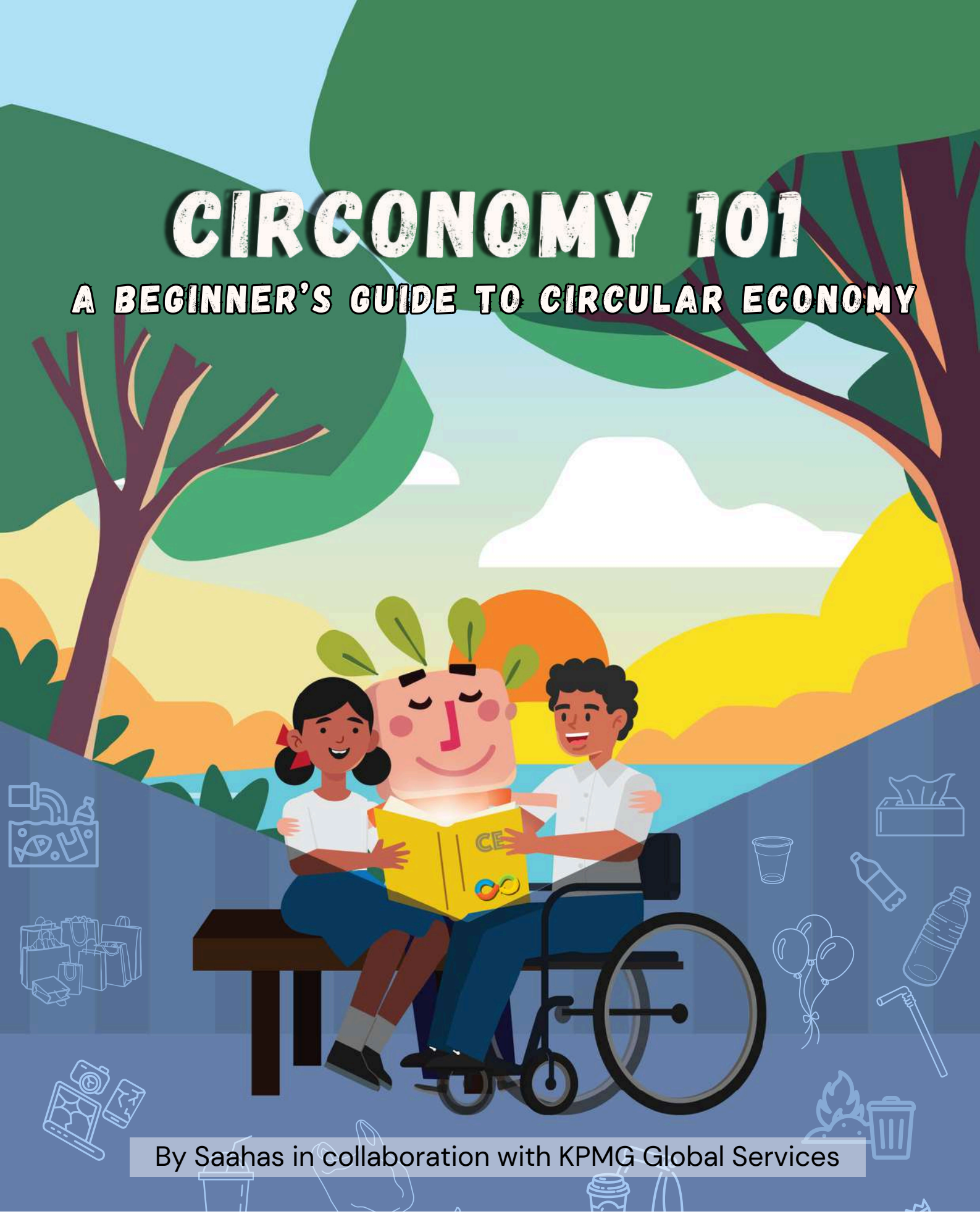
CIRCONOMY 101

A BEGINNER'S GUIDE TO CIRCULAR ECONOMY



By Saahas in collaboration with KPMG Global Services

SAAHAS nothing is waste

KPMG

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nothing is waste

CIRCONOMY 101

A BEGINNER'S GUIDE TO CIRCULAR ECONOMY

ReSET

Revitalizing Environment Sustainability through Education & Technology

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Foreword

By Divya Tiwari

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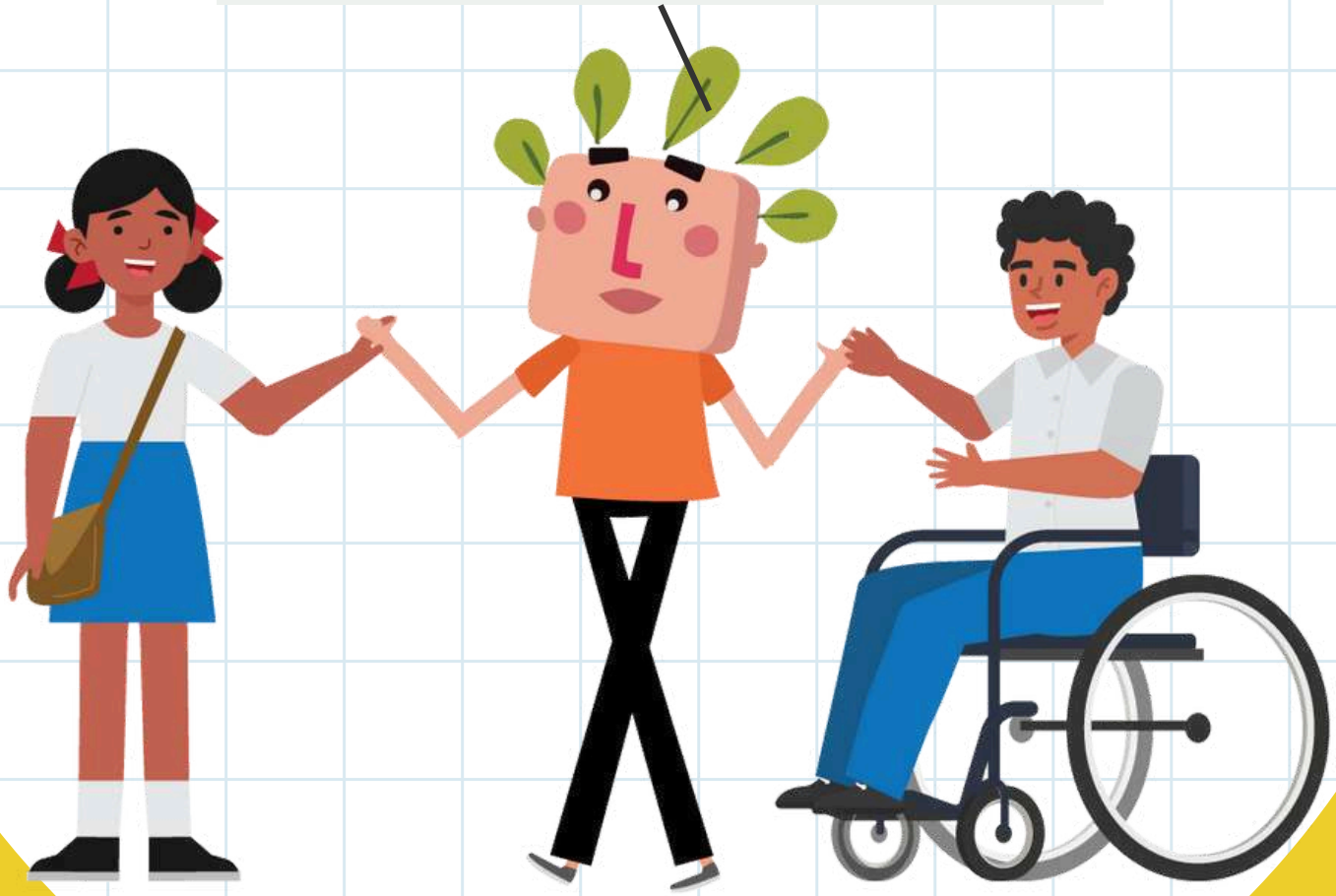
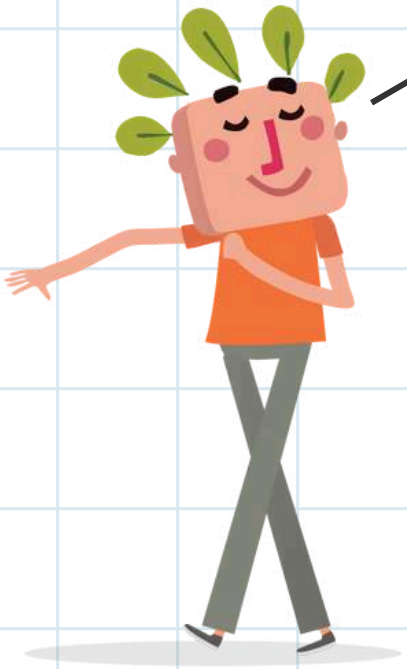
Advisor, Saahas

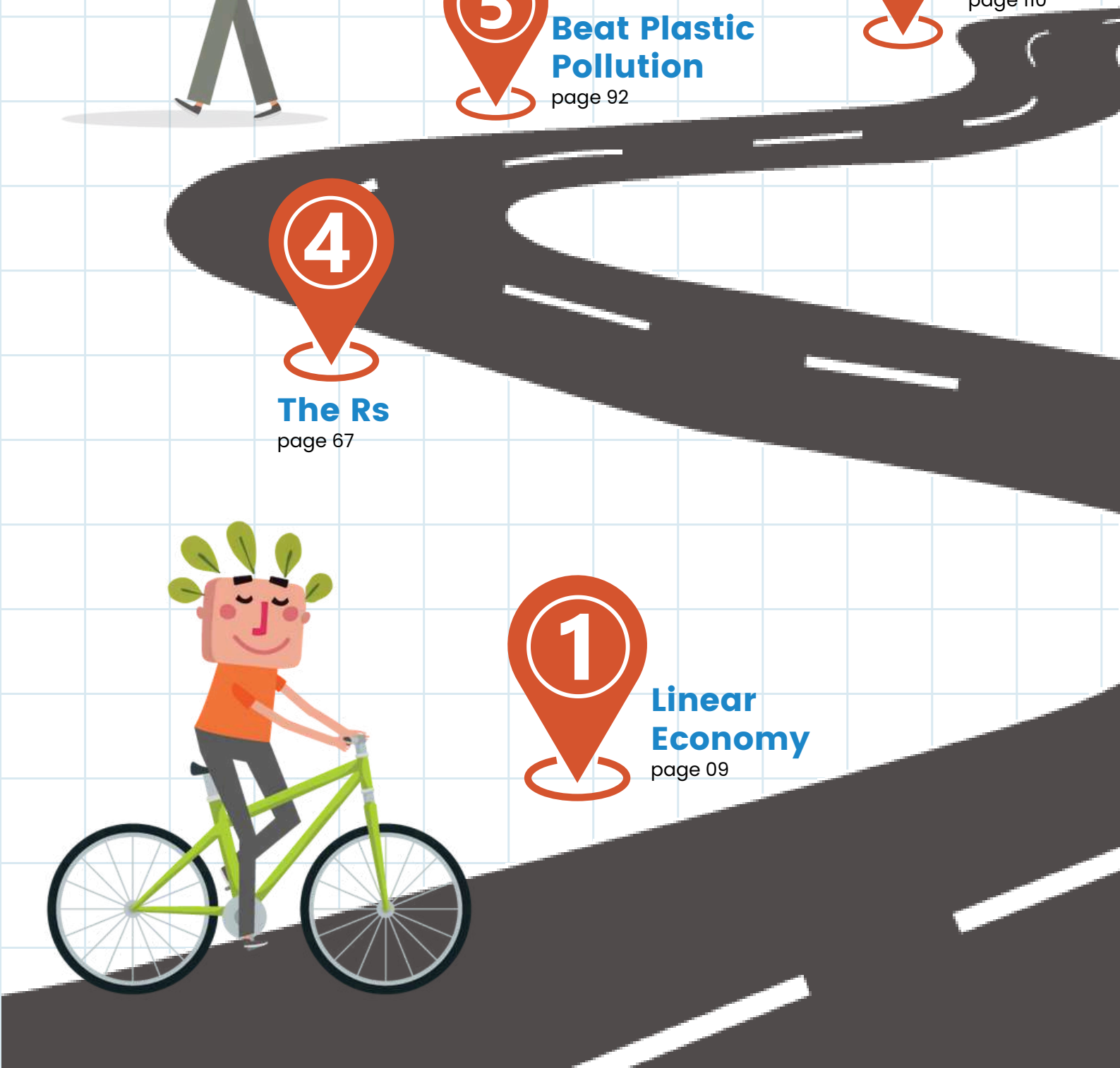
Circular Economy as a concept has the potential to address most of the sustainability challenges plus generate local and empowering livelihoods, increase consumer and producer accountability and even improve cohesion in the society. The reason this idea is so powerful is because this is how nature manages its resources and runs the world where every end circles back to another start and where every species has an equally important role and they are all interdependent. Unfortunately, the transition from concept to application has been quite slow, governments have been hesitant in framing the right policies, businesses are conservative and most importantly the public remains unconcerned and unengaged. Unless the public demands circular products and services, governments and businesses are unlikely to take action. This playbook is an attempt to stimulate and engage the young minds with the key aspects of Circular Economy. The book explains the core principles through easy local examples and further reinforces those with interesting hands-on activities. There is a lot that each one of us can do to kick start the wheels of Circular Economy and this playbook nudges us to look around and take those small steps towards big impact.

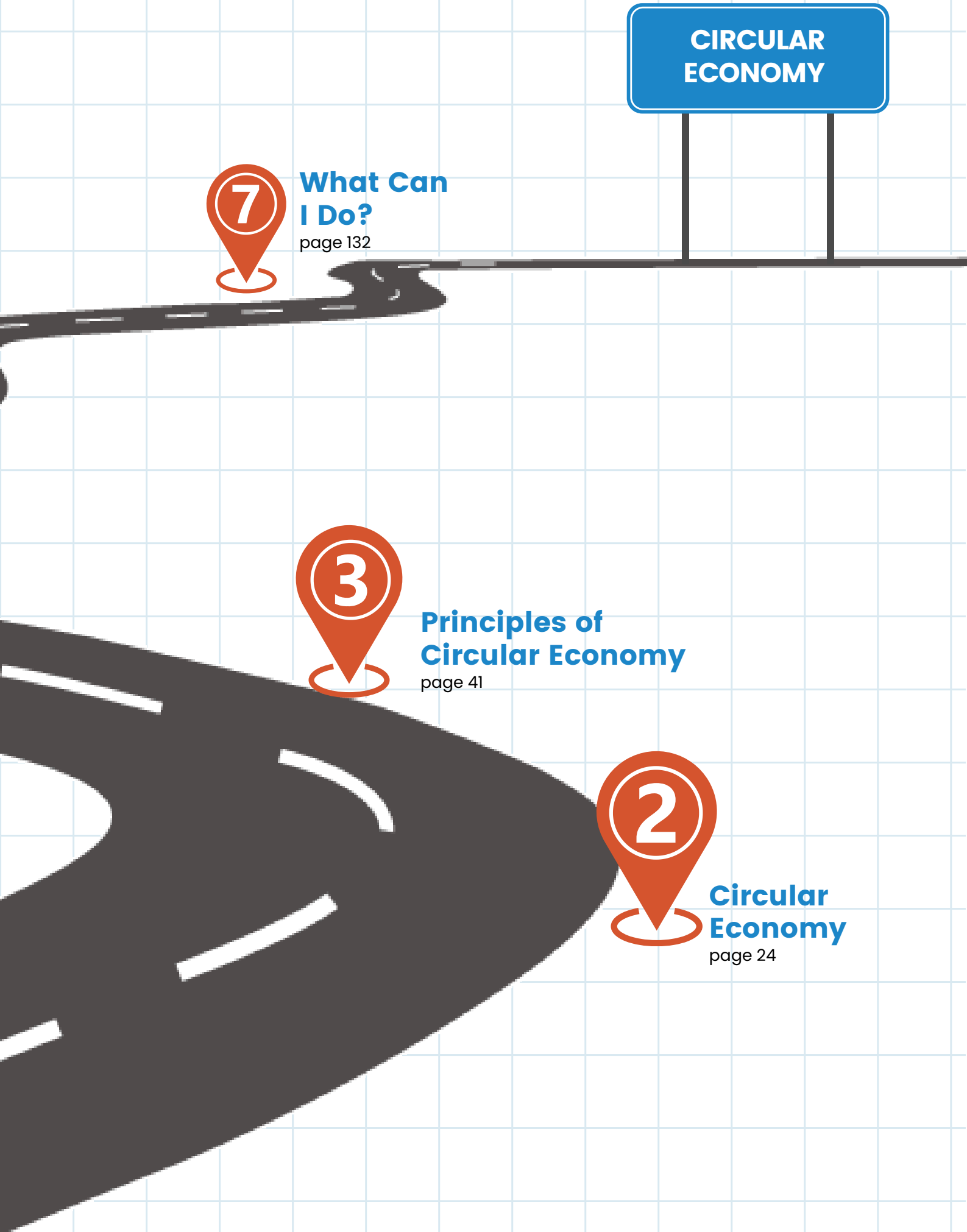
Hello! I'm Environmental, your friendly guide on our trip to the various stops of this Circular Economy Playbook. Meet my friends, **Riya** and **Ravi**!
Like you, we care about keeping our planet healthy and beautiful. Let's take a journey together to understand how things work today—and to help explore how we can make them more circular!





Here are the various stops on our journey towards a Circular Economy

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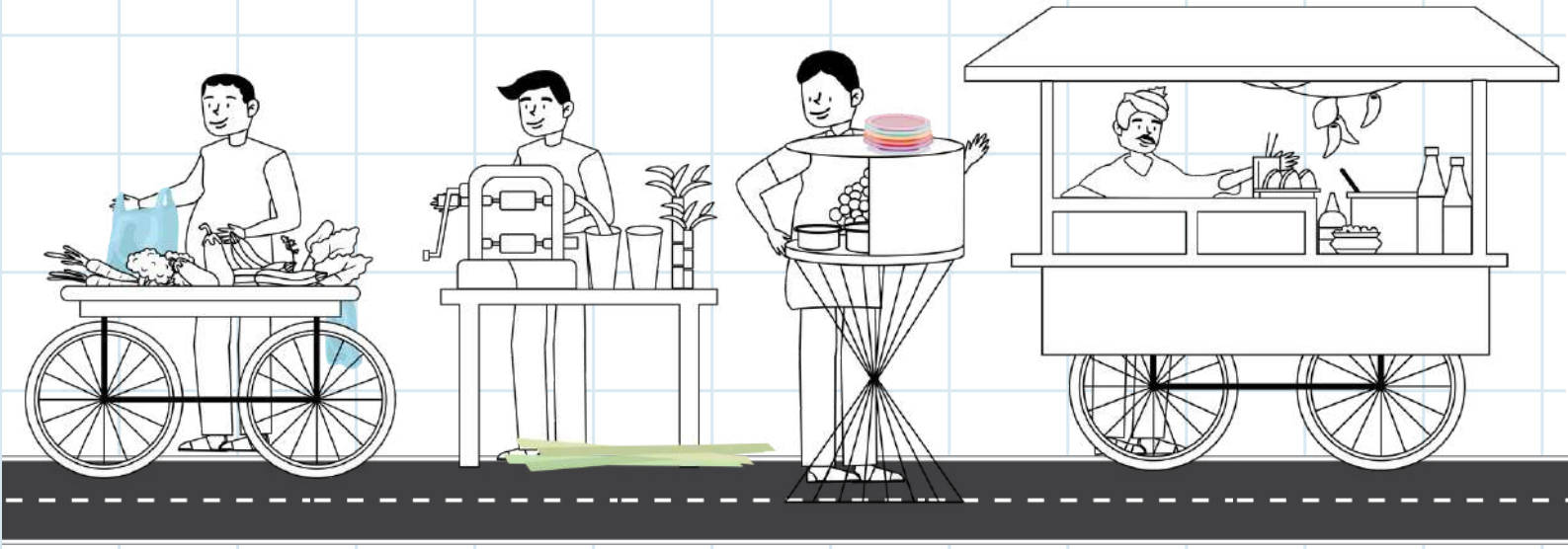


Wow! Golgappas, vada pav, masala dosa! My mouth is watering!

Tell me a little bit about yourself.

What is your favourite snack or drink? _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

After you have eaten your favourite snack/drink, where do you dispose* of the waste?

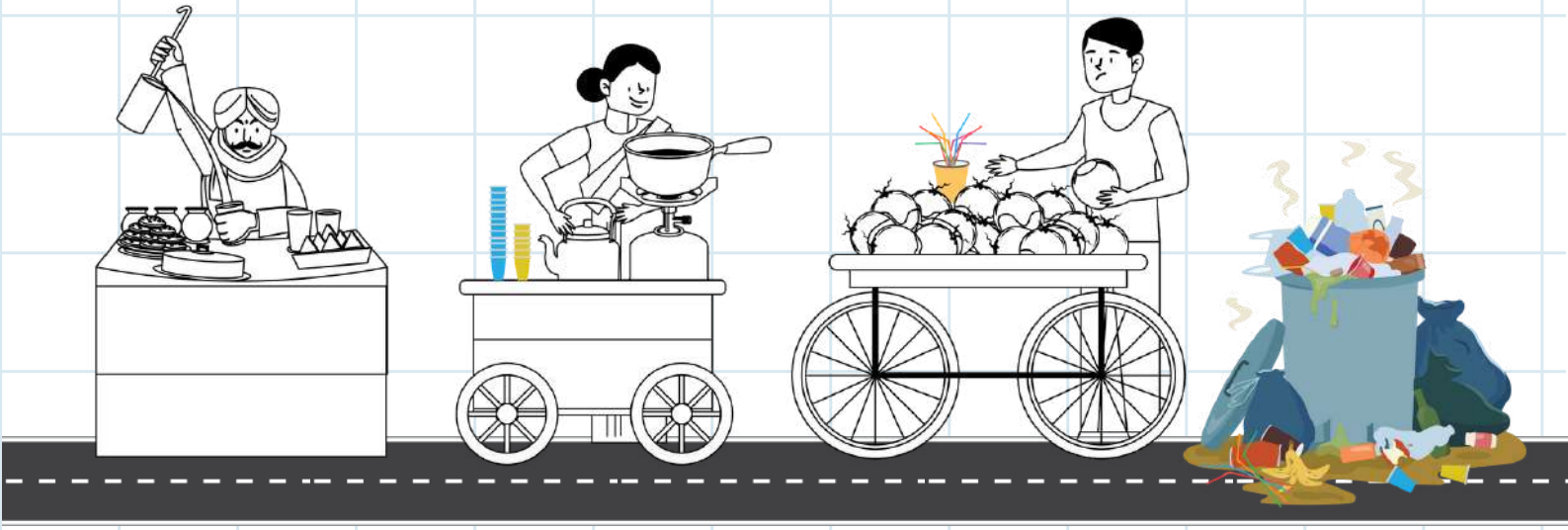
_ _

Do you know where this waste goes?

_ _

Keep reading to find out more!

**Dispose: to discard after use*



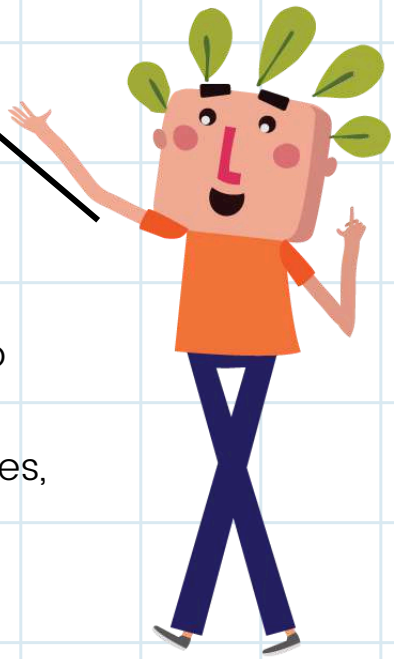
At the end of our first stop, you will be able to:

- Define a linear economy and explain how it works.
- Identify the main stages of the linear economy*: take, make, use, and dispose.
- Know the benefits and pitfalls of a linear economy.

**Economy: the system of how goods and services are produced, traded and consumed*

Linear Economy

'***Take, make, use, dispose***' is a process we use in our everyday life.



Take-Make-Use-Dispose

While passing by the snack stalls, we observed how we take ingredients to make snacks or drinks, use plastic to package or serve them, and then dispose of the waste. Other common items like chip bags, water bottles, tissues, and plates also follow this 'take, make, use, dispose' process.

Take **Make** **Use** **Dispose**

What is the 'take, make, use, dispose' process called?

This system/process where we take resources*, make products, use and dispose them, is called the Linear* Economy.

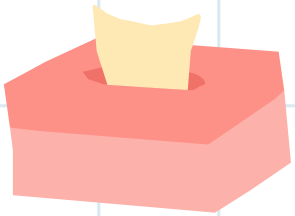
*Resource: a useful or valuable possession

*Linear: a process that moves in one direction

Do you know of other products that are part of a linear economy? Answer this riddle to guess which product I'm thinking of!

I'm soft and thin, yet strong in need,
I help you when you sniffle or sneeze.
I come in a box or maybe a roll,
What am I?

You guessed right. A **TISSUE**!

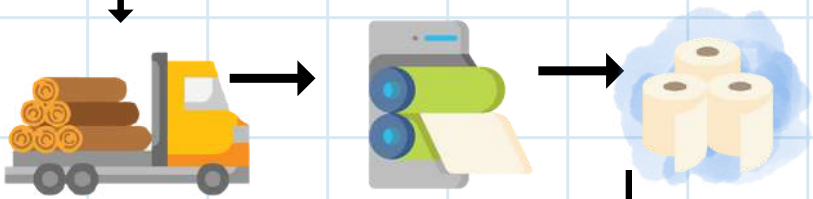


Let's look at the linear process of how a tissue is made.

Large trees are cut and taken to the manufacturing site.

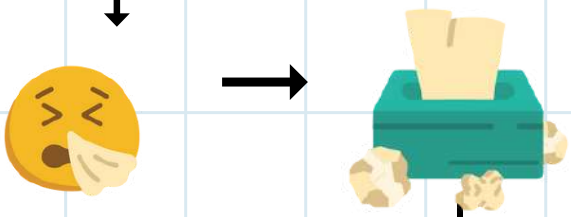
Take

Tissues are made using a lot of energy and resources.



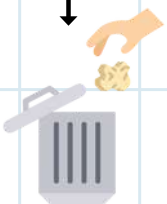
Make

Used **once** in washrooms, offices, restaurants, food stall etc.



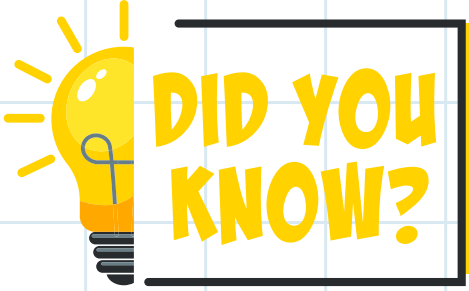
Use

Disposed as waste in bin



Dispose

(Wasteful)



According to National Geographic, around

27,000 trees

are cut down every day to make toilet paper, which is about 9.8 million trees per year.

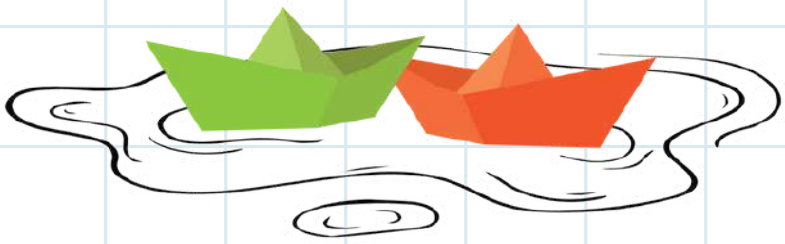
Power Up




Complete the steps of a linear economy process used to make a tissue.

Take **Make** **Use** **Dispose**

Speaking of tissue paper, I remember making paper boats with my friends and racing them in the streams on the road during the monsoon! My boat never won, but we had fun. Now, I wonder—where did all those paper boats go, if we didn't catch them?



SCAN ME! to know more on Linear Economy

THINK BANK

Have you or your friends made paper planes and flown them for fun? What did you use to make them? Tick the materials you used.

- ☐ Newspaper
- ☐ Old magazines
- ☐ Cardboard
- ☐ Blank/used pages from notebook
- ☐ Tissue paper
- ☐ Chips packet
- ☐ Leaves and twigs

Which of these materials are part of the linear economy? List them.

Did you catch every paper plane you and your friends launched? If not, where did it go?

Choose the material you used the most to make paper planes and fill in the boxes below. Follow the example.

Take	Make	Use	Dispose
Plastic	Paper plane	Fly the plane	Roadside drain

When we 'dispose' of objects/waste, they usually end up in large piles called landfills, in rivers, oceans or other water bodies and in illegal garbage piles along empty roads or in parks and playgrounds.

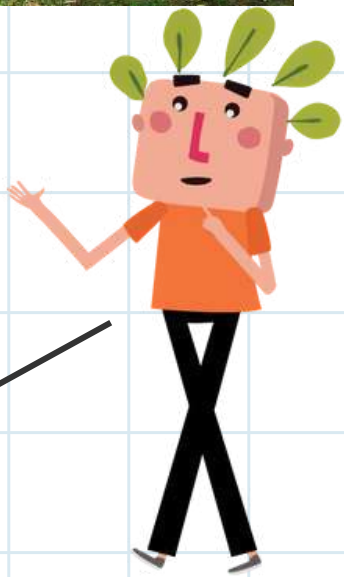
landfills

rivers, oceans

illegal garbage piles

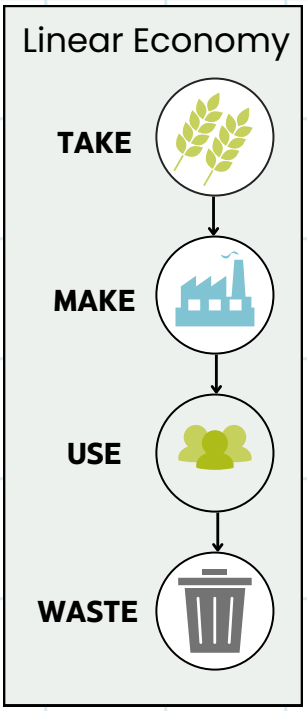
Why should I care about where my waste goes?

We should care because the Earth's resources are depleted and wasted. Moreover the waste we generate* through the linear economy pollutes the land, air, and water, affecting human, animals and the EARTH.



*Generate: to create or produce

Oh no! That does not sound good. Then why do we follow a linear economy?



PROS

The design process is easier and products are cheaper as the cost of end disposal is not borne by the producer but by society.

Industries create jobs in manufacturing and retail.

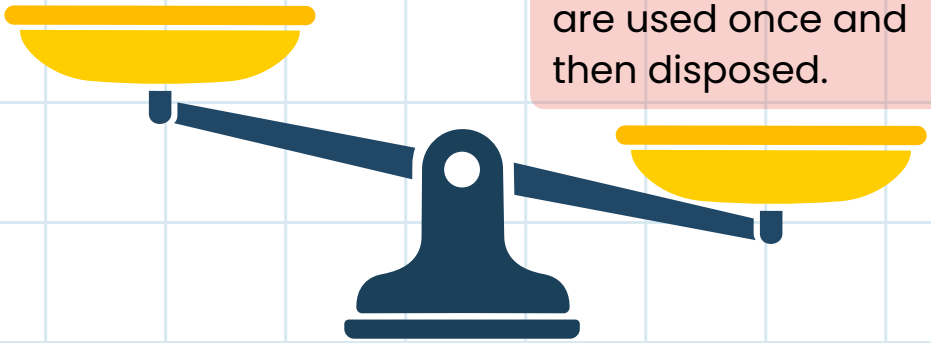
Uses a simple and straightforward process: products are made, used, and disposed of. Logistics are easier to manage as products are not collected back after use.

CONS

It generates waste and leads to pollution.

Natural resources are used excessively, some of which cannot be replaced.

Promotes a 'throwaway culture,' where things are used once and then disposed.



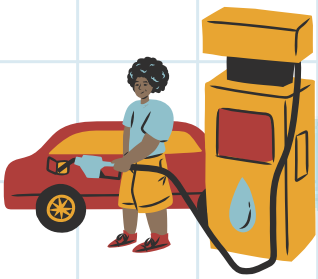
We are fast running out of Earth's many renewable and non-renewable resources.

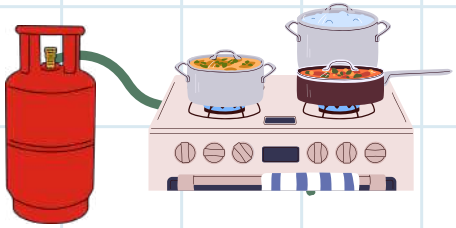
DID YOU KNOW?

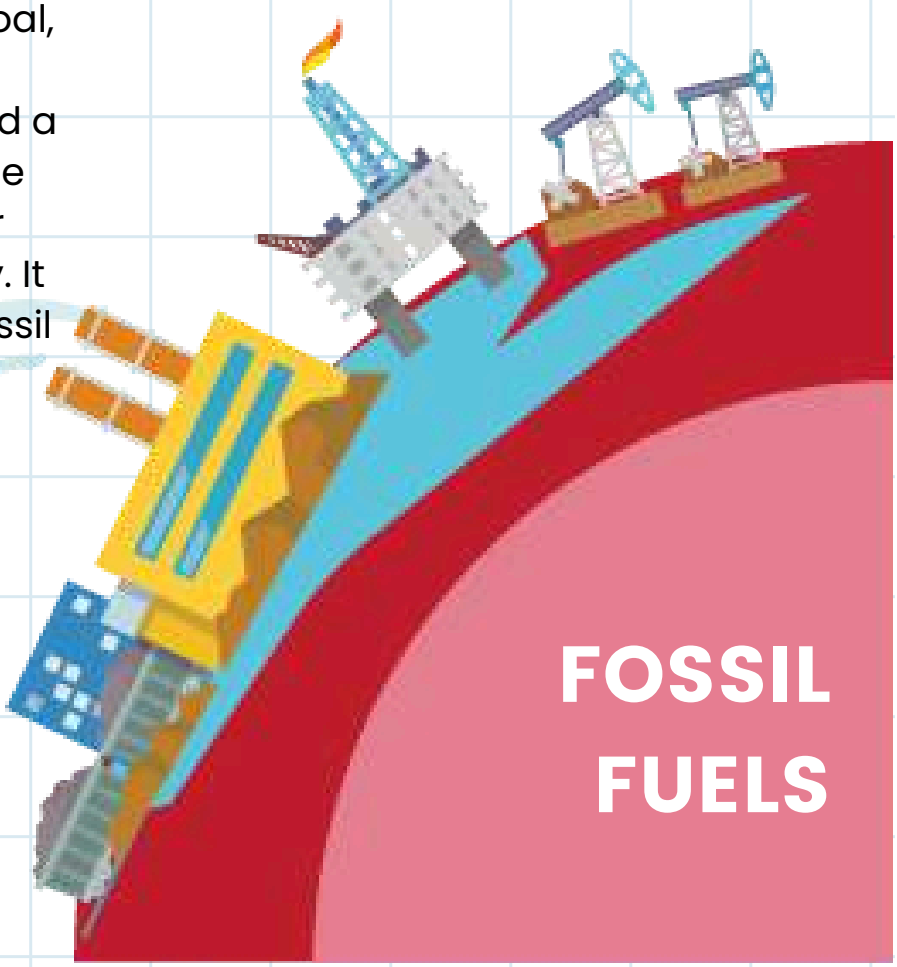
Earth Overshoot Day is the approximate date when humanity has used more natural resources than the Earth can regenerate in a year. Earth Overshoot Day in 2024 was observed on August 1 - This means that by this date, humans had already used all the natural resources than the Earth could produce for 2024.

SCAN ME !

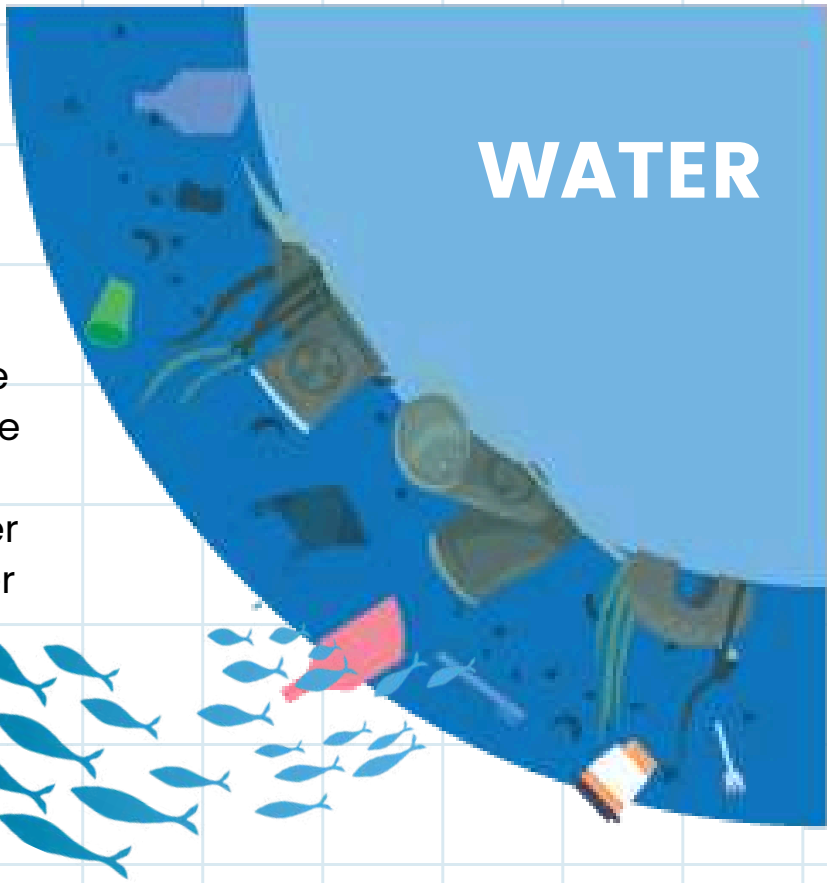
Fossil fuels, like petrol and coal, come from the remains of plants and animals that lived a long time ago. We burn these fuels to power cars, heat our homes, and make electricity. It takes millions of years for fossil fuels to form.



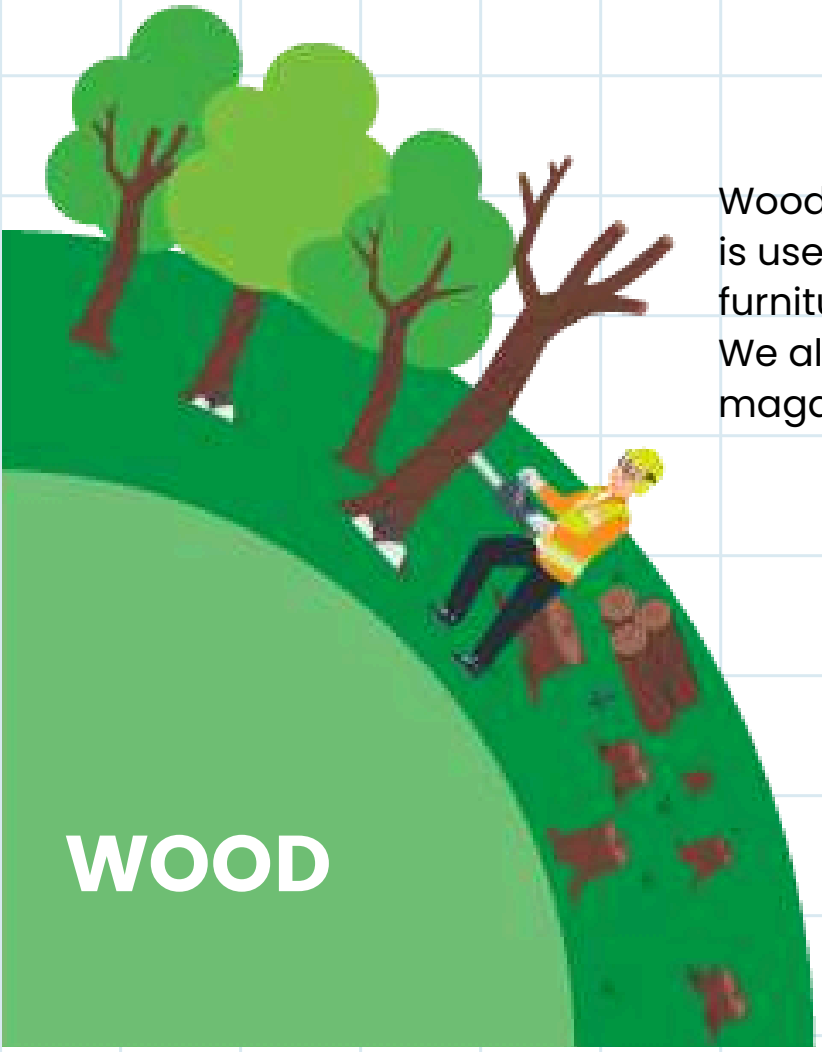




Earth's

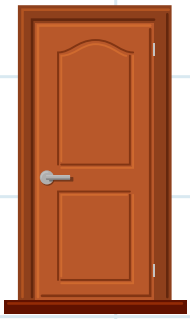


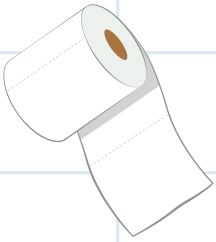
There is only a certain amount of water on Earth, and the same amount has been here since the planet was formed! Unfortunately, most of this water isn't safe for us to use. The water in the oceans is too salty to drink, and we've made a lot of the water dirty with waste.

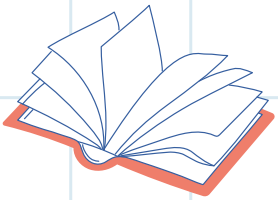


WOOD

Wood is an important material. It is used to build houses, make furniture, and as a source of fuel. We also use trees to make books, magazines, and toilet paper rolls.







Resources

MINERALS

Minerals are solid materials that form underground over millions of years. There are thousands of different minerals, like silver and gold. While some minerals are valuable, mining them can harm the environment. We are also starting to run out of some rare minerals.

Riya, did you know the tallest and largest landfill in India is the Ghazipur landfill? In fact, it's almost as tall as Qutub Minar in Delhi

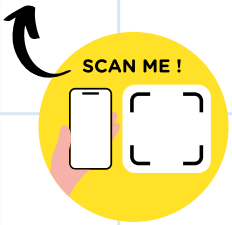
Hello Environmental! This is worrying. How did it get so tall and large?

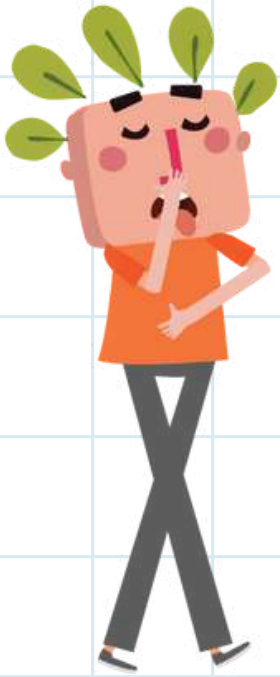
One reason for this is the Linear Economy - 'take, make, use, dispose' - which has led to over consumption* and thus waste generation.

Does this excess waste cause problems to humans and animals?

Yes! It causes much harm.

Consumption: amount used or eaten





Apart from the stink and the eye-sore, there are serious problems caused by the landfill.

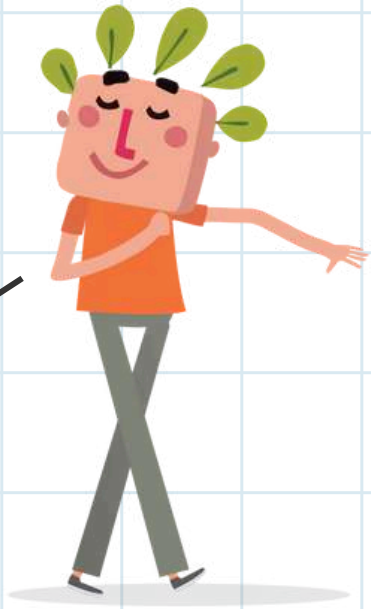
Major problems caused by this landfill include:

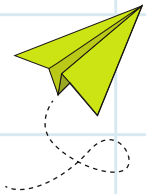
Health Risks:
Those living nearby suffer from respiratory diseases, skin infections, and other illnesses due to toxic gases and pollutants.

Environmental Damage:
The landfill releases harmful greenhouse gases, which contributes to climate change and poses fire risks. Toxic chemicals also seep into the ground, contaminating soil and water.

Oh no! This seems scary! Can we do something about it?

Yes! There is a lot we can do. Let's travel to our next stop to find possible solutions to the problems caused by Linear Economy!





Before we get to our next stop, think of what would happen to the paper plane that you were flying?

Would you catch it and use that paper again or would you let it end up in the landfill?

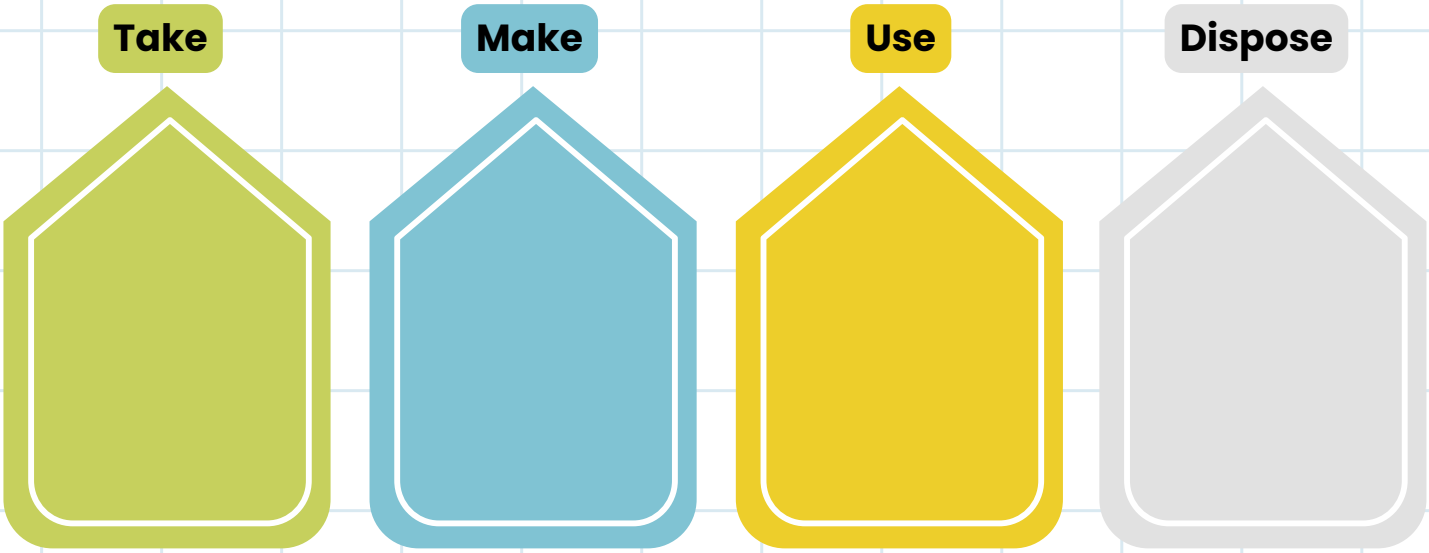
Before we go, let's recall what we have learnt:

- A linear economy is a system or process of 'take, make, use, dispose.'
- This linear process of manufacturing and consumption uses high amounts of resources and leads to huge amounts of waste and environmental degradation.

**Degradation: the process in which the beauty or quality of something is destroyed or spoiled*

Power Up

Think of your favourite object. List the steps in a linear economy with that object in mind. Provide short descriptions for each step.



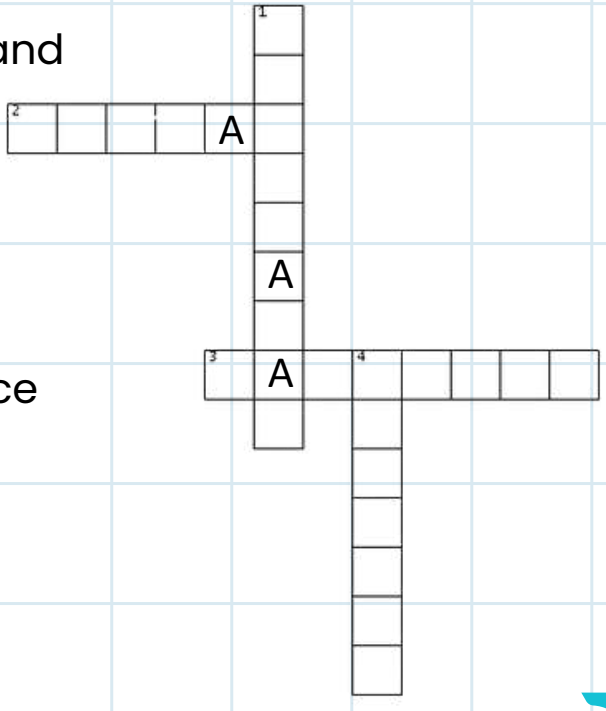
Solve Me

ACROSS

2. Economy that generates waste and leads to pollution
3. Piles of waste dumped at a designated site

DOWN

1. Culture where we use objects once and throw them away
4. Take-Make-Use-_____



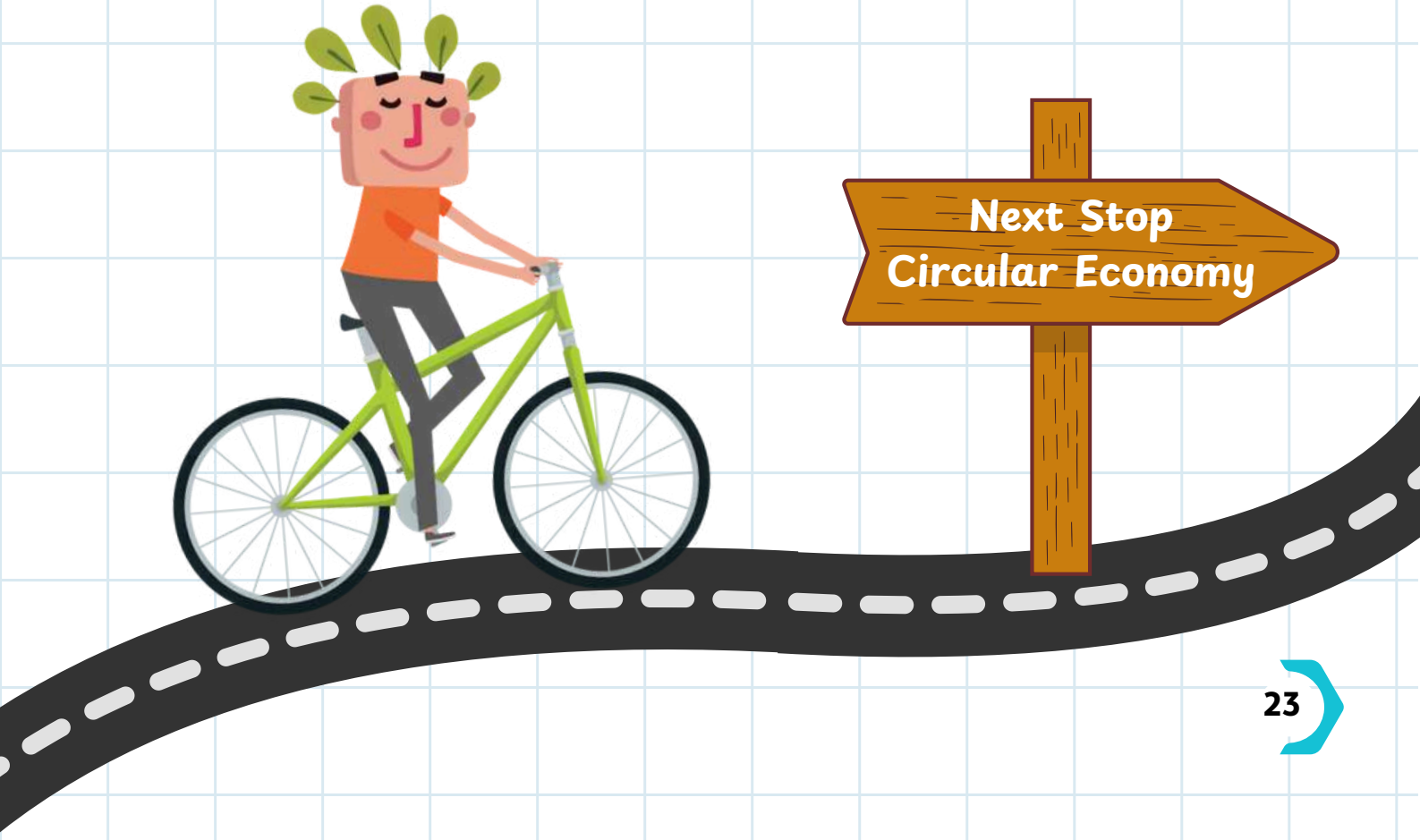
DETECTIVE'S DIARY:

1. Set-up a bin: Assign a bin in your classroom or household just for empty chips and snack packets.

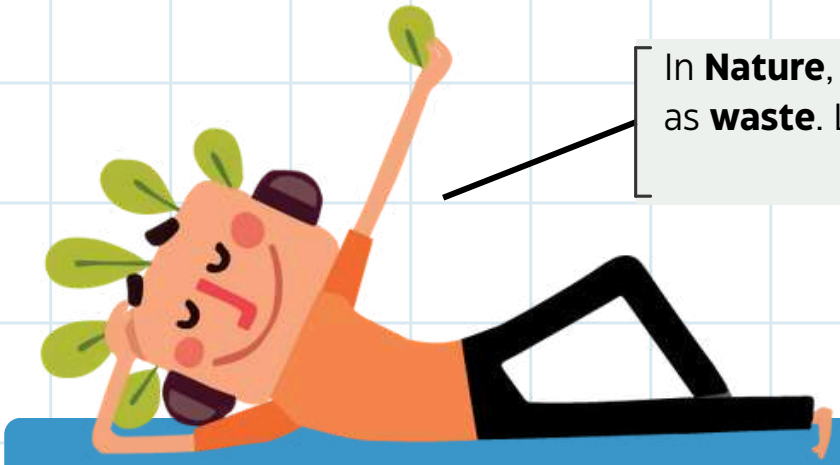
2. Make a Prediction: With a friend, make a guess about how many days it will take to fill up the bin. Will it take a week? A month? Write down your predictions.

3. Observe & Track: Each day, add the empty snack packets to the bin. Keep a diary to track your progress, and note any days when you add more than usual (like after a birthday celebration or a party at home!).

4. Check Your Prediction: When the bin is full, see if your prediction was correct. How close were you?

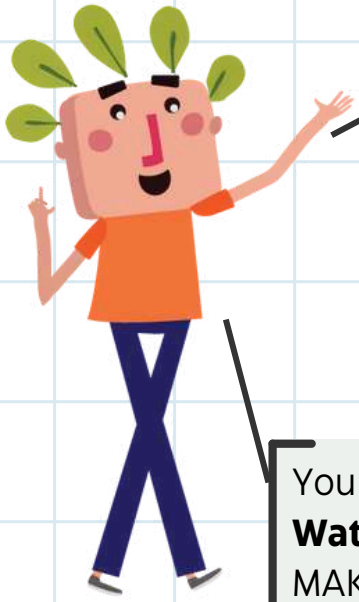


Introduction to Circular Economy



At the end of this stop you will be able to -

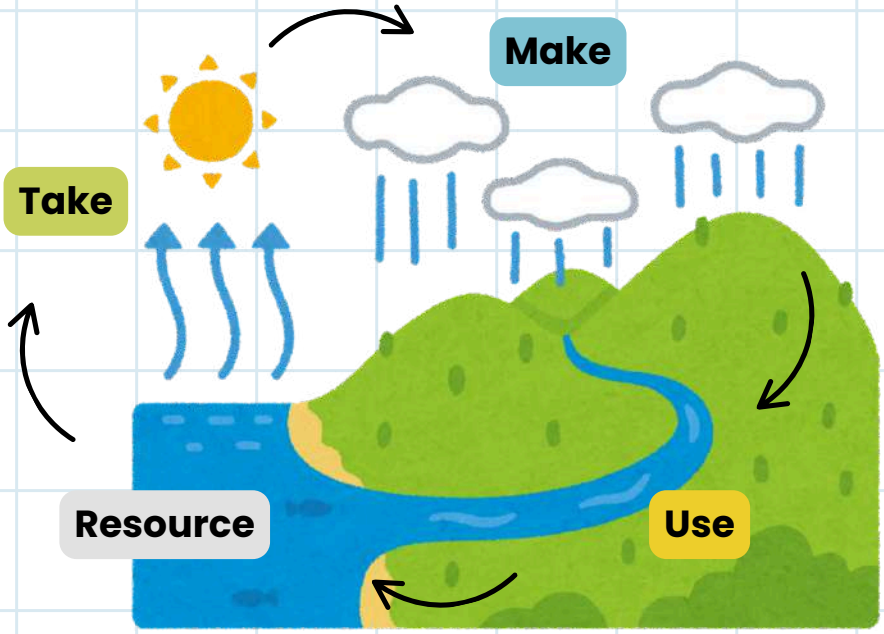
- Understand and name core concepts of circular economy.
- Identify the flow of different materials in a circular economy.



Where do you think the excess rain water goes?

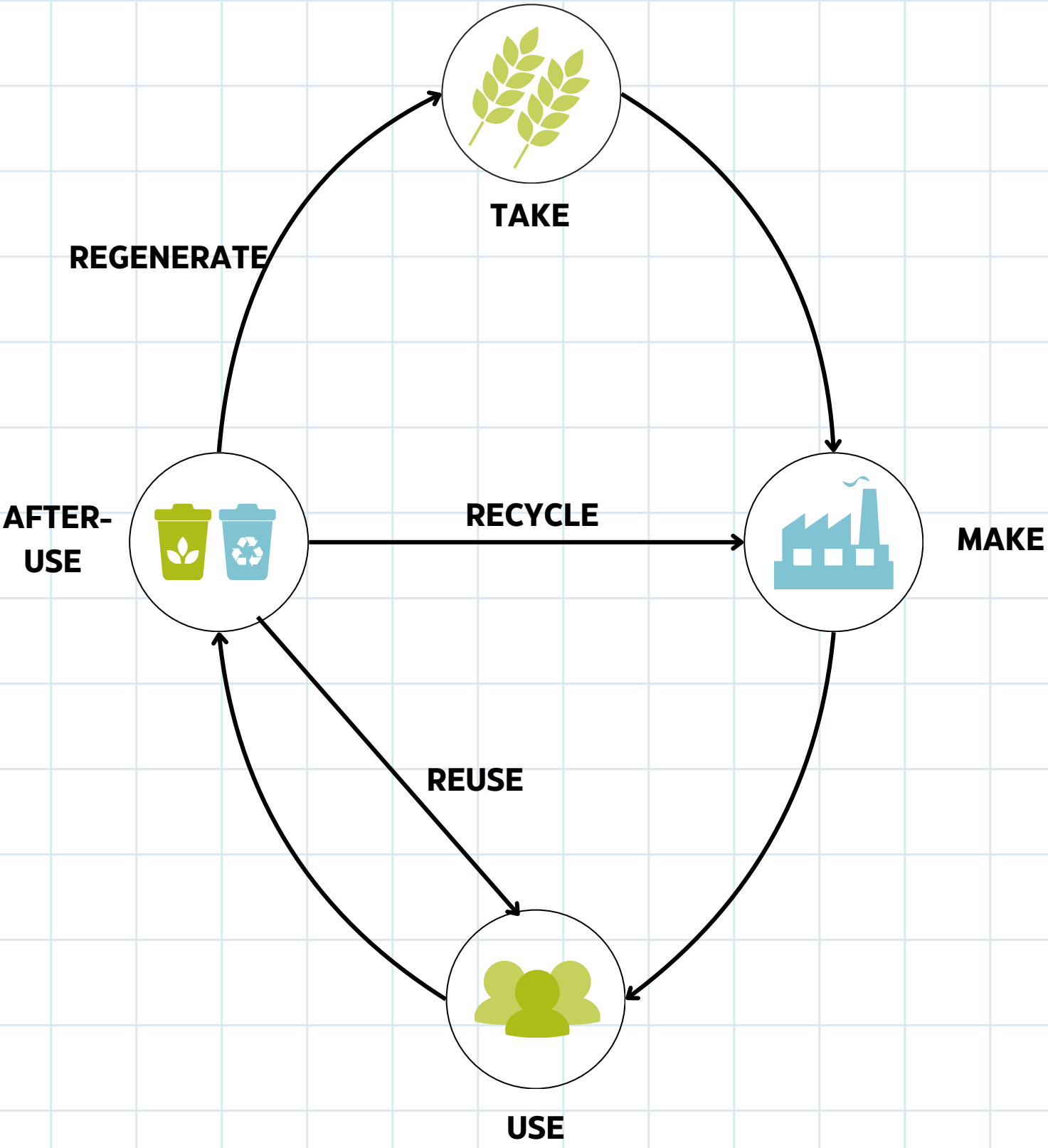
When we learnt about the water cycle, I remember it goes back to the ocean and other water bodies.

You are right, Riya.
Water from oceans and water bodies is TAKEN to MAKE **clouds**. When it **rains** or snows, it gives us water to USE for **drinking**, washing, and to grow crops. The excess rainwater **drains** back into the **oceans** and waterbodies as a RESOURCE, which is TAKEN to MAKE **clouds** again.



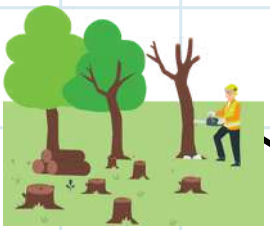
This system/cycle where we **TAKE** resources to **MAKE** something and after **USE** they can **again** be used as a **RESOURCE** is called the ***Circular Economy.*** Circular Economy is an economy where **NOTHING IS WASTE**.

CIRCULAR ECONOMY



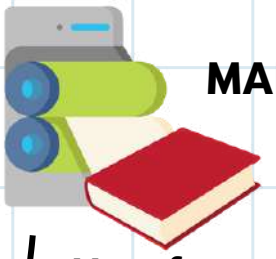
Let's see how this works for books.

TAKE



Cutting trees

MAKE



Manufacture books

USE

Read/Write/Draw/Colour

REUSE

Donate/ Lend

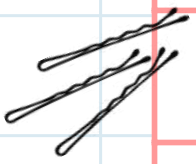
RECYCLE

Old / torn book

Power Up

Write the steps in the circular economy cycle (refer to chart on page 26) for the objects given in the table. Follow the example.

Newspaper	Take - Make - Use - Reuse - Recycle
Water Bottle	
Hair Pins	
Laptop	



After learning what is circular economy, I have a question for you.

Do you think cow dung is a WASTE:

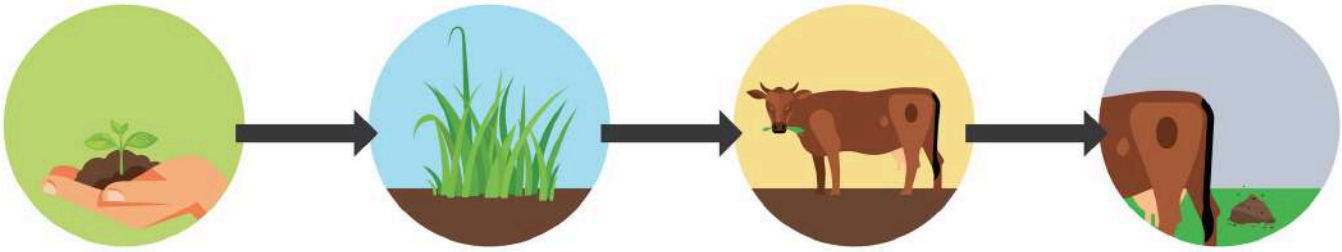
OPTION 1

To be disposed of like in the linear economy?

OR

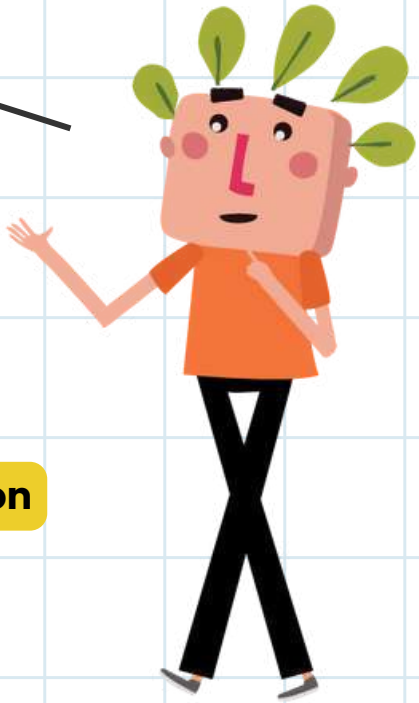
OPTION 2

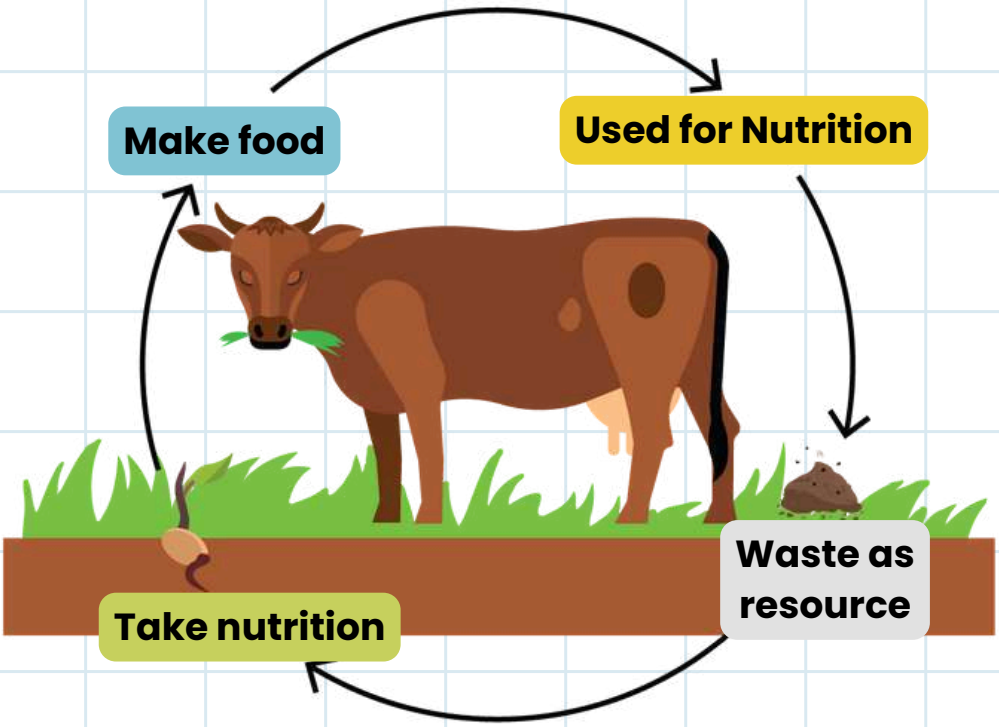
A RESOURCE in the circular economy?

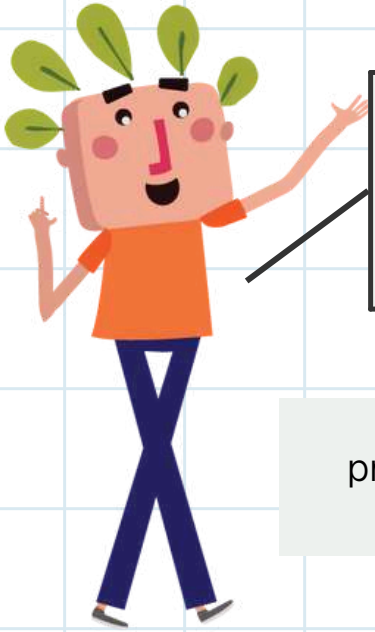


Take Make Use Dispose

Farmers use cow dung to grow crops, so that makes cow dung a **RESOURCE**!



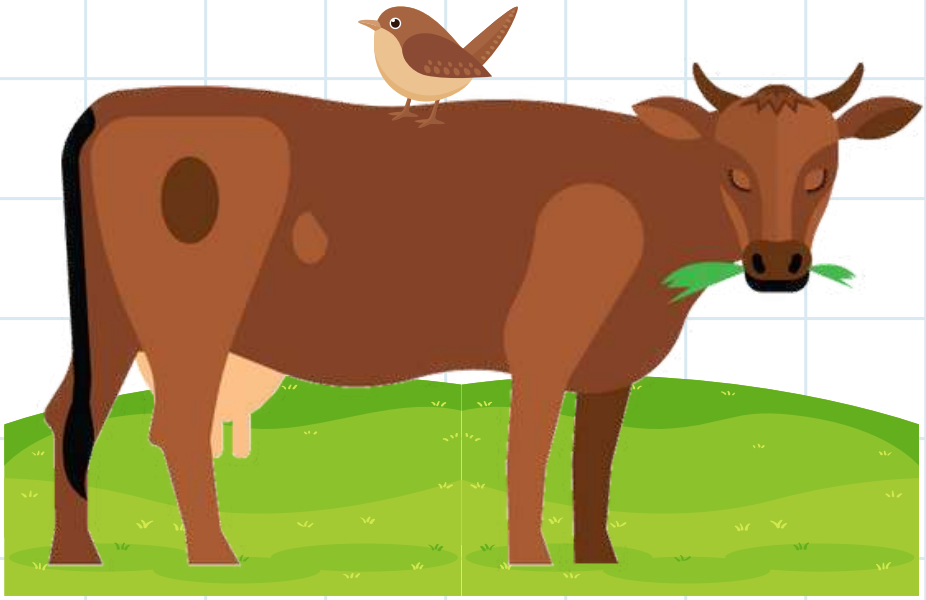




There is no waste here!
The answer is Option 2: The cow dung acts as **RESOURCE** for more food to grow. This is the cycle of Circular Economy.

So if we can convert the linear economy process to a circular economy cycle, there will be no waste – only resources!

You are absolutely right! One way to find solutions to our Linear Economy problems is by emulating nature's processes. This is called **Biomimicry.**



SCAN ME !

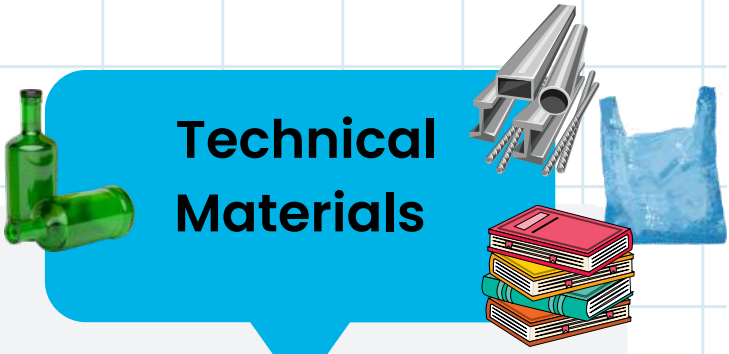
Biomimicry

Can all materials go through the circular economy cycle?

Most things can. However, it depends on the type of material, product, process etc. First, let's learn about the kinds of materials we commonly use.

Biological Materials

These materials come from plants, animals, and microorganisms, and are often easily returned to nature. For example- fruits, leaves, wood, cotton, bones. These materials are biodegradable.



Technical Materials

Technical materials are man-made materials. Glass, steel, plastic, porcelain or concrete are examples of such materials. Technical materials are non-biodegradable and are challenging to return to nature.

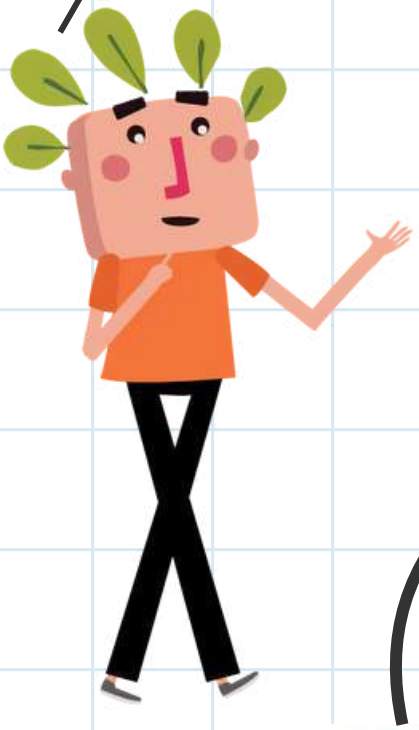
Environmental has organised this birthday party for grandfather. Environmental wants your help in identifying the different materials used in this celebration.

THINK BANK

Looks like a fun party!
List all the biological and technical materials you can spot in this picture, in the table below.

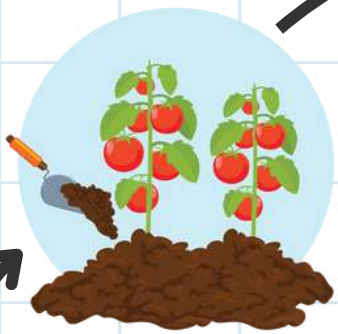
Biological resources	
Technical resources	

Now that you can identify different materials, let's learn about their respective circular economy cycles.



Biological materials follow the **Biological cycle.**

TAKE (harvesting crops for food)



GROW

MAKE (cooking)

REGENERATE (Compost)

USE (eating)

FOOD WASTE – biological materials

Technical materials follow the **Technical Cycle.**

Butterfly Diagram

SCAN ME !

TAKE
(Deforestation/mining)

RECYCLE

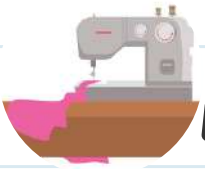
REMAKE

MAKE
(Manufacturing)

melt

parts

REPAIR



soda can

USE
(at home/ school etc.)

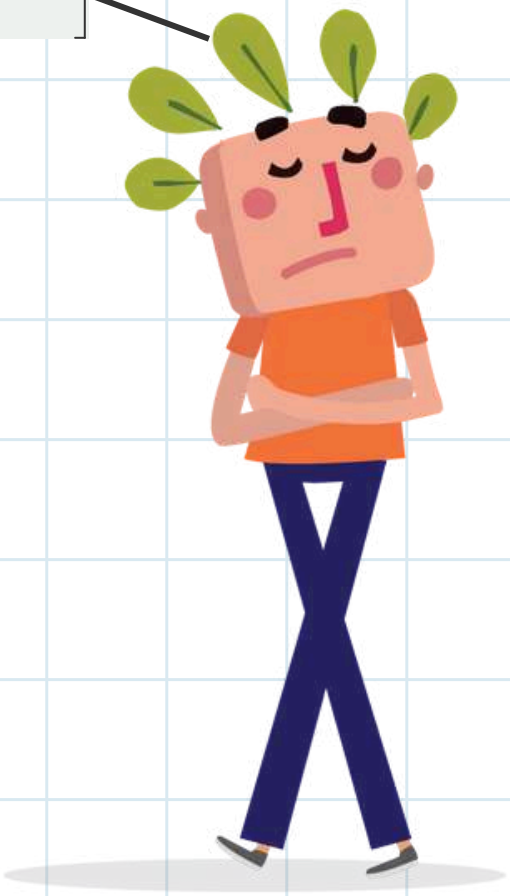
torn clothes

damaged car

If you look closely at the technical cycle, you'll notice that the arrows do not loop back to the '**Take**' stage. This is because, products **cannot** be converted into natural resources.

Oh wow, so everything can follow the circular economy cycle, right?

No Riya. It is not that simple.



When biological and technical materials are mixed, it is one of the biggest barriers for circular economy and resource recovery*. In such cases, they need to be disposed of, like in the linear economy process. For example:


diaper

+

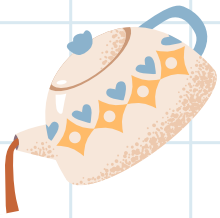

baby poop

=


soiled diaper

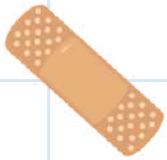

paper cup

+


tea

=

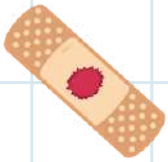

papercup with leftover tea


bandaid

+


wound discharge

=


used bandaid


plastic takeaway box

+


food curry

=


plastic box with leftover curry thrown

*Resource recovery: Resource recovery is the activity of separating materials from waste that can be recycled into new products or used as an energy alternative to fossil fuels

So how do we deal with this mix of biological and technical materials?

Let's travel to our next stop to understand the principles of Circular Economy. You will find the answer to your question there.

For further reading

Before we go, let's recall what we have learnt:

- A circular economy is a continuous cycle of 'take, make, use, resource.'
- There are two types of materials - biological and technical.
- If materials are mixed, it is difficult to achieve circularity.

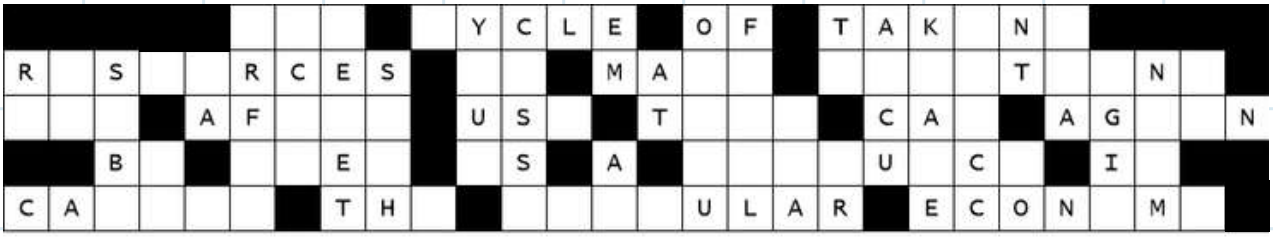
POWER UP!

A. Find the words in the puzzle below.

Biological	Biomimicry	Circular
Mixed	Recycle	Manufacture
Repair	Resource	Technical

Z R A U J N C E B T J L M G A B T T G V K G L A N
Q E X Y P D V I W B W I V V D H Z F P J V G W A L
H P N O W Z T V O J N D U A Z X U F P H M C Q L X
R A F I D W F V X S S K E X W J Z O Y I A N E V G
R I S I S A R Q V D K O J K P J J Y J E K Y A B N
H R O H M F Q H Y Y S G X J H D P W L D W Z G E U
M T C I X C Y R W D N F A D O A U T K V L K O F V
X X X F X Q J V R I B Z L J A T I U J T A N M P L
E E R I I X F Y M Y U L S A C U R E C Y C L E P R
D M L E C I W P I S R R Y M C I Q O Y H I I G D D
J R H U M T X D L U Y E M V W I J C G Q N S H R Z
W Z K G E A X V F I U X Q J D K G O G J H T A Q U
H P T T Y Z N B Q R A L U C R I C O P H C M K I S
V B Y B H T W U K G B R K X X V F D L I E R Y V L
E O V V P K L E F I D N F R P U B J T O T L L K C
B A D X G J W D O A M F O P Z X R O V G I I J H B
J Q S P Z S G M E Z C K Z U D X Y E R V R B E U K
P W O X Z F I C K H O T D C L O F Q Y K L P Z F V
D G E G W M R U W S C O U V M U X E P D I Y Z N U
F C Y Q I U S O Z L V K G R Q W L Z W R B S H E U
Y W Y C O P R M R S Y U W B E U Z Z U E U K D R T
N B R S K J U S S Y O X V L P L I T D O T W I A W
K Y E E H H R N K H E X F Y P T C M N W O N Q J D
M R T U X Z F C Y D J C G F A M V O E D C R K E P
J K U A D R W W H V T K P K V U N W V Y D C Z O Z

B. Complete the message by filling in the missing letters from below.



E U H R E N Y
E L O U T S E R C T O I H E S O R I H I S I
A N D L E D T E D E A C E R C K E Y S O M E E G O A G

C. Solve the riddles and write if it is a technical material or biological material.

I'm small and I vanish mistakes with a swipe,
I'm soft and I crumble,
I'm your only friend when pencils go wrong,
What am I, helping your work all along?

ANSWER: _____

What material am I?

I'm shiny and hollow, but hold things with care,
From food to drink, I'm found everywhere.
Recycle me, and I'll return once more,
What am I, with a pop or a pour?

ANSWER: _____

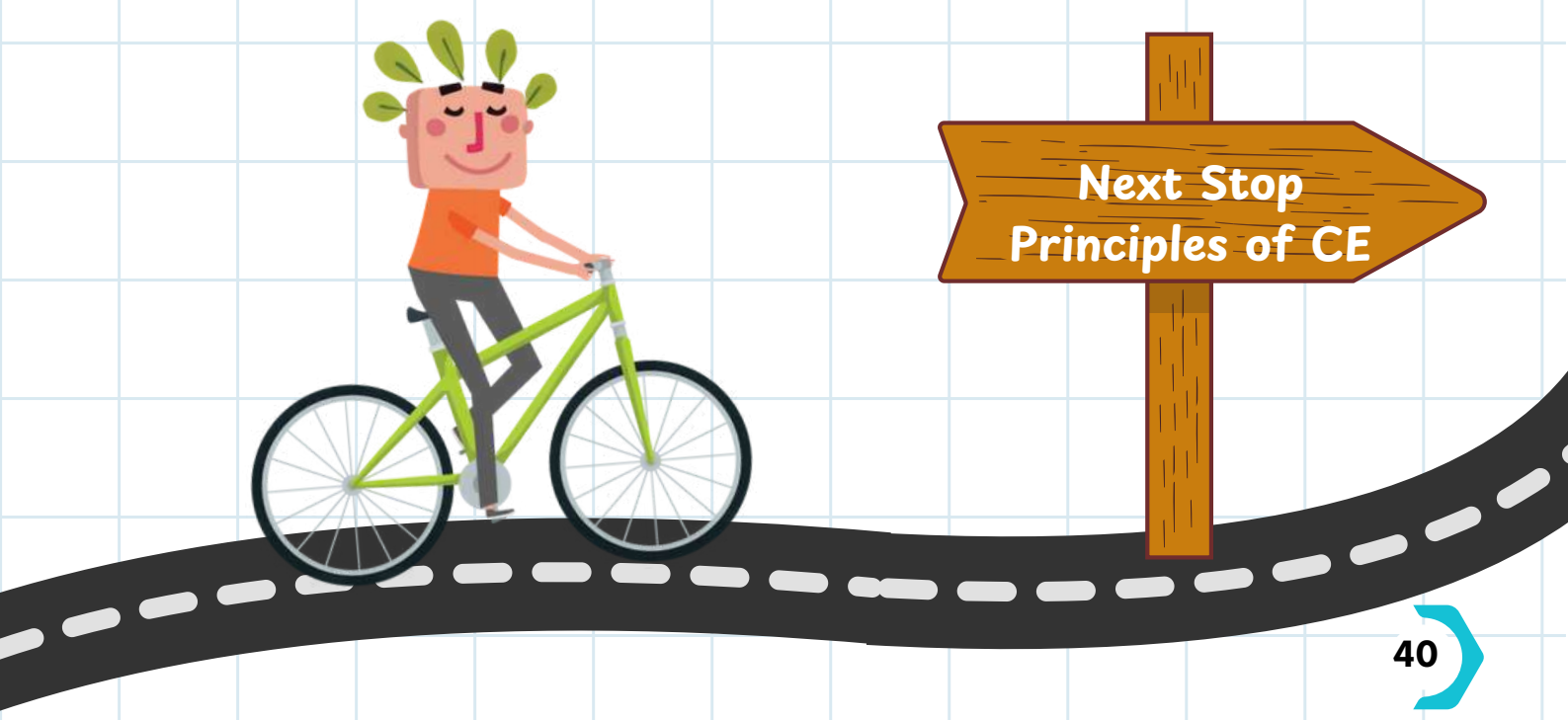
What material am I?

DETECTIVE'S DIARY:

STEP 1: Choose one object which is made of either a biological or technical material. Draw the circular economy cycle with this material in mind.

STEP 2: Can you think of another material that may be used to make the same object? Name the material and draw the circular economy cycle for this new material.

STEP 3: Are the cycles different? Give reasons why or why not below.



3 Principles of Circular Economy

I'm craving some snacks. Maybe I can buy a packet of chips? It's just Rs. 5 per packet. Would you like to share it with me Environmental?

No, thank you. Although I am tempted, but did you know the packaging for these chips are not designed for Circular Economy (CE).

Do you mean that they don't follow the 'take-make-use-resource' cycle?

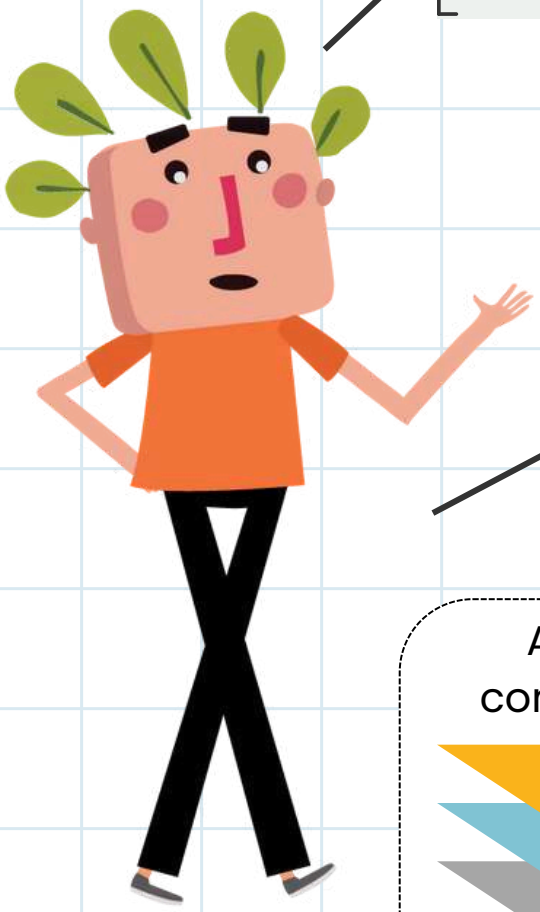
You are correct! Let's learn more about why this is not good and what we can do about it.

At the end of this stop you will be able to -

- Understand and name the principles of circular economy.
- Identify the circular cycles of objects/things.
- List ways to convert linear processes in our everyday life to circular cycles.

Did you know that chips packets are made of many layers- making it harder to separate and recycle?

Oh! I thought it was only made with plastic.



You are partly correct. That is one of the layers.

A typical multi-layered packaging consists of two or more of these layers.

—Printed plastic (branding)
—paper (strength)
—aluminium (gas barrier)
—plastic (moisture barrier)

Because of all these layers that are challenging, expensive and polluting to separate, when we buy a packet of chips, we drive the **linear** economy process of take-make-use-**dispose** instead of **circular** economy cycle of take-make-use-**resource**.

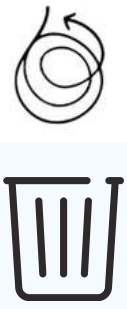
How can we drive CE instead? Can individuals make a difference?

Yes, but we need to understand the principles of Circular Economy for that.

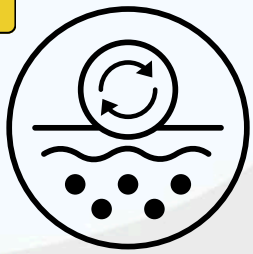
The Principles of Circular Economy

1. **ELIMINATE**
   Waste & pollution

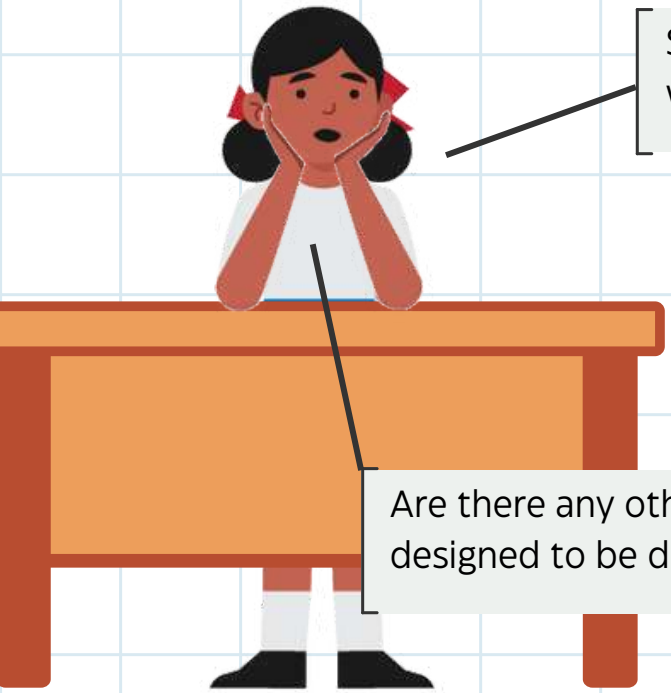
2. **CIRCULATE**
   Products & materials



3. **REGENERATE**
   Nature



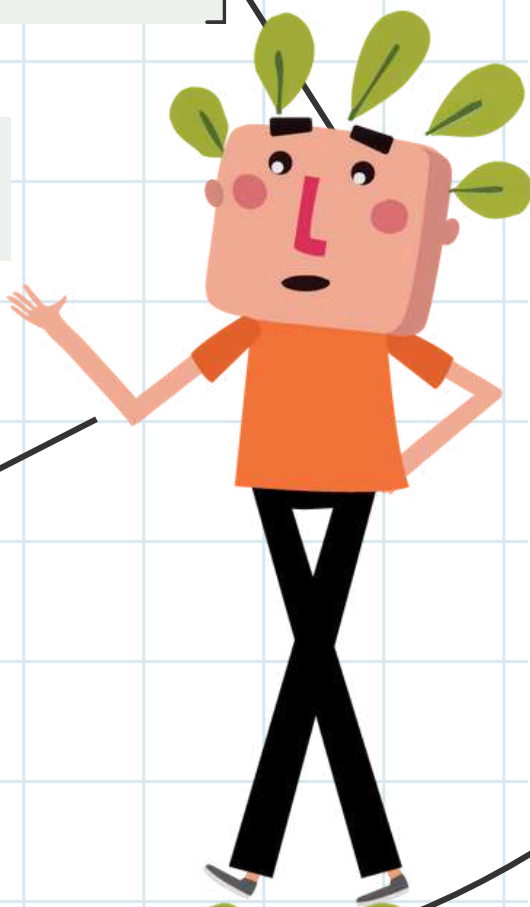
1. ELIMINATE WASTE & POLLUTION



So if I eliminate, circulate and regenerate, will I be helping the CE cycle?

Yes! By refusing the chips packet, I helped eliminate more waste from being dumped into the landfills.

Are there any other products that are designed to be dumped in the landfills?



One common example is this. We drink a lot of hot things in it, especially at train stations, at celebrations and functions. Can you guess what am I talking about?

Is it a cup?

Yes, it's a cup but I was talking mainly about a paper cup.

DID YOU KNOW?

6,500,000
trees are cut down every year to produce paper cups

THINK BANK

When we get wet in the rain, our books and other papers get wet and become limp. But have you wondered how your paper cup with juice/tea/coffee remains firm even when a hot liquid is poured into it?

DO THIS ACTIVITY TO FIND THE ANSWER!

Take two papercups. Soak one paper cup in water for 4-6 hours, and pour water into the other paper cup and keep for the same duration. Note your observations and findings below.

- Which paper cup is destroyed by water- 1 or 2?
- What is left of paper cup 1?
- What is left of paper cup 2?

Paper Cup 1

Paper Cup 2

READ MORE

paper cup pollution

paper cup env impact

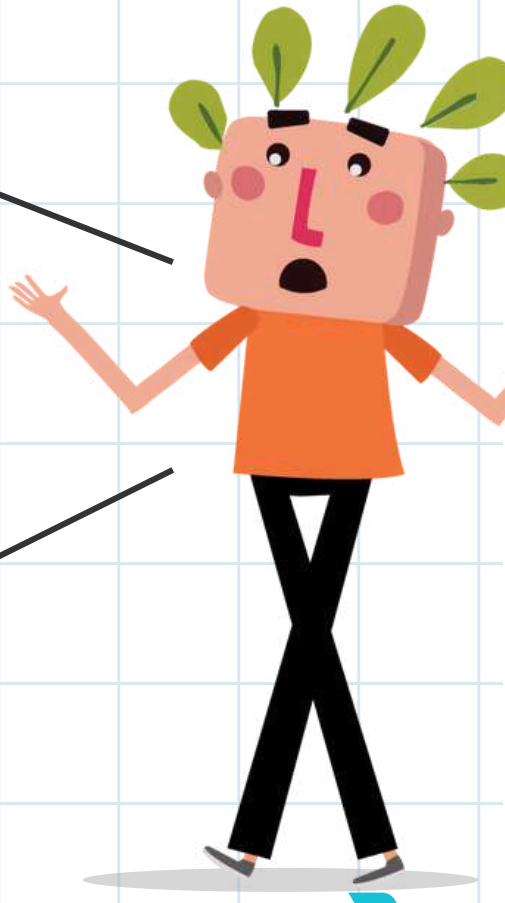
Tea or coffee is often served in paper cups, but these cups have a thin layer of plastic inside. To recycle them, the paper and plastic must be separated, which is a lot of work. Because of this, most paper cups are thrown away and end up in drains or landfills.

PAPER CUPS (DISPOSABLES)

I always thought paper cups have only paper and no other material.

Yes! Like the chips packet, which often has many layers of plastic, paper, foil to keep the chips crisp, the same holds true for the paper cup.

Each layer needs a different recycling process, but they are hard to separate. Hence, most of the time it goes to the landfill as waste. This is because they are **designed for dump**.



What can I use that is not designed for dump?

If tea or coffee is served in steel, ceramic, or glass cups, they can be washed and reused, which means **waste is eliminated**!

CERAMIC, STEEL AND GLASS (RESUSABLES)

Power Up

Write down at least 3 disposable objects you use, that can be substituted with reusables.

Disposable Object	Reusable Substitute

A lot gets decided at the stage of product design. Key sustainable and circular design principles are -

- **Design modular and repairable** products.
- **Avoid disposables** to minimize waste, and promote the use of sustainable, reusable alternatives.
- **Renewable energy*** harnesses natural resources like sunlight, wind, and water to generate power, offering an eco-friendly alternative to fossil fuels.
- **Use of recycled goods** in design promotes sustainability by reducing waste and conserving resources.
- **Making multi-purpose products** enhances functionality, reduces consumption, and minimizes waste by offering versatile solutions that cater to multiple needs with a single item.

As consumers, we can play an important role in driving sustainable design by choosing and promoting sustainable products, avoiding disposable and single-use items.

*_**Renewable energy**_: *energy that comes from natural sources that never run out. The Sun gives us solar energy for electricity, wind energy helps us in running the windmills, plants help in creating energy when converted into biogas.*

Now that you know reusable products are a key driver for eliminating waste, can you help me identify which of these objects are designed for dump? Draw a circle around them.

tissues

steel lunch box

paper cup

baby diapers

plastic straw

garbage liners

steel cutlery

cupcake liner

cloth bag

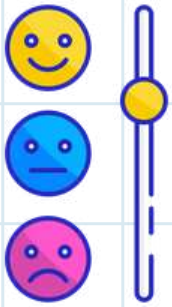
wet wipes

bath towel

cling wrap

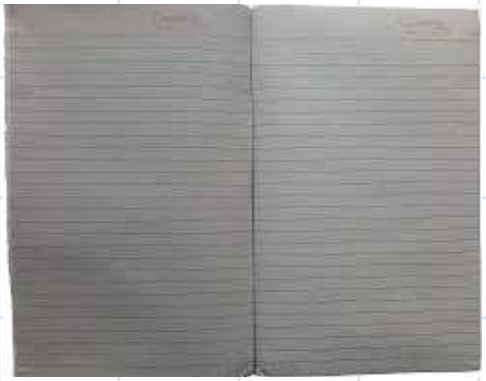
How many of these 'design for dump' objects listed do you use? Each object you use is one minus point. My score is 0. Check you score below.

How many of these objects (that eliminate waste) do you use? Give yourself a point if you use them. Add all the points to get your total score.



electric vehicle (car/auto/scooter)

metal straw



recycled rough notebook

bamboo/wooden brush

reusable cloth bag

handkerchief

school bus

ink pen

reusable water bottle

2. CIRCULATE PRODUCTS & MATERIALS

Keeping products in use for as long as possible at their best value is called circulation. When they can't be used anymore, they are broken down into parts or raw materials. This way, nothing becomes waste, and their value is preserved.

DID YOU KNOW?

24
trees are cut down to make 1 ton of paper!

The library is a great example of the principle of 'circulating products,' where books are the ‘products’ and are shared among multiple students rather than being individually owned.

Purchasing a book

- One can own the book and keep with themselves for longer.
- Will cost money.
- Demand for more books in the market means cutting down of more trees!

Borrowing a book

- One book can be read by multiple people. (ie. the book is **circulated**).
- Saves money.
- Will save trees.
- More efficient use of resources.

Head to the next page to find out more ways of Circulating Products!

POWER UP!

A collection of books is called a library. Like we just learned, when we borrow books from the library we help circulate products and participate in the Circular Economy.

Can you think of any other objects or things at home or in schools that can be circulated? Draw/name them below.

AT HOME

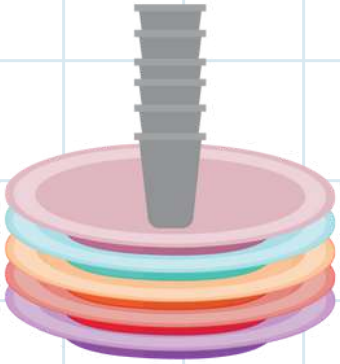
IN SCHOOL

Have you heard about the **BARTAN BANK**?

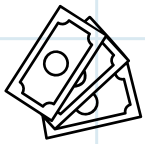
Bartan Bank is a service where you can rent utensils, plates, spoons, cups etc. for events like weddings, school annual days, birthdays and more.

Instead of using disposable spoons, plates and cups, you can rent these items, use them, wash and return them after the event.

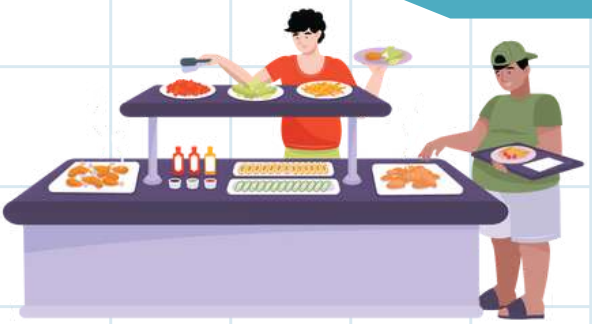
BARTAN BANK



BORROW



Pay money, take plates/glasses/ spoons required.



USE

Keep a bin for food waste and a tub for used plates.

WASH

Hire staff to wash the plates/cups/ spoons.

RETURN

Return plates/cups/ spoons and collect the deposit after deducting the rental fees.

The same set of 1000 plates serves many events, thus helping reduce waste. This is an example of ELIMINATE and CIRCULATE!

Adamya Chetana Plate Bank located in Bengaluru, is one of the largest bartan bank with 10,000 sets of plates, glasses and bowls available for borrowing. They provide this service free of cost in order to promote low-waste events.

Saahas has helped set up many bartan banks at their project locations in order to curtail waste generated at large events. The photo below is of the fortnightly Ekadashi feast at a temple at Mahalunge (Chakan, Maharashtra), where the temple authorities have taken charge of maintaining the bartan bank.

In our office, we rent desktops and laptops instead of buying them. The vendor ensures the systems are maintained and upgraded regularly. We don't need to worry about having extra systems or fewer, based on variable staff strength. Other examples of circulate are book library, thrift shops, furniture rental, cab service, tractor/tempo rentals.

MORE EXAMPLES

Rented chairs for an event

Electric bikes for rent

Costume rental

Cab service

Thrift shop (where second-hand clothes are sold)

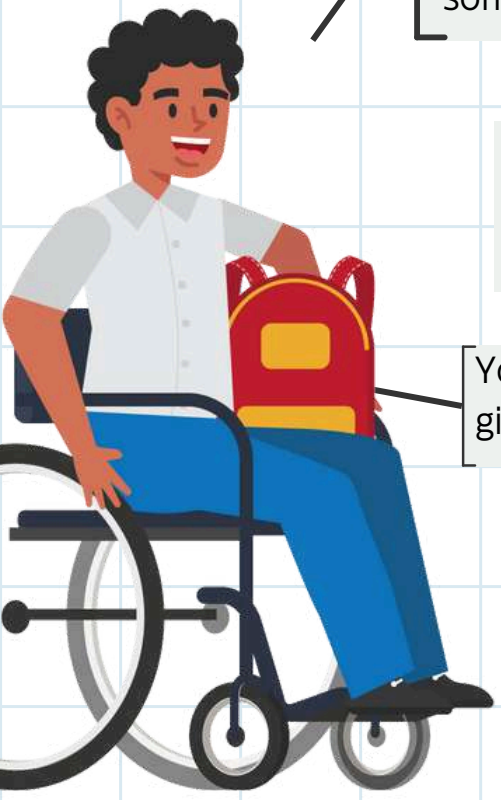
Rented computer systems in offices

If you remember the Technical Cycle we learnt in the last stop, the repair, remake and recycle loops also keep products in circulation. We will learn more about them in our next stop on the Rs of Circular Economy.

3. REGENERATE NATURE

The third principle of circular economy is to regenerate nature. By moving from a linear economy to a circular economy, we support natural processes and leave more room for nature to thrive.

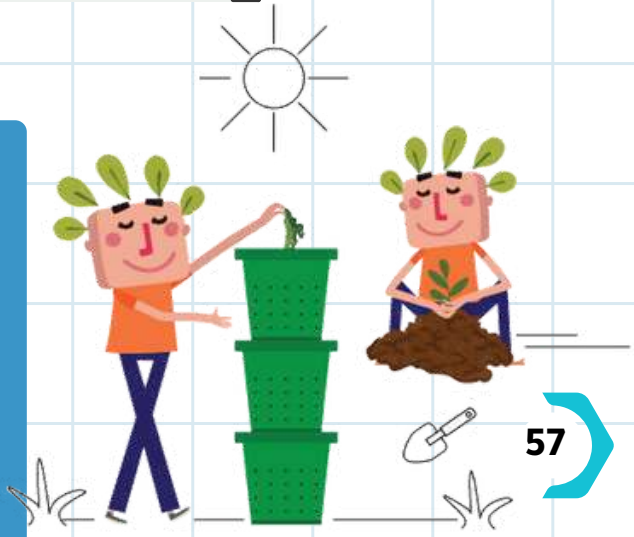
Environmental, nature provides us so many resources like air, water, soil, food and much more!
Sometimes I wonder if we can give something as a return gift to nature?



Regeneration is how you can shift the narrative from '**extraction**' to '**contribution**'.

You mean instead of taking, we can give? How?

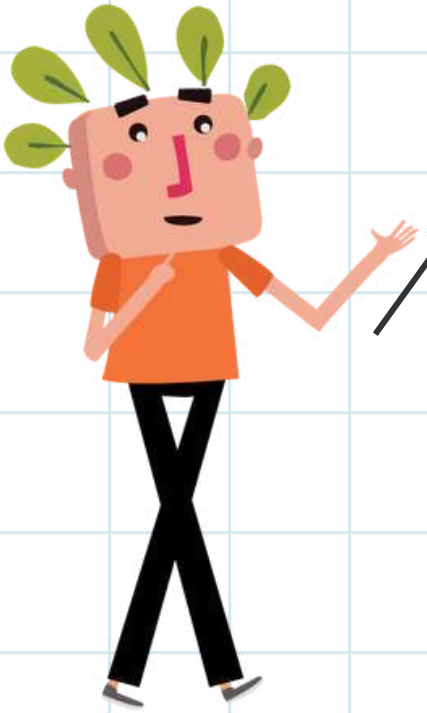
I am sure, you must have planted a tree some time, right? That's giving back to nature. Similarly, **composting** is another great way of regenerating nature.



Let's learn -

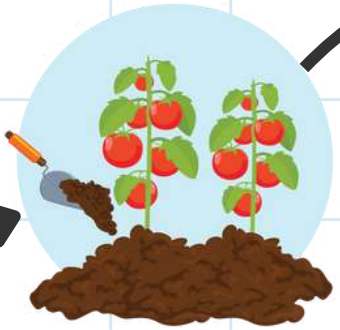
- Why composting is important in Regenerating nature.
- Benefits of composting.
- How composting is done.
- What can we do we the compost.

Why is Composting important in Regenerating nature?



60-65% of our household waste is kitchen waste. If we add it to a composting bin everyday, it turns into nutrient-rich compost that acts as a manure for plants. Let's revisit the biological cycle we saw in the last chapter.

TAKE (harvesting crops for food)



GROW

MAKE (cooking)

USE (eating)

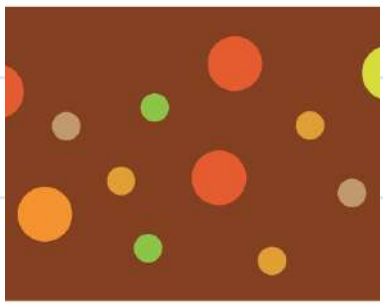
FOOD WASTE - biological materials

REGENERATE (Compost)

Benefits of composting

Nature's way of recycling

Builds stronger roots



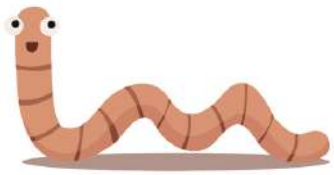
Improves soil quality

Allows soil to hold moisture

Better for plant growth

Reduces need for chemical fertilizers

Controls soil erosion



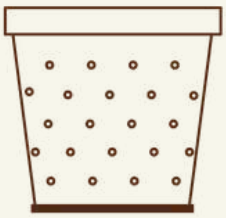
Earthworms love it

Reduces half the waste from landfills

Check this video on why social activist and composting queen, Vani Murthy (also know as @wormrani on instagram) likes composting.

How to compost?

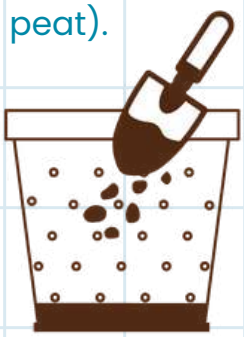
1



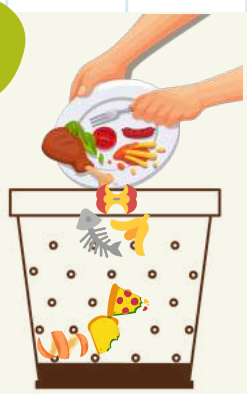
Take a bin with lid and drill 5mm holes all over.

2

Add Browns (dry leaves or coco peat).



3



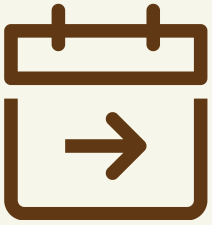
Add the day's kitchen waste (greens).

4

Cover waste with more browns.

5

Keep adding organic waste and browns everyday till the bin is full.

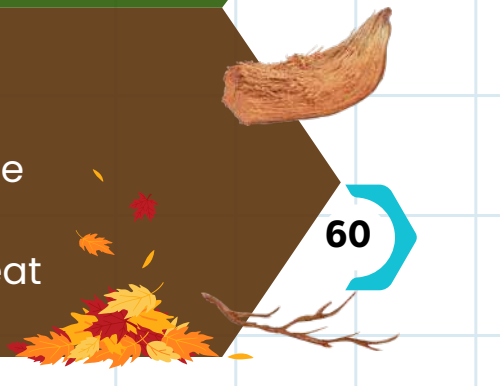


Keep the filled bin in an aerated place for 3 to 4 weeks.

Harvest earthy-smelling compost and add to plants. Restart composting in the empty bin starting from step 1.

Greens:
Green materials are high in nitrogen, and play an important role in providing moisture to the compost. These are wet or recently living materials, and include:
Eg. Grass clippings, Vegetable and fruit scraps, Coffee grounds

Browns:
Brown materials are rich in carbon, and help in absorbing excess moisture in the compost. These are dry or woody plant materials, and include:
Eg. Dead leaves, Branches, Twigs, Wood ash, cocopeat



What to do with the compost?

Start your own herb garden

Add to your plants

Sprinkle compost around trees in the neighbourhood

Gift it to a plant-loving friend

Feel the connection with the soil

Use it for cat litter box

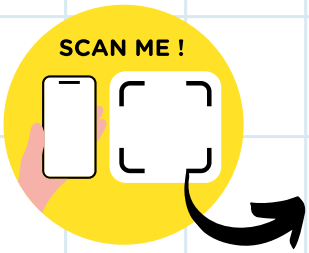
dailydump.org

SCAN ME !

Thanks Environmental for teaching us the principles of CE!
This reminds me of the time I went to a 'Green Store', started by Mr. Bittu John, an Engineer. This store is a 'Zero waste store'!

The shop sells rice, pulses, spices, and snacks. Nothing is pre-packed in plastic bags like other stores. You bring your **own containers or cloth bags**, and take home the groceries you need. This means the shop is helping **ELIMINATE** plastic waste and **CIRCULATING** the same storage containers and carry bags.

You can scan this code to read more about this green store and watch how this store looks from inside!



Bittu John's sustainable store is inspiring a movement to reduce waste by encouraging reusable containers and teaching eco-friendly habits like making homemade products. Together, small steps like these can help us all transform into a Circular Economy.

POWER UP

What a brilliant idea it is to have such zero-waste grocery stores! It is great to learn how they eliminate and circulate waste, but how do they regenerate nature?

Write your thoughts on what regenerating nature would look like keeping such a store in mind.

_____

_____

_____

_____

_____

POWER UP

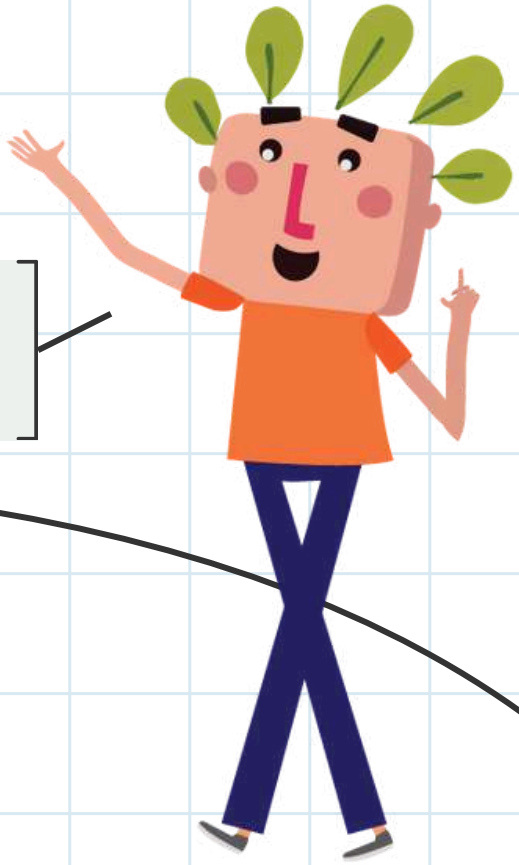
Word Search: Look for the words in the puzzle below.

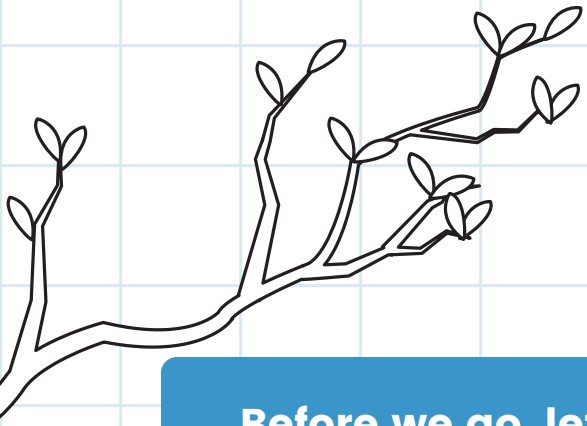
circulate	compost
disposable	eliminate
regenerate	reusable
design	harvesting

g	x	v	v	z	e	g	i	g	t	d	t	o	p	s
c	o	m	p	o	s	t	o	p	i	z	b	r	p	z
q	s	n	n	q	j	z	a	s	k	y	u	m	a	e
f	j	g	s	b	u	b	p	l	s	f	z	k	t	n
d	o	r	s	a	z	o	c	m	u	i	t	a	g	g
h	e	l	b	a	s	u	e	r	r	c	r	a	l	i
t	a	e	t	a	n	i	m	i	l	e	r	p	z	s
n	f	r	b	k	i	b	i	l	n	v	u	i	b	e
t	h	l	v	q	f	c	c	e	c	j	a	h	c	d
v	e	g	y	e	h	f	g	y	s	f	v	q	h	t
x	s	r	y	e	s	e	h	g	i	w	y	m	y	b
u	j	o	d	c	r	t	f	d	m	b	p	h	q	i
q	w	q	g	s	b	q	i	m	z	s	m	a	h	t
b	v	a	o	u	o	w	l	n	o	r	x	p	s	c
d	g	c	t	z	g	g	f	s	g	c	m	e	o	v

So **eliminate** disposables, **circulate** products as much as possible and compost to **regenerate** nature!

Let's explore ways to do the first 2 in detail in the next stop.



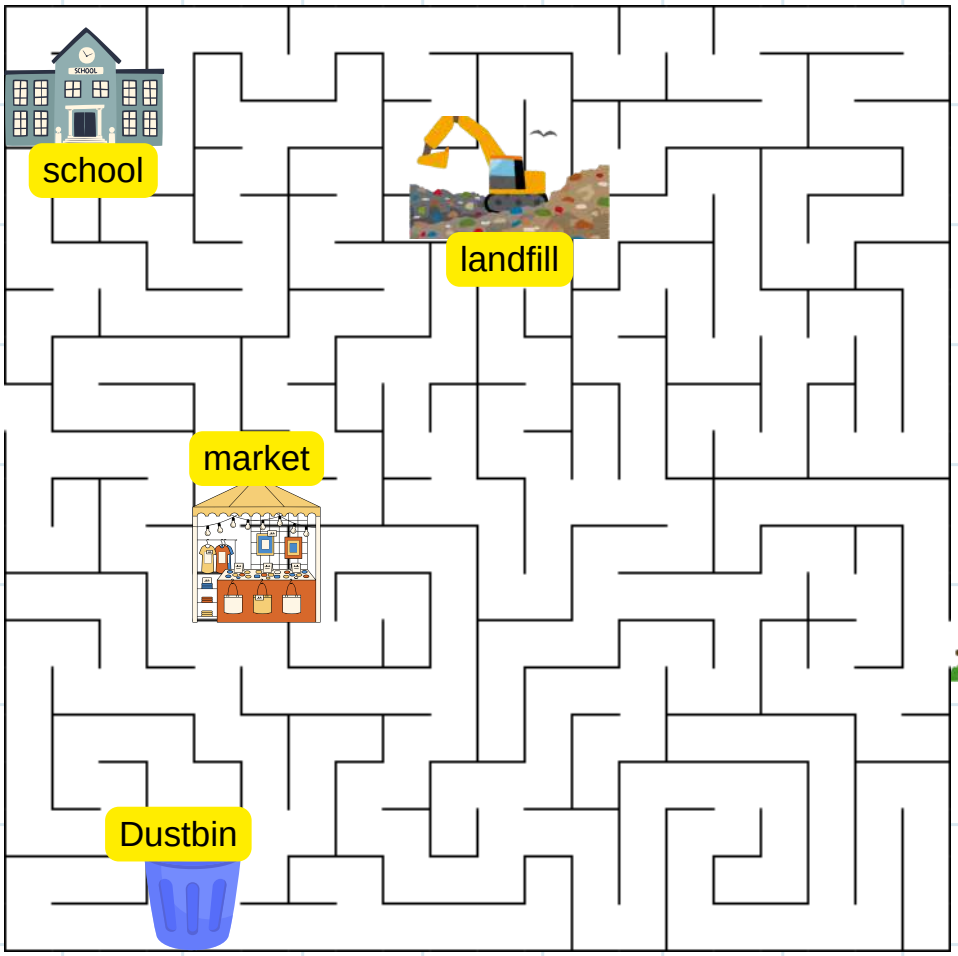


Before we go, let's recall what we have learnt:

- The three principles of Circular Economy are:
  1. Eliminate waste and Pollution
  2. Circulate products and materials
  3. Regenerate nature
- Composting helps in improving soil properties, reducing waste from landfills and giving back to nature.

POWER UP

Help Environmental find their way to a destination where they can eliminate and circulate books and participate in the circular economy cycle.



<Answers on the last page>

DETECTIVE'S DIARY:

Is there any store/ idea that you can think of that covers one or more principles of CE? Write what happens in each step.

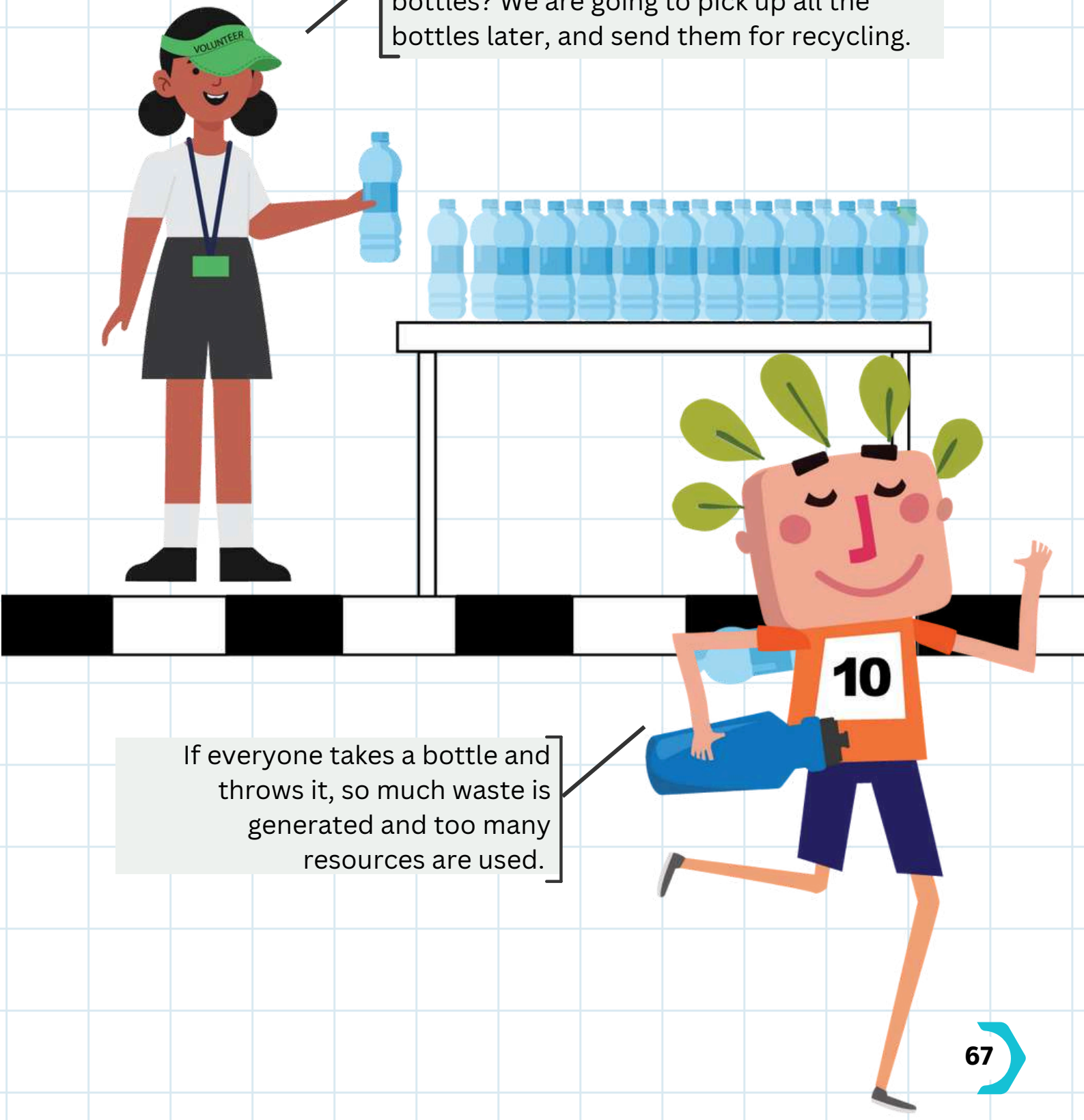
1 **ELIMINATE**
Waste & pollution

2 **CIRCULATE**
Products & materials

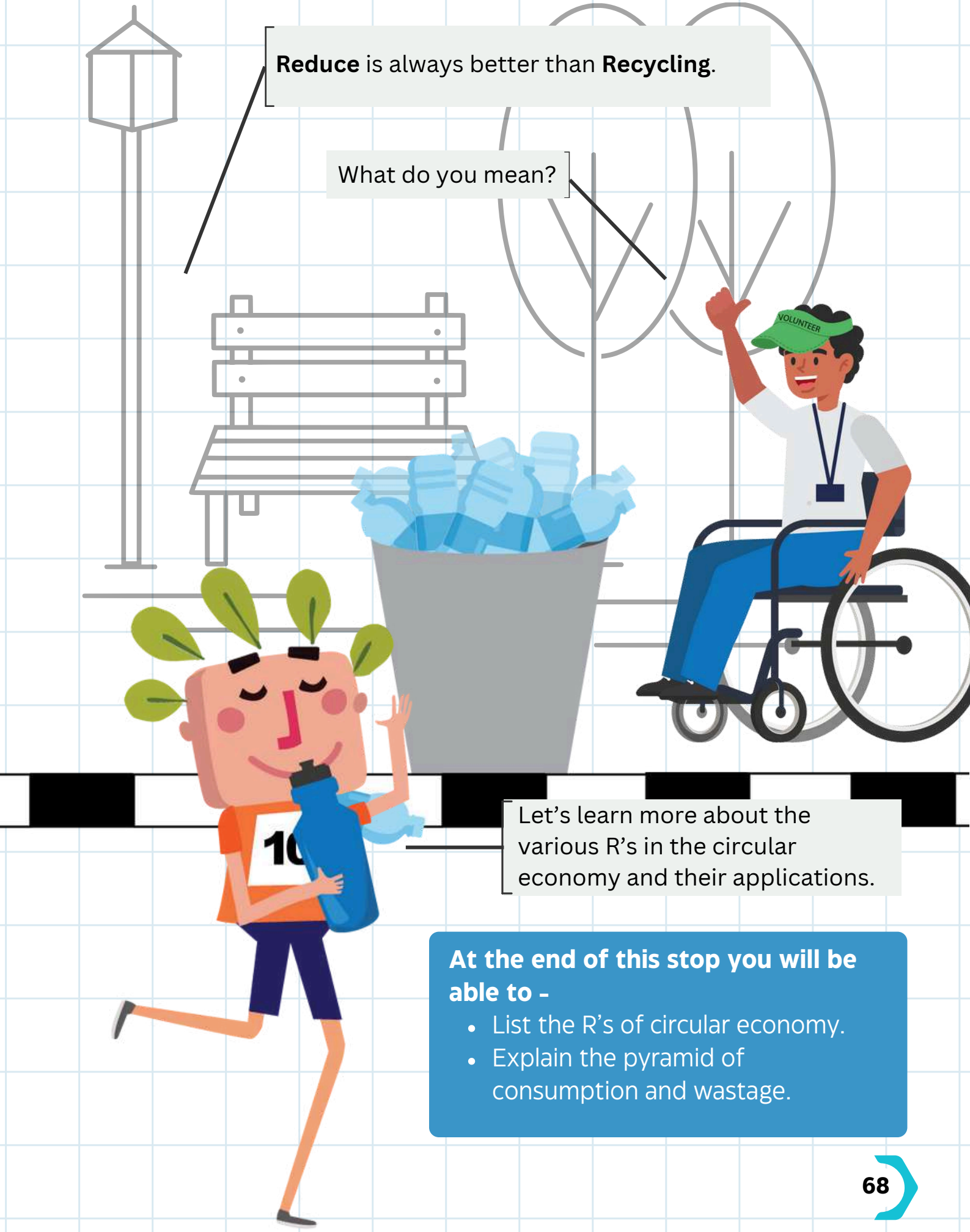
3 **REGENERATE**

4 The R's of Circular Economy

Environmental, why do you run with your bottle? It is such a problem to keep refilling. Why don't you use these plastic bottles? We are going to pick up all the bottles later, and send them for recycling.

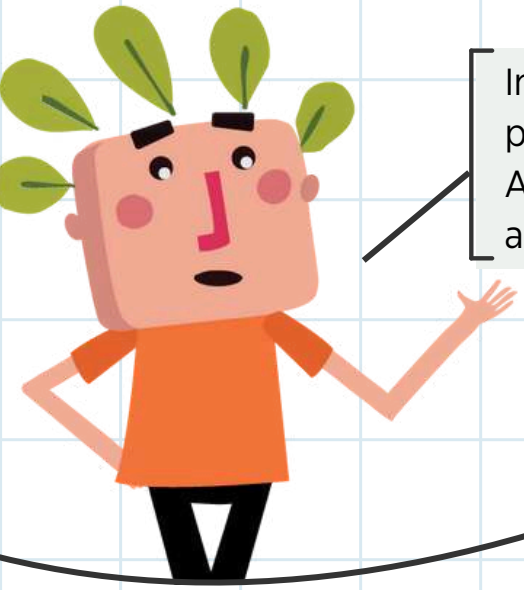


If everyone takes a bottle and throws it, so much waste is generated and too many resources are used.

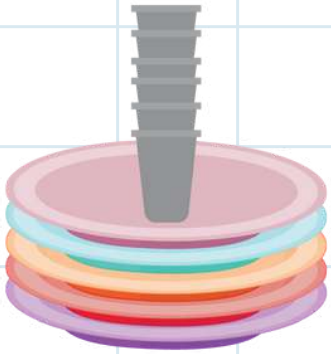


At the end of this stop you will be able to -

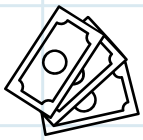
- List the R's of circular economy.
- Explain the pyramid of consumption and wastage.



In our last stop, we learnt about the principles of CE.
Are there specific ways to eliminate waste and circulate products and materials?



BORROW



Pay money, take plates/glasses/ spoons required

USE

Keep a bin for food waste and a tub for used plates

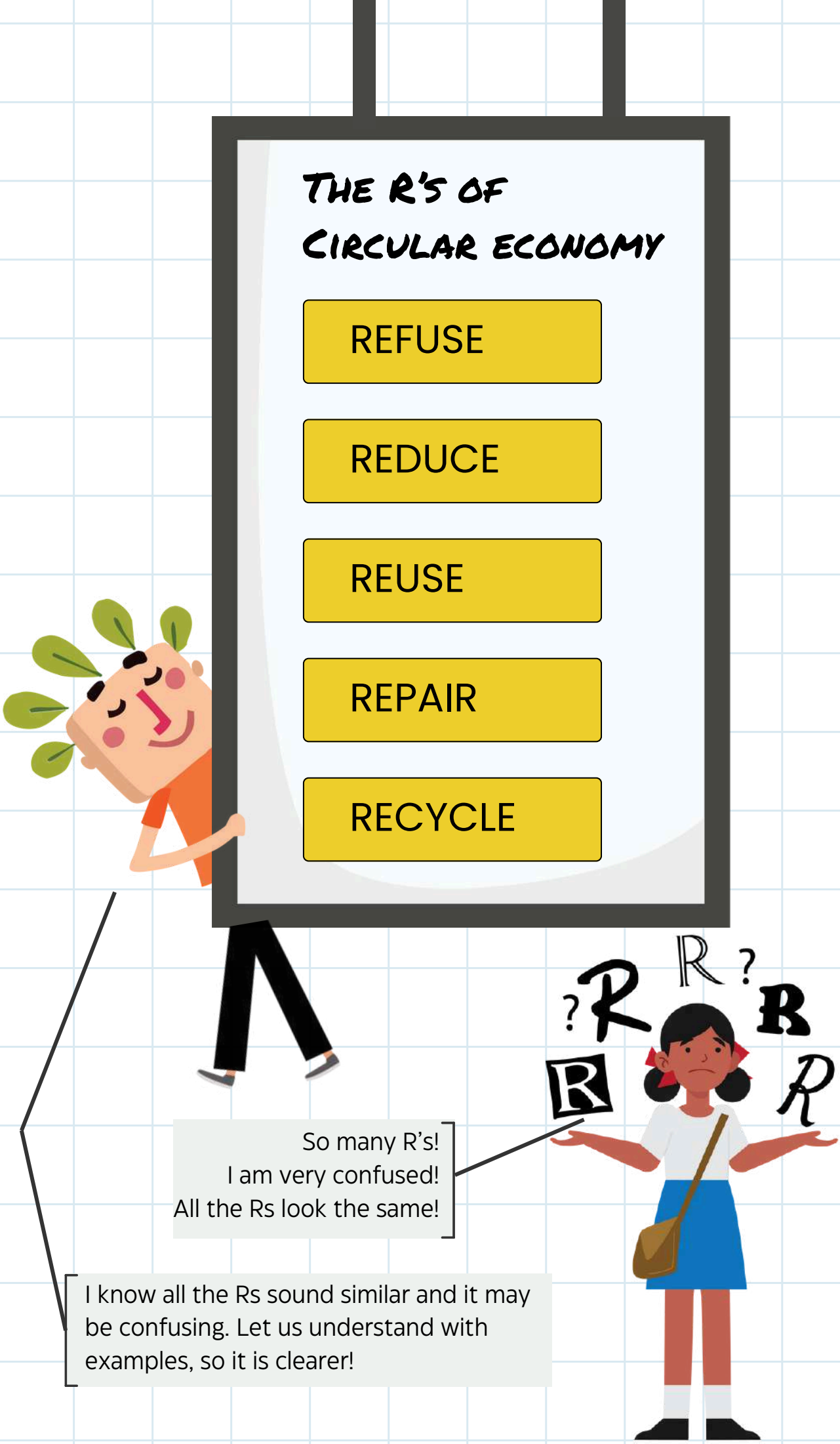
WASH

Hire staff to wash the plates/cups/ spoons

RETURN

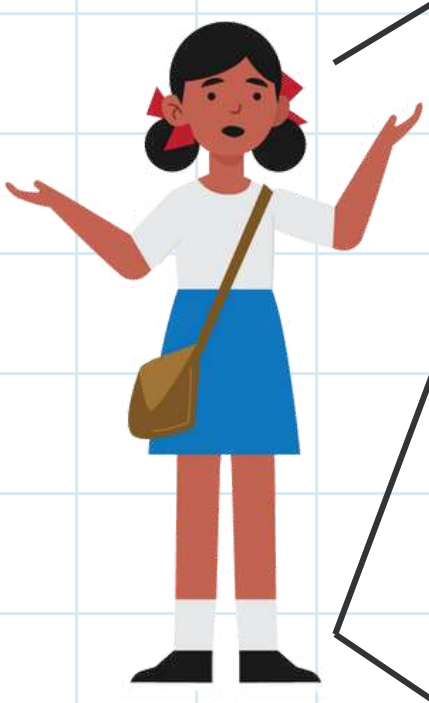
Return plates/cups/ spoons and collect the deposit after deducting the rental fees.

What did you observe when we discussed about the BARTAN bank? The utensils were being REUSED!
REUSE, is one of the R's of Circular Economy. Let's have a look at the other R's of Circular Economy.

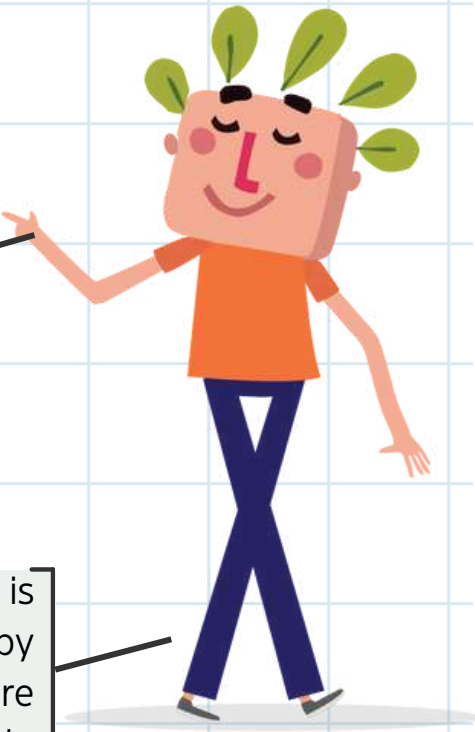

THE R'S OF
CIRCULAR ECONOMY
REFUSE
REDUCE
REUSE
REPAIR
RECYCLE
So many R's!
I am very confused!
All the Rs look the same!
I know all the Rs sound similar and it may be confusing. Let us understand with examples, so it is clearer!

REFUSE

Refuse is avoiding products that are not environmentally sustainable*.



Does it mean avoiding products that are **designed for dump**?



Correct. Can you give examples of '**Refuse**'?

Is it refusing plastic bag, paper cup, plastic straws, foil plates?

Yes, the best way to manage waste is not generate it in the first place! So by the simple act of REFUSING you are reducing mountains of trash.

- **REFUSE**
- REDUCE
- REUSE
- REPAIR
- RECYCLE

**Environmentally sustainable products: products that do not cause any harm to the environment throughout their whole life cycle - from TAKE to DISPOSE.*

THINK BANK

Identify single use items (disposable) to refuse by drawing an X across them.





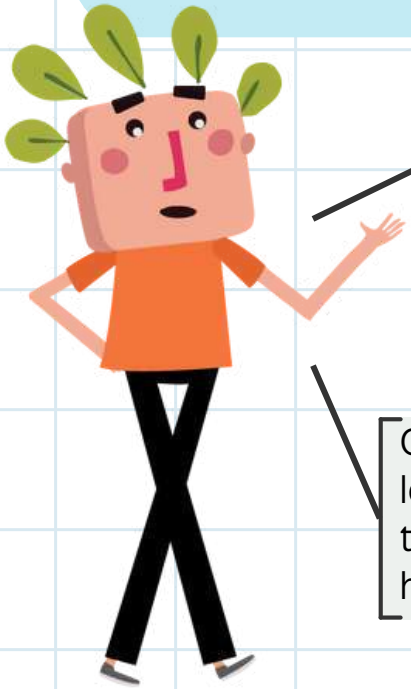







REDUCE

Think carefully before buying, and only purchase what's truly necessary.



You must have heard about the saying '**LESS is MORE**'. What does it mean?

Being happy with less?

Correct. It means that if you lead a simple life with less things, you will feel like you have enough and more.

Ask yourself these questions before buying anything:

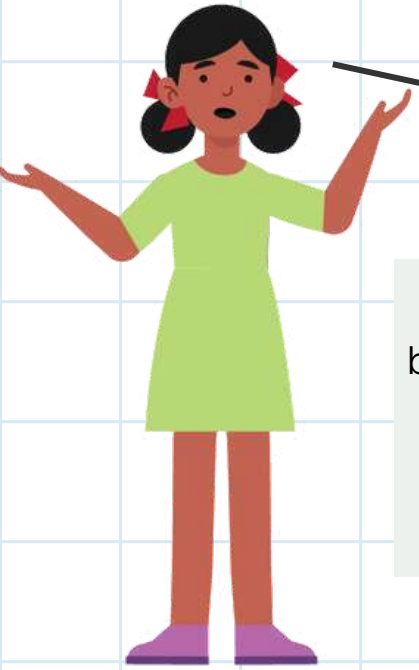
- REFUSE
- **REDUCE**
- REUSE
- REPAIR
- RECYCLE

Do I really need this?

How long will I use this?

Can my parents afford it?

Is there a more sustainable alternative?

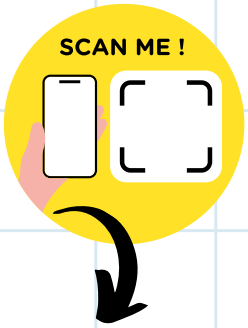


Is this why many people specifically mention in the celebration invite not to get any gifts or bouquets?

It is! You know what Abir did? On his birthday they had a **Preloved* Gift Swap**! All the children were asked to bring 2 preloved items as exchange gifts. So gifts and return gifts were all preloved!

No New Birthday Gifts... Organised A Preloved Gift Swap Instead

Asked all kids to get 2 preloved items.
Every kid took back one.
The rest went to Abir.



@sonikabhasin

***Preloved**: It refers to an item that was previously owned. It is another word for used or secondhand items.*

REUSE

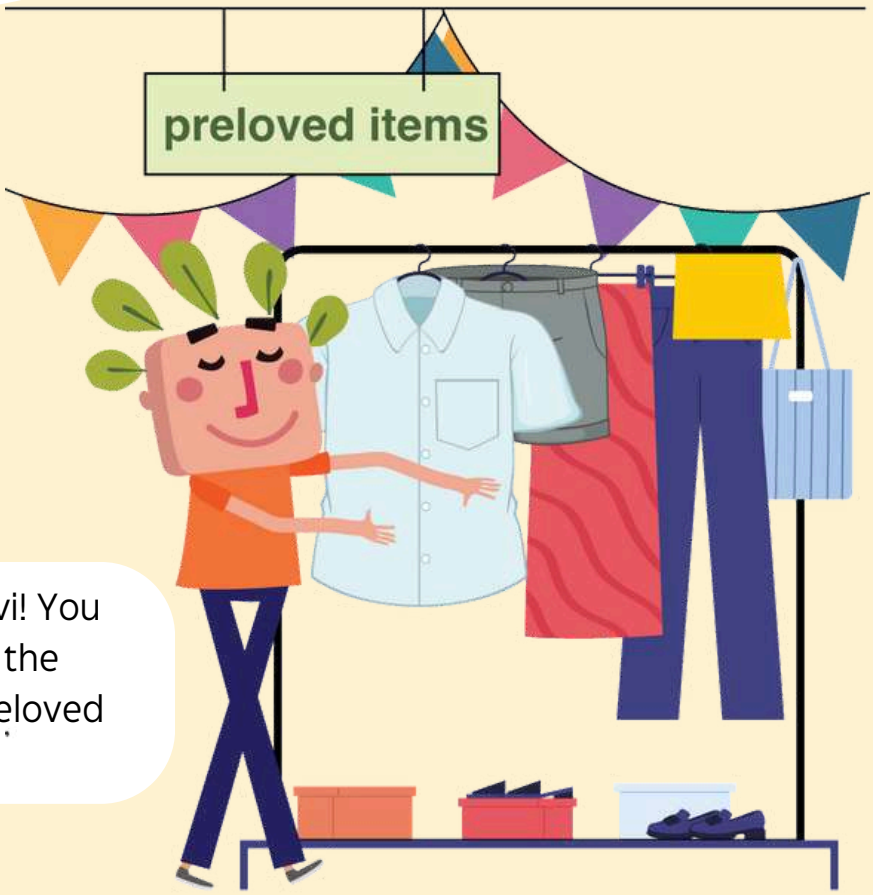
Use of any discarded product (which is still in good condition and fulfills its original function) by another person.

Is buying '**preloved**' a way of **REUSE**?

Yes, it is like giving a second life to something that has already been of use to someone.

Another example is **hand-me-down** clothes from older siblings. I was not a big fan of having to wear bhaiyya's clothes. But I am happy to be contributing to circular economy by wearing them.

- REFUSE
- REDUCE
- **REUSE**
- REPAIR
- RECYCLE

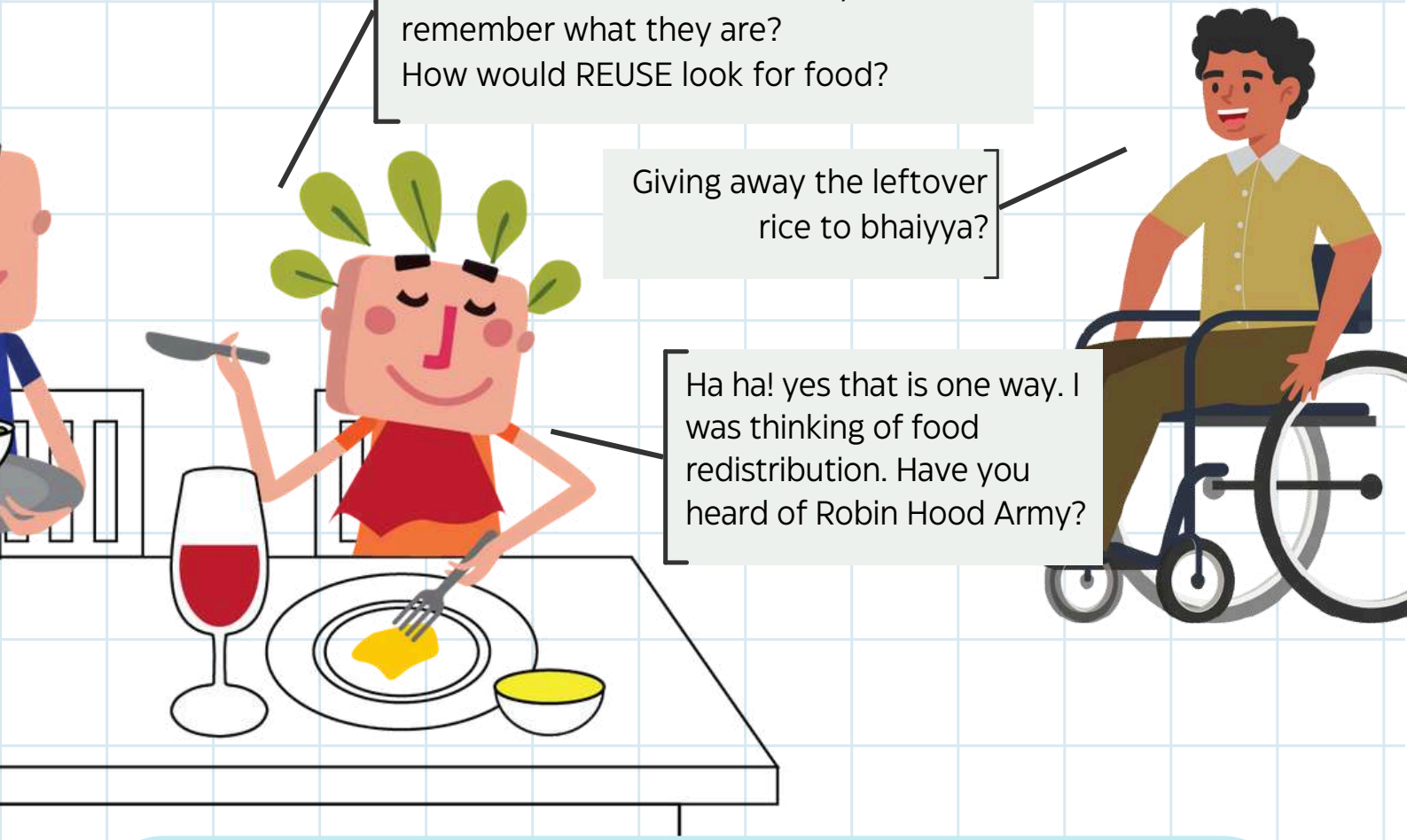


Way to go Ravi! You could shop in the market for preloved clothes.

Did you observe that we talked mostly about technical materials. Do you remember what they are?
How would REUSE look for food?

Giving away the leftover rice to bhaiyya?

Ha ha! yes that is one way. I was thinking of food redistribution. Have you heard of Robin Hood Army?



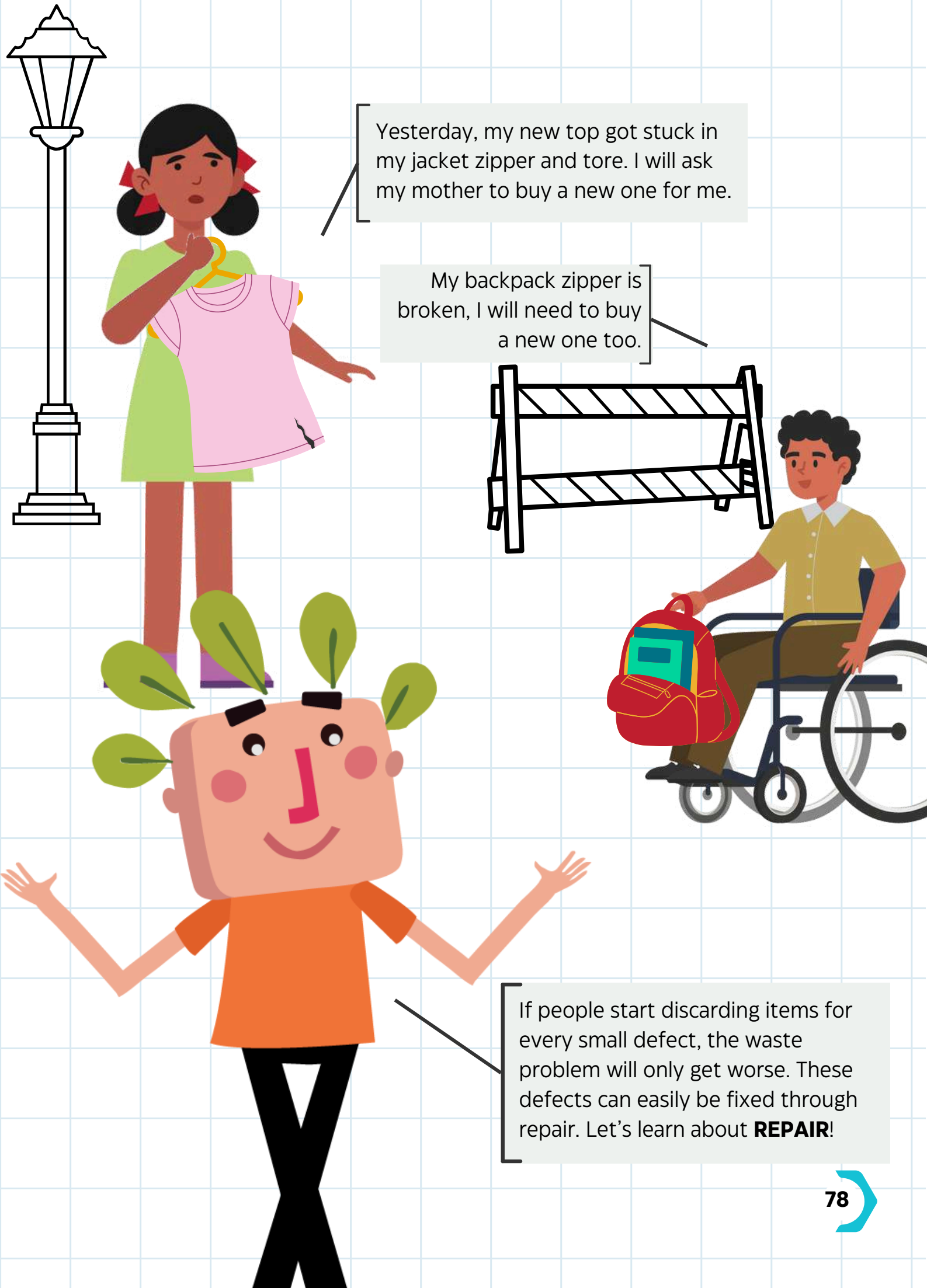
At large events, parties, or cafeterias, a lot of unserved food often gets leftover. Organizations like Robin Hood Army collect this surplus unserved food and give it to nearby communities in need.

This prevents food from being wasted, ensuring it is **REUSED**.

More about Robin Hood Army

From the picture below, list the objects that can go into the bins of Refuse, Reduce and Reuse. Some objects can go in more than one bin.

REFUSE	REDUCE	REUSE


Yesterday, my new top got stuck in my jacket zipper and tore. I will ask my mother to buy a new one for me.
My backpack zipper is broken, I will need to buy a new one too.
If people start discarding items for every small defect, the waste problem will only get worse. These defects can easily be fixed through repair. Let's learn about **REPAIR**!

REPAIR

Fixing or maintenance of a damaged/defective product so that it can be used again for its original function.

REPAIR

- Extends life of products
- Reduces consumption
- Saves Money
- Gives jobs to repair technicians

Repair supports circular economy by keeping products in **CIRCULATION**. It also helps skilled repair technicians—cobblers, electricians, tailors, and even toy doctors like me—by giving them work and keeping their craft alive! So, Repair Karo!

REFUSE

REDUCE

REUSE

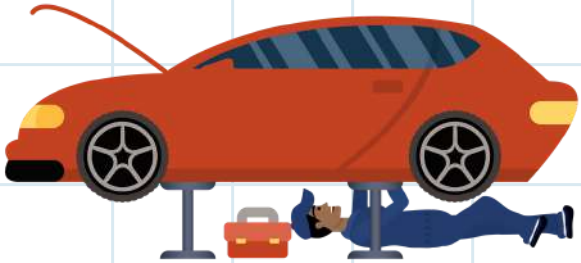
REPAIR

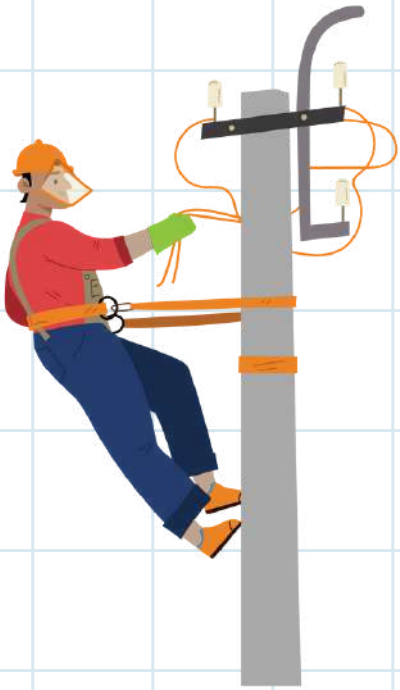
RECYCLE

SCAN ME!

For a fun video on Repair Karo

Actvity: Identify and name these people who help us repair different types of resources.





Have you repaired anything in your home?

Did you do it yourself or did you call a professional to help you?

Name the object and write the steps you took when an object needed repair.

1

2

3

4

5

Read about the Repair Collective

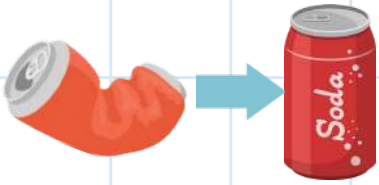
SCAN ME!

RECYCLE

It is the process of making new products from a product that has originally served its purpose.

We collected a lot of these bottles during the run. I'm wondering how it can be disposed of responsibly.

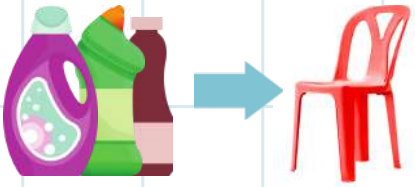
Well, the bottles can be recycled! Let's see a few other things which can be recycled to create new objects.



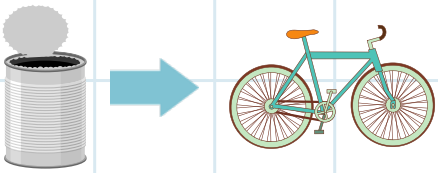
Aluminium Cans ... become new aluminium cans.

- REFUSE
- REDUCE
- REUSE
- REPAIR
- **RECYCLE**

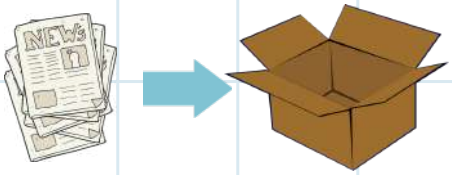
Glass Bottles ... can be used to make new glass bottles/jars.



Recycled plastic bottles...are used to make garden furniture.



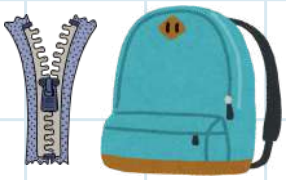
Steel/Tin cans ... are melted to make bike parts.

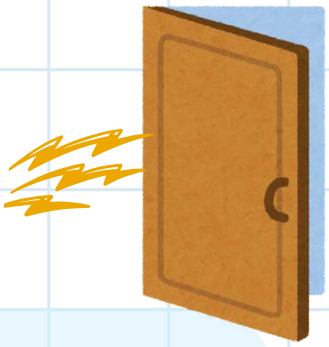


Recycled Paper ...is used to create packaging material.

THINK BANK

Complete the 'R' in the box beside each problem. What can be done to solve it? Explain your answer.





R ___

Broken zip

_____

_____

_____

_____

R ___

Empty glass bottle

_____

_____

_____

_____

R ___

Shoe too tight

_____

_____

_____

_____

R ___

Squeaky door (a door that makes noise while opening or closing)

_____

_____

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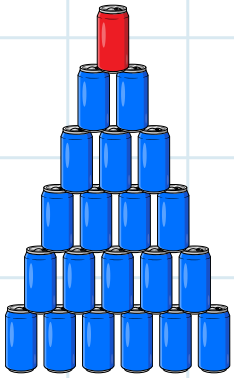
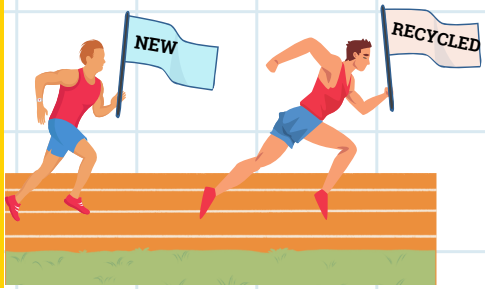
DID YOU KNOW?

Energy spent in manufacturing **1 Aluminium Can** from raw Bauxite = **20 cans** made from recycled aluminium.

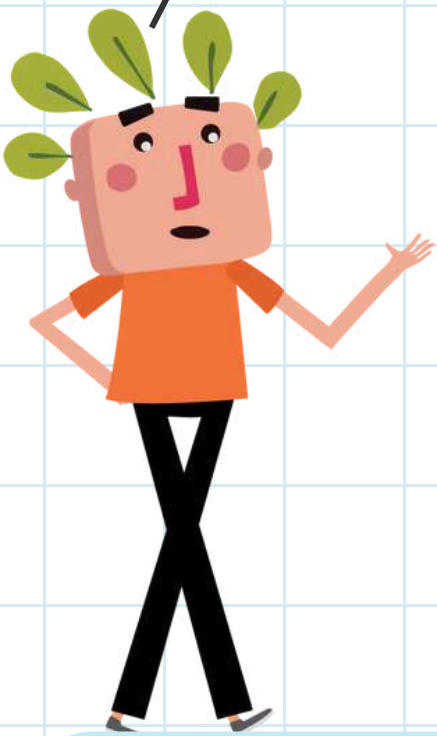


DID YOU KNOW?

It takes **70% less energy** to recycle paper compared to making it from raw materials.



Recycling reduces the need for taking fresh resources.



Recycling sounds great, why **reduce**/**reuse**?

Yes. Why don't we just switch to **recyclable products**?

Recycling is better than throwing things away, but Reduce, Reuse, and Repair are even better. They help us use less and keep things working longer. Come, let's understand this better.

Why RECYCLING is not the preferred R in Circular Economy?

1 Not everything gets recycled

Mixed materials, like multi-layered plastic (MLP), plastic-lined paper cups, blended fabric, and some types of plastic (like styrene), are difficult to recycle. This is because the different materials are stuck together and can't be separated easily.

2 Few Buyers

- Manufacturers don't buy back enough recycled material.
- Since plastic products made from virgin materials look shinier, are less brittle and cost similar to recycled plastic products, there is very low demand for recycled products.

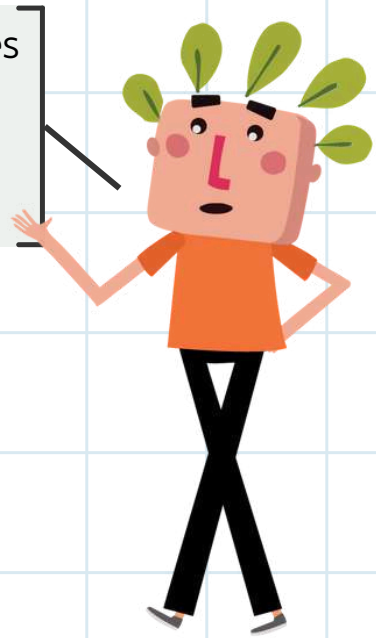
3 Costly & Polluting

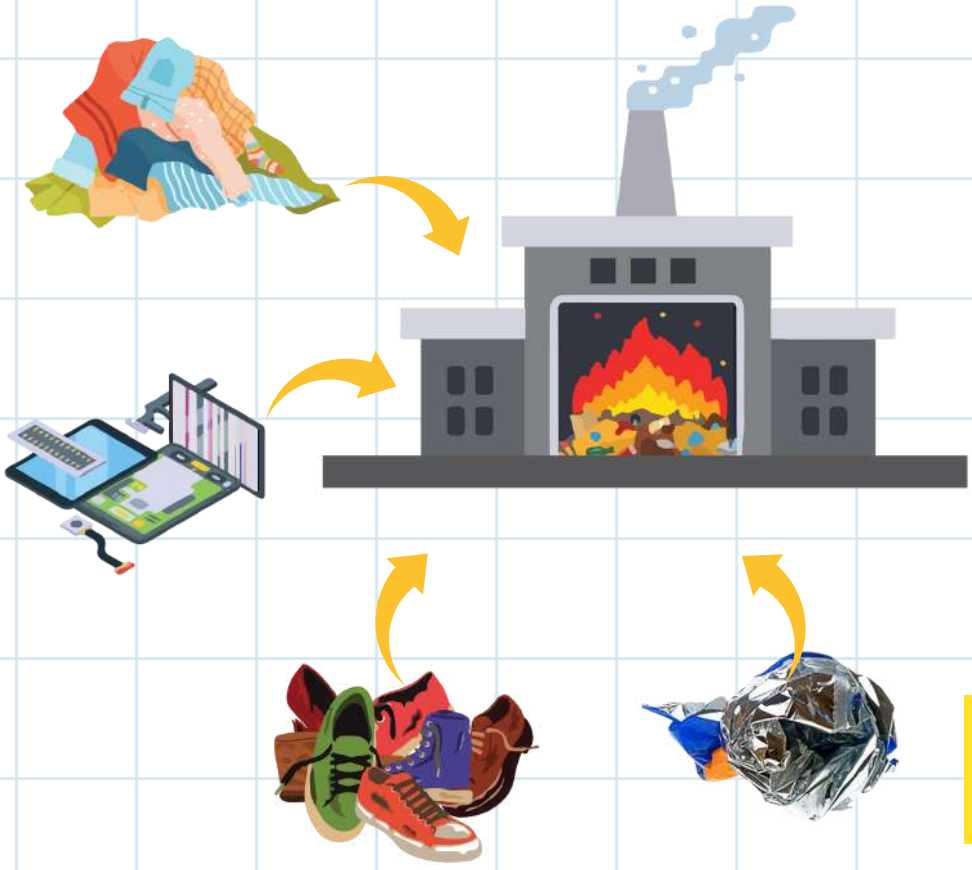
Uses large amounts of resources (fossil fuel, electricity, water, labour) to make, to collect & transport and to recycle. Recycling also generates some amount of pollutants.

ENERGY/LANDFILL

Items that cannot be recycled are either used as fuel (also called **co-processing**) or sent to a landfill, where they remain for years until they decompose naturally.

Clothes that can't be recycled are sent to cement factories to be burned as fuel. Similarly, parts of phones, shoes, suitcases, multi-layered packaging that can't be recycled are burned to get energy from them.





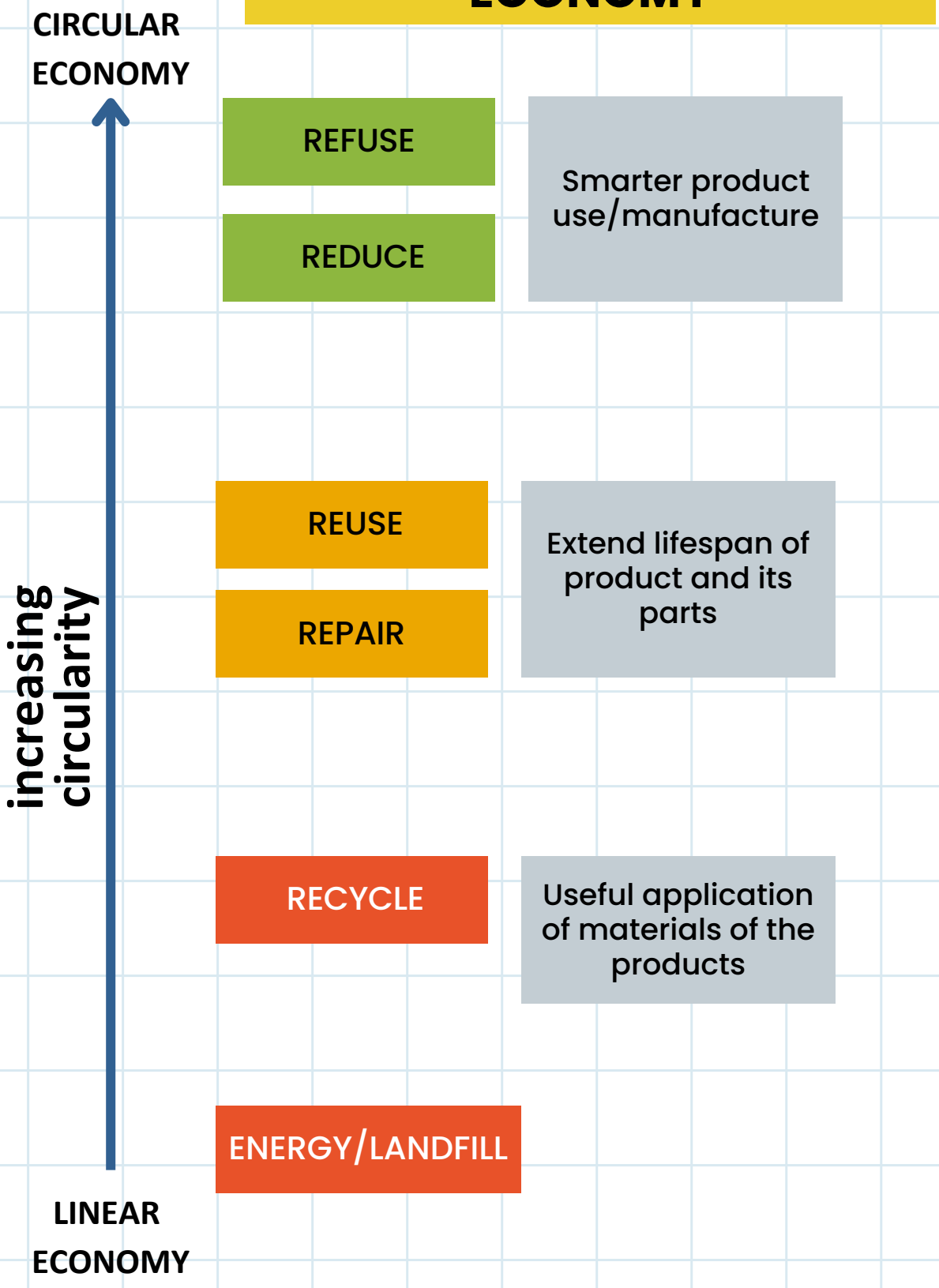
SCAN ME!

For more information on Waste to Energy

Even though co-processing helps us manage non-recyclable waste, it leads to significant air pollution. Cement factories are a major source of industrial air pollution. They contribute to global warming, and can cause a range of health problems, including respiratory issues. However, co-processing is still a better solution than landfill because -

- Reduces space needed for landfills.
- Replaces fossil fuels.
- Some energy recovery that would be wasted in landfills.

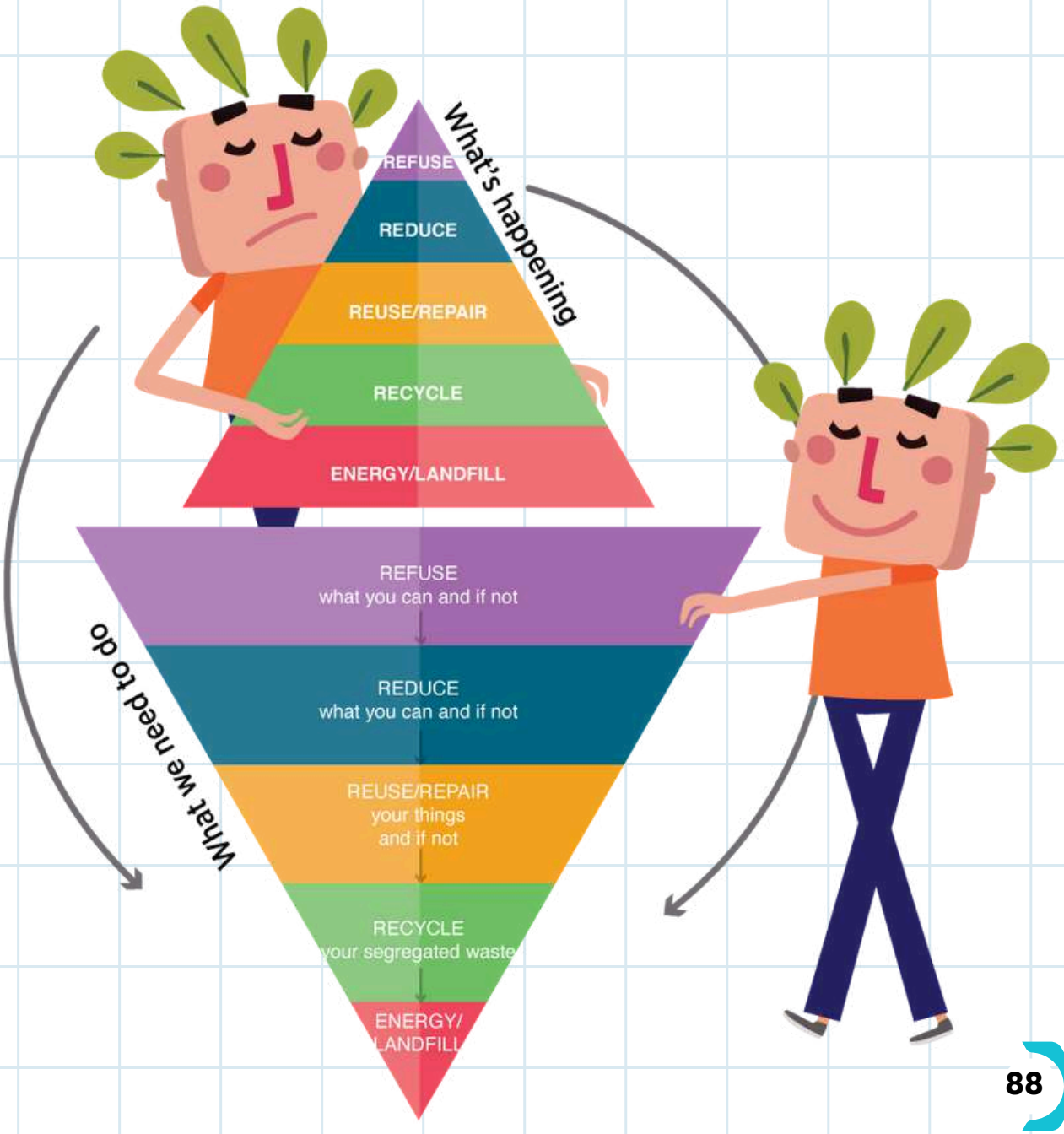
THE R'S OF CIRCULAR ECONOMY

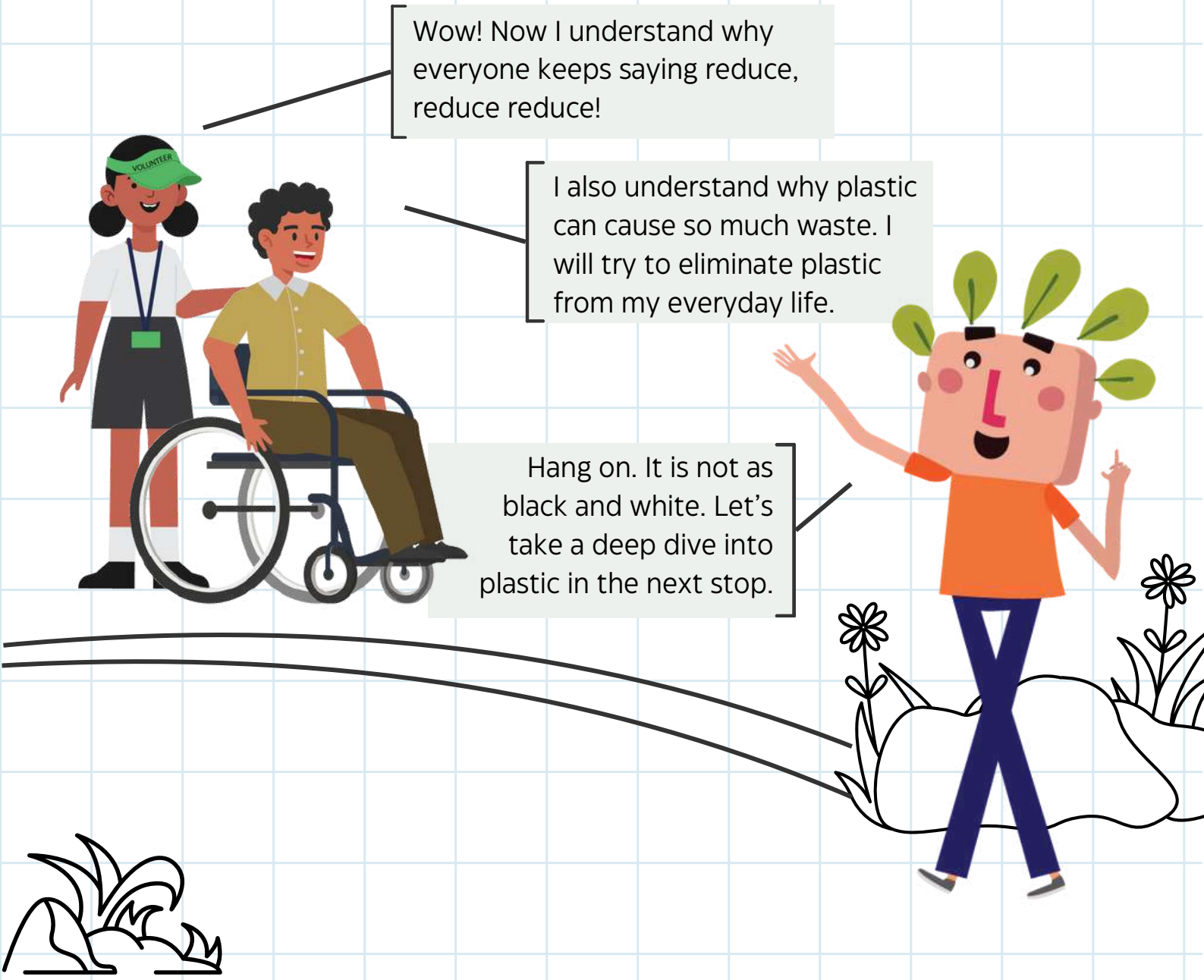


LET'S INVERT THE PYRAMID

Currently, we hardly REFUSE,
REPAIR very few things,
but RECYCLE and DISPOSE most of our things.

We need to flip this pyramid.
First, we should refuse and reduce what we buy. Then, we can repair and reuse what we have. Finally, we should recycle and send as little as possible to the landfill.



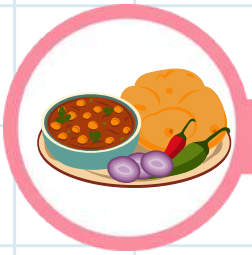


Before we go, let's recall what we have learnt:

- The 5 Rs in Circular Economy are **refuse**, **reduce**, **reuse**, **repair** and **recycle**.
- It's better to reduce, reuse, and repair things instead of just recycling, and how to use these ideas in our daily lives to create less waste.

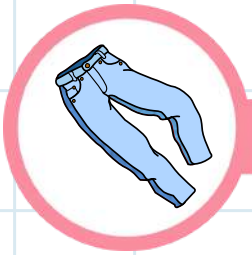
POWER UP

Write which 'R' may be used for each object listed below.

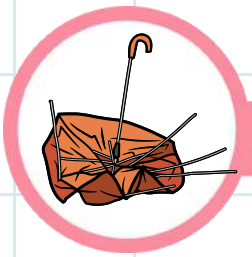


Extra food _____

Paper bag _____



New pants _____



Broken umbrella _____

POWER UP

Choose the correct answer to fill the blanks.

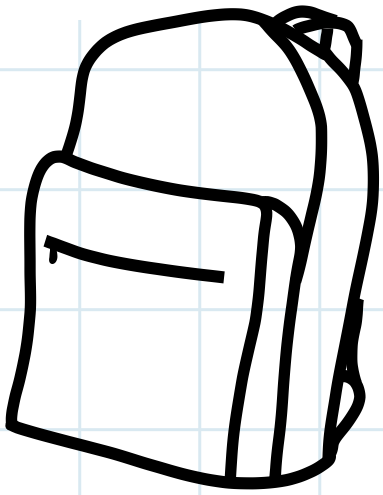
1. When we buy preloved clothing, we are helping _____ (*refuse/reuse*).
2. When we fix the brakes on our old bicycle, we are _____ (*recycling/repairing*) it.
3. When you carry your own bottle, we are _____ (*reducing/refusing*) a disposable one.

DETECTIVE'S DIARY:

We learned from Environmental how we can practice the R's at home and outside. If you are going to a sports event, what will you carry in your bag to practice those R's?

What do I do if I am thirsty?

What should I do if I am hungry?



What should I carry if I want to wipe my hands and face?

Where will I dispose of the waste I generate? E.g.: After eating an apple, where can I throw the waste? Do I carry a container only to collect waste?

I will carry a _____ to wipe my hands.

I will carry a _____ to drink.

I will carry a _____ to collect waste.

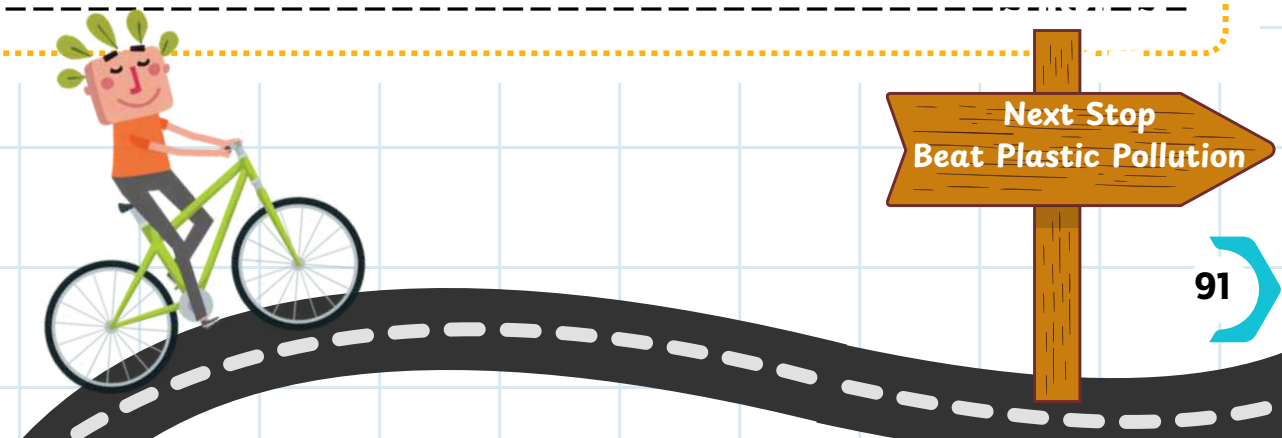
I will also carry these things which will help me practice the R's learnt in this chapter:

_____

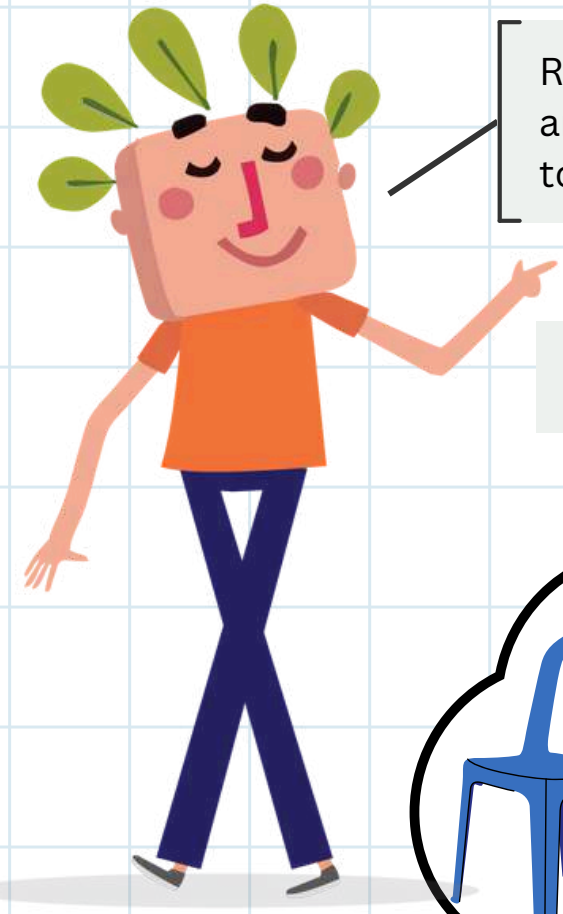
_____

_____

_____

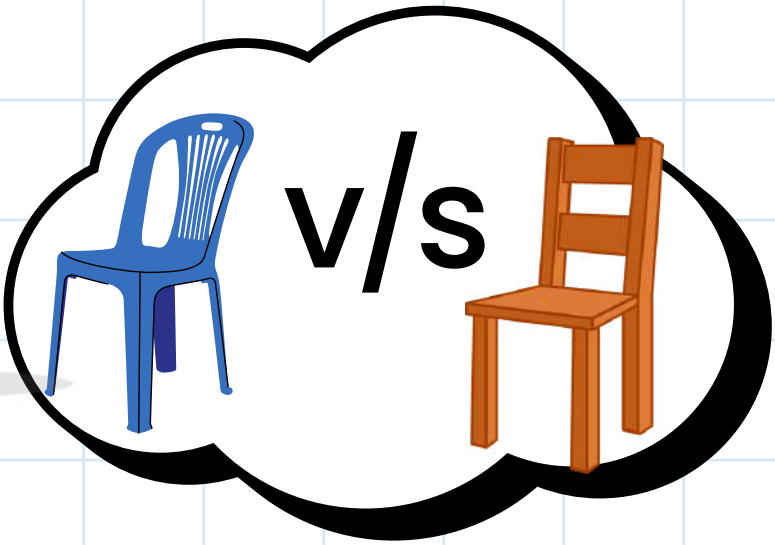


5 Beat Plastic Pollution



Remember the 500 plastic chairs at the annual day? If those were wooden, we'd need to cut down at least two full-grown trees!

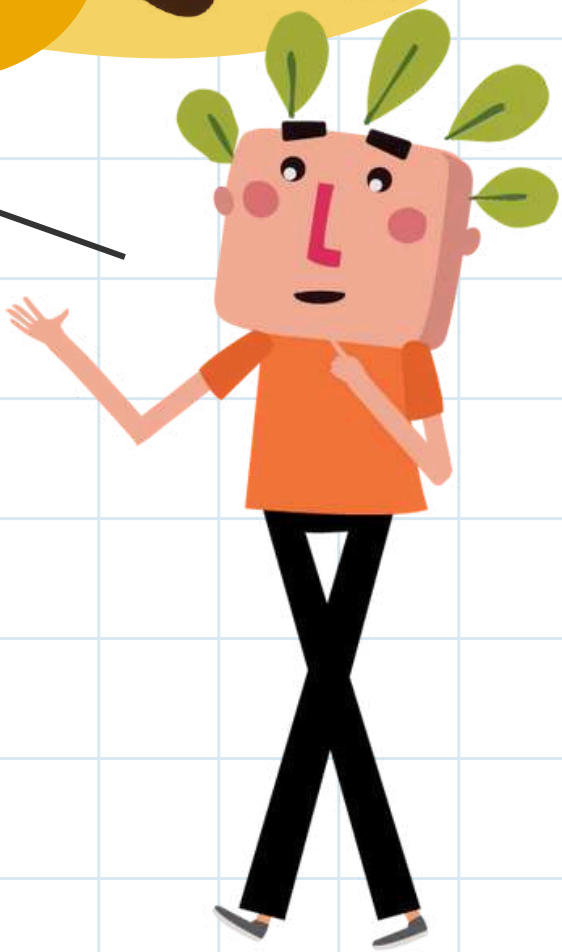
Oh, I never thought of plastic like that!

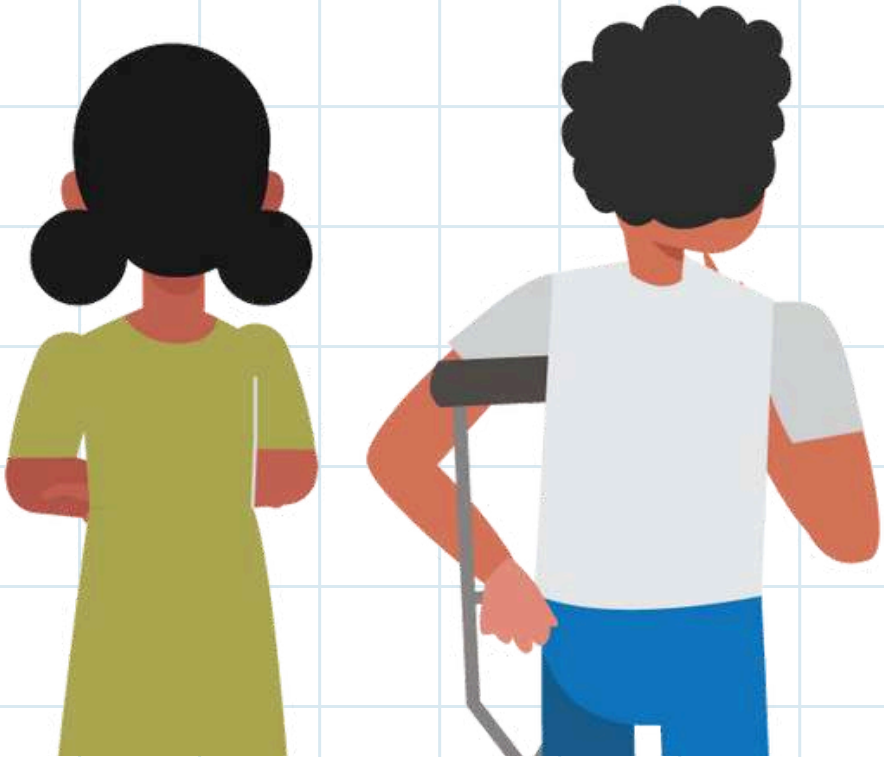


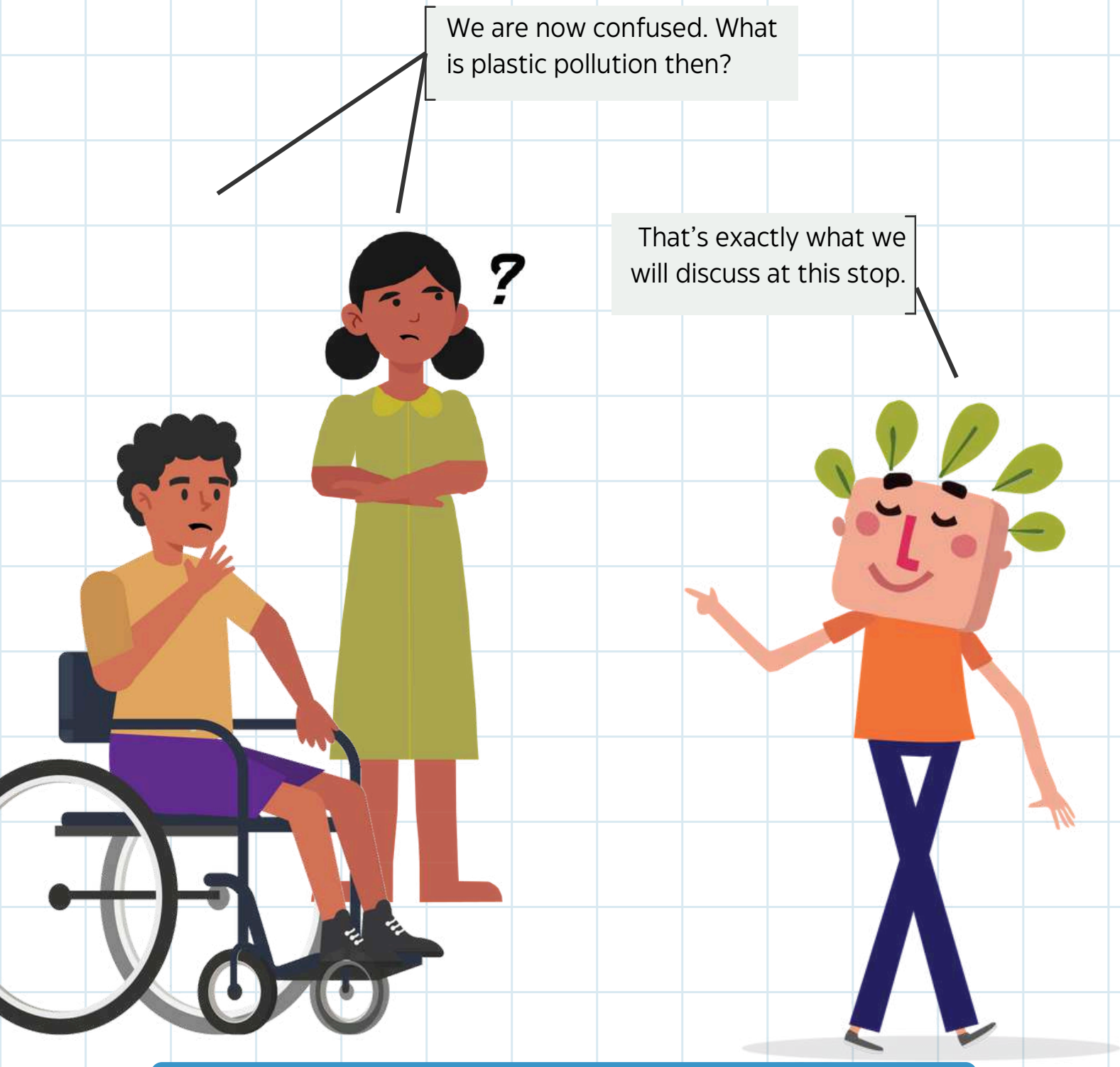
If all components of a laptop were made of metal and wood, it would be ten times the size and weight. Imagine airplanes—they wouldn't even take off!

That's correct! Plastic is light, water-resistant, cheap, and strong. It's changed how we make things.

Exactly, it's a great asset for the manufacturing industry!







At the end of this stop you will be able to –

- Define plastic pollution.
- Differentiate between reusables and disposables.
- List the main polluting items.

The same properties that make plastics so useful — their durability and resistance to degradation* — also make them nearly impossible for nature to completely break down. Rivers and lakes carry plastic waste from land to the sea, leading to **ocean pollution.**

Riya, I recently visited a beach in Odisha and found the endangered **Olive Ridley sea turtles**! One of the many threats for their conservation, is water pollution! The turtles often tend to swallow the polythenes* and plastic straws which are littered by the tourists on the beaches.

Come let's first learn about the **different kinds of plastics** to understand their impact on the environment.

***degradation**: Degradation is the process of something becoming worse or weaker.*

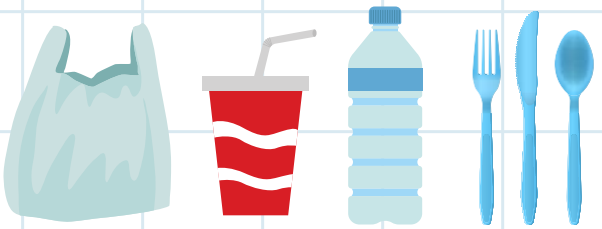
***Polythene**: Polythene is a type of thin plastic that is most commonly used to make carry bags.*

TYPES OF PLASTIC BASED ON USAGE

PLASTIC

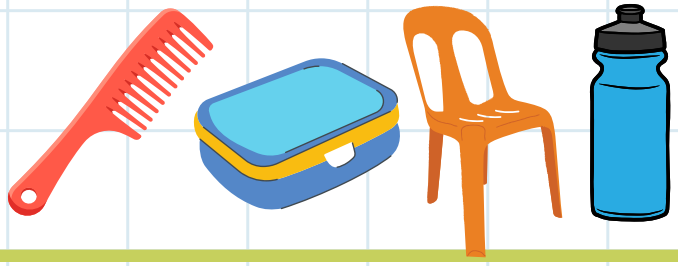
DISPOSABLES

Used only once (typically for a few minutes) and discarded



REUSABLES

Used several times until product is broken or unusable



Plastics are more manageable when used as REUSABLES. If they are used as 'DISPOSABLES', they are more difficult to manage.

WHY?

They are the chief contributor of mixed waste (example kitchen waste given in plastic bag, coffee cup thrown with coffee in it, take away boxes thrown with some leftover food still in it).

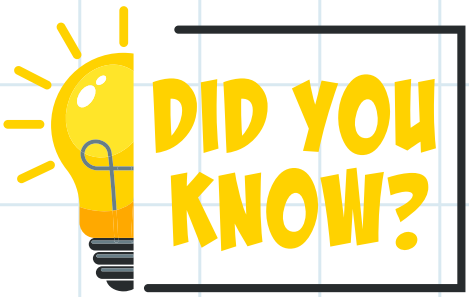
In landfills, plastic items take 20-500 years to breakdown.

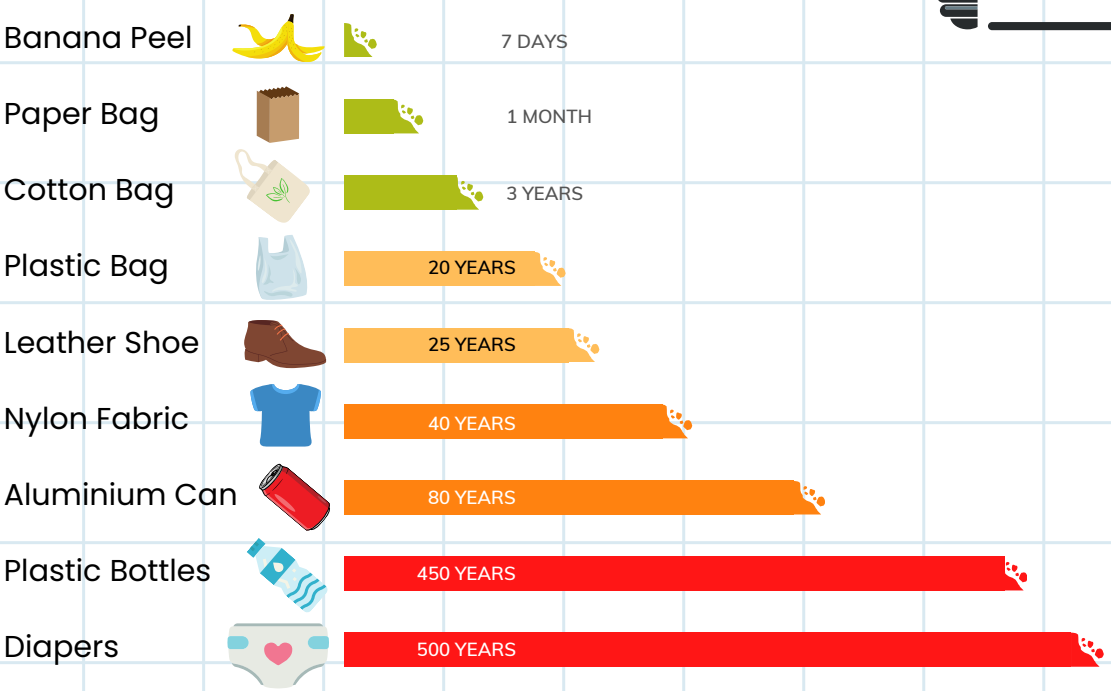
Even when it is recycled, we saw in our earlier stop that the process is polluting and takes up a lot of resources.

How long until its gone?

Once thrown, waste does not disappear.

Source: www.liveabout.com



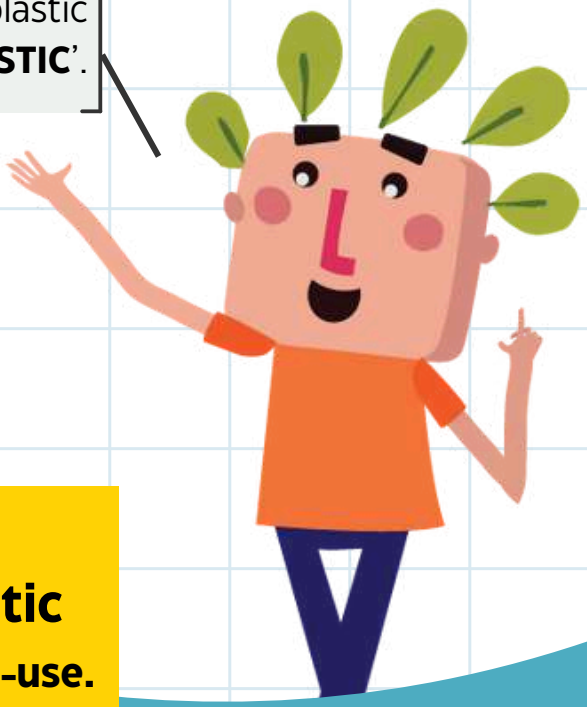


THINK AND ANSWER

Identify and circle the disposable items among these.

Ah! So disposable plastic is the biggest culprit?

Yes, in the last stop we referred to disposable plastic as '**SINGLE -USE PLASTIC**'.



DID YOU KNOW?

Globally more than **50% of total plastic** production is for **single-use.**

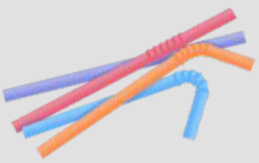
Guess which single-use plastic items top the list as most polluting items in the world?

The Big 4

PLASTIC BAG

PLASTIC CUP

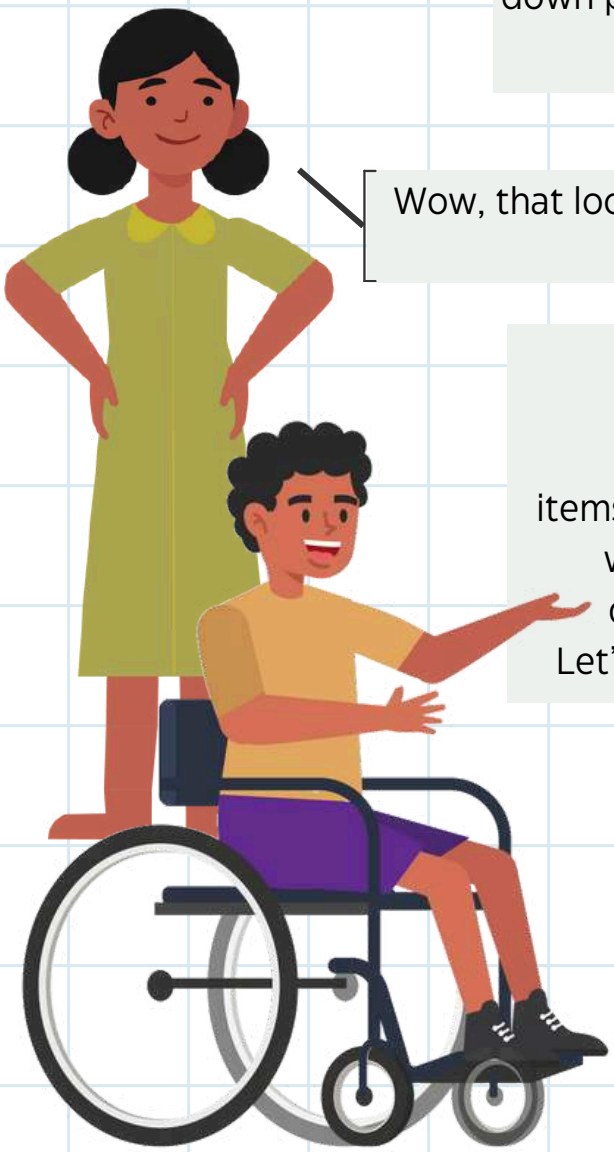
PLASTIC BOTTLE



PLASTIC STRAW

So if we avoid the **BIG 4 polluting items**, we can cut down plastic pollution by more than 70%.

Wow, that looks doable!



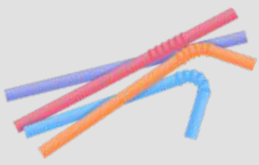
Remember what we have learned so far?
If you have to avoid these 4 items, you need to replace them with **REUSABLE** items, not a different kind of disposable.
Let's discuss them one-by-one.

1
PLASTIC BAG

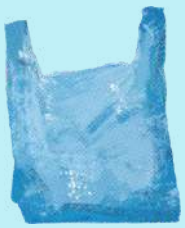
2
PLASTIC CUP

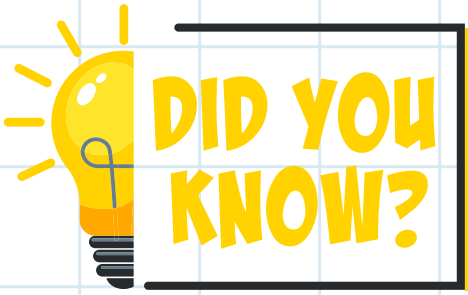
3
PLASTIC BOTTLE

4
PLASTIC STRAW

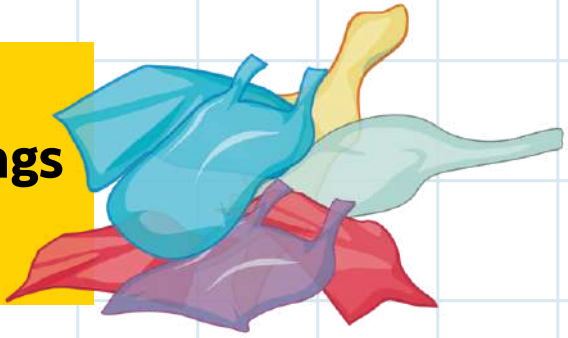


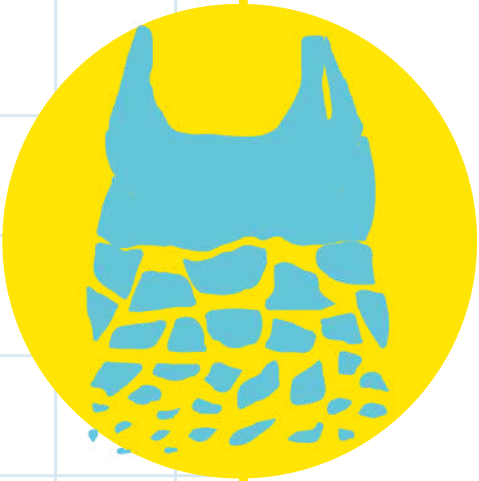
1 PLASTIC BAG





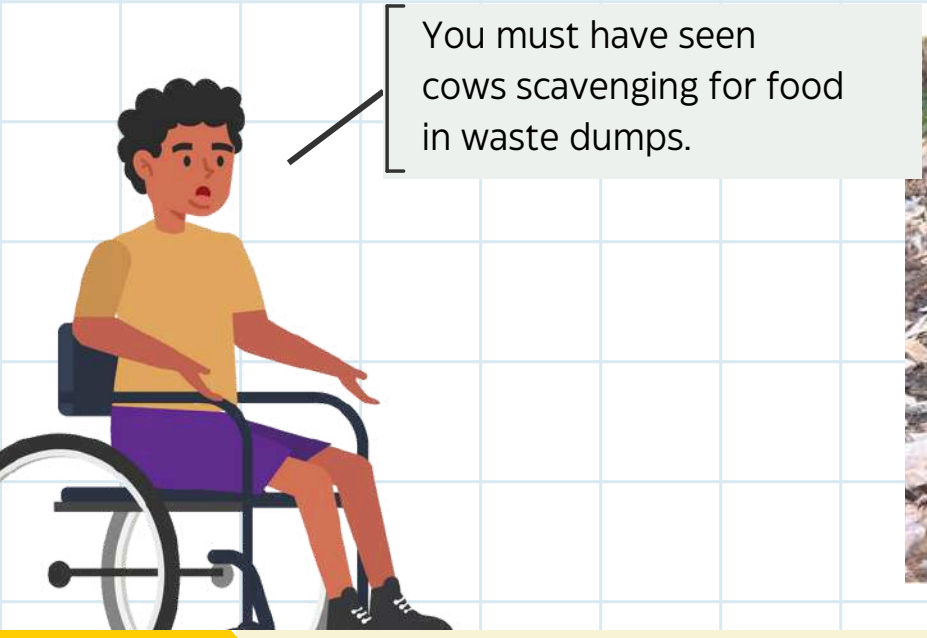
The world uses
5 trillion plastic bags
a year.





Plastic bags take a very long time—about 1,000 years—to break down in a landfill. But instead of disappearing, they break into tiny pieces called **microplastics***. These small pieces can soak up harmful chemicals and keep polluting the environment for a very long time.

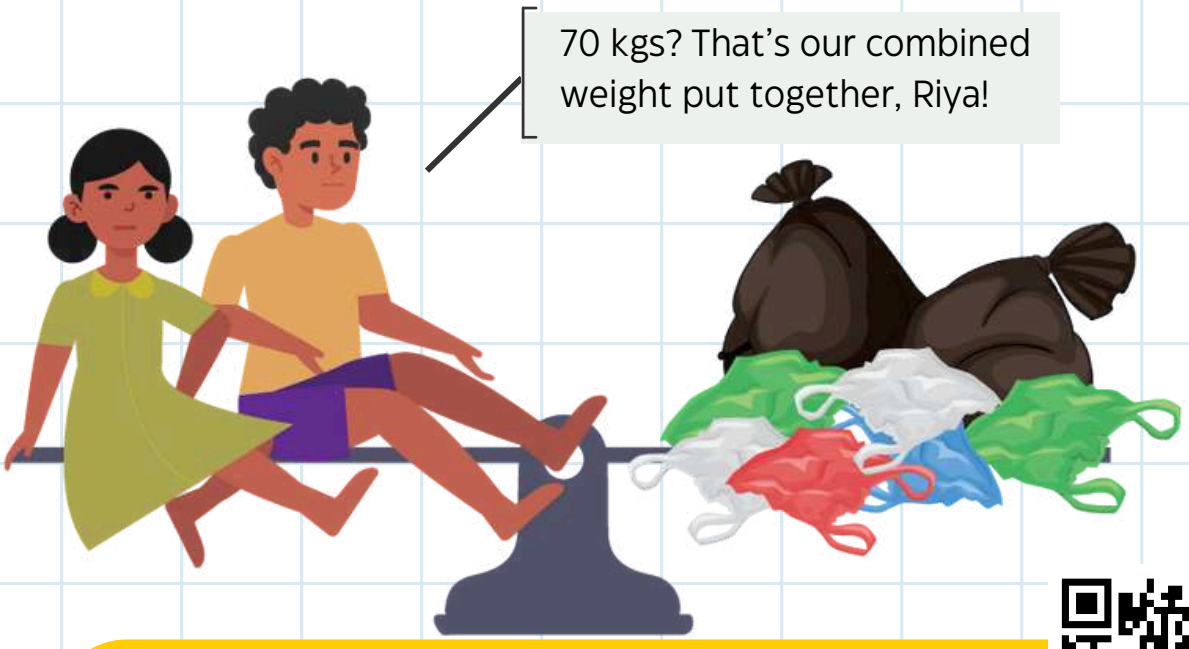
***Microplastics**: These are tiny bits of plastic, (not visible to the naked eye) that are difficult to get rid of!



Many of them eat the plastic (as food waste is tied in plastic bags and thrown away).

Plastic blocks the digestive system of the cows.

As much as 70 kgs of plastic has been found in their stomach.



Read more about the plastic cow project of Karuna society.

ALTERNATIVES

Which of these can we use as **alternatives to the PLASTIC BAG**?

CLOTH BAG

NON-WOVEN POLYPROPYLENE PP BAGS

JUTE BAG

PAPER BAG

Do you think a paper bag is better than a plastic bag?

trees are cut to make paper

it is not very strong

not waterproof

after-all single-use

The real solution is to carry your own reusable bag made of cotton cloth, polyester, jute, canvas etc.

Avoid polythene bags, non-woven polypropylene bags, paper bags, compostable plastic bags - because all of them are DISPOSABLES.

2 PLASTIC CUP

Apart from the environmental hazards, drinking hot beverage in a plastic cup is harmful for health too.

Hot coffee in plastic cup.

Microplastics in coffee.

Digestive disorders, cancer.

Which of these can we use as alternatives to the PLASTIC CUP?

Paper cup
The inner lining of polyethylene in paper cups makes it difficult to biodegrade and is very expensive to recycle.

Kulhad (clay cup)
Clay is eco friendly and easily compostable until it is baked- once baked it takes centuries to disintegrate and form soil.

REAL ALTERNATIVES

Glass Cup

Ceramic Cup

Steel Cup

REMINDER

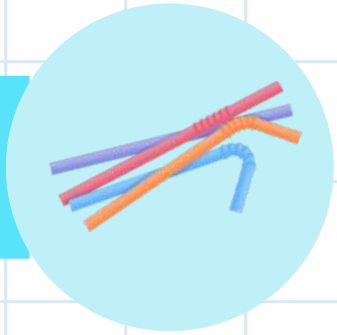
Disposables, even if eco-friendly, should be avoided.
Reusables, even if plastic should be embraced.

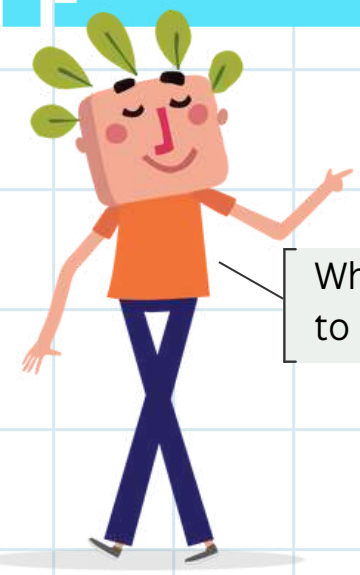
3 PLASTIC BOTTLE

Water ATM

A water ATM is a machine that provides drinking water, often purified using Reverse Osmosis (RO).

4 PLASTIC STRAW



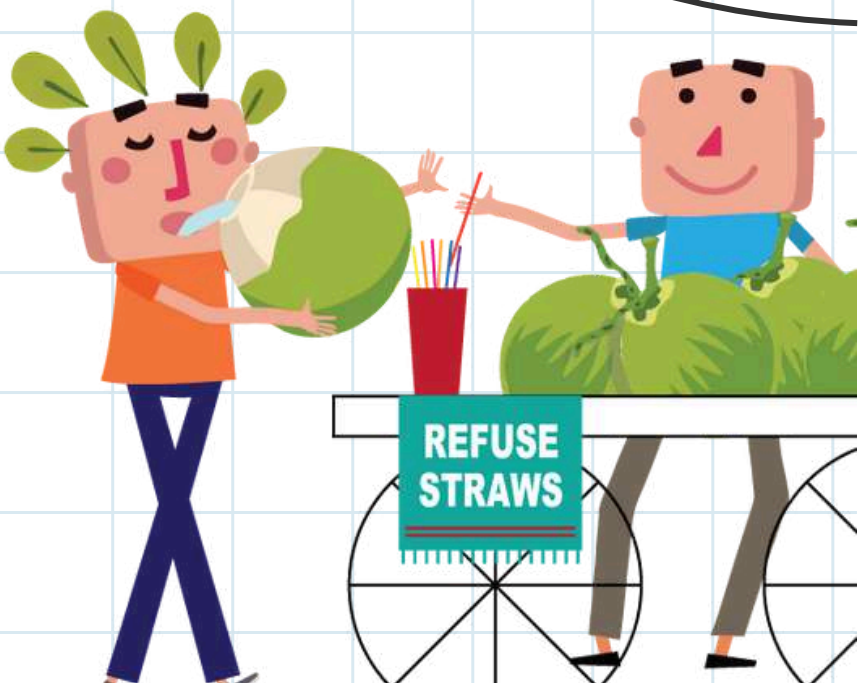


What's the alternative to plastic straw?

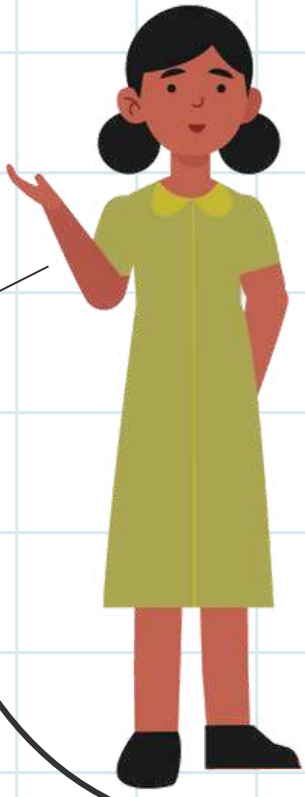
I know it is **NOT** paper straw or bamboo straw.

Is it a steel straw?

Steel straw is expensive and difficult to clean. The simplest alternative is NO STRAW. Drink your juices/milkshakes **directly** and wipe off the moustache with a hanky!



So **single use disposables** (plastic or eco-friendly) should be avoided.



And **reusable items** (even if they are made from plastic, like chairs, buckets) can be used!

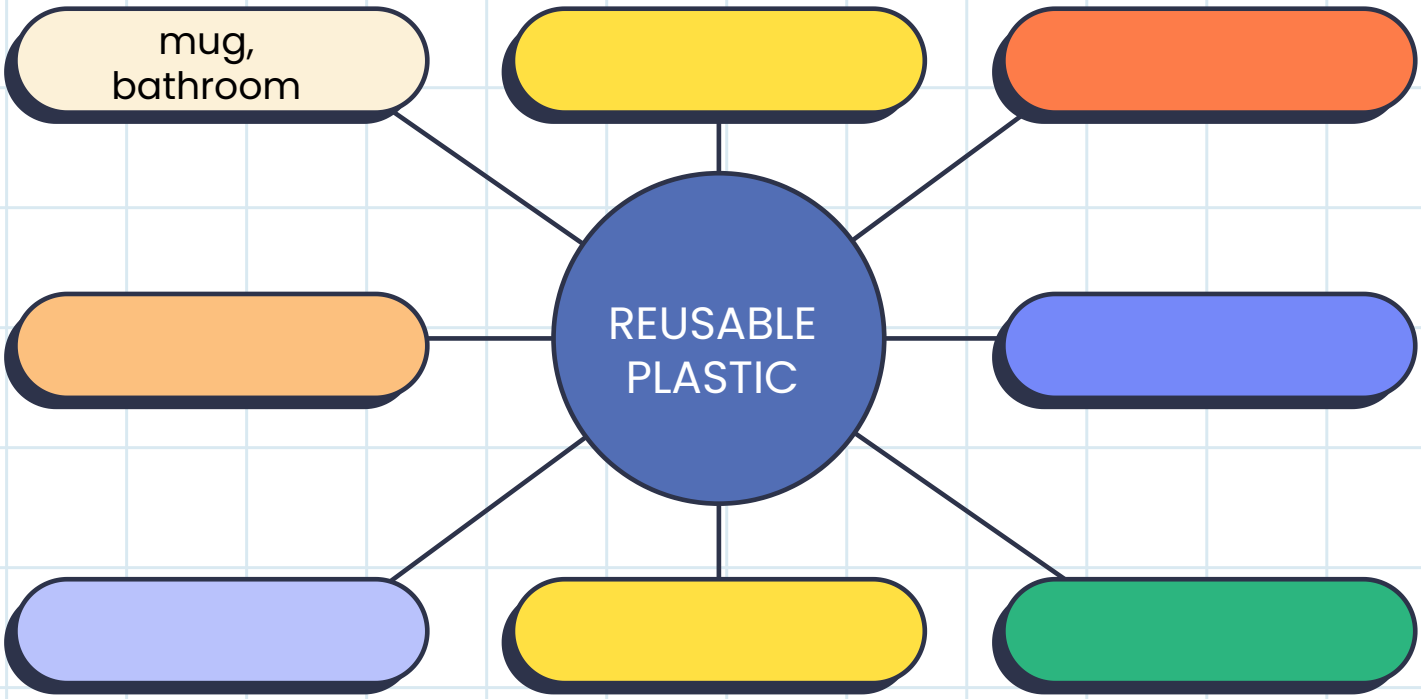
You got it right, Ravi and Riya! Now that you have understood how to beat plastic pollution, let's talk about fashion in the next stop!

Before we go, let's recall what we have learnt:

- The four most polluting types of plastic waste are plastic bags, plastic cups, plastic bottles, and plastic straws.
- Reusable items, even if they are made of plastic, are a more sustainable choice compared to disposable ones.

POWER UP

Name some reusable plastic objects that you come across in your everyday life and where it is used. Follow the example.



POWER UP

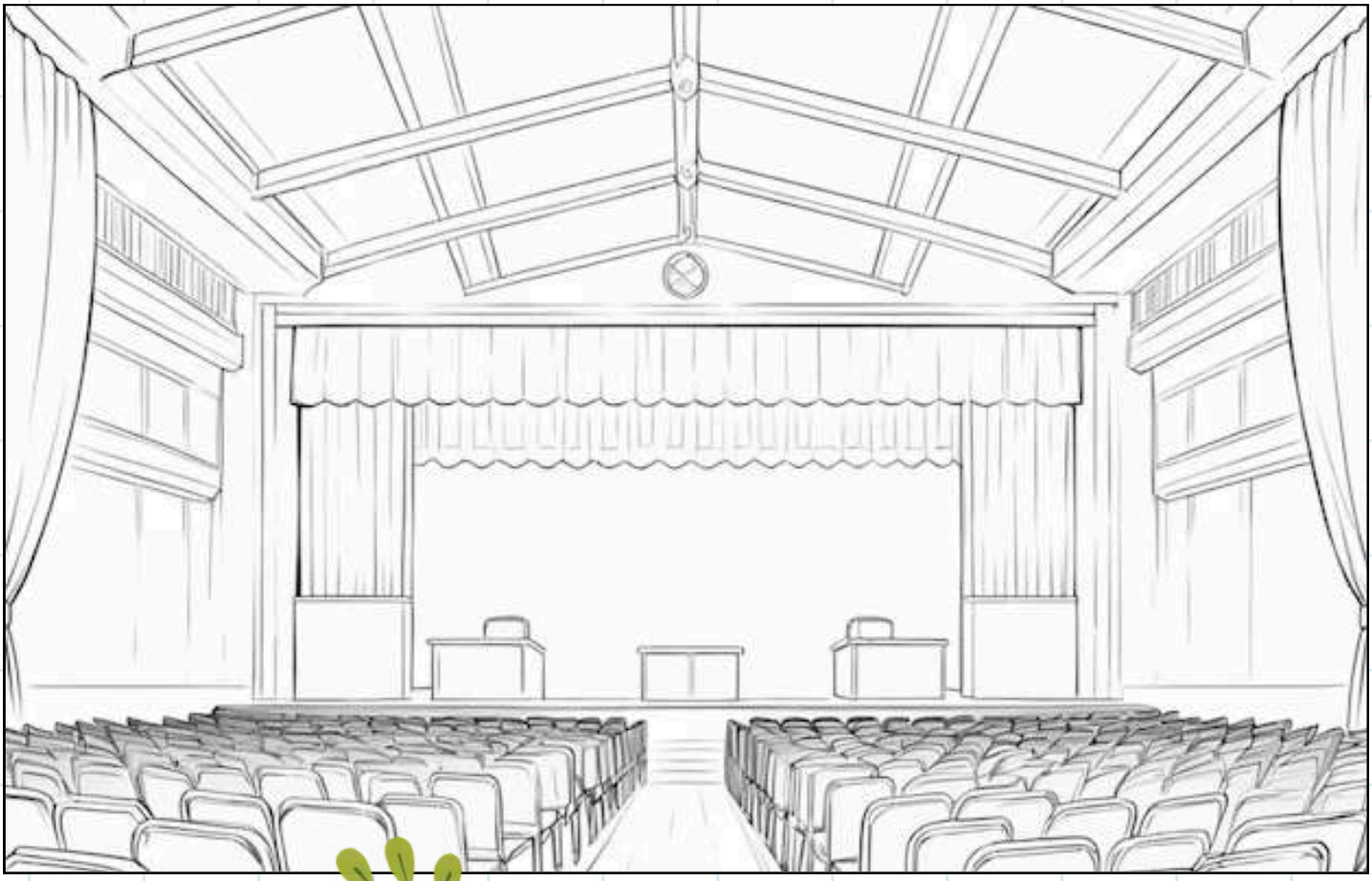
List at least four objects that are 'good' plastics and four that are 'bad' plastics in your home or school.

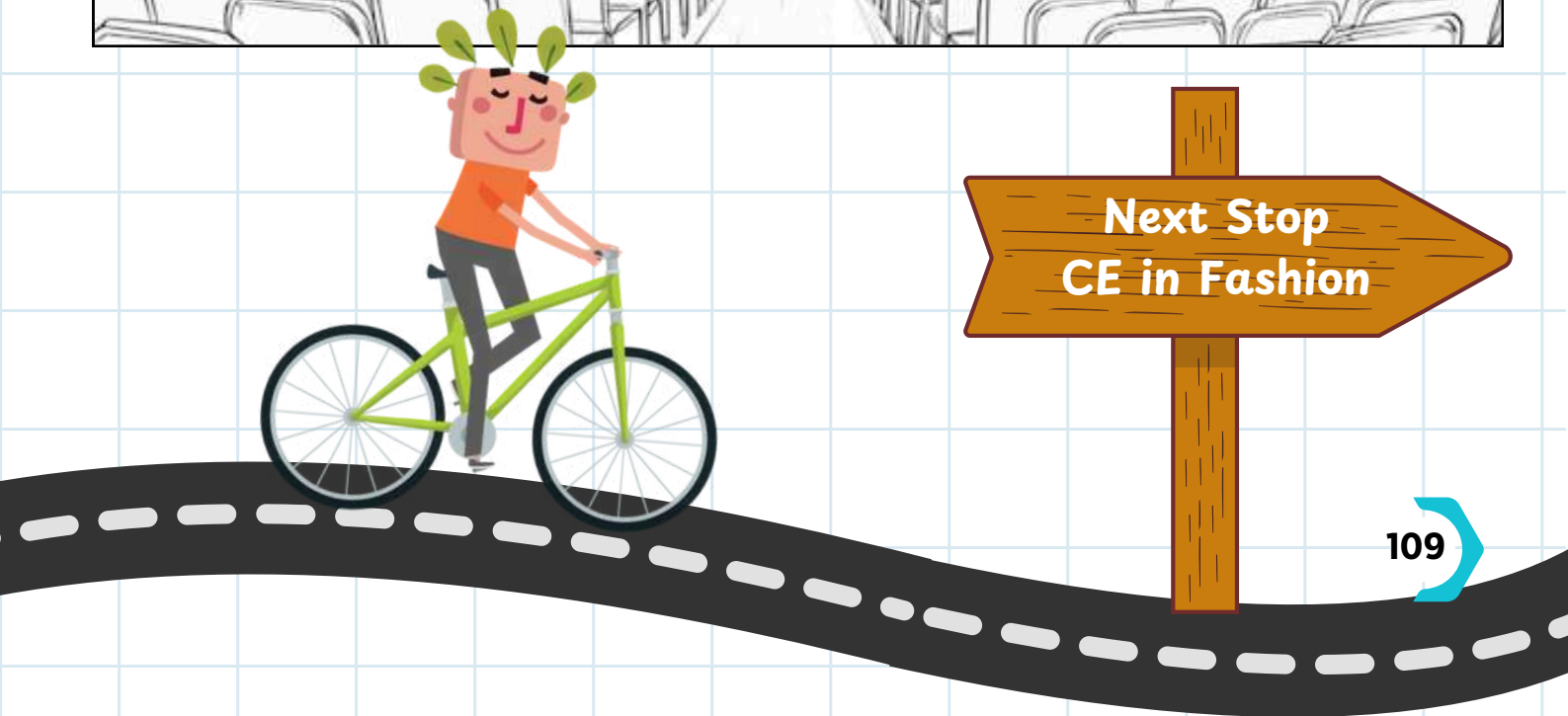
'Good' plastic	'Bad' plastic

DETECTIVE'S DIARY:

You have to decorate the auditorium in celebration of your school winning the hockey match.

Draw the objects/things you will use to decorate the auditorium below. Choose objects carefully keeping in mind what you have learned in this chapter about reusable and disposable plastic.





CE in Fashion

Where are you two headed?

We are going to see an IPL match - Rajasthan Royals v/s Delhi Capitals. I am supporting Delhi Capitals and he is supporting Rajasthan Royals.

Did you buy these t-shirts only for this event?

They were cheap and they are not disposable, we can wear them again.

Hmm I think it is time to take a deeper look at the fashion world from the lens of circular economy.

At the end of this stop you will be able to -

- Explain the problems related to textile waste.
- Identify ways to make fashion circular.


You have learnt the **Take-make-use-dispose** process of linear economy in Stop 1. What does it look like for a t-shirt?
boutique
70%
NOW
excellence

Take

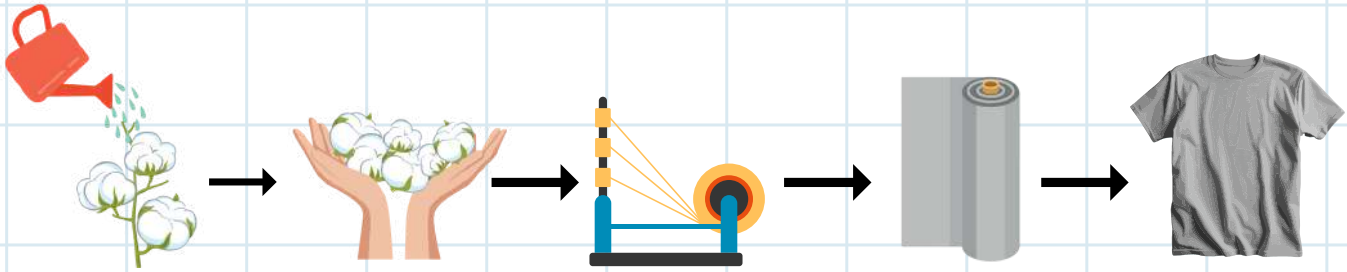
Natural fabrics:
Natural fibres are made from plants or animals.

- Cotton
- Linen
- Wool

Synthetic fabrics:
They are made from plastic.

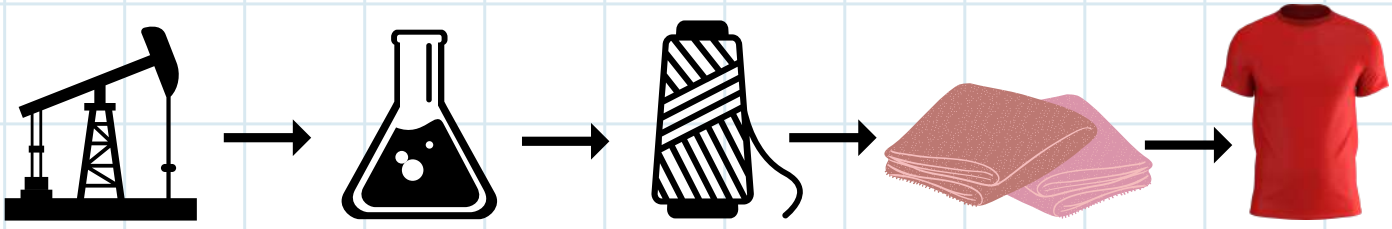
- Polyester
- Rayon
- Nylon
- Spandex

COTTON FABRIC :

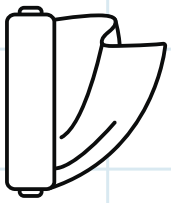


Grow cotton plants → Harvest cotton balls → Spin into yarn → Knit into cotton fabric → Turn fabric into a cotton tshirt

POLYESTER FABRIC :

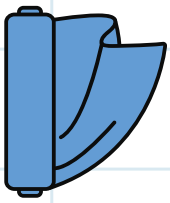


Crude Oil → Make polymers and melt spinning → Polyester threads → Woven into polyester fabric → Turn into a polyester tshirt



Fabric

Chemical dyes



Coloured fabric

Stitch into shirt

Sell at store

Make

Wear t-shirt

Wash after use

Dry it
and iron it

Use

After a few uses, the t-shirt is donated/discarded.

REUSE
OR
RECYCLE
OR
DISPOSE


The whole process of *take-make-use-dispose* of the textile industry is **wasteful** and **polluting**.

FASHION POLLUTION

There are issues at every stage of the fashion cycle as elaborated below.

Take

Overconsumption of natural resources like land and water.

Make

WATER POLLUTION
The chemical dyes to colour the clothes pollute water bodies.

PRE-CONSUMER TEXTILE WASTE
Tailoring bits, waste fabric.

Use

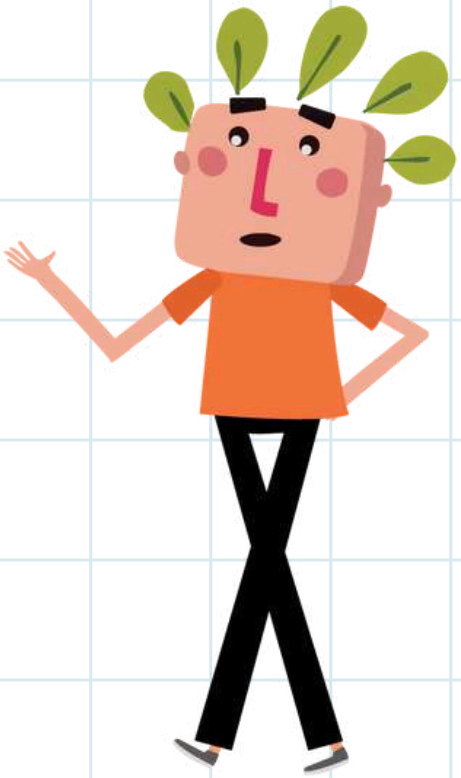
WATER POLLUTION
When you wash polyester clothes it discharges microplastic fibres into our water bodies .

Dispose

WASTE
India generates **7,800,000,000 kgs** of textile waste annually = weight of **14 lakh elephants.**

14 lakh elephants? That's 3 times the number of elephants that are there in the world*.

Why are these clothes disposed of as waste? Aren't they sent for recycling?



No, globally only 1% of clothes are recycled into new clothes!

But why?

Most textile waste is just dumped, not even collected. Even if collected, most cannot be recycled. Let's understand why most fabrics can't be recycled.

**According to the WWF, there are approximately 415,000 African elephants left in the world. There are around 40,000 to 50,000 Asian elephants left.*

WHY IS TEXTILE RECYCLING DIFFICULT?

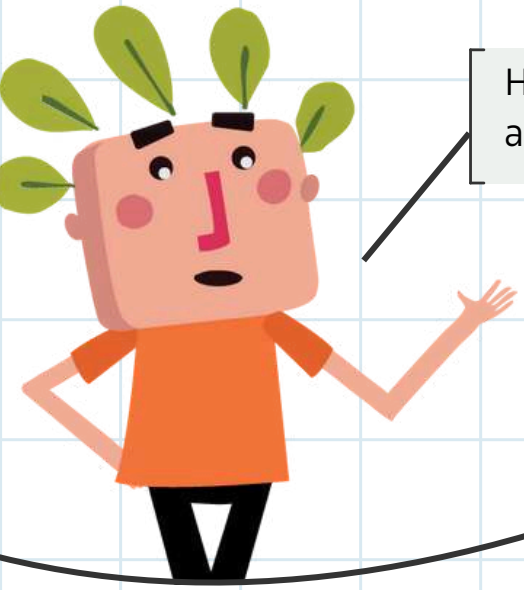
1 BLENDS

Blends are a mix of different natural and/or synthetic fabrics. Mixed fabrics are difficult to recycle. Can you think why that is so?

Hint: mixing of technical and biological materials we learnt in Stop 2.

2 ACCESSORIES

Clothing often includes accessories and parts like buttons, zippers, lace, sequins, tags, and labels. These are usually made of different materials, such as metals and plastics. Separating and sorting these materials from the fabric can be difficult because they are attached in various ways.



Here are some shocking facts about the fashion industry.

DID YOU KNOW?

One Truckload of Clothing Is Wasted Per Second.

Only 1% of clothes will get recycled into new garments.

We have enough clothing on the planet to dress the next 6 generations.

THINK BANK

You want to participate in a costume competition. Design and draw the costume you want to wear. Keeping textile pollution in mind, what materials and accessories will you choose to make your costume?

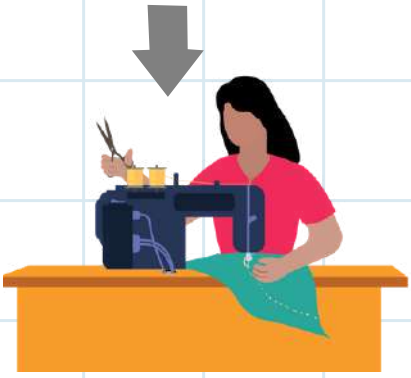
Materials & accessories I will choose:

My costume

FAST FASHION

Fast fashion relies on cheap, disposable clothing that is produced quickly and sold at low prices, encouraging consumers to buy and discard clothing at an alarming rate. Let us understand why this is a problem.

Cloth : Rs 300



Stitching : Rs 400

Transport : Rs 100

This is the process of making a tshirt.

Now tell me how can you get your t-shirt for only **Rs 399**?

The fast fashion industry is linked to bad working conditions. About 75 million people work in making clothes, and many of them earn very little money. This means they often have to work in tough situations and don't get paid enough for their hard work!

REMEMBER

Someone is paying the price for your cheap clothes!

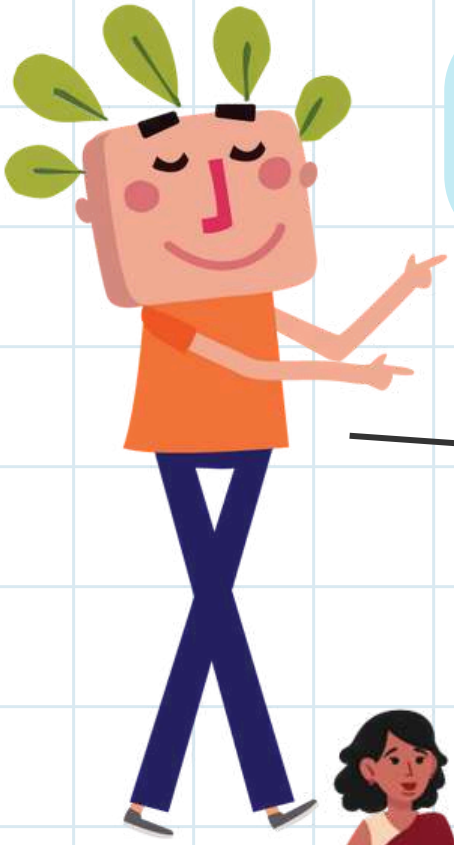
Garment workers in Bangladesh protesting against low wages and death of fellow workers due to lack of basic fire-safety norms at workplace.

Do you think we should keep buying new clothes then?

No, since it is so wasteful and the people working in the textile industry are being exploited, I think we should avoid buying new clothes.

But we might get bored wearing the same clothes or we might outgrow our clothes. Here are a few ways we can get new clothes / new look in a circular economy.

RESTYLE



Mix and match clothes and accessories to create a new look every time. Restyle your clothes into new outfits with a little help from Pinterest and your local tailor.

Drapes like saree and dhoti are very versatile clothing. Do you know there are 100 different ways to drape a saree? Plus you would never outgrow them vertically or horizontally!

Casual

Gujarati-style

Pleated/formal

Bengali-style

Lehenga-style

Modern

5 different ways to wear a shirt, to give different looks:

professional

formal

traditional

smart casual

casual

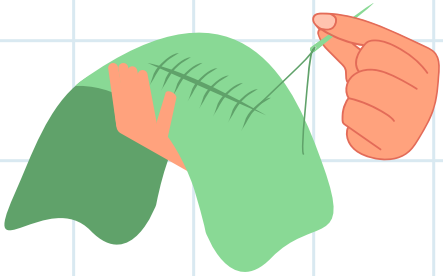
Other examples of restyling:

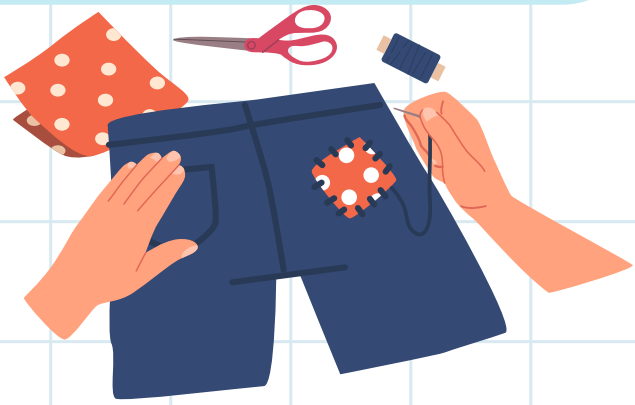
Try these simple tips to get a new look out of your existing clothes:

- Long tops can be cut to make crop tops.
- Long jeans can be cut to make shorts.
- Long sleeves can be folded or cut to make cap sleeves.

REPAIR

Replacing broken zip, sewing missing buttons, length/width alteration, attaching/removing sleeves, are all different forms of repair. If there is a stain or a tear on your clothing, can you think of interesting ways to cover it or fix it?





Create a new design with spray paint and stencils

Colour it with a fabric marker

Create a new design with bleach

Cover with a button or brooch

How to hide stains on clothes

Add an iron-on patch

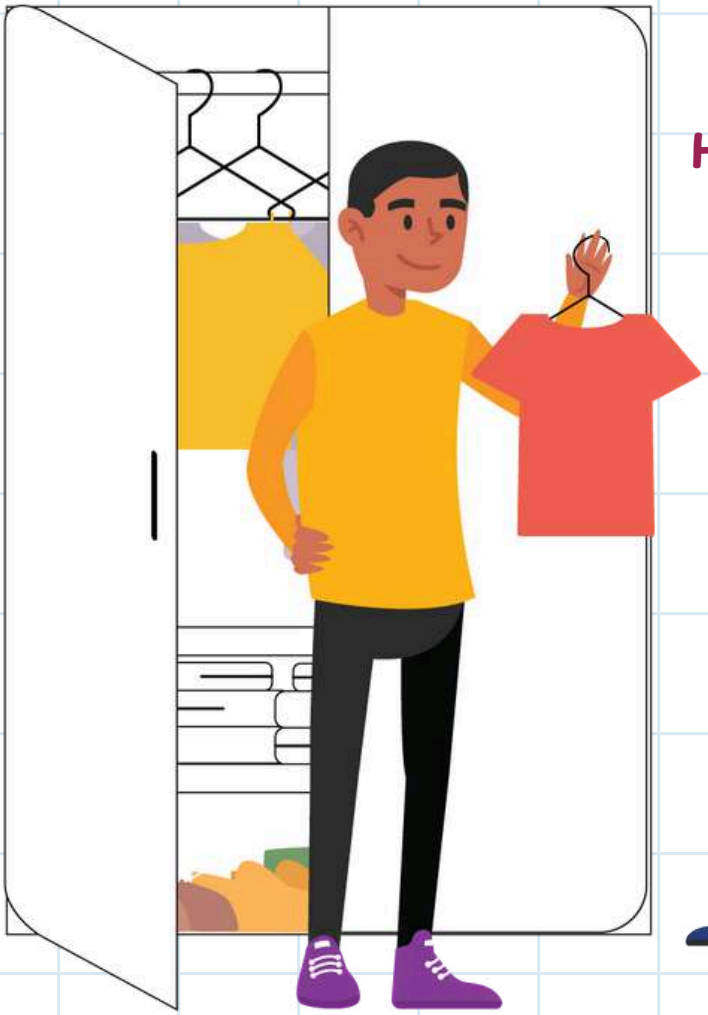
Tie-dye it

Stitch a patch on

Make something new out of the garment

BORROW

Borrow clothes from friends, organize swap events in the local communities. Proudly wear hand-me-downs from siblings. Rent fancy clothes for party wear just like you rent costumes for school plays.



Hand-me-down from siblings

Rent clothes

Picture of cloth rental flyrobe.com

Borrow from friends

THRIFT

If you have to shop, shop at local thrift/second-hand shops. You might get gently used clothes at a bargain price.

Festive swap shop organized by Sumrux.com during Diwali.

Thrift store at Textile Recovery Facility run by Saahas Zero Waste.

BUY NEW

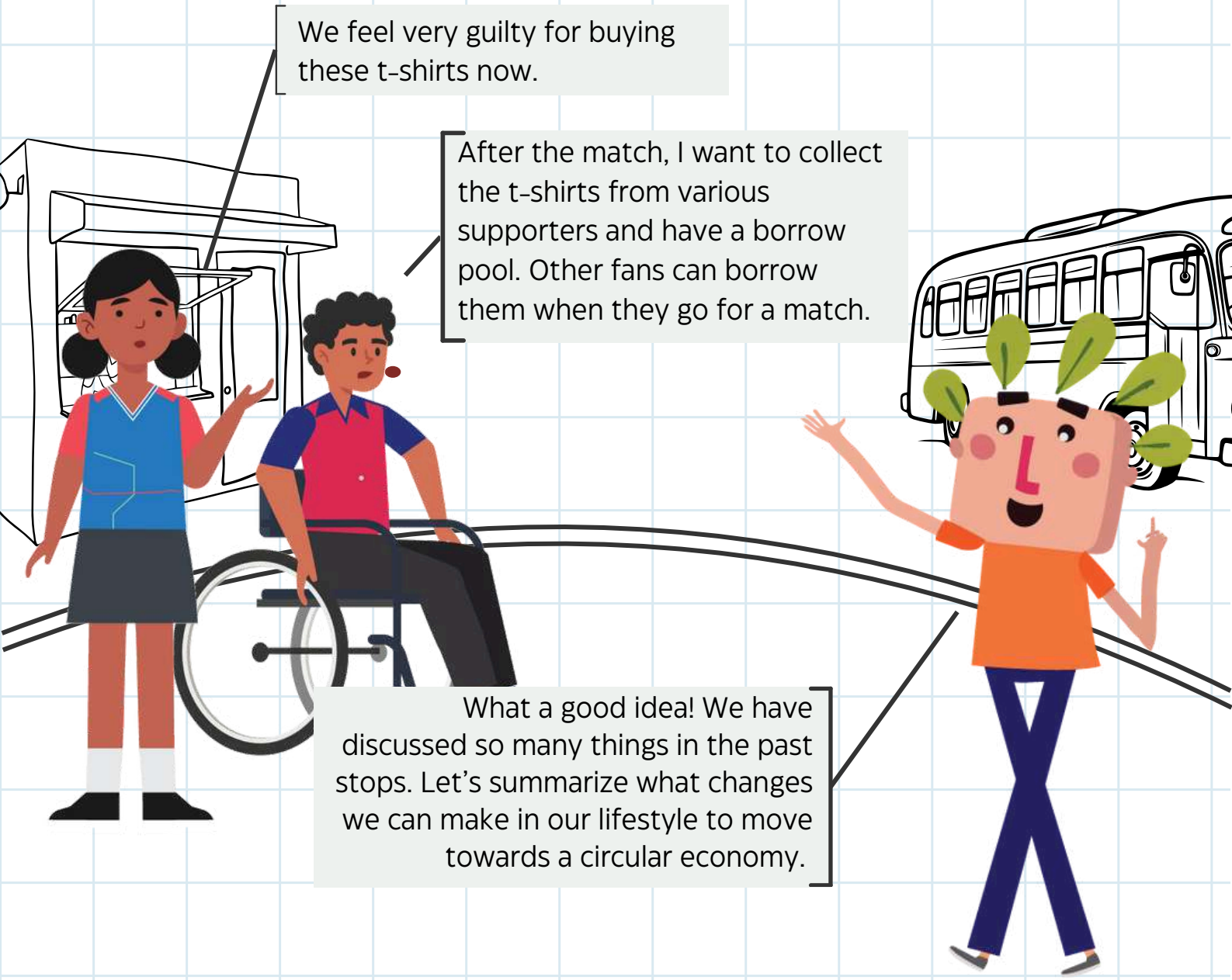
If you absolutely have to buy a new clothing item, these are the things to keep in mind :

Read the label

- The label will list the materials used to make the clothing. Avoid buying blends (55% cotton 45% polyester) Buy Natural fabric instead(100%).
- Read the care instructions and follow them, for long lasting fabric.

Design

- Buy versatile clothes that can be worn in different ways.
- Buy clothes that can be extended when you grow.



Before we go, let's recall what we have learnt:

- There are 3 kinds of fabrics- **natural**, **synthetic** and **blends**.
- Textile waste is one of the major contributors of global waste and pollution.
- Various ways of avoiding textile pollution are- **reduce**, **repair** (mend or stitch damaged clothes), **reuse** (by borrowing, renting, purchasing pre-loved clothes) and purchasing clothes made of long-lasting, natural materials.

POWER UP

Draw one clothing label for a piece of clothing which may be recycled and one for clothing which cannot be recycled. Use the template provided.

POWER UP

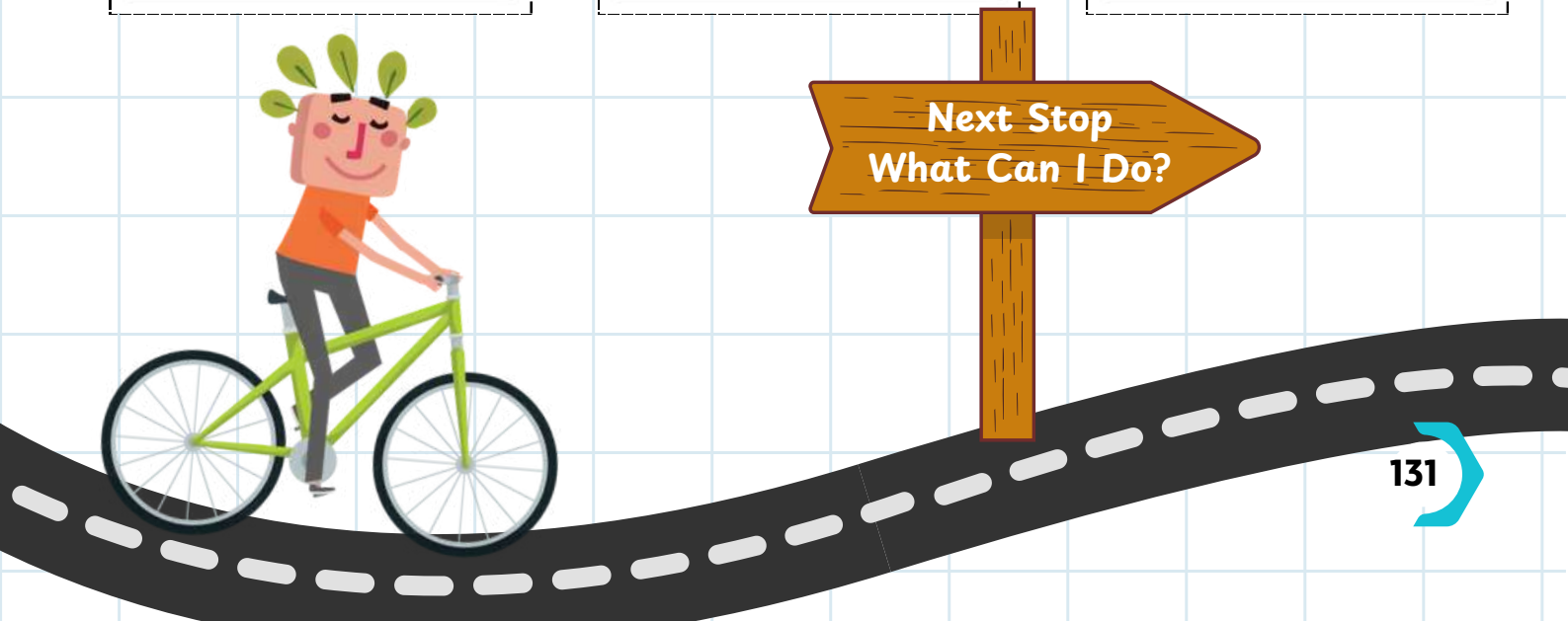
Fill in the blanks

1. _____ is an example of versatile clothing.
2. Blends are a mix of _____ and _____ fabrics.
3. When a zip is broken, it can be _____.
4. The Earth has enough clothing to dress the next _____ generations.

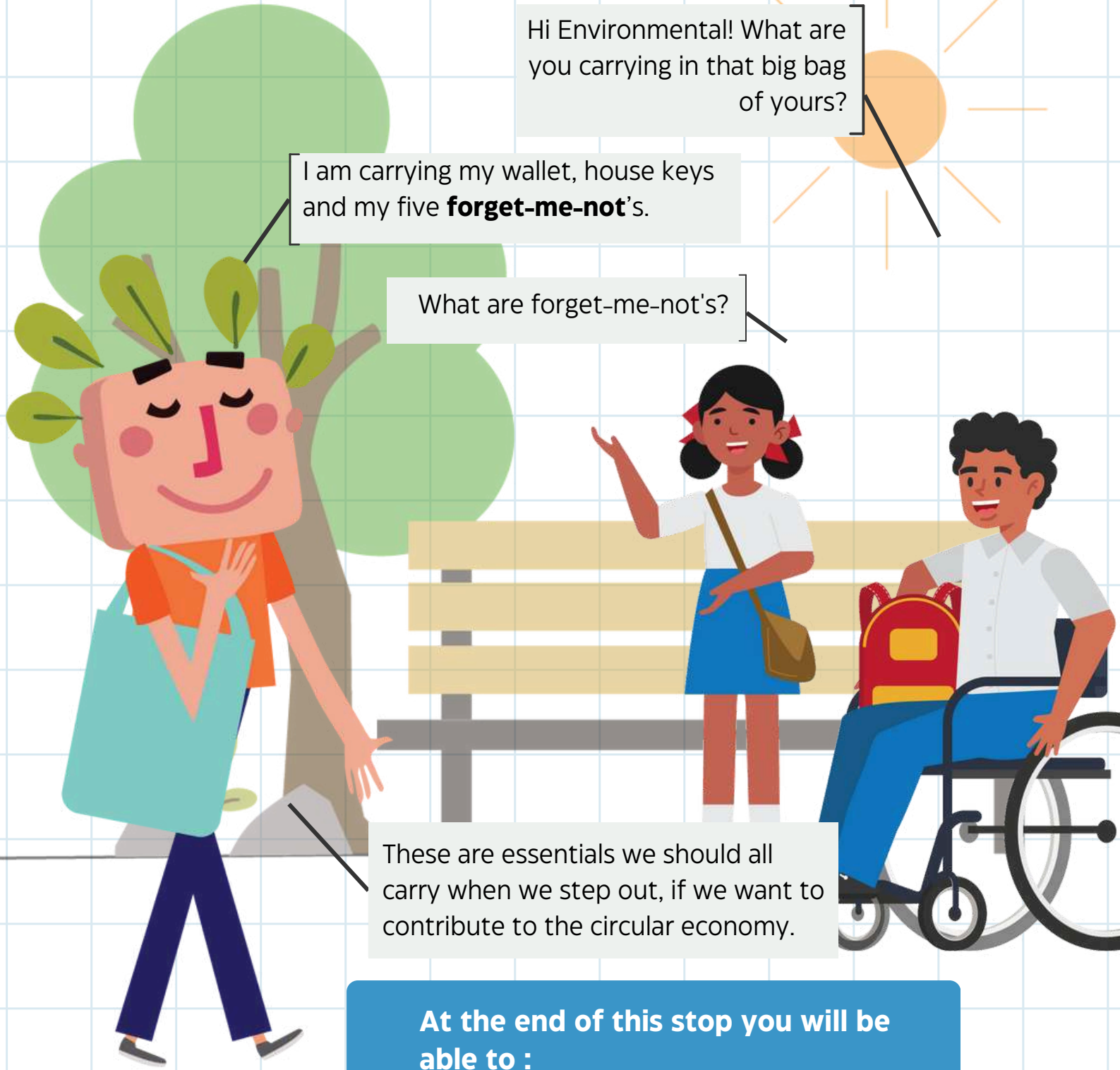
DETECTIVE'S DIARY:

Environmental wears clothes made with natural fabrics. What is the most common material that your clothing is made of? Go through your wardrobe and look at the labels of nine of your most used clothes. Write down the type of clothing and what material it is made of. Write 'R' for those which may be recycled.

MATERIALS USED CLOTHING TYPE _____	MATERIALS USED CLOTHING TYPE _____	MATERIALS USED CLOTHING TYPE _____
MATERIALS USED CLOTHING TYPE _____	MATERIALS USED CLOTHING TYPE _____	MATERIALS USED CLOTHING TYPE _____
MATERIALS USED CLOTHING TYPE _____	MATERIALS USED CLOTHING TYPE _____	MATERIALS USED CLOTHING TYPE _____



What Can I Do?



At the end of this stop you will be able to :

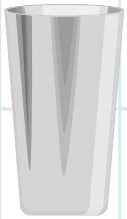
Apply individual actions:

- at home.
- when we travel.
- when we host celebrations.
- how can we influence others.

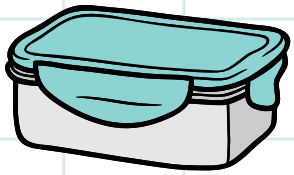
STEPPING OUT

Before stepping out I remember to carry :

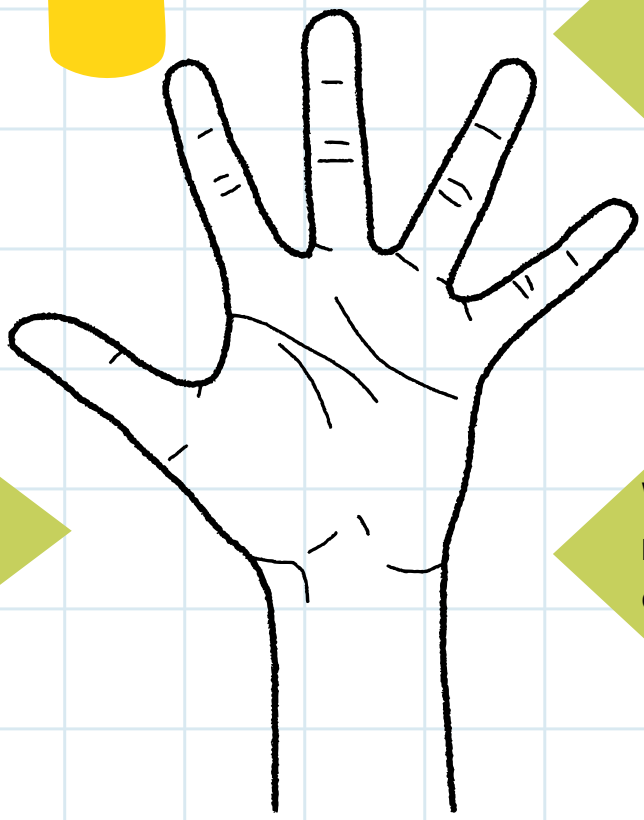
Reusable Cup in case you want to drink a beverage and avoid using disposables.



Bottle of water.



Reusable Box in case you want to carry back leftovers.



One or more foldable **BAGS.**

Washable cloth napkin so that you can avoid tissue papers.

By carrying these five things everywhere you go, you can avoid disposables when you are out.

This is very simple to do. Tell us more!

Let me share the sustainable practices we follow in our home. Would you like to come in?

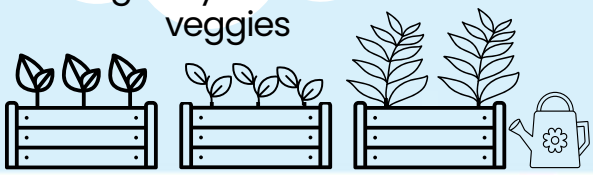
Thank you. We would love to see and learn some sustainability tips that can be followed inside a home.

AT MY HOME

14 Use solar water heater

Compost your kitchen waste

13 grow your own veggies



Wash clothes only if necessary

8 Bucket-bath uses less water than shower bath

Have a limited set of clothes 9

Invest in natural fibres

Re-use RO reject water for mopping

Install aerators in taps

Shut the fridge door

1 Segregate your waste at home

2 Use only reusable plates, bowls and cutlery

close taps properly

3

12

11

Use rechargeable batteries

Switch off the lights when leaving a room

Repair electronic items/toys instead of buying new ones

10

7

Take refillable jars to buy groceries

6

Open windows for air circulation in summers close them to preserve warmth in winters

Washable cloth napkin (not tissues)

4

Cycle short distances and avoid taking out the car

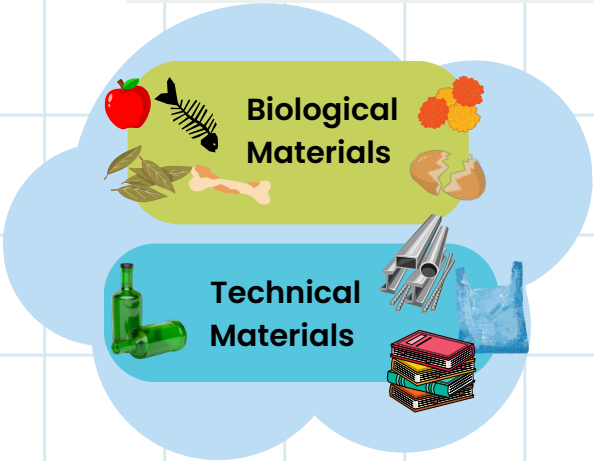
5

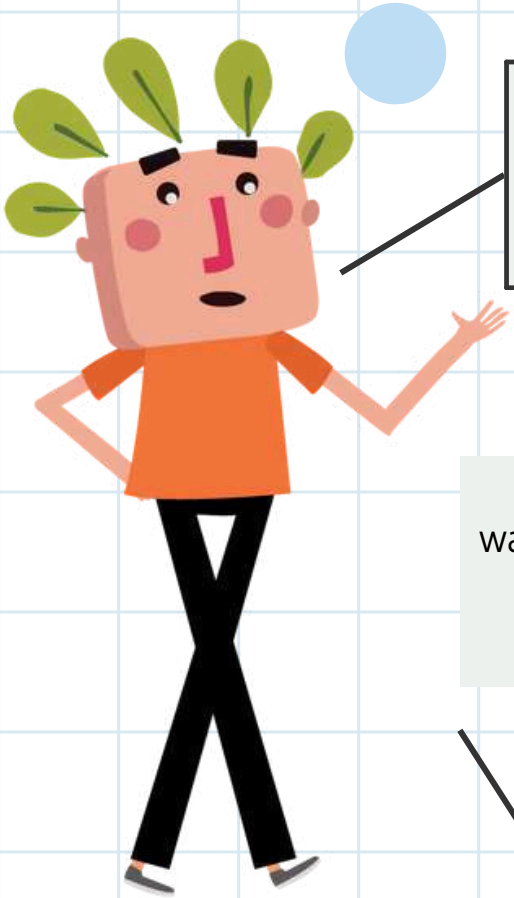
avoid ordering food from outside

Tips for a sustainable home -

1. Segregate your waste at home <refer page 138 of 7th stop for details>
2. Use only reusable plates, bowls and cutlery <refer page 44 of 3rd stop>
3. In the bathrooms:
    - Close taps properly – a single dripping tap potentially wastes several thousand litres of water per year, which is equivalent to filling a small pool over time
    - Washable cloth napkin (not tissues) – <refer page 11 of 1st stop>
4. Cycle short distances and avoid taking out the car. Car consumes petrol or diesel which are both non-renewable sources of energy. Cycling is good exercise too.
5. Avoid ordering food from outside – <refer page 140 of 7th stop>
6. Windows : Open them for air circulation in summers – it reduces the need for coolers and air-conditioners. Keep them closed in winters to preserve warmth – it reduces the need for air heaters. And hence saves electricity.
7. Kitchen –
    - RO reject water: RO water purifiers typically reject 3 litres of water for every litre of pure water. The reject water can be used for gardening, mopping, washing utensils or washing cars.
    - Install aerators in taps: Low flow aerators are special filters in taps that reduce the water flow (and hence wastage) by more than 60%
    - Shut the refrigerator door – leaving the door open allows cold air to escape, forcing the fridge to work harder and use more electricity to maintain its temperature, ultimately increasing your electricity bill.
    - Take refillable jars to buy grocery – <refer page 143 of 7th stop>
8. Bath: Bucket-bath uses 20litres of water, whereas a shower bath typically uses 80 litres of water and a tub-bath typically uses 200 litres of water. Hence a bucket bath is preferred.
9. Wardrobe:
    - Have a limited set of clothes <refer page 73 of the 4th stop>
    - Invest in natural fibres <refer page 128 of the 6th stop>
10. Living Room:
    - Switch off the lights : Switching off lights when you leave a room is a simple and effective way to save energy
    - Repair electronic items/toys instead of buying new ones <refer page 79 of 4th stop>
11. Use rechargeable batteries: Rechargeable batteries though more expensive than disposable batteries, but they can be used multiple times, making them more cost-effective in the long run. They are also low waste and the batteries are reused.
12. Wash clothes only if necessary: Washing clothes consumes water and releases micro-fibre in case of blended fabric. It is recommended that you wash your jeans after 5-6 wears.
13. Compost your kitchen waste and grow your own food. <refer page 57 of 3rd stop>
14. Use solar water heater: Using sunshine to heat or preheat your water can cut your annual hot water costs in half.

I see a few colourful bins in step 1? Do we need so many?





Remember, we discussed at Stop 2, how mixing of the biological and technical materials causes environmental problems?

Oh! Yes! So you mean that the waste that we generate is nothing but a mix of biological and technical materials right?

Correct! That's why waste segregation is essential:

- wet waste can be composted.
- dry waste can enter the technical cycle.
- hazardous waste, like sharp or infected items, can be properly managed.

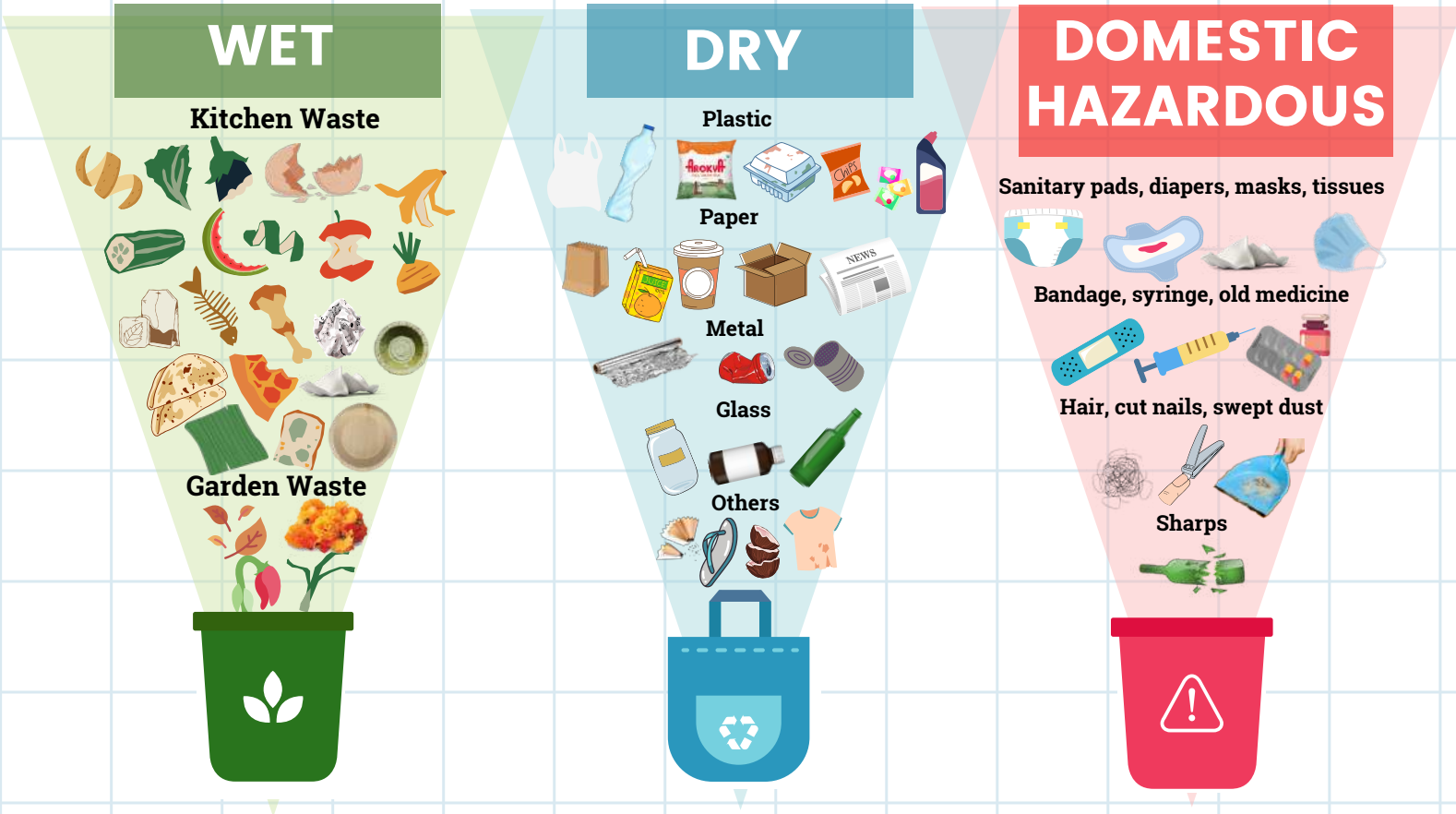
Okay. Can you show us how segregation is done?

We dispose the :

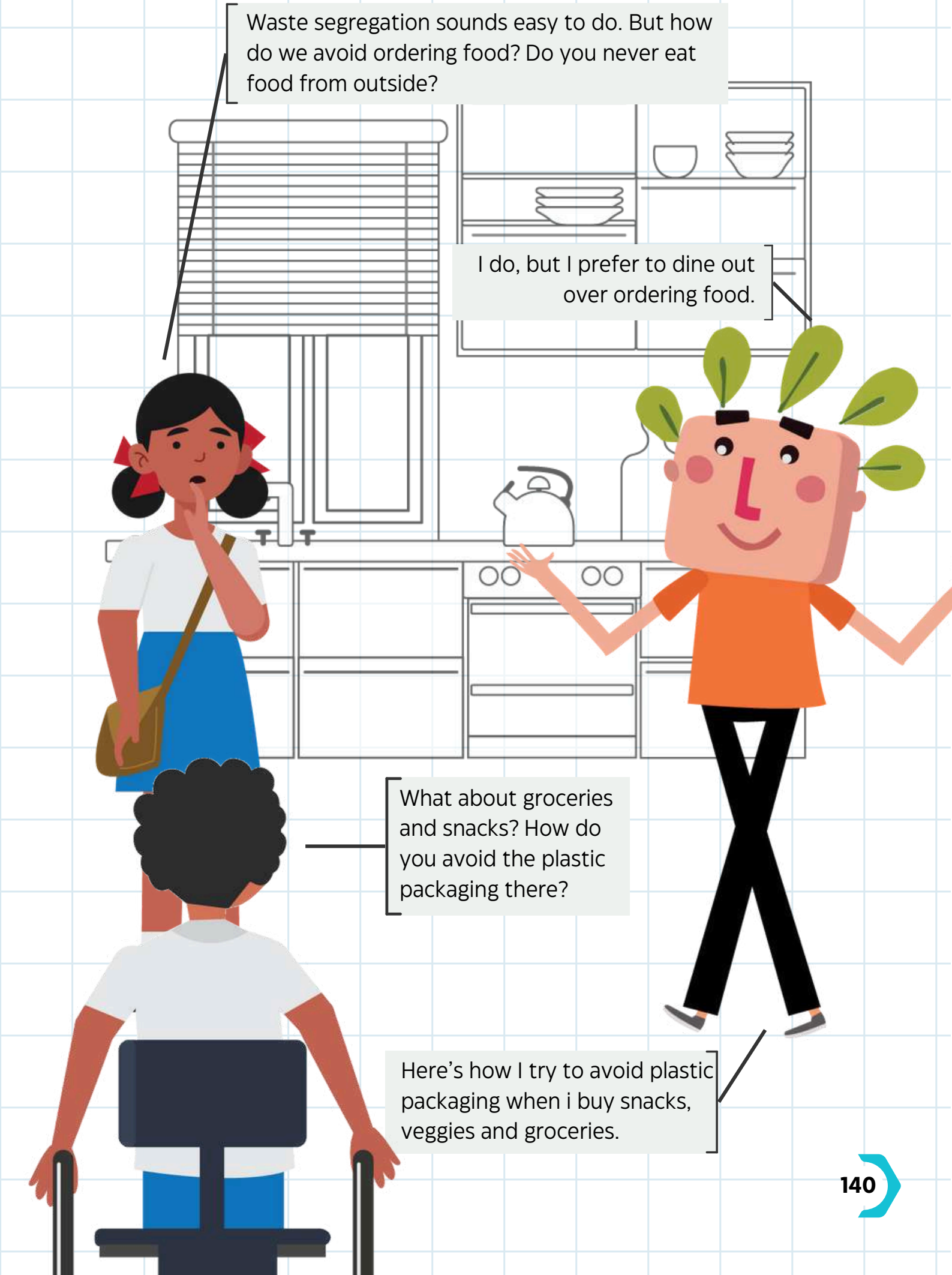
Biodegardable (also known as **wet waste**) in the green bin.

Recyclable (**dry waste**) in the blue bin.

Domestic hazardous waste in the red/ black bin.



Colour-coding makes it easier for children, illiterate people and senior citizens to identify what kind of waste goes in which bin. If everyone in the country follows the same colour code, it will become easier for waste workers/domestic help when they switch jobs.

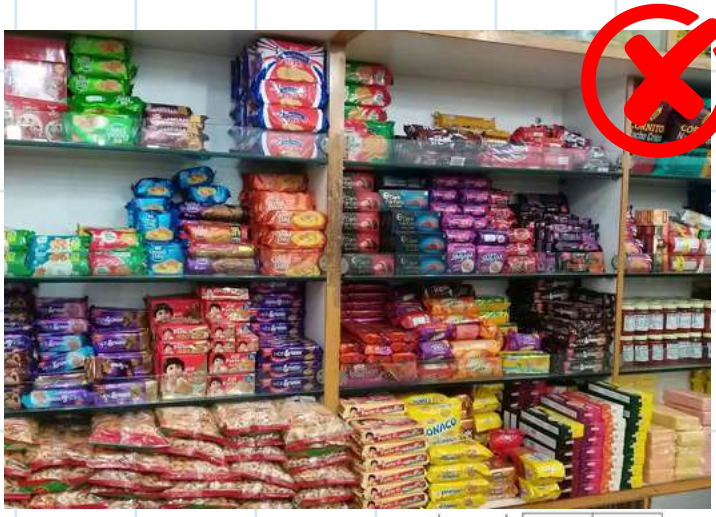

Waste segregation sounds easy to do. But how do we avoid ordering food? Do you never eat food from outside?
I do, but I prefer to dine out over ordering food.
What about groceries and snacks? How do you avoid the plastic packaging there?
Here's how I try to avoid plastic packaging when i buy snacks, veggies and groceries.

SHOPPING

Carry my own bags/containers and buy **unpackaged** items.

1 SNACKS

Most snacks are available in multi-layered packaging which is **non-recyclable**. Earlier I used to buy these packaged snacks.



Now I buy snacks from a neighbourhood home chef or a local shop in my **own container.**

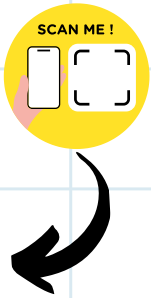
My friends Pankti and Shweta buy snacks and fruits often from the local vendors and take their tiffin along to carry and store the snacks.

Pankti Pandey
@zerowasteadda

Shweta Kataria
@shwetakataria_

2 FRUITS/VEGGIES

Buy in open markets where fruits/vegetables are not pre-packed in plastic and carry you own bags.



3 GROCERIES

Find stores where groceries are sold loose and you can carry your own containers to shop. Or buy in bulk where you can.

A typical kirana store in India sells groceries in loose.

Adrish store in Bangalore, Pure & Eco in Delhi are organic stores encouraging customers to bring their own containers to buy groceries.

More zero waste stores across India link


That's nice. We are planning to travel to Bangalore for our vacation. We can check out Adrish store then! Do you have any other tips for us?
Yes, I want you to be a responsible tourist.
What does that mean?

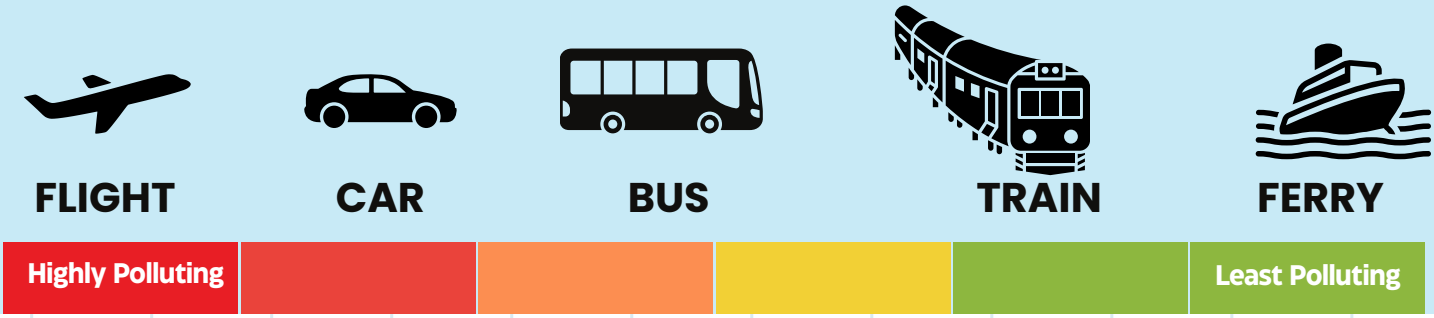
TRAVEL

Responsible tourism means traveling and exploring a destination while respecting its environment, culture and economy. Here are a few tips on that.


Stay at eco-friendly hotels.
Eat local food.
Use sustainable modes of transportation to travel locally.

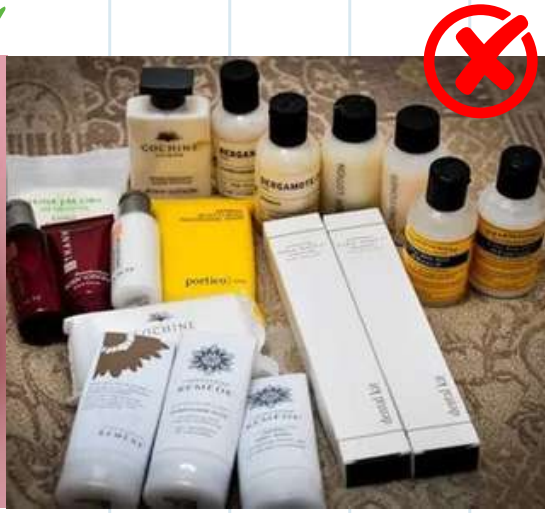
Reaching there

Mode of transport.
Choose train or bus over flight, as it causes less pollution.



Stay at eco-friendly hotels

- Ensure they serve filtered, not bottled water.
- Refuse mini-toileteries (carry your own).
- avoid single-serve condiments like jam/butter/ketchup.



Eat local food

- Support local by choosing locally sourced products.
- Reduce the distance food has to be transported to - to save fuel and lower emissions.
- Enjoy fresh, healthy, locally grown food.
- Use reusable utensils instead of disposables to cut waste.



Use sustainable modes of transportation to travel locally

Opt for eco-friendly travel modes, such as walking or cycling, whenever possible.

Have you ever tried traveling by a bullock cart or hitching a ride on a local truck? I have! It's a unique way to reduce your carbon footprint while connecting with locals and experiencing their way of life!

Interestingly bicycles are available for rent at various places like near the lake at Kodaikanal, a hill station in the Nilgiris, Tamil Nadu.

See how my freind Megha, AKA Climatewali travels to places sustainably! We can take inspiration from her and follow some of her tips while traveling.

Megha
@climatewali

Support local art

Support local art and craft by buying handmade items. It preserves traditions, supports artisans, and reduces environmental impact. Small actions like attending fairs or gifting local crafts make a big difference.

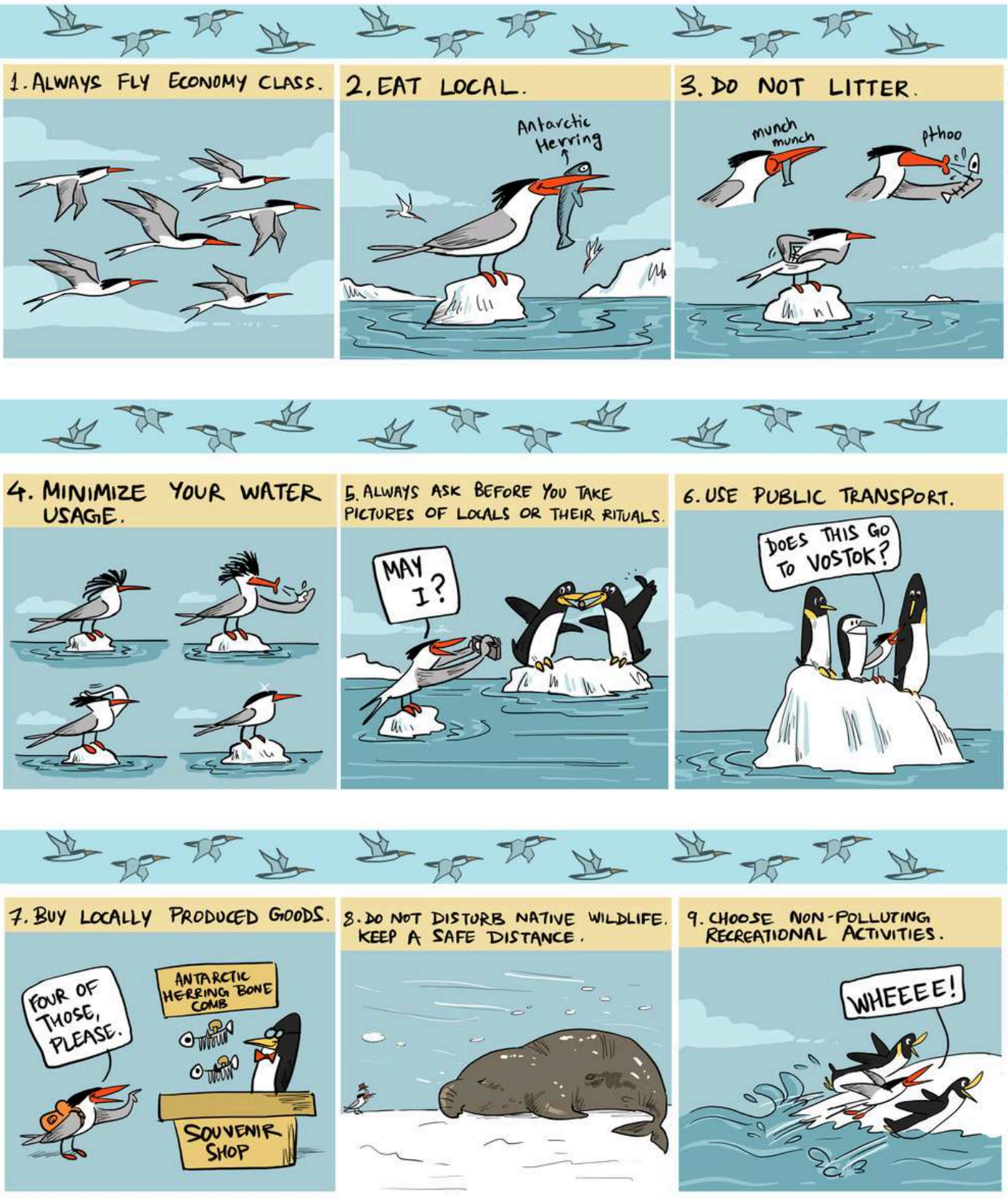
THINK BANK

You and your family are going to visit Bandhavgarh National Park. What are the things you will do to make your visit sustainable?

Think in terms of your stay, food, transport, and clothing and fill in the boxes below.

Clothing	Food	Stay	Transport

SUSTAINABLE TRAVEL TIPS FROM THE ARCTIC TERN



Cartoon credit: Rohan Chakravarty (@green_humour)


I am travelling too. But not as a tourist. I am going to attend my Aunt's marriage.
Congratulations to your Aunt! Do you need any help in making it zero-waste?
That will be wonderful!

CELEBRATIONS

Here are some tips to keep our celebrations, parties and gatherings low waste.

	NO	YES
INVITE	 Paper/card/laminated invitations	 Email/ WhatsApp invites
DECORATIONS	 Balloons,plastic buntings, flex banners, confetti, thermocol	 Lights, cloth drapes, flowers, plants
GIFTS	 Shiny wrapping, plastic/nonwoven gift bags	 Old paper wrapping, cloth bags
SERVEWARE	 Non-biodegradable disposables	 Steel, ceramic, melamine, glass
WASTE	 All waste in single bin	 Separate bins for food, dry & bathroom waste


If you don't have enough plates/glasses you can rent from a nearby bartan bank.
empty plates/ spoons here
food scraps

I pledge to do all of the the things we learnt so far! But if only I do it, what will be the impact?

Donna Brazile has said “It takes but one person, one moment, one conviction, to start a ripple of change”.

Well said, Ravi! The **ripple of change** starts from you. For the movement to grow bigger, you should influence others to join you - your parents, friends, relatives.

Plogging

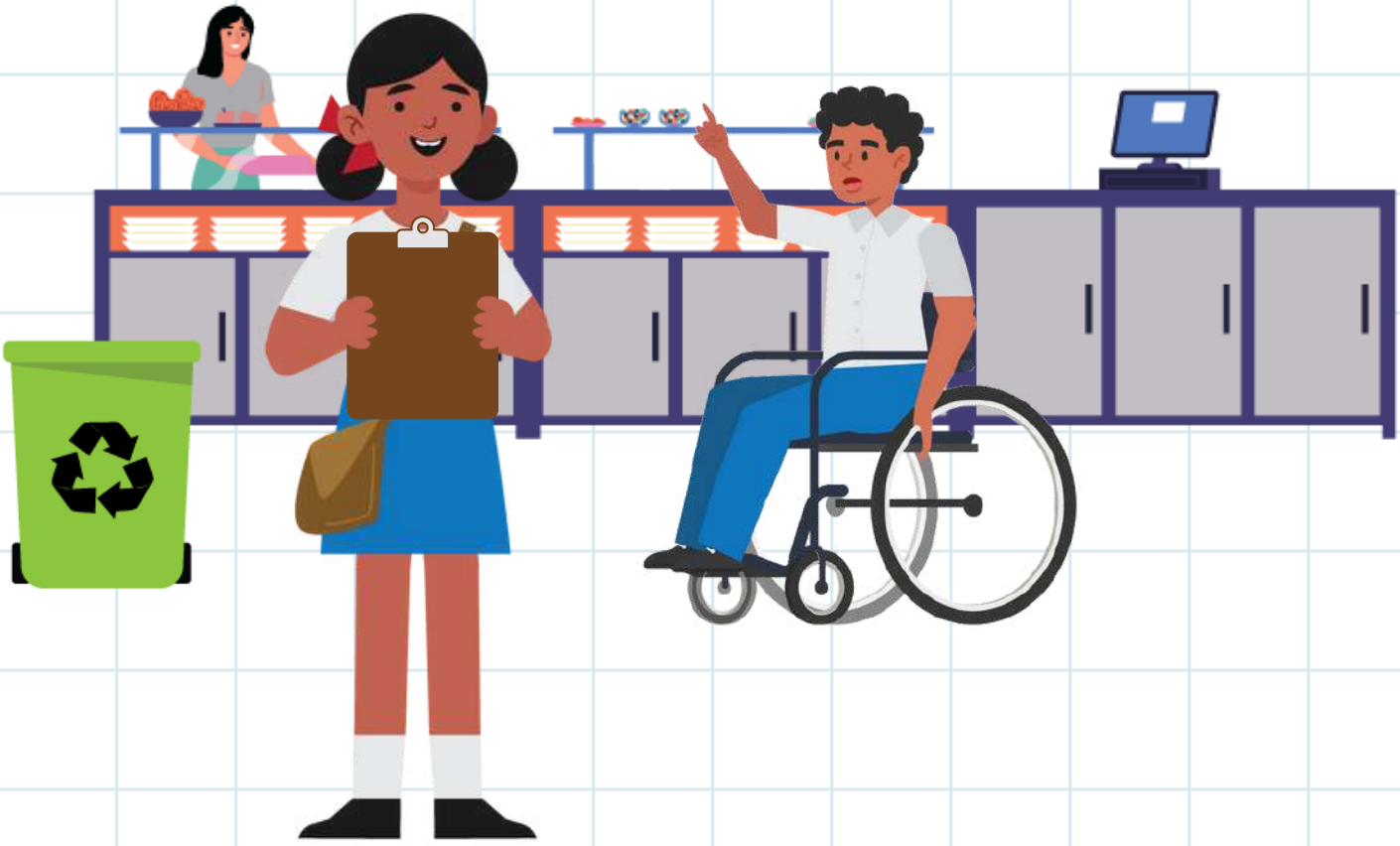
On a weekend morning, collect a few friends and pick litter as you run in your neighbourhood/park/beach.

Plog Raja
@plograja

My friend, Plog Raja, of the Indian Ploggers Army is a true inspiration for the country. He plogs every weekend morning with new citizens joining him in keeping our streets, parks, lakes litter-free. His efforts motivate countless people to join the zero waste revolution. Let's follow his lead and contribute to this meaningful cause!

Waste Audit

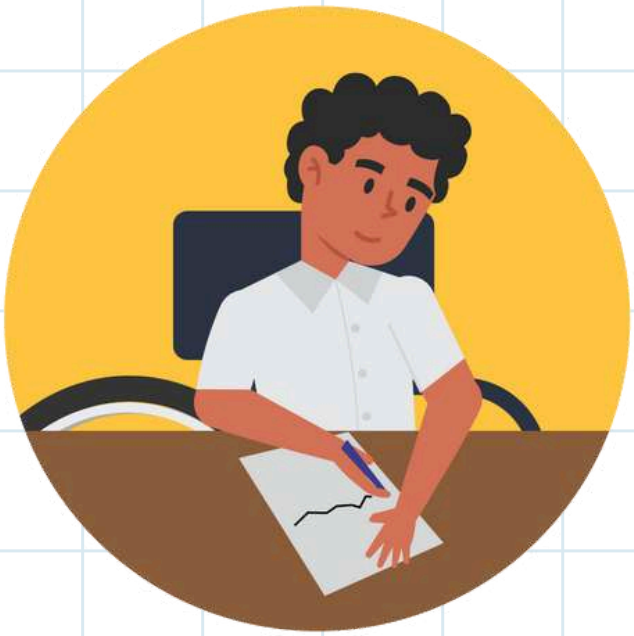
Check the trash in your school canteen or apartment complex for food scraps, plastic wrappers, and disposables. Think of ways to reduce waste, like using reusables, composting, and recycling. Share your ideas with a teacher or manager, create a plan, and teach others why reducing waste matters.



Reduce your waste footprint

For one week, collect all of your family's dry waste. At the end of the week, go through each item and think of waste-free alternatives to use instead.

Voice your concern



Write to your favourite snacks company to switch to recyclable packaging. You will find the address on the back of the packet.

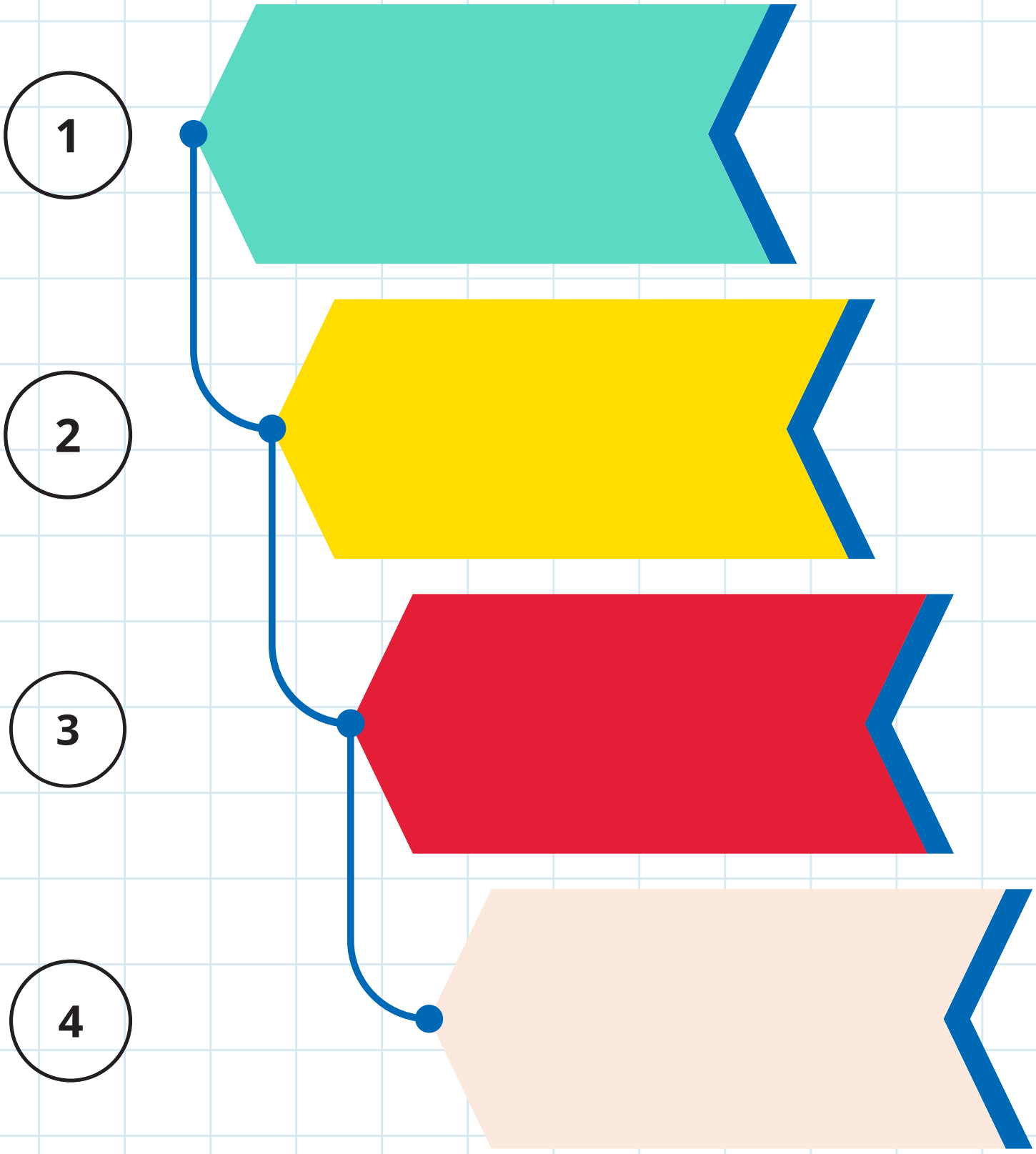
It has become more urgent than ever to embrace a circular economy. Let us do everything in our capacity to keep our planet beautiful and liveable. Think of ways to reduce waste, like using reusables, composting, and recycling. Share your ideas with a teacher or manager, create a plan, and teach others why reducing waste matters!

Before we go, let's recall what we have learnt:

- At **home**- Segregate waste, save water and electricity by using only when required, reuse resources.
- While **stepping out**- carry a bag with a water bottle, cutlery etc.
- While **traveling**- eat local, use eco-friendly modes of travel, support local art and craft, choose eco-friendly places of stay.
- **Plogging**- picking up litter while jogging, walking, or hiking.
- **Celebrations**- avoid disposables; avoid unsustainable decor items like balloons, confetti etc; use digital invitations to avoid waste; set up separate bins for waste segregation.
- Educate your **family and friends** about Circular Economy.

POWER UP

Write at least four steps you can take to make changes in your everyday life to switch to a sustainable lifestyle.



POWER UP

Create a poster to inform your family of what they can do to move towards a circular economy.

Keep these guidelines in mind when creating the poster:

- Use materials that follow the circular economy cycle including paints, glue, paper etc.
- Use the information in this chapter to inform others.
- List a few steps that everyone can follow to reduce their waste footprint.

Space for a draft of the poster

DETECTIVE'S DIARY:

Imagine you are going shopping with your family. You want to practice zero-waste shopping. But when you reach the shop you see all the items on your list are already packaged in plastic/non-biodegradable materials. Write the names of the items that are packaged and list reasons why they need not be.

Item name	They should not be packaged because

WHAT WOULD YOU DO?

A. Would you still shop for those packaged items?
B. Would you go to another store where items are not packaged?
C. List at least one step that others can practice for zero-waste shopping.

Write your thoughts below.

Glossary

Biomimicry
Biomimicry is imitating nature for the purpose of solving complex human problems.

Circular Economy (CE)
This system/cycle where we TAKE resources to MAKE something and after USE they can again be used as a RESOURCE is called the Circular Economy. Circular Economy is an economy where NOTHING IS WASTE.

Decompose
When a material (natural or man-made) breaks down naturally.

Disposables
Disposables are products (made of plastic, paper or any other material) that are used once and then thrown away. For example plastic straw, paper cup, tissue paper, arecanut plate.

Eco-friendly
Something that does not harm the environment.

Incineration
Incineration is the process of burning waste materials to generate energy.

Landfill
A landfill is a large area of land where solid waste is disposed of.

Microplastic
These are tiny bits of plastic, (not visible to the naked eye) that are polluting.

Plogging
Picking plastic while jogging.

Pre-loved
It refers to an item that was previously owned. It is another word for used or secondhand items.

Recycle
It is the process of making new products from a product that has originally served its purpose.

Renewable energy
Energy that comes from natural sources that never run out. For example energy from Sun or wind energy.

Repair
Fixing or maintenance of a damaged/defective product so that it can be used again for its original function.

Reuse
Use of any discarded product (which is still in good condition and fulfills its original function) by another person.

Reusables
Reusables are products that can be used again and again.They are also referred to as multi-use items. For example a cloth bag, a steel glass or plastic dustbin.

Single-Use Plastic (SUP)
Single-use plastics are those plastic products that have a one-time use before they are thrown away.

Solid Waste Management (SWM)
Solid waste management is the process of collecting, treating, and managing of waste in a safe and environmentally responsible way.

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Ellen MacArthur Foundation (https://www.ellenmacarthurfoundation.org)
This is the source of most of our knowledge on CE and we are ever grateful for content on their website that has been our guiding light.

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Pankti Pandey (@zerowasteadda)
Shweta Kataria (@shwetakataria_)
Use less plastic (@uselessplastic)
Rohan Chakravarty (@greenhumour)
Megha (@climatewali)
Plograja - Nagaraj (@plograja)

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Bittu John
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Robin Hood Army (robinhoodarmy.com)
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The Repair Collective (@repaircafe.bengaluru)

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We would like to express our acknowledgement for the brilliant work done by Saahas teams on ground. We have used some of the photos of the project work and referred to their case studies while working on this book.

Images/illustrations:
While most of the illustrations have been developed as part of this book, we have used some pictures from the internet and some icons/illustrations that were accessible by the Canva pro license.

Answers to the exercises

Chapter 1

Solve Me: 1. Throwaway 2. Linear 3. Landfill 4. Dispose

Chapter 2

2.1 Environmental's birthday party for grandfather:
Biological resources - 1) Chips, 2) Samosa, 3) Juice, 4) Orange slices, 5) Plant

Technical resources - 1) Balloons, 2) Head cap, 3) Bunting, 4) wheelchair, 5) Glass, 6) Plates, 7) Bowl, 8) Jug, 9) straw, 10) Radio, 11) Phone, 12) Sofa, 13) shoes, 14) table, 15) goggles, 16) clothes, 17) stick, 18) Chair.

2.2 Riddles: 1. Eraser (Technical Material) , 2. Metal Box (Technical Material)

2.3 Power Up: The cycle of taking resources to make something new after use that can again be used as a resource is called the Circular economy

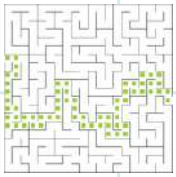
Chapter 3

3.1 Paper cup activity:
1) - 1
2) A thin layer of plastic
3) It is the same as it was

3.2 Power Up: Example
Disposable Object-
Ans - 1) Tissue, 2) Polythene, 3) Paper cup
Reusable Substitute-
Ans - 1) Hanky, 2) Cloth bag, 3) steel or reusable cup

3.3 Power Up: Cues -
At Home - Clothes, Toys, Appliances (Grinder, barbeque, cooler), Utensils (Bartan), ladder, tools
At School - Books, chairs, sports equipment, projector, stationery, craft materials, cultural day costumes

3.4 Power Up:



Chapter 4

4.1 THINK BANK
CUES:
3) (1) Torn Jeans - steps involved - went to Tailor, gave the jeans, he/she darned it and returned
(2) Page torn because of excessive erasing: used a tape to hold the tear in place.
(3) Punctured tube of bicycle: Take help from cycle repair shop to identify and patch the puncture.
(4) Shoes: Torn laces or sole worn out
(5) Books (Loose Pages) - Rebound loose pages using stapler, glue and tape.
(6) Bag/backpack: torn zip.

4.2 THINK BANK:
1) Broken Zip - Repair
2) Empty glass bottle - Reuse
3) Shoe too tight - Reuse by donating to the needy
4) Squeaky door - Repair

4.3 Power Up:
1) Extra food - Reuse by donating
2) Paper bag - Refuse
3) New pants - Refuse, no need to buy new one we can reuse the older one
4) Broken umbrella - Repair

4.4 Power Up:
1) When we buy preloved clothing, we are helping - Reuse
2) When we fix the brakes on our old bicycle, we are - Repair
3) When you carry your own bottle, we are - Reduce

Chapter 5

5.3 Power Up: Examples -
Good Plastic - Plastic Storage Containers, Electric Switchboards , Comb, Remote control, Plastic frame of spectacles, Plastic dustbins

Bad Plastic - Plastic Straws , Polythene Bag, Plastic Forks/spoons, Plastic Cup, Cling wrap

5.4 Detective's Diary: Hints - Chairs, Electronic standee, Cloth Buntings, Plants, Drapes, Fairy lights

Chapter 6

6.3 Power Up: 1. Saree 2. Natural, synthetic 3. repaired 4. Six

SAAHAS

nothing is waste