least waste.

- **Wednesday Paper Day** – Use erasable boards instead of paper.
- **Thursday Conservation Day** – Get indoor plant saplings like peace lily, bamboo palm, fern and rubber plants for

- your classroom. They improve indoor air quality and reduce air pollution.
- **Friday Give-away Day** – Take clothes, toys, books that you do not use to school. Organize to donate these to needy charities.



Empty bags of chips will lie in the landfill for a long, long time.



# Can you repeat that?

**Plastic bags or bottles that come with our grocery, can be cleaned after use and reused to store cookies or grains in the kitchen. This would keep the plastic and glass away from a landfill or a recycling unit. Similarly rubber bands that come with sprigs or a bunch of greens can be used over and over again. Finding repeated use for things helps reduce waste.**



## Reuse before recycle

Recycling involves collecting, sorting, and processing things into new products. This process needs money and uses transport, which adds to pollution. On the other hand, using an old teapot as a flower vase is 'reusing' just as much as saving wrapping paper from a gift to pack a present later. This type of reuse saves money and natural resources because the item does not need to be recycled.

## Again and a 'gain'

Products can be reused for the same purpose. Plastic bags can be saved to be used later. In countries such as India and Pakistan, soft drink bottles are collected after use and refilled to reduce costs of production. Sometimes, when furniture, toys, shoes and gadgets are damaged, they can be reused after repair. This too helps save energy. Fix it, so you can use it!



## Disuse to reuse

One person's disuse can well become another one's reuse. Hangers from dry-cleaners can be returned to them. Selling or donating books, appliances, clothes, and sports equipment earns money for people who give and saves money for those who take. Exchanging items with neighbours and friends also helps people who could use things that others do not need.

Yet, it is best to reduce first and keep reuse as a second option.



## Same but new

Old tyres can be turned into boat fenders, steel drums can be used as feeding troughs for livestock, and torn clothes can be made into cleaning rags. 'Kabadiwallas', or scrap collectors, in India buy paper that is used for repackaging or recycling. Countries like Jordan, Kuwait and UAE which have a shortage of fresh water, treat and reuse waste water in fields, parks, fountains, car washes, and factories.

## Husk and save water!

**Turkish scientists have found that the peanut husk can remove 95 per cent of the copper ions from waste water, thereby cleaning it and improving its quality. This reuse of the husk and waste water will help reduce land and environmental pollution. And, this reuse will cost peanuts!**

## Reusable items



Shopping bags can be reused to line your waste bins. They can be reused as long as wet things are not discarded in it.

The white plastic tray in which food is packed and sold can be collected and reused for mixing paint in your art class.



By sticking labels over the address you can reuse envelopes. Old envelopes can be used as scrap paper to make notes on.



By cleaning glass jars and small pots, you can use them as small containers to store odds and ends.



Newspaper, cardboard, and bubble wrap make useful packing material when moving house or to store items.



Packaging such as cardboards, foil, and cartons can be donated to schools, where they can be used in art and craft projects.

Scrap paper can be used to make notes and sketches. Don't forget to recycle it when you no longer need it.





# Reasons to recycle

**Reusing things does not, and cannot, completely make waste disappear. Neither can recycling, but it can prevent things that we no longer need from ending up in a landfill. Recycling is actually cheaper than dumping trash in landfills, rivers or oceans, and there are four good reasons to recycle.**

## Saves energy

Energy is used to make new items. When products are recycled, energy is saved. It takes 95 per cent less energy to recycle aluminium cans than it does to make new ones. One recycled tin can saves enough energy to run a television for three hours. One recycled glass bottle saves energy sufficient to run a computer for twenty-five minutes.

*Recycling products uses less of the planet's natural resources.*

## Saves natural resources

Natural resources such as water, trees, metals, and fossil fuels come from the earth. Paper is made from trees, plastic is made from oil, and cans are made from metal. Each time people throw away paper and cans they also waste the planet's natural resources.

*Recycling can save plastic and metals from landing up in our oceans and beaches.*

*Recycling one plastic bottle saves enough energy to light a sixty-watt bulb for three hours!*

## Saves landfill space

Landfills take up a lot of space. This space can be used for other useful purposes or even left untouched for animal habitation.

Most families throw away an average of between twenty and forty kilograms of plastic each year which can, otherwise, be recycled. Plastic can take up to five hundred years to decompose or break down. When items get recycled they do not go to landfills. This saves landfill space and reduces the need for them.

## Saves air and water from pollution

When clothes, shoes, computers, furniture, and other products are made, the factories where they are manufactured emit greenhouse gases. Waste from factories is also dumped into rivers and oceans. This pollutes both air and water and is one of the known causes of global warming. Air is also polluted when garbage is burned.

However, factories that make recycled aluminium products cause 95 per cent less air and water pollution compared to factories that use fresh natural resources to manufacture them. Paper mills that recycle paper cause less water pollution than factories that make paper from scratch.

If you must throw out something, recycle it!

## What about you?

**How much recycled paper do you use? How many glass bottles do you recycle? How many tin or aluminium cans do you recycle? Make a note of what you recycle in a month to know your savings.**

*Up to 60 per cent of the rubbish that ends up in the dustbin can be recycled.*



# What filling does this have?

**Where on the earth, even after fifty years, would you find a shower cap that you can use; a glass bottle that is still intact; and a newspaper that is almost entirely readable? A landfill, of course!**

## Not quite pits!

Landfills are large open grounds, far away from cities, where waste is dumped. Landfills used to be mountains of trash, but today, they are well-designed pits that keep the garbage dry. A basic landfill is an enormous pit that is dug up and lined with thick plastic and clay, which stops water or trash from leaking into the ground. Garbage is not just simply tossed into a landfill. It is offloaded in old and new sections of the landfills. It is then covered with dirt everyday. Garbage rots very, very slowly here.

### SANITARY LANDFILL

Cells to bury waste in. Waste is compressed and packed into these cells.

Fertile soil for trees and plants

Layers of soil

Layer of gravel

Layers of compacted clay and tough plastic film form the bottom liner, which prevent waste from soaking into the groundwater

Groundwater

Leachate collection pipe

Some landfills are massive structures—almost four times the size of a football field!

## Airy and non-airy landfills

Most countries around the world use 'sanitary landfills'. Garbage is squeezed and packed together, and when tonnes of it piles up, no air or oxygen can pass through it. The garbage then starts to produce greenhouse gases, methane and carbon dioxide. When rain falls and mixes with the garbage, the liquid turns into leachate, a poisonous substance.

Bioreactor landfills are now being tested in developed countries such as the US and Canada. Air and water are passed through the garbage in a controlled way in these landfills to help waste decompose, or rot, faster. The gases produced are used to make electricity.

## What's wrong with landfills?

In most landfills, air barely reaches the bottom layers and trash rots very slowly. Scientists from the University of Arizona studying landfills have found twenty-five-year-old hot dogs and grapes that were still recognizable!

Landfills are expensive to build and manage. Even after a landfill is full and not in use, it has to be monitored for years.

The two biggest problems are leakages of methane and leachate. Some landfills, especially the older ones, burn the methane gas to get rid of it. When methane is burned, it destroys the ozone layer in the atmosphere. Methane is also dangerous because it can explode easily.

When leachate leaks into the groundwater and soil, it pollutes them. This can make people seriously ill.

## Make your own mini landfill and an open dump

### Take

- Two large containers
- Fruit or vegetable peels
- Small pieces of plastic (for example, fork), glass, aluminium foil, styrofoam, and other wastes
- Small pieces of newspaper
- Soil

**For the landfill:** Take a container and spread a layer of soil in it. Place peels, plastic, foil, styrofoam, and newspaper over the soil. Cover these completely with soil.

**For the dump:** Fill the second container with soil. Fill it with the same things as the landfill, but do not cover it with soil.

Place both the containers in a warm place and add water to keep the soil wet. Over the next three weeks, check both containers and their fillings for:

- Smell and odour
- How much have the fillings rotted and which filling looks the same as before?
- Which filling, do you think, is more harmful for the environment?





# Is the hazard sign up?

Is your house dusted, mopped, and swept regularly? Is your house spotlessly clean? Do you think your house is free of dust and germs? Even if your answer is 'yes', you should know that you have 'hazardous', or dangerous, products sitting in your kitchen cupboards and bathroom cabinets—some of which you use almost daily!

## Know your waste

If it's hazardous, or toxic, waste it must be an oil spill in ocean waters, right? Wrong! The truth is that much of this waste comes from things we use in our homes!

Many household products contain chemicals that make them corrosive, flammable, and/or toxic. Petrol and paint are flammable. They can catch fire easily. A corrosive item, such as acid, can eat through metal and human skin. Chlorine and ammonia are reactive materials that can explode easily or turn into a poisonous gas when mixed with other chemicals. Weed killers are toxic because they can cause illness, and even death, in humans and animals. When these products are no longer needed, they make hazardous waste.

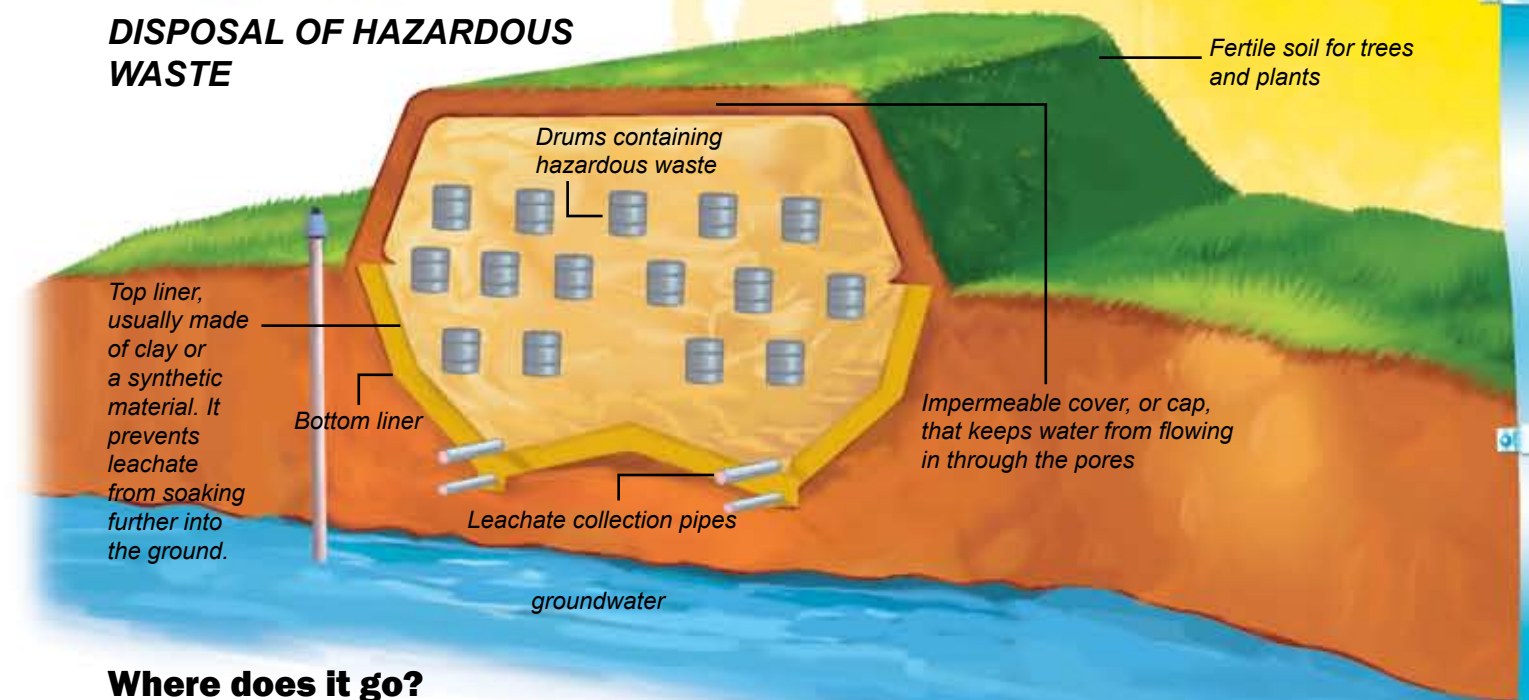
Factories that make pesticides, leather, paper, textiles, and building materials also produce hazardous waste.

## Replace your hazards

- Use baking powder to clean greasy cooking pans.
- Toss out those mothballs and use dried margosa leaves or cedar tree shavings to keep away insects from clothes.
- Sprinkle eucalyptus seeds and leaves around your pet's mattress to keep fleas away.

Some hazardous products such as bathroom cleaners, oven cleaners, room fresheners, toilet bowl cleaners, and laundry detergents are commonly used in households.

## DISPOSAL OF HAZARDOUS WASTE



## Where does it go?

Hazardous waste can be reused and recycled at special facilities. It is also stored in specially built ponds, burned, and sent to hazardous waste landfills. This waste can be managed only when people do not mix it with their household garbage or trash or pour leftovers down the drain.

Toxic waste also becomes a problem when it leaks from landfills into the ground, catches fire while being transported, or is sneakily dumped at a place not suitable for it. When chemicals from this waste leak into the groundwater or air, they can poison the food we eat and the air we breathe.

Paint, paint thinner, varnish, and glue add to household hazardous waste.



## Hazards checklist

These are some of the products that need to be disposed of carefully.

- Electronics: telephones and radios
- Batteries: AA, AAA, C, and D cells
- Musical greeting cards
- Thermometers
- Disposable diapers



# At home with recycling

**Practicing the three Rs at home can be fun and exciting. The only tools you need are a caring heart and a thinking mind. Make more with less and use less to make a big difference to planet Earth.**

## Cupboards

- Paint, decorate, repair or donate shoes. Some shoe brands accept used shoes and reuse them to make surfaces for tracks and courts!
- Donate clothes, pass them on to siblings or make quilts, cushions or cleaning rags.



## Lights

- Switch off lights when not needed.
- Use compact fluorescent lamps (CFLs) to save energy.

## Taps

- Turn off taps while brushing your teeth. Use a glass of water when rinsing your teeth.
- Wash clothes in cold water. Air-dry and sun-dry them wherever possible.
- Use the energy-saving settings on your dishwasher and let dishes air-dry.

## Kitchen

- Wash dishes in cold water.
- Use egg shells for composting.
- Place leftover seeds and bread crumbs in the garden as bird food.
- Reuse plastic and glass bottles as containers. Recycle what is not needed.
- Wash fruit and vegetables and rinse dishes in a plugged sink or bowl instead of under running water.
- Use reusable grocery shopping bag.
- Buy cereal boxes and juice cartons in bulk to reduce buying more packaging.
- Use cleaning cloths instead of paper towels.



## Garage

- Recycle the metal parts of a bicycle. Handle-bars, chains, inner tubes, and seats are useful for artists and designers.

## Living room

- Clean, repair, or donate carpets. Cut them up into floor mats for the home or car. Use as compost bin cover in winter.



## Study

- Use newspapers and magazines to wrap presents. Recycle the rest.
- Turn off the computer when done. The 'stand-by' mode uses electricity.



- Donate books to a charity or library. Sell them online. Books cannot be recycled because they are bound by glue.
- CDs: Recycle or cover with felt and use as coasters. Make a wind chime with old CDs. Hang them from plants to keep birds away.
- Recycle envelopes, junk mail, catalogues, and coloured paper.

## Garden

- Wash vehicles, outdoor furniture, and the family pet on the grass – this will water your lawn.
- Use a trigger nozzle on your garden pipe. Add compost instead of fertilizers to grass and potted plants.



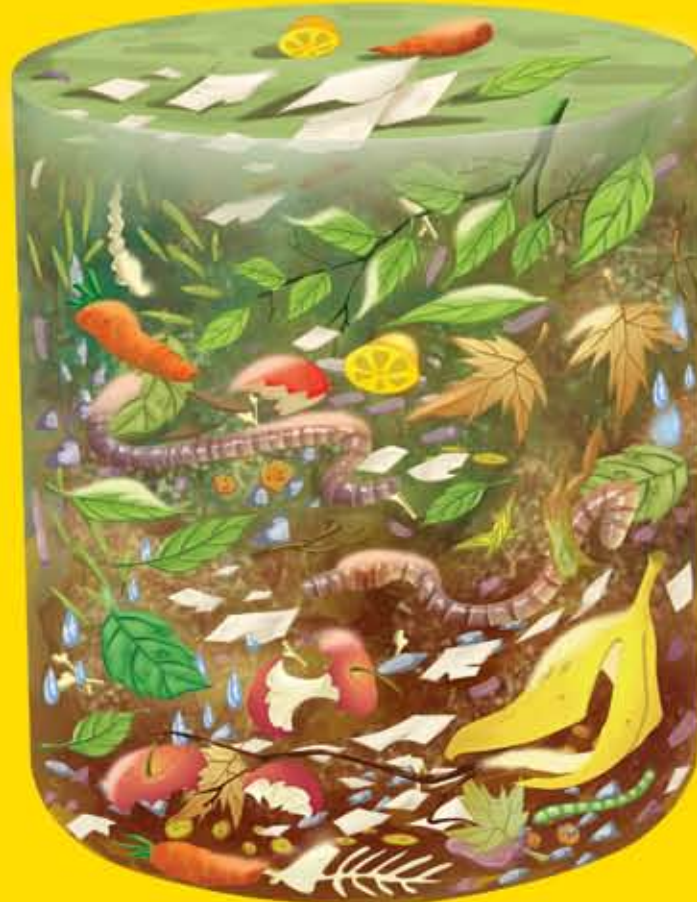


# Composting with Crawlies

In forests, leaves, fruits, flowers, and seeds from trees fall to the ground and rot on their own. They turn into compost, which helps plants to grow. This happens all the time and without the help of humans. Nothing is wasted and everything is recycled back to nature. In cities, people make more waste than nature can manage. But with a little help from human hands, waste can be turned into rich soil. Composting is a cheap way to reduce and recycle waste to make natural nutrition for soil.

## How it works

Compost is made when different kinds of living creatures such as worms, beetles, insects, bacteria, and fungi feed on waste. It needs air, water, carbon, and nitrogen. Carbon is found in 'brown' materials such as dry leaves, straw, wood chips, and cardboard. 'Green' materials contain nitrogen gas, which is found in living things like grass, plants, and vegetables.



Take leftover food, fallen leaves, and newspaper shreds. Mix them together, and soon you will have compost.

Green, leafy material form the top layer in a compost pit.

Dry, brown material form the bottom layer.

When these ingredients are mixed in the right quantities in a pile or a container, the waste begins to rot. Too much of green material can turn the pile smelly. Too much of brown material can make the pile rot very slowly. The waste pile will turn into compost over a period of time even if it is not checked. The heat from the sun and air are all that are needed. However, if the pile is stirred from time to time it will rot faster. Finally, the waste will turn into a sweet-smelling humus, or compost.

Throw in some earthworms to speed up the process.

## Bake a compost cake

### Ingredients

**Kitchen waste** – vegetable and fruit peels, egg shells, tea bags, and so on

**Garden waste** – hay, grass, ash, sawdust, wood chips or straw

### Worming it indoors

Compost can also be made using worms. This is called vermiculture and it can be done in small spaces using just a container. This can easily be done in a less spacious urban apartment. A compost bin under the sink is all that you need. Not only will it take up little space in your apartment, it will also allow you to make compost from all the food scraps and the kitchen waste. This will turn into a rich, organic fertilizer and be used as manure for your potted plants.

### Food for the 'soil'

Compost is a health food for grass, plants, and soil. Chemical fertilizers have to be used in the right quantity so that plant roots do not burn. That is not a problem with compost. The soil can take in and use as much as is put into it.

## METHOD:



**1** Take a composting bin and add kitchen and garden waste.



Mix the compost from time to time. This will help it bake faster.

**4**



**2** Spread soil over this layer of waste. Bugs and insects in the soil start to feed on the waste.



**5** When the pile shrinks in size, it means it is baking well.



**3** After a few days, check the waste pile. If it looks soggy, add straw or saw dust. If it looks dry, add water. The pile should feel like a squeezed-out sponge.



**6** The compost is ready to use in one to twelve months. When it turns dark and crumbly and begins to smell sweet, it is ready to use.



# Three Rs at school

Learning to do what is right for the planet is as important as going to school. And, practicing the three Rs at school is as simple as learning the alphabet! Saving energy, money, and the earth are all worth your time and effort.



## Going to school

Use the school bus or car pool with friends to reduce air pollution and save fuel.

## Plastic bags

Recycle. Cut into one-inch strips and join to make yarn. Knit a new, stronger plastic bag. About sixty bags make a new one.

## Printer cartridges

Refill them. Many manufacturers collect old cartridges and pay money.



## Cafeteria

Place a recycling bin and a composting bin. Food waste can be used for composting.

## Shredded paper

Avoid shredding. If it must be done, then use the shreds in a compost bin to absorb water in a soggy pile.

## Stationery

Buy long lasting plastic folders instead of paper ones. Buy refillable items like pens and pencils. Put notices on bulletin boards instead of making paper copies.



## Cardboard boxes

Reuse for craft projects. Collect and store recyclable items in them.

## Recycling bins

Place separate recycling bins for paper and metal and throw trash in the correct bins.



## Paper sheets

Use both sides of the paper. Use scrap paper for taking notes.

## Celebrate an Eco-Day

Fix one day in a month to clean up litter. Learn about reusing materials, reducing waste, recycling, and composting.



## Books

Cover school books with cut-up brown paper bags or newspapers. Decorate creatively. Pass on used textbooks to junior students. Donate your story books to the school library.



## Art class

Use non-toxic vegetable-based inks and water-based paints. Have a creative art sculpture lesson. Use recyclable items such as plastic bottles, wood, paper, hangers, and containers.



## Classroom

Switch off lights and fans when not in use. Set up a reuse box in the classroom for pencils, pens, folders, and other items that are still usable.

## Waste-free lunch championship

A lot of garbage in schools is made during lunchtime. Disposable water bottles, paper napkins, and plastic cutlery form some of this waste. Hold a competition to find out who makes the least waste from their lunch.



## A sample of a waste-free lunch

- Sandwiches and other food in reusable containers
- Whole fruits without packaging and snacks in reusable containers
- Drinks in containers that can be reused, such as a thermos
- Reusable forks, spoons, and cloth napkins





# Eee-ks waste!

**When electrical and electronic gadgets such as computers, televisions, DVDs, cell phones, and refrigerators are trashed, they make up e-waste.**

**In European countries and the US, e-waste makes up 1 per cent of the total solid waste, and by 2010, it will grow to 2 per cent. In the European Union, each person makes about fourteen to fifteen kilograms of e-waste every year; in China and India, it is less than one kilogram per person in a year.**

## Is it all waste?

By the end of 2007, we had made forty million metric tonnes of e-waste, which could fill up a line of trucks, bumper to bumper, halfway around the world! So, you may wonder, where does all this waste go?

In many countries, e-waste ends up in landfills. In Hong Kong, 10%–20% of old computers go to a landfill. E-waste is also taken apart and burned to get metals, such as copper, from it. It is also sold to be dumped in other countries.



## My trash is your trash

Up to 80 per cent of the US's e-waste, which can be recycled, is sent to China, Nigeria, India, and Pakistan. The US would have to spend twenty-five dollars to recycle a computer, whereas sending it to India costs only two to three dollars.

## Isn't that a good thing?

If all the e-waste that is exported by the US and European countries were recycled, it would be good for our planet. But this is not what happens. In Guiyu, China, piles of e-waste clog the Lianjiang river. In Accra, Ghana, e-waste from the US and China is ripped apart for its useful parts and the rest is burned or dumped.

Dumping, burning, and even stripping e-waste for their parts is harmful to humans and the environment. The chemicals from e-waste enter human bodies, water, soil, and air and are known to cause diseases like cancer.

## E-waste excess

People in Asia trash twelve million tonnes of e-waste every year, and India makes 146,000 tonnes of it. By the end of 2009, it is estimated that UAE would generate e-waste to the tune of 29,000 to 38,000 tonnes.





# It's all coming back...recycled!

Once paper, aluminium cans, glass, and plastic are trashed in recycle bins they are taken to recycling centres. It is there that the recycling process begins.

## Glass – see through recycling!



Glass is separated according to colour.



It is then taken to a glass unit, where it is cleaned. It is crushed into small pieces called cullet.

The cullet is mixed with sand, soda ash, and limestone. This mixture is heated and turned into a liquid.



The liquid is poured into moulds to make new glass products such as bottles, floor tiles, kitchen counters, and even glassphalt for road surfaces.

## Aluminium – you can!

Aluminium cans are taken to a recycling plant.



They are shredded and melted in giant furnaces.



The melted aluminium is cooled and shaped into a block called ingot.



The ingot is turned into sheets that are then sent to factories that make cans, foils, furniture, and more.



## Paper – don't write it off!

Paper is first sorted. It then goes to the paper mill, where it is turned into pulp by running it through water and some mechanical processes.



Air bubbles are passed through the pulp, which help remove the ink. It is then soaked in chemicals to remove glue and other dirt.



The pulp is beaten and then fed into a machine that rolls out sheets of paper, which are dried before they can be used.



The recycled paper is made into newspapers, magazines, printing paper, cardboard, and toilet rolls.



## Plastic – long live plastic!

Plastic bottles and containers are sent to a facility where they are washed and checked.



The plastic is cut into tiny pieces that are melted into liquid in a furnace. The liquid is then turned into long strands.

The strands are cut into pellets, which are sent to factories to make new items.



Recycled plastic is turned into the most imaginative products—tables, chairs, stationery, and packing material.



# What's recyclable and what's not

**There are many things that you can recycle. Some of these things may need extra effort to get them to their correct recycling centre, yet for our planet's sake it is all well worth it.**

## Batteries

Primary batteries such as those used in radios, toys, cameras, torches, watches, computers, calculators, and hearing aids cannot be reused. Secondary (rechargeable) batteries, which are used in camcorders, portable radios, laptops, mobile phones, and remote-controlled toys can be reused. The bad news is that most household batteries end up in landfills because people cannot identify the different battery types to recycle them accordingly.

Those that are marked as nickel cadmium (Ni-Cd), nickel metal hydride (Ni-MH), lithium ion (Li-ion), and small sealed lead (Pb) are recyclable.

## Plastics

Plastic bottles are labelled with a number that stands for the material they are made of. Bottles numbered one, two, three, four, five, and seven are usually containers for soda, cooking oil, milk, and detergent. These are recyclable. It is very difficult to recycle polystyrene found in bottles that are numbered six.

## PLASTICS CODES



- Soft drink bottles
- Water bottles
- Shampoo bottles
- Peanut butter jars



- Milk, water, and juice bottles
- Detergent containers
- Grocery bags



- Clear food packaging
- Shampoo bottles



- Breads bags
- Frozen-food bags
- Squeezable bottles of mustard and ketchup



- Ketchup bottles
- Yogurt cans and margarine tubs



- Egg cartons
- Cups and plates



- Ketchup bottles
- Juice bottles

## ...and many more

Cell phones, old computers, fluorescent bulbs, used motor oil, aluminium and steel cans and containers, tyres, wood, plastic bags, paint, building materials, cardboard egg cartons, empty aerosol cans, tissue boxes, and wrapping paper are some of the many things that can be recycled.

**Where there is a can there is a cannot...**

**There are an equal number of things, if not more, that cannot be recycled.**

## Paper

- Waxed paper
- Freezer packaging such as frozen concentrate cans, frozen dinner boxes, paper ice-cream cartons
- Chip and cookie bags and canisters
- Chocolate bar wrappings
- Fast food drink cups

## Glass

- Ceramics and porcelain
- Drinking glasses, window glass, light bulbs, mirrors

## Plastic

- Meat and cheese packaging
- Household plastic food wrap
- Plastic from dishes, make-up jars

Toothpaste tubes, carbon paper, disposable diapers, cement, carpets, cigarette butts, old clothes, rags, sponges, toys, hangers, animal waste, cat litter, and paper plates are things that cannot be recycled.

*Non-recyclable batteries need to be disposed of carefully according to local solid waste management rules.*

*Hearing aid batteries cannot be reused but they can be recycled.*



# Closing the loop

**A circle has no beginning and no end, and all the points on its path must meet to complete it. The recycling loop is much the same. In order for all of its points to meet, people need to recycle, as well as buy recycled things. Just reducing, reusing, and recycling is not enough. After a product is recycled, people must choose to buy it over products that are not.**



*When things are recycled, far less waste is generated and there is very little pollution.*



## In good shape!

When people buy recycled items they make a huge contribution not just to the planet but also to other human beings.

Water, land, minerals, and forests are the earth's limited natural resources. Some of our resources like oil and coal, once used, can never be replaced again. Each

time a product such as furniture, paper, and glass bottles is made, natural resources are used up. Buying recycled products means saving resources and energy. And, resources saved are resources earned!

The waste that is created when things are made from scratch goes into the ground, water supply, air or landfills. For every fifteen thousand tonnes of waste that is sent to landfills only one job is created for people. However, when that waste is recycled, it gives a chance to nine people to earn a living.

*Recycled products look just as good as the non-recycled ones and are just as hardy and durable.*



## Affordable and available

Many people believe that recycled products are more expensive. That might have been true some years ago, but today, recycled products are affordable and easily available. In fact, most cereal boxes are made from 100 per cent recycled paper; they are grey in colour on the inside.

Whether people can tell or not, hundreds of things in their homes, schools, and at work are made from recycled materials. Some of the things you would never expect to see recycled into are: fleece jackets from plastic bottles; mouse mats from rubber tyres, pencils from plastic cups and even teddy bears from 100 per cent recycled knitwear.



*Telephone directories can be recycled into sleeping bags!*



## Caution!

Sometimes, recycled items may have poisonous materials, which could be harmful for our health.

A common example is water containers. Recycled plastic cans may contain some toxic elements that may pass on to the water over a period of time.



# Recycling around the world

**Scandinavian and north-western European countries recycle the most. Overall, Sweden, Finland, Norway, Holland, Denmark, Austria, Switzerland, Germany, France, and Japan have the highest recycling rates.**

## US

Today, the US recycles 42 per cent of all paper, 55 per cent of all aluminium beer and soft drink cans, 57 per cent of steel packaging, and 52 per cent of all major appliances. This has more than doubled in the last fifteen years. Of course, the amount of recycling in the US differs from state to state. Alaska recycles less than 9 per cent of its waste, while New York recycles 40 per cent.

*The US recycles 40 per cent of all plastic soft drink bottles.*

## Fact box

London is now the first city in Europe to run a hydrogen bus fleet. Ten buses will be powered by hybrid engines, making them not just quieter, but also pollution free.

## Europe

The Swiss do not just throw things away. They reuse and recycle them. They have to. And, they have to pay for some of it! Although recycling is free, rubbish bags that are collected from homes must have a sticker, which costs one Euro. If the rubbish does not have a sticker, the rubbish rots at the person's doorstep. Switzerland recycles 91 per cent of its drink cans. It recycles 80 per cent of its plastic containers, which is more than Europe's average 30 per cent!

If it's Germany, it must be eco-friendly. Recycling in Germany is a very complicated activity. People tend to look out for items with the Green Dot, which simply means that the manufacturer has to pay for packaging. Green Dot products have less paper and metal and use thinner glass. Recycle bins are colour-coded brown, grey, black, yellow, and green. If things are not in the correct bin they could land up getting burned in the incinerator, which could give out poisonous gases.

Spain can easily be called the leader of glass recycling. The law in this country puts the responsibility of recycling on companies that sell their products in glass containers. Companies have to pay for the collection, sorting, and recycling of their bottles.

*Germany produces thirty million tonnes of garbage every year. Of this, 50 per cent is made up of household waste.*



# Circle of life

**Every product, when made, uses natural resources of the environment like water, minerals, land, and so on. Every product has a life from the moment it is created. That is the beginning of its life cycle. When the user does not need it anymore, or when it stops working, the product's life cycle comes to an end.**

## Cell phones: Not a happy ring to it!

People generally change their phones every eighteen months. Not many people may know that making more cell phones means hurting the environment and also gorillas. Cell phones are made up of a mineral called coltan, which is found in the Congo, which also happens to be the habitat of gorillas. Mining for this mineral means cutting down trees and forests where gorillas live.

Learning about the cell phone's life cycle may make you think about the energy, money, and resources that go into making it. Think about giving 'reuse, reduce or recycle' a chance before you throw it in the trash.

## Life cycle of a cell phone

### 1. Gathering the material

A cell phone is made from minerals and materials that are obtained from the earth, for example, nickel, cobalt, zinc, cadmium, copper, and lithium metallic oxide among others.

### 2. Preparing the materials

The materials needed to make a cell phone are extracted from the earth treated, prepared, and shipped to parts of the world for assembly.

### 3. Putting the materials together

Electricity, crude oil, plastics, fibreglass, and glue are only some of the things needed to put the cell phone together. All of these materials are sourced and treated in different places and, finally, transported to the assembly unit.

### 4. Getting the cell phone to the store

Plastic and cardboard packaging boxes that are made in other parts of the world are shipped to the factory where the cell phones are assembled. Once packed, the cell phones are again shipped to different countries from where they are sent by road or rail to stores in different cities.

### 5. Using the cell phone

People buy and use the cell phone. The packaging is trashed.

### 6. Getting rid of the cell phone

Cell phones are either reused by another person or stay unused with the owner. Often, they end up in landfills.

Parts of a cell phone: case, LCD display, wiring board, plastic keypad, microphone, speaker, antenna, battery, SIM card, and adapter

These parts are made in factories all over the world.

Materials needed to make a cell phone are shipped to the assembly unit.

The cell phone reaches the consumer after being shipped from factories and transported to stores.

There are approximately two cell phones being used by a single person in the United Arab Emirates.





# Get 'loopy'

Collect all the scraps of paper, including newspaper that you do not need. When you have a boxful, you can recycle the paper at home and complete the loop, that is, by using recycled items.

## What you need

- Sheets of used paper or newspaper
- Large square pan, about three inches deep
- Three cups of water
- An empty bottle
- A large bowl



1

Tear the paper into small pieces.

2

Put the paper pieces into the bowl. Add water, a little at a time.

3

Mash the mixture into a pulp. Add water and paper till the mixture looks like a thick paste.

4

Take the pan and turn it upside down. Take a handful of the paste and spread it evenly on the upturned pan.



5

Cover the spread with a few sheets of newspaper.

6

Place one hand on the top of the pan, and carefully, turn it upside down on a table.

7

Lift the pan. The paste will stick to the newspaper.

8

Cover the paste with a few sheets of newspaper.

9

Take the bottle and hold it like a rolling pin. Flatten the paste with the bottle and press the top sheets of newspaper to blot the water from the paste.



10

Remove the top sheets of newspaper and let the paste dry completely.

Once dry, the 'new' paper will peel off from the newspaper below. Your recycled paper is ready to use.

## Recycling paper and your eco-savings

**Energy:** It takes 64 per cent less energy to make paper from used paper than from trees. Recycling one tonne of paper saves the equivalent of more than 260 litres of oil.

**Water:** It takes 61 per cent less water to make paper from 100 per cent recycled materials.

**Land:** Every tonne of paper that is recycled saves three cubic metres of landfill space.

**Air:** Making recycled paper gives out 70 per cent lesser air pollutants than making paper from trees.



# Glossary

**Bioreactor**— a chamber or device in which organisms break down waste (as in landfills) or make useful substances

**Carbon**— an element found in rocks, carbon dioxide, rivers, lakes, trees, and some animals

**Compost**— a mixture of rotting matter that is later added to soil to make it richer

**Corrosive**— capable of destroying

**Crude oil**— raw petroleum as it comes from the ground

**Fertilizers**— food for plant growth

**Flammable**— easily set on fire

**Fossils fuels**— coal, petroleum, and natural gas, which are dug out from the earth and used as fuel

**Furnace**— a closed box or chamber in which heat is produced

**Glassphalt**— road-surfacing material made of asphalt and crushed glass

**Global warming**— an increase in the earth's average temperature

**Incinerator**— a furnace that burns garbage to ashes

**Landfill**— land where trash and garbage is dumped

**Litter**— scattered rubbish

**Leachate**— liquid waste in a landfill

**Microbes/bacteria**— very, very tiny living thing

**Methane**— a colourless and odourless gas used as fuel

**Municipal solid waste**— unwanted litter or rubbish from homes, businesses, and schools

**Nitrogen**— a colourless gas present in the atmosphere

**Non-recyclable packaging**— packaging that cannot be reused and lands up in landfills, some of which takes 450 years to decompose

**Non-renewable**— something that cannot be replaced after it is used

**Omnivores**— living beings that eat both plants and animals

**Pharmacy**— a store that sells medicines

**Pollutant**— something that dirties the air, water or land

**Polystyrene**— clear plastic or stiff foam

**Precycling**— reducing waste by buying in bulk to reduce packaging, buying recyclable things and packaging, avoiding junk mail etc.

**Recycling**— treating waste to make usable products

**Recycling centre**— a place where people can take recyclable material like paper, aluminium can, and glass bottles and get money for it

**Reducing**— using less of something

**Reusing**— using or finding use of something over and over again

**Re-pulp**— adding water to paper to make a smooth mixture

**Resource**— a source of supply or materials

**Silica**— a mineral present in sand

**Swapping**— making an exchange

**Symbol**— is a word, phrase or image that represents or stands for something

**Toxic**— having a poisonous effect

**Vermiculture**— using earthworms to turn kitchen waste into compost

**Waste**— unwanted litter or rubbish

**Watt**— a unit of power



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THIS IS A GREEN BOOK

