

Junior Ambassadeurs

PROGRAMME MANUAL



Levels 1 & 2

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PROGRAMME OVERVIEW

The Earth Ambassadeurs

The Earth Ambassadeurs is an education-based volunteer organization focused on helping individuals, institutions and communities rethink their relationship with nature, through citizen science, research, and education. Our programmes empower individuals and communities to gather and use data to inform policy decisions for the blue economy. The organisation focuses primarily on the health of the marine environment, which is impacted by the amount of waste that is generated by human action. Included in that is plastic, which makes up approximately 80% of marine litter.

The Junior Ambassadeurs Programme

The Junior Ambassadeurs Programme targets children at the primary school level between the ages of 7 and 11. It teaches environmental stewardship by shifting the focus from adaptation to mitigation. This helps students to anticipate how their actions could lead to an environmental problem and identify ways to avoid the creation of those problems. The programme has 5 levels beginning with understanding the earth as our home, the challenges of indigestible waste with a look at different types of man-made waste. These include:

-  Level 1 – Earth as home
-  Level 2 – Rethinking plastic
-  Level 3 – Of food and fabric
-  Level 4 – Using metals and glass







Students will begin with the history of the material, its use, its impact on the environment and the human body and how we may be able to reduce the amount of waste that is generated by its use. The programme empowers students to rethink how they use these items and examine how they may refuse their unnecessary use, reduce the amount that they use, reuse the material that they currently have to use, repurpose the item after its primary function has been exhausted and recycle the waste at the end.

The programme is designed for use by any class, club and/or institution. It can be incorporated in an existing programme or used as standalone.



Objectives of the Programme

The Junior Ambassadeur programme is designed specifically for schools to achieve the following:

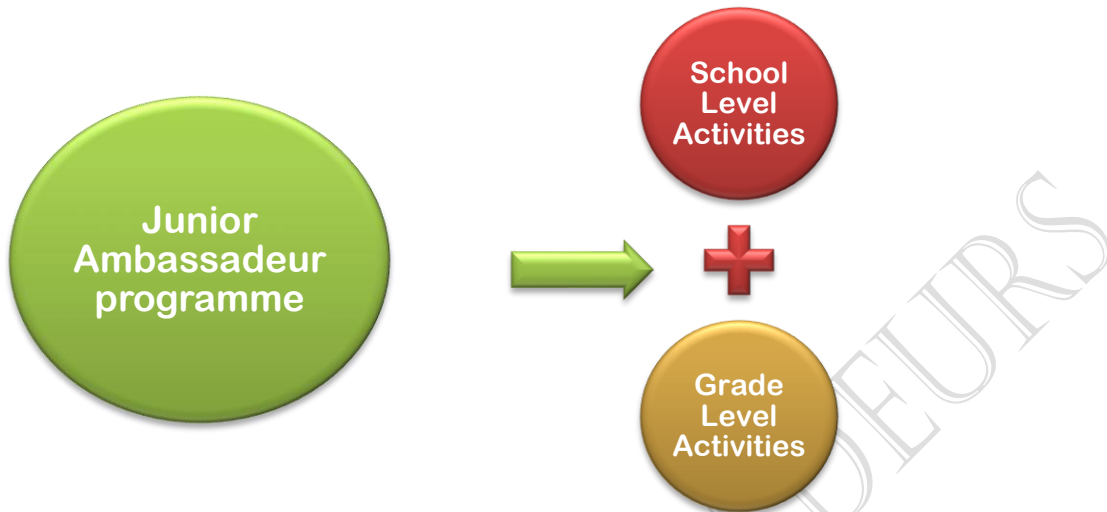
-  Educate children about the environment and the need to protect it.
-  Teach children about current environmental threats and the need to reduce the amount of waste that is generated.
-  Help children understand the impact of human action on land, oceans, and people.
-  Encourage children to rethink, refuse, reuse, repurpose, recycle, and reflect on how we use resources and how we may improve.
-  Create lasting environmental change in their communities.
-  Develop a community of environmental stewards who will collectively transform our society's relationship with nature.

At the end of participating in the programme students should be able to:

- a. Distinguish between the different types of materials from which products are made of glass, paper, plastic, or metal.
- b. Determine the types of trash that they generate as individuals and as a school.
- c. Explain at least 5 of the 7 Rs.
- d. Distinguish between good materials and bad materials.
- e. Identify ways to reduce resource waste and decrease the amount of waste that is being generated that cannot be assimilated into nature.
- f. Recognise the importance of the natural environment.
- g. Appreciate the impact of human waste in the environment.

Structure of the Programme

The programme activities are designed to be completed at two levels as presented below:







Using the manual

The manual is for the coordinators and provides the content which should be covered at the first two levels of the Programme. It should be used alongside the activities that are included for the students.

THE SCHOOL LEVEL

There are several programme activities to be performed at the school level. As such each school administration will be responsible for the following:

-  Scheduling: Developing a schedule for the implementation of the programme
-  Data collection: Collect data regarding the school's plastic usage
-  Celebrate Junior Ambassadors Day
-  Celebrate Earth Ambassadors Day

Schedule

The schedule below is for recommendation only. This can be used where the programme is being implemented into the institution's academic year.

LEVEL 1			
Activities	Series 1	Series 2	Series 3
1	Introduction to Vocabulary words	Classroom challenge	Junior Ambassadors Day preparation
2	The nature of Earth	Other vocabulary words and 7Rs comprehension	Junior Ambassadors Day
3	Earth's Resources	Help save the Earth	Recycle: Trash to Treasure – Easter Waste Art
4	Data collection (See Appendix for Data collection sheet)		
5	How humans affect the Earth – Water pollution	Repurpose: Trash to Treasure – Christmas Waste Art	Plastic-free day challenge
6	How humans affect the Earth – Air pollution	Repurpose: Trash to Treasure – Christmas Waste Art	Waste-free day challenge
7	How humans affect the Earth – Land pollution	Energy - Types of renewable energy	National Earth Ambassadors Day preparation
8	Data collection (See Appendix for Data collection sheet)		
9	How humans affect the Earth –deforestation	10 Steps to Save the Planet	National Earth Ambassadors Day
10	Plan a Zero Waste Christmas Class Party b) Assign Christmas Waste challenge	a) Refuse and repurpose b) Assign Easter Waste challenge	Plan a Zero Waste Christmas Class Party
11-12	Data collection (See Appendix for Data collection sheet)		



LEVEL 2			
Activities	Series 1	Series 2	Series 3
1	Vocabulary Words	Christmas waste audit results.	Ambassadeurs Day prep.
2	The History of Plastic	Classroom challenge	Junior Ambassadeurs Day
3	Types of Plastic	Christmas trash to treasure	Reduce: Easter waste results – repurposed art
4	Data collection		
5	Good Plastic: How Plastic Improves our Lives	Classroom waste audit	Plastic-free day challenge
6	The World of Waste	Class waste audit – trash to treasure.	Waste-free day challenge
7	Plastic Pollution	Class waste audit – trash to treasure.	Earth Ambassadeurs Day preparation
8	Data collection		
9	a) Plastic Litter Journey b) Assign Christmas challenge - home waste audit	a) The importance of mentoring b) Assign Easter waste audit	Earth Ambassadeurs Day
10	Plastic Free Party Challenge	Refuse: Item swap	Waste-free party challenge
11-12	Data collection		



Data Collection

The school will be responsible for collecting data on its plastic usage using the *Plastic Bottle Data Collection Sheet* ([Appendix 1](#))

The team should:

- Collect, count, weigh and document the weight of plastics on the Plastic Bottle Data Collection sheet.
- Each collection must be dated. The counted bottles are to be bagged for collection.
- The recycling partner must be contacted, and arrangements made for collection.
- Counted bottles must be kept separate from the undocumented bottles.

a. Establish baseline plastic data (at week 3 – 4 into each semester)

- At the end of this activity the school should be able to determine the number of plastic bottles generated by the school

b. Subsequent data collection from bottles collected from recycling efforts to be taken 3 – 4 weeks apart in each semester i.e. weeks 3, 7 & 11

- At the end of these activities the school should be able to determine the number of plastic bottles generated by the school since the previous data collection; and
- Calculate the difference in plastic bottle waste generated since the previous data collection

Please Note!

Students should not rummage through bins. Instead, they will collect plastic bottles that are not yet placed in the correct bins, as well as things that are in the recycle bins.



Junior Ambassadors Day

This will be celebrated annually on the Friday closest to April 22nd, to commemorate Earth Day each year. It will serve as the platform for new members to be inducted as it showcases the students work at the school. Each school will report on the process and progress to date. This will stimulate pride within the student community as well as take the conversation around waste generation and management to the broader school community. Included in this activity will be the recital of the plastic pledge and the Junior Ambassador Challenge.

Earth Ambassadors Day

This will be celebrated annually within the first week of June, in commemoration of World Environment Day (June 5th) and World Oceans Day (June 8th). It will bring together of all schools engaged in the Junior Ambassadors Programme. It will showcase the students work at a national event, which will include, but not limited to workshops on plastic waste. The event will also serve as the badging ceremony for the Ambassadors and will provide:

- 🌍 national recognition of the new generation of environmental stewards.
- 🌍 students with an opportunity to showcase their work with persons outside of their school community.
- 🌍 schools with a platform to engage with government, private sector and NGOs who are actively engaged in the national attempt to address the negative impact of plastic.
- 🌍 school administrator with an opportunity to investigate similar challenges with the possibility to generate practical solutions.
- 🌍 schools with networking opportunities among other educational partners in the fight to address plastic waste.
- 🌍 students with the opportunity to meet other members of the national community of environmental stewards.

STUDENT LEVEL

Earning Badges

Students at Level 1 earn their membership badge upon completion of the Workbook activities. Beginning at Level 2, students can earn other badges throughout the programme.

Levels	Badges	Completed activities	Level 2 Evaluation
Rethink	1Rs	The Earth as our home – The importance of nature	Images Story telling Poster
		The 5 Rs	
		History of plastic	
		Good & bad plastic	
		Plastic pollution	
		Local legislation	
		The litter journey - water channels and plastic litter	
		The effect of plastic	
		Circular flow	
Reduce	2Rs	Home waste audits	Essay/image on audit results
Reuse/Repurpose	3Rs	T-Shirt	Reused/repurposed item(s)
Recycle	4Rs	Trash to Treasure	Recycled item(s)
Refuse	5Rs	Item swap	2 swapped items maintained
Mentorship		Mentor	At least 1 mentee earns the Rethink badge



VOCABULARY

These words should be explained to the Ambassadeurs and routinely punctuate discussions.

	Word	Meaning
1.	Biodegradable	Something that can break down into small parts that become part of the Earth again.
2.	Biodiversity	All the plants and animals that exist in a particular area.
3.	Carbon dioxide	A greenhouse gas that is found in all living things; it is also released into the air when fuels like coal and petrol are burned.
4.	Climate change	The term used to explain how the earth is getting warmer because of too much greenhouse gas in the atmosphere; this is mostly caused by too much carbon dioxide (CO ₂).
5.	Compost	Turning things like food scraps and dead leaves into fertilizer for new plants by letting it decompose into a kind of dirt that's full of vitamins that are good for plants
6.	Conservation	A word we use a lot with being green; it means ways to keep the planet clean so we can protect parts of it that are already in good condition, and help parts of it that need to be tidied up
7.	Deforestation	Cutting down and removing all or most of the trees in a forest
8.	Eco-friendly	A word used to describe something that is good for the environment
9.	Greenhouse gas	A type of gas in the atmosphere that keeps the earth warm
10.	Pollution	When something makes part of the environment dirty and dangerous for living things, like spilling oil into the ocean
11.	Recover	To change waste into useful products like compost
12.	Recycle	Taking out useful materials that otherwise might be thrown away so that they can be used again (often in a different form.)
13.	Reduce	Using less of an item.
14.	Reflect	To think about what you did and think of ways that you could have done it better
15.	Refuse	Refers to not to accepting an item you DO NOT NEED
16.	Repurposing	To use an item for a different purpose than which it was designed.
17.	Rethink	To think about what you know about plastic and to think about it in a different way
18.	Reuse	Using an item more than once for the purpose for which it was designed before discarding it.



EARTH AS OUR HOME

Objectives:

By the end of this week students should be able to:

- 🔍 Define the concepts environment and biodiversity.
- 🔍 State why it is important to take care of the environment.
- 🔍 Describe how litter impacts the environment.

What is the environment?

The environment is everything around us including living and nonliving things such as the air, soil, water, plants, and animals.



- Select any of the following videos to show to the children. Share guided questions before showing and discuss the questions after the video, for example: What are some of the things which we can find in the environment? Videos:

- [What is Environment And How To Keep It Clean? | Environmental Studies For Kids | Vid #1 - YouTube](#)
- [Environment And Me | Environmental Studies For Kids | Grade 2 | Vid #1 - YouTube](#)
- [Our Environment - YouTube](#)

- Discuss the additional content contained in the Manual.

What is biodiversity?



- Show the video and discuss the concept biodiversity: [Biodiversity and its importance - YouTube](#)
- [What is Biodiversity & Its Importance? Environmental Science for Kids | Educational Videos by Mocomi - YouTube](#)

What does it mean to care for the environment?

The Earth has all the things we need to live, but we need to take care of the Earth so it can keep giving us what we need. Caring for the environment means doing things that will keep the Earth healthy, like reducing the amount that we take from it so that it can have time to restore itself,



reusing, repairing and repurposing items instead of throwing them in the bin, and turning off lights when you don't need them on anymore.

It's important to conserve the Earth's natural resources, like water, so people living decades after us can still enjoy living on our amazing planet. It's up to us to do what we can to care for the environment. There are plenty of ways to be green and make choices that help our planet, and you don't have to be a grown-up to make eco-friendly choices!

Taking care of the environment

- Discuss the importance of caring for the environment and the various ways we can do so. Ask students guided questions such as:
 - Why should we take care of the environment?
 - What will happen if we don't?
 - What are some of the ways in which we can care for the environment?
- Show and discuss key points from the video: How to Take Care of the Environment – 10 Ways to Take Care of the Environment [How to Take Care of the Environment - YouTube](#)



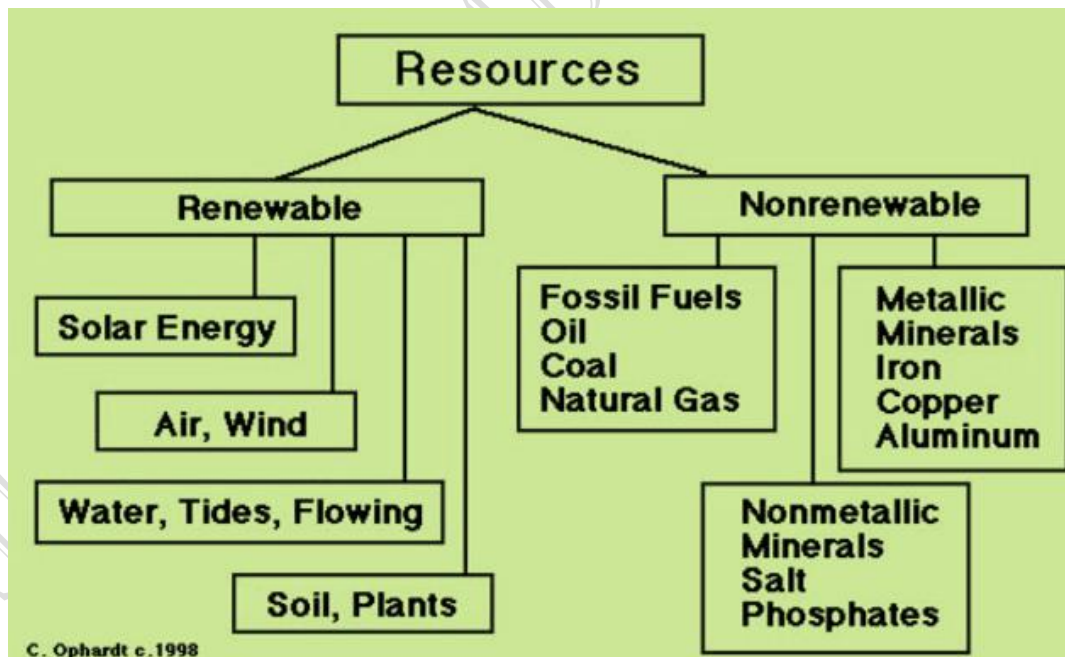
WHAT ARE RESOURCES?

Objectives:

By the end of this week students should be able to:

- 🌐 Define the concept resource.
- 🌐 Differentiate between natural and man-made resources.

A resource is something that can be used for a purpose. For example, tools and materials are resources. The word is usually pluralized (resources) and can be classified based on their availability. There are many kinds of resources, for example, natural resources which is something that is valuable in its relatively natural form and human resources which speaks to the value of human work power. A natural resource is what people can use which comes from the natural environment. Examples of natural resources are air, water, wood, oil, wind energy, natural gas, iron, and coal. Natural resources can be either renewable or non-renewable.



A **renewable resource** is a resource which can be used repeatedly and replaced naturally. Renewable energy almost never runs out, for example: solar energy is powered by heat from the

sun and never runs out. Examples include oxygen, fresh water, solar energy and biomass. New resources may include goods or commodities such as paper and leather.

A **non-renewable resource** is a natural resource that is used up faster than it can be made by nature. It cannot be produced, grown or generated on a scale which can sustain how quickly it is being consumed. Once it is used up, there is no more available for the future. Fossil fuels (such as coal, petroleum, and natural gas), types of nuclear power (uranium) are examples. Gold, silver, and iron are nonrenewable resources. Resources such as timber (when harvested sustainably) can be called a renewable resource. Non-renewable resources are also called exhaustible resources.

Water

Over 70% of the surface of the Earth (the parts you can see when you look at a globe) is covered in water. That means there's more water on the Earth than land! It's important to save water to make sure everyone has enough. This means not using more than you need. So, when you brush your teeth, don't leave the tap running the whole time – turn it off when you don't need it, then turn it back on when it's time to rinse.



Trees

Trees are also very important for us as a renewable resource. Trees are our breathing partners. You may not live in a forest, but you need trees to live. People and animals depend on trees and plants for oxygen. As you breathe in, your body uses oxygen. As you breathe out, it gives off carbon dioxide. Trees do just the opposite. They take in Carbon Dioxide and then release oxygen (which also helps clean the air).

Trees also help cool the Earth. Trees give off moisture. More moisture in the air means more rain and all living things need water. Trees cool the air by shading and through water evaporation. They act like



huge pumps to cycle water up from the soil back into the air.

We depend on forest products for things like the wood we use to make houses and furniture. We use trees for the paper to make books and letters we write. There are more than 5,000 things made from trees. Trees give us baseball bats, shoe polish, and even tooth paste that comes from tree extracts.

When trees are cut down to make paper and other products, new trees are planted or regrow naturally. Forests help wildlife by providing them food and a home. Trees and forests help us by cleaning our air, soil, and water. We can all help the world by planting a tree. (Kidsface.org)

Animals

Animals are important parts of our environment. They supply a wide variety of foods that we need to survive such as: milk, cheese, eggs, butter, and meat. Some animal species, such as corals and oysters, are used to produce jewels and handicrafts while the hide of others is used to produce clothes. In many places across the world, animals are still one of the main means of transport. For instance, camels are used in desert areas as the Sahara Desert, while in Northern areas sleighs are drawn by huskies, dogs that are very resistant to cold and fatigue. (www.eniscuola.net)

Some animals are endangered, meaning that they are disappearing fast or have an exceedingly small population - not large enough to survive. Endangered animals are protected. To protect animals there are laws against harming or capturing animals and also for when certain animals can be hunted such as the bird season.

People

Human resource means the people of a country's workforce and the education, knowledge and skills that they have. It involves how productive and healthy people are. It's important for a country to take care of its people by ensuring they are educated, skilled and healthy.

Renewable energy

Many renewable energy sources are also better for the environment than burning fossil fuels. They produce less pollution which will help protect the environment and provide us with cleaner air and water.

- Wind Power - Large wind turbines generate electricity from the power of the wind.
- Solar Energy - The rays from the sun can help to heat a building or a pool. They can also be turned into electricity using solar cells.



- Hydropower - Water from a dam or a river can be used to spin turbines and generate electricity.

What does it mean to care for the environment?

The Earth has all the things we need to live, but we need to take care of the Earth so it can keep giving us what we need. Caring for the environment means doing things that will keep the Earth healthy, like reducing the amount that we take from it so that it can have time to restore itself, reusing, repairing and repurposing items instead of throwing them in the bin, and turning off lights when you don't need them on anymore.

It's important to conserve the Earth's natural resources, like water, so people living decades after us can still enjoy living on our amazing planet. It's up to us to do what we can to care for the environment. There are plenty of ways to be green and make choices that help our planet, and you don't have to be a grown-up to make eco-friendly choices!

The main things to remember when it comes to caring for the environment are:



POLLUTION

Water Pollution

Objectives:

By the end of this week students should be able to:

- State what is water pollution.
- Identify the various causes of water pollution.
- Identify the effect of water pollution on the environment, animals, and humans.
- State the ways we can reduce water pollution.



Watch [What is WATER POLLUTION? | What Causes Water Pollution? | The Dr Binocs Show | Peekaboo Kidz - YouTube](#)

Water pollution is when waste, chemicals, or other particles cause a body of water (i.e. rivers, oceans, lakes) to become harmful to the fish and animals that need the water to survive. Water pollution can disrupt and negatively impact nature's water cycle as well.

Natural Causes of Water Pollution

Sometimes water pollution can occur through natural causes like volcanoes, algae blooms, animal waste, and silt from storms and floods.

Human Causes of Water Pollution

A lot of water pollution comes from human activity. Some human causes include sewage, pesticides and fertilizers from farms, wastewater and chemicals from factories, silt from construction sites, and trash from people littering.

Effects of Water Pollution on the Environment

Water pollution can have disastrous effects on the environment.

- Pollution in the water can reach a point where there isn't enough oxygen in the water for the fish to breathe. The fish can actually suffocate!



- Sometimes pollution affects the entire food chain. Small fishes absorb pollutants, such as chemicals, into their bodies. Then bigger fishes eat the smaller fishes and get the pollutants too. Birds or other animals may eat the bigger fishes and be harmed by the pollutants. One example of this was the use of the insecticide (bug killer) DDT. When birds of prey ate fishes that were infected with it, they would lay eggs with thin shells. The population of birds of prey began to drop until DDT was banished.
- Sewage can also cause major problems in rivers. Bacteria in the water will use oxygen to break down the sewage. If there is too much sewage, the bacteria could use up so much oxygen that there won't be enough left for the fish.
- Water pollution from major events like acid rain or oil spills can completely destroy marine habitats.

Air Pollution

Objectives:

By the end of this week students should be able to:

- 🎯 State what is air pollution.
- 🎯 Identify the various causes of air pollution.
- 🎯 Identify the effect of air pollution on the environment, animals, and humans.
- 🎯 State the ways we can reduce air pollution.



Watch the video - Why clean air is important

https://www.youtube.com/watch?v=t7Q7y_xjR5E

Air pollution is when unwanted chemicals, gasses, and particles enter the air and the atmosphere causing harm to animals and damaging the natural cycles of the Earth.

Natural Causes of Air Pollution

Some sources of air pollution come from nature. These include eruptions of volcanoes, dust storms, and forest fires.

Human Causes of Air Pollution

Human activity is a major cause of air pollution, especially in large cities. Human air pollution is caused by things such as factories, power plants, cars, airplanes, chemicals, fumes from spray cans, and methane gas from landfills.

Burning Fossil Fuels

One of the ways that humans cause the most air pollution is by burning fossil fuels. Fossil fuels include coal, oil, and natural gas. When we burn fossil fuels this releases all sorts of gasses into the air causing air pollution such as smog.

Effects of Air Pollution



On the Environment

Air pollution and the release of gasses into the atmosphere can have many negative effects on the environment.



- Global warming - One type of air pollution is the addition of carbon dioxide gas into the air. Some scientists believe that releasing too much carbon dioxide into the atmosphere is one of the causes of global warming. This upsets the balance of the carbon cycle.
- The ozone layer - The ozone layer helps protect us from harmful rays from the sun. It is getting damaged from air pollution such as methane gas from livestock and CFCs from spray cans.

On Health

Air pollution can also make people sick. It can make it difficult to breathe and cause diseases such as lung cancer, respiratory infections, and heart disease. According to the World Health Organization, 2.4 million people die each year from air pollution. Air pollution can be especially dangerous to children living in big cities with bad smog.

What can you do to help?

Anytime you can use less energy, like electricity or gasoline, it can help reduce air pollution. You can help by turning off the lights when leaving your room and not leaving the TV or computer on when you're not using it. Driving less helps a lot too. Be sure to talk to your parents about carpooling with friends and planning errands so that you can get them all done in a single trip. This saves money on gas as well, which everyone likes!



Land Pollution

Objectives:

By the end of this week students should be able to:

- 🌐 Define the concept of pollution.
- 🌐 State what is land pollution.
- 🌐 Identify the various causes of land pollution.
- 🌐 Identify the effect of land pollution on the environment, animals, and humans.
- 🌐 State the ways we can reduce land pollution.

Land pollution is anything that damages or contaminates the land.

Causes of Land Pollution

There are many causes of land pollution from the trash we throw away in our homes to waste produced at giant factories. Sometimes chemicals from the trash can contaminate the soil and eventually the groundwater we need for drinking.

- Garbage - The average person in Jamaica produces around 4 pounds of trash every day! That's a lot of trash. Some of this trash gets recycled, but much of it ends up in a landfill or on the ground.
- Mining - Mining can directly destroy the land, producing large holes in the ground and causing erosion. It can also release toxic chemicals into the air and soil. Farming - We all need farms to eat, but agriculture has destroyed many ecosystems and animal habitats.
- Farming also produces a lot of pollution in the form of chemicals such as pesticides and herbicides. Animal waste from livestock can also pollute the soil and, eventually, the water supply.
- Factories - Many factories produce a significant amount of garbage and waste. Some of this waste is in the form of damaging chemicals. There are regulations in some countries to prevent harmful chemicals from getting dumped directly onto the land, but this is not the case in many countries.

Effects of Land Pollution

🌐 On the Environment

Land pollution can be one of the most visible types of pollution. You see trash outside of buildings or on the side of the road. You may see a large landfill or dump. This type of land pollution not only can hurt animals and their habitats, but also is ugly and destroys the beauty of nature. Other types of land pollution like mining, farming, and factories can allow for harmful chemicals to enter



into the soil and water. These chemicals can cause animals and plants to die, disrupting the food chain. Landfills release the greenhouse gas methane, which may lead to global warming.

On Health

Different kinds of land pollution have been known to have adverse effects on the health of animals and humans. The harmful chemicals that can get into the soil and water can cause cancers, deformities, and skin problems.

Biodegradable:

Trash that is made of organic substances will eventually decay and become a part of the environment. This type of trash is called biodegradable. Different types of materials take different amounts of time to decay. Paper can decompose in around a month, but it takes a plastic bag over 20 years to decompose. Scientists predict that it could take a glass bottle about 1 million years to biodegrade and that some materials, like Styrofoam, will never biodegrade.

Things we can do to reduce land pollution

- Produce less trash - Some ways to reduce trash include not using a napkin or paper towel unless you absolutely need one, drinking water from a cup rather than a plastic bottle, and being sure to properly dispose of harmful trash like batteries and computer equipment.
- Pick up trash - Don't be a litter bug! Also, you can help out by picking up trash when you see it lying around. Kids make sure to ask your parents for help before you pick up strange trash.
- Composting - Get with your parents or school and start a compost heap. Composting is when you collect organic waste and store it so it breaks down to where it can be used for fertilizer.
- Recycle – Less than 5% of trash in Jamaica is recycled. When you recycle you add less land pollution.
- Companies to use less packaging on products. Things like smaller bottle caps, thinner plastic, and more compact packaging has played a major role in reducing the amount of trash. Certain types of litter can kill animals when they get tangled or caught in it. Around 40% of the lead in landfills is due to improper disposal of computers and other electronic equipment.



DEFORESTATION

Deforestation

Objectives:

By the end of this week students should be able to:

- 🌐 Define the concept of deforestation.
- 🌐 Identify the various causes of deforestation.
- 🌐 Identify the effect of deforestation.
- 🌐 State the ways we can reduce deforestation.

[Deforestation Facts for Kids \(kiddle.co\)](https://www.kiddle.co/deforestation)
[deforestation - Kids](#) | [Britannica Kids](#) | [Homework Help](#)

Deforestation

Deforestation is when forests are destroyed by cutting trees (logging) and not replanting them.

Reforestation: Restoring trees in deforested areas.

Why are trees important?

Trees are important for a number of reasons. Together, as forests, trees provide a home to the planet's biodiversity and help to:

- Regulate the [water cycle](#)
- Produce [soil](#)
- Provide [habitats](#) for [animals](#)
- Provide most of our [oxygen](#)
- Remove carbon dioxide (CO₂) from the atmosphere
- Balance the climate
- Regulate Earth's temperature
- Prevention soil erosion
- Protect against natural disasters.



Causes of deforestation

The most common reason is to clear the land to make farms and ranches. Deforestation also occurs when trees are removed for firewood and lumber and to make room for cities to expand (urban sprawl).

Effects of deforestation

Deforestation destroys the habitat of many animals, leading to their death and possible extinction. The loss is more severe in so called primary forests, which are forests that have yet been untouched by humans.

Deforestation also releases sequestered carbon and contributes to climate change

Ways to reduce deforestation

There are many ways to help save the forests that are remaining.

- Plant a tree.
- Practice the Rs – Refuse, Reduce, Reuse, Repurpose, Recycle.
- Buy from companies that are environment friendly. They don't ruin our environment just to make money.
- Try to eat less meat which requires grazing lands – another reason why forests are cleared.
- Buy products made out of recycled materials.
- Do not buy newspaper or magazines. Read them online.



[Deforestation | Causes, Effects & Solutions | Video for Kids - YouTube](https://www.youtube.com/watch?v=-01T9e6VDWU)
<https://www.youtube.com/watch?v=-01T9e6VDWU>



Activity

You don't have to be big to make a big impact! Here are some great ways that the children can help to save trees and forests.

1. Do a class project to [learn more about rainforests](#) and [the plants and animals that live there](#). Create a skit, write a story, or decorate your classroom to look like a real rainforest. Use these [coloring pages](#) to get them started.
2. Have a bake sale, garage sale, or school fundraiser to raise money to [donate](#) to an organization that works to conserve forests.
3. [Read about other children who live in and near the rainforest](#); see how they and their families depend on the plants and animals in the rainforest.
4. Challenge them to tell their friends and family about how important the rainforests are.
5. Challenge them to use less paper—re-use paper instead of throwing it out. Cut it up to use as a notepad, or recycle the paper they use.
6. Have them write a letter and post on social media (with an @ mention) to thank organizations and companies that are working to protect the forest.
7. Challenge them to look around their homes for [things they use or eat that originate in the forest](#); Have them think about how many [things that they use every day originate in the forest](#), and how it would affect you if they were no longer around.

[Easy Ways Kids Can Help Save Rainforests | Rainforest Alliance \(rainforest-alliance.org\)](#)



THE 7 RS TO WASTE MANAGEMENT





Waste management involves the collection, removal, processing and disposal of waste or things we throw away. Waste includes food waste, plastic, tins, glass, paper and liquid. Waste management reduces the effects of waste on the environment and our health. It involves the reuse or recycle of trash such as plastics. When waste is recycled or disposed of correctly it helps to reduce the negative impact on the environment such as reduction in pollution. Waste management also assists in maintaining cleanliness as well as keeping the environment free of substances that are harmful to humans and animals.

PLASTIC

The History of Plastic

Objectives:

By the end of this topic students should be able to:

-  Explain what plastic is.
-  Understand how plastic was developed

Plastic is ubiquitous, but most people do not know how plastic was developed and how it became a part of our daily lives. These sessions are designed to provide this information.

Humans have been using naturally derived plastics for far longer than you may imagine. For example, medieval craftsmen made lantern windows out of translucent slices of animal horn. Horn is made of keratin - a mixed carbon-nitrogen polymer - the same stuff that skin and hair, including wool, is made of. But the history goes back further.

Fifteen hundred years before Christ, the Olmecs in Mexico played with balls made of another natural polymer - rubber. It was not until the 18th Century that the first European, French explorer Charles-Marie de La Condamine, stumbled upon the rubber tree in the Amazon basin.

And it was only in the 1840s that the American Charles Goodyear and the British Thomas Hancock took out patents on either side of the Atlantic for "vulcanized" rubber - treated with sulphur to make it more durable.

Vulcanisation made possible the rubber tyre for the bicycle, and later the motor car (hence the Goodyear tyre company). Thomas Hancock, meanwhile, collaborated with Charles Mackintosh to make water-resistant clothing. But the story of plastics goes back earlier even than the Olmecs, in fact as long as man has been using wood. That's because about half of your average piece of wood is cellulose - a polymer that provides the tough walls of plant cells, and wood its stiffness and durability. It is the long strands of cellulose that are separated by the pulping industry, and that give paper its strength.

It was also cellulose that provided the raw material for the next great breakthrough in modern plastics - the material "Parkesine", modestly named by the British inventor Alexander Parkes, who put it on display at the 1862 international exhibition in London.

It was left to two Americans, the Hyatt brothers, to make a mint from the material - much to Parkes' chagrin. They added camphor, improving the plastic's malleability, and renamed it celluloid in 1870, thus providing what would become the raw material for the film industry.

Electrification was first made possible by rubber, which could be used to insulate electrical switches, while the first submarine cables for telecommunications from 1851 were coated in a protective layer of a cousin of rubber called gutta percha.

But the big breakthrough - arguably the birth of the modern plastics era - came in 1907, with the invention of Bakelite by the Belgian-born American Leo Baekeland. It was the first synthetic plastic - the first to be derived not from plants or animals, but from fossil fuels. Baekeland used phenol, an acid derived from coal tar. His work opened the floodgates to a torrent of now-familiar synthetic plastics - polystyrene in 1929, polyester in 1930, polyvinylchloride (PVC) and polythene in 1933, nylon in 1935.

These new materials were considered the very height of glamour.



Figure 1: Collection of objects made from Parkesine, held by the Science Museum

But what really drove the industry's growth was the war effort, as plastics were used in everything from military vehicles to radar insulation. Petrochemicals companies built plants to turn crude oil into plastic by the lorryload, with the predictable result that, come the end of the War in 1945, the industry faced a horrendous glut.

To keep production running, they were forced to think outside the box - or should that be inside the box? - as they turned their attention to the mass consumer goods market, with new products such as Tupperware, launched in 1948.

Synthetic plastics had the added advantage that seemingly lasted forever. No organisms had evolved that could digest these complicated and alien materials. But that advantage is, of course, also a great disadvantage.

Plastic might sit in a landfill, or litter a street, for thousands of years without decomposing.

1. More worrying are reports that much of our plastic junk - including gazillions of tiny plastic micro-particles that might have broken off from plastic-based clothes in washing machines - have found their way into our oceans, where they collect in giant floating junkyards that go round and round in natural gyres in the ocean currents.

A passion for plastic

The world's love affair with this indestructible miracle material has left our oceans full of the stuff.

Over 63% of all litter recorded during Beachwatch Big Weekend was plastic! That's a 3% increase on 2011.



Here's how it started:

1862 Alexander Parkes creates the first ever man-made plastic – it's called Parkesine. 	1907 Bakelite makes an appearance – totally man-made, totally synthetic. Jewellery, clock and radio housings were all soon made of Bakelite. 	1939 Nylon is invented by DuPont and women go wild! 	1982 Fleece is invented – it's a clothing phenomenon. 
1869 Celluloid is created and is used to make billiard balls as it's cheaper than ivory! 	1920 PVC is created and is used in place of natural rubber which was getting pricey. 	1954 Styrofoam makes an appearance and changes the face of packaging. 	2012 Everywhere you look there's plastic: TV controls, handles, bits of your car, kitchen utensils, bath, shower tray, DVD, medical inhaler, computer mouse, light switches, buttons... the list goes on. 

Beachwatch - www.mcsuk.org/beachwatch 11

The History of Plastic

How plastic was developed and went on to conquer the world

The Early Days:
Mesoamericans
made items with
natural rubber



In Europe, horn
and tortoiseshell
were used in
early plastics



1839: Charles
Goodyear invents
the process of
vulcanization



1870: Chemist
John Hyatt further
develops the
making of celluloid



1856: Alexander
Parkes invents an
early celluloid
he calls 'Parkesine'



This involved adding sulphur to
heated rubber, which gave it
new stretchy and malleable
properties

Hyatt and his brother went
on to patent the first plastics
injection moulding machine
two years later

1909: Bakelite, and
an early synthetic
plastic is launched



1926: Polyvinyl
Chloride (PVC)
perfected by BF
Goodrich scientists



1941: Polyethylene
Terephthalate (PET)
first produced



1939: DuPont
introduces the
world to nylon



1933: Researchers
at ICI discover
how to make
polyethylene



1939-45: The development of
plastics up to this point
makes them in high demand
for production during
World War II

The first
polyethylene
bags are seen
in the 1950s



1954: Giulio
Natta discovers
polypropylene



Nowadays, around 300
million tons of plastic
are produced each year

From the 1960s and 70s
onwards, plastics were
further toughened and
refined, allowing them to
compete with metals

In the same year,
expanded
polystyrene
is invented by
Dow Chemical



Sponsored by solentplastics.co.uk

Additional material:

<https://www.bbc.com/news/magazine-27442625>

Introduction to Microplastics

Microplastics and their environmental impact.

Plastics can be made in almost any shape for almost any purpose. They are shaped to make car parts, bottles and toys, and rug and clothing fibers. Plastic polymers don't occur naturally; we create them. And since they aren't found in nature, no organisms exist to break them down completely. Plastics don't biodegrade, they just break into smaller and smaller pieces. And this is a problem. Plastics smaller than 5mm are called microplastics. They're pieces of a plastic item that have broken apart, microbeads found in face washes, pre-production plastic beads called "nurdles," and microfibers.

Microfibres – Plastics in our clothes

Microfibers are tiny strands of plastic that are woven together to create synthetic fabrics. They've been around for decades, but we've only recently realized their negative impacts. Synthetic fabrics, including nylon, polyester and polypropylene, shed these tiny fibers into the air when we wear them or walk on them (rugs!) and into the water when we wash them. Since many microfibers are too small to get caught in washing machine or wastewater treatment plant filters, they wind up in our waterways, where they are eaten by marine life, such as invertebrates and fish. Scientists are still researching all of the effects of microfibers in the environment, but we know that some plastics release chemicals which are harmful to human health.



<https://www.youtube.com/watch?v=GLgh9h2ePYw>

<https://www.youtube.com/watch?v=Yomf5pBN8dY>

Benefits of Plastic

Strong, lightweight, and moldable, plastics are used in thousands of products that add comfort, convenience, and safety to our everyday lives. Plastics in carpets, blankets, and pillows keep us comfortable in our homes. Plastics in bottles and coolers allow us to take food and drinks with us anywhere. Plastics in portable electronic devices let us access the Internet or communicate with family and friends on the go. Plastics in sports players' helmets and police officers' bullet-proof vests keep them safe.

Plastics and Packaging

Plastic's light weight, strength, and ability to be molded into any form makes it an ideal packaging material. Rigid plastic keeps fragile items secure and flexible plastic makes easy-to-carry bags. Plastic is used for food and non-food packaging. Foods stay fresh longer when packed in plastic, which reduces waste by reducing the amount of spoiled food that must be discarded and decreases the amount of preservatives needed to keep food fresh. Advances in plastic technology has made plastic packaging more efficient: the average packaging weight for a product has been reduced over 28% in the last decade. Plastic packaging is convenient for consumers: clear plastic lets shoppers view the item they are purchasing and plastic packaging is easy to open. Plastic packaging protects food, medicine, and other products from contamination and germs when it is displayed and handled. Plastic also protects consumers. Tamper-proof packaging keeps consumers safe and child-proof packaging keeps children safe from accidental poisoning by medications or chemicals. Plastic is shatter-proof, which reduces the potential for injury from broken items.

Plastics and Transportation

Because plastic is both lightweight and durable, it makes an ideal material for manufacturing cars, trucks, and other vehicles. Plastics make up 28% of new vehicle's total weight, and over 50% of their volume. Steering wheels, door liners, and stereo components are made of plastic, as are less visible parts, such as engine components. As plastic technology advances, many car companies envision using more plastic to lighten the weight of cars and trucks to make them more fuel-efficient. For every 10% reduction in weight, a car or truck will save 5% to 7% in fuel usage. Reduction in vehicle weight translates into a reduction in carbon dioxide emissions: every pound of vehicle weight that can be eliminated means 25.3 pounds of carbon dioxide emissions are saved over the vehicle's life.

Plastics also make vehicles safer and more comfortable. Life-saving seat belts and airbags are made of plastic. Plastic padded bumpers, door frames, foam door panel inserts, plastic foam filled roof supports, and pillars are structural components that keep occupants safer during a crash.



Molded plastic fuel tanks are less likely to split apart during a collision and shatter-proof headlights are less likely to break. The windshield of most cars contains a layer of plastic between two sheets of glass, which makes the windshield less likely to break during a collision. Plastics are also used to make the seats and dashboards more attractive and easy to use. Interior features of vehicles, such as carpets, are often made of recycled PET plastics, giving new life to used plastic beverage containers.

Plastics and Energy Efficiency

Plastics can make your home more energy efficient. Plastic sealants and caulks can seal up window leaks and plastic foam weather stripping can make doors and windows draft-free. Clear plastic sheeting for windows improves insulation and decreases drafts in the winter. Plastic blinds, window shades, and drapes help insulate windows by keeping out the sun in warm months to keep the house cooler and by keeping in heat during the winter months. Plastic awnings and reflective films also help shade the home. Many brands of high efficiency LED light bulbs are made from recycled plastic. Plastic insulation in the walls, floors, attic, and roof of your home keeps heat in during the winter and out during the summer, which saves you energy and money on your heating and cooling. Plastic foam spray fills large and small holes in walls, doors, and attics.

Plastics in Sports

Plastics are used in many sports to increase athlete efficiency and safety. Plastic helmets - used in many sports, from football to skateboarding - made from molded polycarbonate with interior plastic foam padding reduce head injuries and concussions. Mouth guards reduce injury to the teeth, jaw, and mouth during collisions and plastic foam pads protect players' shoulders, hips, tailbones, knees, and thighs from injury. Plastic foam pads down and distance markers in football and foam-wrapped goalposts protect players from injury during accidental collisions. Soccer players play with a plastic foam ball and polypropylene netting and benefit from foam shin guards, latex foam goalie gloves, and light-weight cleats. Even the turf of a football or soccer field may be made of plastic, which reduces water and fertilizer use and is recyclable. Plastic has many other uses in sports - from tennis players' lightweight and strong rackets to beach volleyball's wound nylon and plastic ball and runners' shock-absorbing shoes.

Plastics and Medicine

Plastics increase the efficiency and hygiene of medicine from the surgery suite to the physician's office. Plastic syringes and tubing are disposable to reduce disease transmission. Plastic intravenous blood, fluid, and medicine bags let health care workers more easily view dosages and replacement needs. Plastic heart valves and knee and hip joints save lives and make patients' lives more comfortable. Plastic prosthesis help amputees regain function and improve their



quality of life. Pill capsules made of plastic ensure correct dosage release in the body over time, which lets patients take fewer pills. Plastic catheters and balloons allow doctors to open blocked blood vessels and insert plastic vessel supports to keep them open and dissolve harmful deposits. In addition to plastic eyeglass lenses, contact lenses, and eyeglass frames, plastics help victims of eye injuries or disease see again: silicone artificial corneas can restore patients' vision. Molded plastic hearing aids assist people with hearing loss to fully participate in conversations again.

Plastics in Electronics

Plastic's strength, light weight, and moldability have revolutionized electronics. Plastic cables and cords on everything from computers to paper shredders keep electronics powered. Plastic insulation for cables and electrical equipment keeps equipment cool and protects users from over-heating. Household appliances, from toasters to DVD players, use plastic to make them lightweight and affordable. The liquid crystalline plastics in LCD flat screen televisions give beautiful pictures and save energy, using less power than traditional cathode ray tube screens. The touch screens on mobile phones, computers, and other electronics are made of polycarbonate film. The tiny microphones in mobile phones are made of polymers for their shock-resistance. Handsets and earpieces are lighter and more comfortable because of plastics.



Local Action/ Law on Plastic

Jamaica now has laws to help to reduce the amount of plastic that is used in the country. The law was introduced in phases with the first phase taking effect on January 1, 2019. The overall ban on plastics focused on the import, manufacture, distribution and use of specific types of single-use plastic carriers.

Phase one of the ban, which took effect in January 2019 was on the importation, manufacture, distribution and use of specific types of single-use plastic carriers below 25-gallon capacity packaging (24 inches by 24 inches (24"x24"), which included those bags commonly referred to locally as 'scandal bags' and 'T-shirt bags', used primarily in the retail and wholesale sectors).

Phase two of the ban saw the law extended to the local manufacture and distribution of polystyrene foam for use as finished goods in the food and beverage industry was banned as at January 1, 2020.

Phase three of the ban incorporates single-use plastic bags with dimensions 24 x 24 inches and above with thickness of 2.5 mils, as well as single-use drinking straws made wholly or in part of polyethylene or polypropylene, attached to juice boxes or drink pouches



Copies of the legal documents can be found here.

https://www.nepa.gov.jm/new/legal_matters/laws/Environmental_Laws/Proc_1_Trade_Act.pdf
https://static1.squarespace.com/static/59bd5150e45a7caf6bee56f8/t/5cc656f7652dea319bb5f9f4/1556502264811/PPM+Order_NRCA+Act.pdf



THE WORLD OF WASTE

Plastic Pollution

Students will be exposed to plastic pollution. They will get a better understanding of the effects of plastics pollution especially with single use plastics or things we use once and throw away, and how plastics and other waste end up in the ocean.

Objectives

At the end of this topic students should be able to:

- 🎯 Identify how plastic contributes to waste.
- 🎯 Determine the types of trash that they generate as individuals and as a school.
- 🎯 Explain at least 5 of the 7 Rs
- 🎯 Appreciate the importance and impact of plastics in the environment



[What Is PLASTIC POLLUTION? | What Causes Plastic Pollution? | The Dr Binocs Show | Peekaboo Kidz - YouTube](#)

Today there are many threats to the water quality and quality of life for wildlife in our rivers and oceans. Persistent chemicals that enter the rivers can remain for many years, with many building up in the food web. The source of toxic pollutants includes decades of industrial waste, raw sewage overflows, runoff from cities, and mining operations. Excess nutrients that throw the ecosystem out of balance enter the rivers from agricultural runoff and untreated sewage. Additionally, solid waste in the form of litter and specifically, plastic pollution, threatens the wildlife that call our rivers and oceans home. Animals become tangled in plastic pollution like plastic fishing line, plastic strapping bands, or other plastic trash that ends up in the rivers and oceans.

Once tangled, they spend energy trying to get free, may become sick or weak, and even die. Certain animals also mistake plastic trash for food and eat it. Many animals have difficulty digesting plastic, so the plastic remains in the animal's stomach causing a feeling of fullness. The animal, feeling satiated, stops eating and eventually starves to death. This deadly trash is known as plastic pollution. It is trash found in the rivers or along its shores. An estimated 80% of this



pollution comes from land-based sources in the form of litter, illegal dumping, and poor waste management practices.

The Effects of Plastic



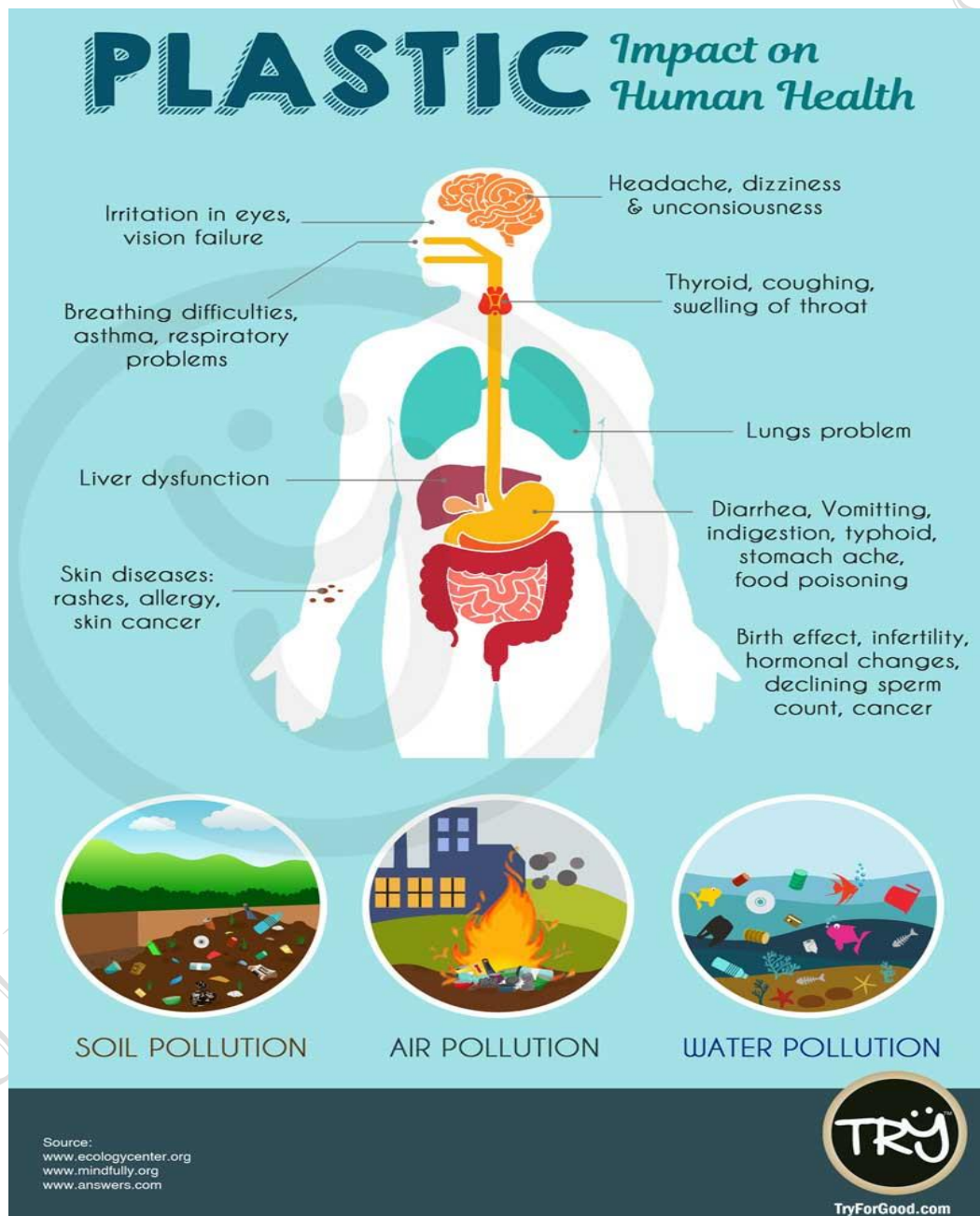
The effects of plastic on the environment

As the world's population continues to grow, so does the amount of garbage that people produce. On-the-go lifestyles require easily disposable products, such as soda cans or bottles of water. Still, the accumulation of these products has led to increasing amounts of plastic pollution around the world. As plastic is composed of major toxic pollutants, it has the potential to cause significant harm to the environment in the form of air, water, and land pollution.

Simply put, plastic pollution occurs when plastic has gathered in an area and has begun to negatively impact the natural environment and create problems for plants, wildlife, and even the human population. Often this includes killing plant life and posing dangers to local animals. Plastic is an incredibly useful material, but it is also made from toxic compounds known to cause illness, and since it is meant for durability, it is not biodegradable.

(<https://www.conserve-energy-future.com/causes-effects-solutions-of-plastic-pollution.php#:~:text=Serious%20Effects%20of%20Plastic%20Pollution%201%20It%20Upsets,t hey%20degrade%20the%20water%20quality.%20More%20items...%20>)

The effects of plastic on the body



Plastic Litter Journey

Objectives

At the end of this topic students should be able to:

- 🔍 Discuss the effects of plastic debris from land on the oceans and on the beaches.
- 🔍 Explain how water systems such as storm drains and rivers are connected and can become a significant source of water pollution and marine debris.
- 🔍 Describe how plastic travels from inland to the ocean.



How Plastic Reaches the Ocean from Inland:

<https://www.youtube.com/watch?v=sGFUhQVMMak>

Water channels and waste

Storm drains are specialized drainage system which can handle excess water as a result of flooding or heavy rainfall. They are frequently found in flood prone areas. When rainfall is heavy the streets, parking lots, and other flat areas can flood and because of the possibility of flooding storm drains are installed.

Storm water drainage systems are necessary but can have a significant impact on the environment. Unfortunately, toxic substances such as fertilizers, cigarette butts, motor oil and other waste are often washed into the drains. These waste leads to polluted water that ends up in the lakes, streams, rivers and oceans which is unhealthy for fish, plants and other marine animals, even killing them. The pollution can also affect humans by eating the contaminated fish. It is therefore important not to dump garbage in the drains as the drains leads to the oceans. We must protect our oceans by disposing of waste properly.



The Circular Flow and Recycling

“The circular economy is an alternative to the current linear, make, use, dispose economy model which aims to keep resources in use as long as possible to extract the maximum value from them whilst in use and recover and regenerate products and materials at the end of their service life. Circular economy solution for plastics include: producing plastics from alternative non-fossil fuel feed stocks using plastic waste as a source; redesigning plastic manufacturing process and products to enhance longevity; reusability and waste prevention; collaboration between businesses and consumers to encourage recycling and increase the value of plastic products; encourage sharing and leasing; developing robust information platforms to aid circular solutions; adopting fiscal and regulatory measures to support circular economy”.

(Source: GEF-Global Environmental Facility investing in our planet June 2018. Plastic and the Circular Economy)



Circular Economy [https://www.youtube.com/watch?v= 9mHi93n2AI](https://www.youtube.com/watch?v=9mHi93n2AI)

Explaining the Circular Economy and How Society Can Re-think Progress -
<https://www.youtube.com/watch?v=zCRKvDyyHmI>

Why Recycle

[Recycling Facts for Kids - Why is Recycling Important? Recycling for Kids - YouTube](https://www.youtube.com/watch?v=7UuUeoyYmxI) -
<https://www.youtube.com/watch?v=7UuUeoyYmxI>

[Recycling Old Crayons! An Earth Day Activity - YouTube](#)



ENGAGEMENT: MENTORSHIP LEVEL – THE JOURNEY OF ENGAGEMENT

Ambassadeur Mentorship Programme & School Plastic Pledge

Objective:

- To ensure continuous commitment to the programme.
- To ensure continuity of the programme

Students use this week to introduce their recruits for mentoring. To earn the mentorship badge, each Ambassadeur is to ensure that their mentee actively engages in the programme's activities and earns the rethink badge. This ensures continuity, especially where active final year students will be leaving at the end of the academic year.

Activity: Plan a social activity (movie screening) to make the new mentees feel welcome. Have some refreshments, play some inclusive games.

ENGAGEMENT: CELEBRATORY DAYS

Objective:

- To give students an opportunity to celebrate their progress
- To bring attention to the need to protect our environment.
- To engage with the broader community and share knowledge
- Build a sense of pride within the student community
- Take the conversation around environmental stewardship to the broader school community

Junior Ambassadors Day

This will be celebrated annually on Earth Day, April 22. Students will showcase their work to the school population and report on initiatives that they've undertaken. It will also serve as the badging ceremony for membership to the Junior Ambassador Programme and provide:

- A platform for students to be recognized as environmental stewards by their school community.
- Students with an opportunity to showcase their work within their school community.
- Students with an outlet to share their knowledge with their school community.
- An opportunity to celebrate the students' successes and reflect on lessons learned and identify opportunities for improvement within their school community.

Earth Ambassadors Day

This will be celebrated annually within the first week of June, in commemoration of World Environment Day (June 5th) and World Oceans Day (June 8th). It will bring together all schools engaged in the Junior Ambassadors Programme and showcase the students work at a national event, which will include, but not limited to workshops on plastic waste. The event will also serve as a special badging ceremony for the Ambassadors who have earned additional pins. It will provide:

- national recognition of the new generation of environmental stewards.
- students with an opportunity to showcase their work with persons outside of their school community.
- schools with a platform to engage with government, private sector and NGOs who are actively engaged in the national attempt to address the negative impact of plastic.
- school administrators with an opportunity to investigate similar challenges with the possibility to generate practical solutions.



- 🌐 schools with networking opportunities with other educational partners in the fight to address plastic waste.
- 🌐 students with the opportunity to meet other members of the national community of environmental stewards.

Students will work on their respective projects for presentation on these days.

JUNIOR AMBASSADEURS

Level 3

These words should be explained to the Ambassadeurs and routinely punctuate discussions.

	Word	Meaning (informed by https://kids.britannica.com/)
1.	Sustainability	
2.	Fossil Fuels	Fossil fuels include petroleum (oil), coal, and natural gas. These materials are called fossil fuels because, like fossils, they are the remains of organisms that lived long ago.
3.	Organisms	plants, animals, and other living things.
4.	Greenhouse effect	The greenhouse effect is a warming of Earth's surface and the air above it. It is caused by gases in the air that trap energy from the Sun. These heat-trapping gases are called greenhouse gases. The most common greenhouse gases are water vapor, carbon dioxide, and methane. Without the greenhouse effect, Earth would be too cold for life to exist.
5.	Alternative energy	Alternative energy sources include solar power, wind power, and waterpower. These are alternatives to coal, oil and nuclear power. Alternative energy sources that cannot be used up are called renewable,...
6.	Solar energy	Solar energy is light, heat, and other forms of energy given off by the Sun . Solar energy can be collected and used to heat buildings and to make electricity.
7.	Wind energy	Wind is the movement of air near Earth's surface. Wind can be a gentle breeze or a strong gale. The most powerful wind happens during storms called tornadoes, cyclones, and hurricanes. Changes in the temperature of air, land, and water cause wind. When air flows over a warm surface, it heats up and rises. This leaves room for cooler air to flow in. The flowing air is wind.
8.	Water	Water is the most important liquid on Earth. It covers almost 75 percent of Earth's surface in the form of oceans, rivers, and lakes. All plants and animals need water to live.
9.	Coal-based energy	The major source of fuel throughout the world is coal. Coal is a black or brown rock that, when burned, releases energy in the form of heat. One of coal's main uses is the production of electricity.
10.	Petroleum	Petroleum is another name for oil, a liquid found deep underground. Petroleum is a valuable natural resource. It is used to make many products that people use every day. These products include gasoline, paints, and even lip balm.
11.	Nuclear energy	The energy that holds together the nucleus of an atom is called nuclear, or atomic, energy. Atoms are the basic building blocks of matter. The nucleus is the central part of an atom.



		When nuclear energy is released, it changes into other forms of energy. These forms of energy are called radiation. Heat and light are examples of radiation.
12.	Natural resource	<p>A natural resource is something that is found in nature and can be used by people. Earth's natural resources include light, air, water, plants, animals, soil, stone, minerals, and fossil fuels. People need some natural resources to stay alive. They use others to make their lives better.</p> <p>Every place on Earth has its own unique group of natural resources. Some countries have lots of oil or diamonds. Others have rich soil and thick forests</p>
13.	Renewable	
14.	Non-Renewable	
15.	Fast fashion	Clothes are produced so cheaply that they're often only worn a few times before being thrown away — adding to the world's waste
16.		
17.		
18.		



What is sustainability

Sustainability

Our planet is also home to millions of other species. The huge variety of life on Earth, and the places where they live, is called biological diversity or biodiversity. It is amazing to think that every living species is connected. We are all delicate threads in the web of life. In carefully balanced ecosystems these threads act as a safety net. But if we don't look after the threads in the net, then it will eventually become too broken to look after us.

There are now more than seven billion people on Earth. These billions of people use the planet's resources every day. Human activity has harmed the environment in many ways. Some of the resources that people use cannot be replaced once they are used. People also use huge amounts of fossil fuels, which has led to pollution and other problems. Sustainability addresses ways to protect and conserve the environment.

Watch the video - [What is Sustainability? | Mocomi Kids - YouTube](#)

[Sustainability for kids \(whiteboard animation\) - YouTube](#)

Sustainability is the idea that humans must interact with the environment in a way that ensures there will be enough resources left for future generations. All life on Earth depends on the environment. The natural resources that come from the environment include food, water, plants, and minerals.

There are now more than seven billion people on Earth. These billions of people use the planet's resources every day. Human activity has harmed the environment in many ways. Some of the resources that people use cannot be replaced once they are used. People also use huge amounts of fossil fuels, which has led to pollution and other problems. Sustainability addresses ways to protect and conserve the environment.

Why does sustainability matter

In order to achieve sustainability, humans need to think about their decisions in almost every aspect of daily life. This applies to people's individual actions as well as to the actions of industries. Today we are putting our planet under more pressure than ever before. We only have one planet and we are using up its resources and polluting it much faster than it can cope with. Our activities, such as burning fossil fuels to produce energy, mean that billions of tonnes of carbon dioxide are released, causing climate change. The Earth's atmosphere is warming faster today than it probably ever has - 16 of the 17 warmest years on record have occurred since 2001, with 2017 being the third warmest ever. Climate change has caused



more extreme weather events such as drought and flooding. Some experts believe that climate change will force 250 million people from their homes and lands by 2050.

Industries—such as **manufacturing**, **agriculture**, and **construction**—depend on fossil fuels (**coal**, **oil**, and **natural gas**). These fuels create **pollution** that affect the land, air, and water. Burning fossil fuels also leads to the production of **greenhouse gases**. These gases contribute to a problem called **global warming**. Fossil fuels are nonrenewable resources. Once they are used up, they will be gone forever. To achieve sustainability, industries are starting to focus on using **alternative energy** sources, such as **solar power**, **wind power**, and **waterpower**. These energy sources are renewable, which means they cannot be used up. They also produce little pollution.

What and how much we eat, and the way we produce food also has a major impact on the planet. In the UK alone, almost a third of our greenhouse gas emissions come from growing, processing, distributing and storing our food. What's more, unsustainable food production is the biggest contributor to biodiversity loss. Changes are so rapid that wildlife and people are struggling to adapt and nearly a quarter of all mammal species and a third of amphibians are now threatened with extinction.

What can we do differently?

Industry

Construction requires a large amount of steel, concrete, wood, and other materials. One way construction can be made more sustainable is by using recycled materials, such as metals and concrete from demolished buildings. Sustainable building design, or green architecture, focuses on making sure each structure wastes as little energy as possible. For example, some buildings are designed to collect and store energy from sunlight to use in heating the building. Builders can also install a “cool roof” made with materials that absorb less heat than a traditional roof. This keeps the building cooler during hot weather.

Agriculture

Water conservation is very important, especially in agriculture. Agriculture uses about 70 percent of the world's fresh water. Farmers can conserve water by planting crops that are suited to the climate where they are planted. Farmers can also collect rainwater and use it for irrigation.

Individuals

Individuals also can change how they use energy and what products they buy and use in order to work toward sustainability. For example, people can install solar panels on their house. Solar panels use power from the sun instead of electricity generated by power plants that use coal. People can buy appliances, such as dishwashers and washing machines, that are designed to



reduce water usage. [Plastic](#), a common household material, creates many environmental hazards. Plastics do not break down, so they take up a lot of space in landfills. A great deal of plastic also winds up in the oceans, where it hurts the [ecosystems](#). People are encouraged to not use as much plastic and to [recycle](#) the plastic they do use. Glass, paper, and other materials can also be recycled. Like industries, people are encouraged to not use [fossil fuels](#). They can bike, walk, or take public transportation instead of driving their cars.

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Fossil Fuels ([fossil fuel - Students](#) | [Britannica Kids](#) | [Homework Help](#))

Watch the following videos - [Fossil Fuels](#) | [Types and Formation](#) | [Video for Kids - YouTube](#)

[Fossil Fuels for Kids](#) | [Learn all about fossil fuels, what they are, and where they come from - YouTube](#)

A fossil fuel is a natural substance formed from the buried remains of ancient organisms that can be used as a source of energy. Fossil fuels formed over millions of years as heat and pressure from layers of sediment changed the decayed organic remains into materials such as coal and petroleum. The energy in fossil fuels is the energy from sunlight stored in the tissues of the buried organisms as a result of photosynthesis.

Fossil fuel usage has steadily increased since the Industrial Revolution. At the start of the 21st century, fossil fuels comprised nearly 90 percent of the world's energy supplies. However, fossil fuels are nonrenewable resources. Because it takes millions of years for fossil fuels to form, they cannot be replaced when they are used.

Fossil fuels may be solids, liquids, or gases. All fossil fuels are hydrocarbons, a class of chemicals composed only of carbon and hydrogen atoms. Coal, petroleum, and natural gas are the most commonly known fossil fuels.

Types of Fossil Fuels

Coal

Coal is the most widely used of the solid fossil fuels. Most coal formed from plants that grew in or near swamps in warm, humid regions of the Earth during the Carboniferous Period (about 359 to 299 million years ago). Dead plant matter fell into the swamps and settled at the swamp bottom, forming a thick layer of decaying plant material. Over millions of years, sediment covered and compressed the decaying plant matter, forming peat. The pressure and heat of more sediment layers changed the peat into lignite, a soft coal. Continued heat and pressure on the lignite changed it into harder forms of coal. Anthracite, the hardest coal, was the last to form. Hard coals are considered the best energy sources among the coals because they burn the hottest and cleanest.

PETROLEUM (OIL) AND NATURAL GAS

Petroleum and natural gas are the most common liquid and gaseous fossil fuels, respectively. Petroleum is often called crude oil or simply oil. Although the term petroleum is often used to refer to the liquid form, as a technical term it also includes natural gas.



Most of the world's large natural gas and oil deposits formed during the Carboniferous Period. Oil and gas formed through a similar process, often in the same swampy location, from the buried remains of tiny aquatic organisms such as [algae](#), [diatoms](#), and [zooplankton](#). As these organisms died and sank to the muddy bottom, decomposition and other changes gradually changed their buried remains into a substance called kerogen. Over millions of years, increasing heat and pressure from more sediment layers transformed the kerogen into petroleum. Depth and temperature determined whether the petroleum was liquid or gaseous, with natural gas forming at deeper and hotter locations.

The main liquid fossil fuels used today are refined products of oil. These include [gasoline](#), fuel oils such as diesel and jet fuel, and furnace oils for [home heating](#). Kerosene, once widely used to provide light, is still used in many places for cooking and space heating. It also is the main fuel for modern jet engines.



Natural gas is used for heating and cooking in the home and for industrial heating. Natural gas produces no smoke and leaves no ash behind. Because it is a fairly clean energy source, natural gas is often a preferred fuel for environmental reasons.

OTHER FOSSIL FUELS

Peat and coke are solid fossil fuels that are commonly used today. Peat is used as a heating fuel in areas where other fuels are not available. It is not an efficient fuel because it burns slowly, producing much smoke and little heat. Coke is a residue that remains after gases and tar are extracted from some types of coal. It is useful in industry because it produces intense heat without smoke. Coke is widely used in [blast furnaces](#) to make [iron](#) and in other [metallurgical](#) processes.


As fossil fuel reserves become depleted, the search for alternative fuel sources has increased. Two such resources are oil shale and tar sands. Oil [shale](#) is a type of rock that contains embedded oils. Tar sands are rocks that contain heavy, tarlike hydrocarbons within the rock. Extracting useful substances from these resources is difficult and costly, making these resources an impractical fuel option at present.

How do we get fossil fuels? ([Burning Fossil Fuels - Kids for Saving Earth](#))

-  To remove fossil fuel energy from Earth, we have to drill, mine or frack (break) the Earth. Next, we have to refine (make ready) the energy so that we can use it in our cars, factories and more. These activities can harm our planet by polluting our land, air, and water.
-  Next, we have to move this coal, oil or gas to where we need to use it like to gas stations or power plants. This means using trains and trucks that can spill, explode or crash.



Pipelines can leak into earth or water. Coal has to be dug out of deep mines and that can be dangerous.

-  Burning fossil fuels throughout the world releases millions of tons of carbon dioxide (CO₂) into the air and this causes global warming. You can see from the chart above that carbon dioxide is the major source of greenhouse gas released into the air. We can all do something about this problem of too much CO₂ in the air

Disadvantages of Fossil Fuels

Two main disadvantages of fossil fuels are their limited supply on Earth and the environmental harm they cause. Burning petroleum and coal releases harmful gases such as carbon monoxide, nitrogen oxide, and sulfur dioxide. These gases pollute the air and react with moisture in the atmosphere to create acid rain.

Scientific evidence shows that burning fossil fuels increases atmospheric temperatures. This warming of Earth's atmosphere, called the greenhouse effect, contributes to climate change, a serious environmental concern.

These problems have led scientists and engineers to develop new ways to generate power without using fossil fuels. For example, some cars are now powered by electricity instead of gasoline. Homes can be heated using solar or geothermal energy. Some electric power plants run on nuclear energy, water power, or wind power. These alternative energy sources are forms of renewable resources because—unlike fossil fuels—they cannot be depleted.



Nothing in nature is linear.

Rubbish or landfill do not exist in the natural world. Energy is provided by the Sun, one species' waste is another's food and when things die, their nutrients return to the soil — in a circle of life. Unfortunately, humans do things in a more linear way. In this module we will look at the many things that we consume that are linear.

Linear production

In a linear economy we take things from nature, process them into things that we use and then throw them away. This is unsustainable because the use of raw materials does not include conservation. That is what happens when we use fossil fuels such as coal and petroleum. We take them from the earth (nature), we use them and then it's gone. It took millions of years for these resources to be formed. When we use them all up, there will be no more available.

There are other times when we take things from the environment, process them into things, such as plastic, we use them and then we throw them away as waste. When we do that, we are also putting things into the environment that the planet cannot break down.

When we want a new outfit, phone or computer, we discard the old one. When our appliances break, we buy a brand-new one. But this wasteful approach, known as the linear economy isn't working! We're running out of resources to make new things with, and we're producing too much toxic waste.

Watch this video - [The Story of Stuff - YouTube](#)

Circular production

a **circular economy** is inspired by the **natural world** — where **everything** has **value** and nothing is wasted.

In a circular economy, smart phones would be designed so they could be repaired more easily. And when they stopped working they would be simple to take apart so that the precious metals and materials inside them could be reused in another product, or returned safely to nature.



Quiz

1. The circular economy is another name for recycling (T/F).
It's much more than just recycling! It makes sure we use fewer resources to make products, and that we use them for as long as possible, regenerating them at the end of their life.
2. In the circular economy we could rent things instead of owning them (T/F)
This could be one solution! If we rented our washing machines or lighting systems, it would be up to the maker to fix and replace parts so nothing would have to be thrown away!
3. Products designed for the circular economy need to be easily dismantled and recycled (T/F).
We should see old tech as a valuable resource of materials!
4. If we make less stuff, there will be less work for people. T/F)
In a circular economy, new jobs could be created in the recycling and remanufacturing industries.
5. If there were no humans, then there would be no landfill. Nature is the original circular economy! (T/F)
Humans have invented loads of brilliant products – but unfortunately many of them cannot biodegrade.
6. The circular economy is really bad for business. (T/F)
Not if businesses adapt! For example, they could provide service packages that include repairs and maintenance for items they make.
7. All waste is bad for the environment. (T/F)
Although we should try to reduce our waste, in the future rubbish is likely to become one of the most important alternative raw materials! For example, manufacturers can develop innovative ways to repurpose used materials such as plastics and foams.

Ways for you to reduce your waste

- 1) Repair - Instead of throwing away your broken things, you can fix them! It can be much easier than you think! Repair Cafés all around the UK and Ireland provide tools, materials and advice to people who want to get mending, whether it's furniture, bicycles, electrical appliances, clothes, crockery or toys. Find one near you at repaircafe.org/en/
- 2) Not so fast fashion – What do you do with your clothes when you have out grown them? Do you give them to someone who needs them? What do you do when you no longer like an outfit? Do you throw it away? We should choose clothes that can last for a very long time so that they do not become waste after you are finish wearing them. Ask your parents to only buy a few things that are made from natural materials that will last. This is better than buying many things that are made from synthetic material (plastic)



that will cause microplastics to get into our water channels each time they are washed and will have you inhaling microfiber.

3) Rewear our clothes

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