



RESOURCE PACK 13 - 18 YEARS

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About the Project

Island Guardians: For a Plastic-Free Med is a project on marine plastic pollution designed and managed by Explora Interactive Science Centre. It is funded via the first Open Call of the Remedies Consortium within the framework of the EU Mission Restore our Ocean and Waters. The project aims to foster a plastic-conscious society and contribute to the prevention of plastic pollution by offering tools that can be easily accessed by any person or entity seeking to carry out a community-based initiative. Through educational resources, storybooks, videos, clean-up events and more, the project implements a long-term strategy to reduce the use of plastic and diminish the volume of plastic litter in our sea and coastal areas.

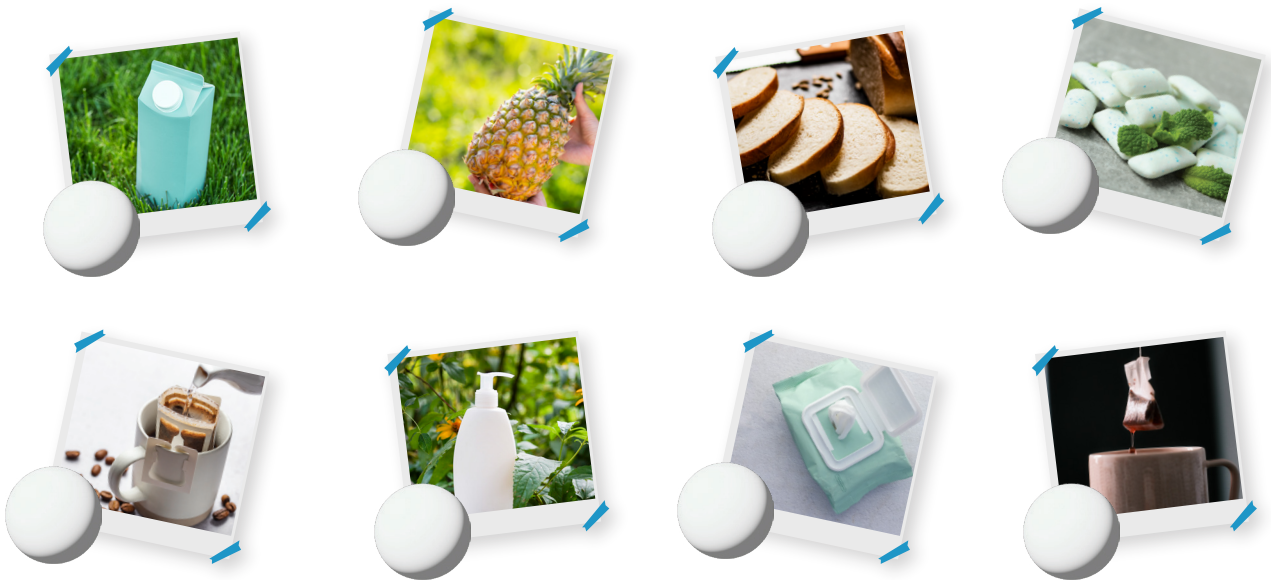
For a full list of project deliverables, kindly visit www.islandguardians.org



WAIT ... IS THAT PLASTIC?

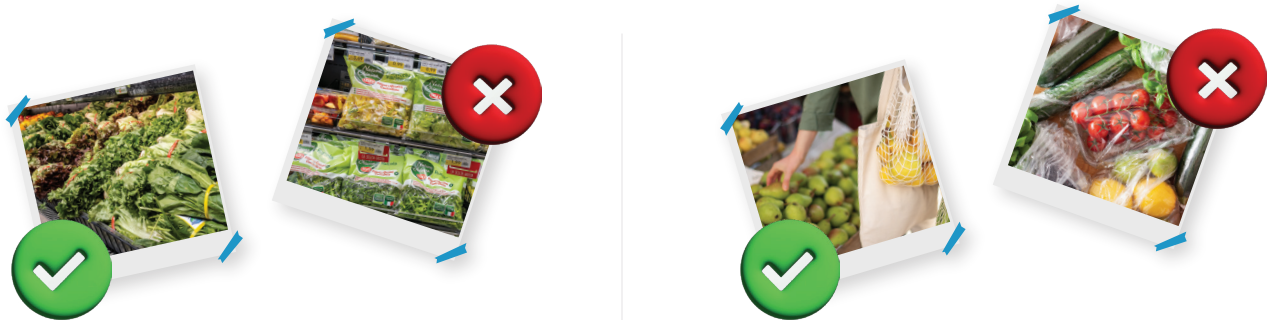
In the past, plastic was mainly used for items like food storage containers and trash bags. Nowadays, however, plastic is present in nearly every part of our homes, even in everyday products that we think are not made of plastic. That is why such products are known as having hidden plastics.

Can you select the products that you think contain hidden plastic?



What can you do?

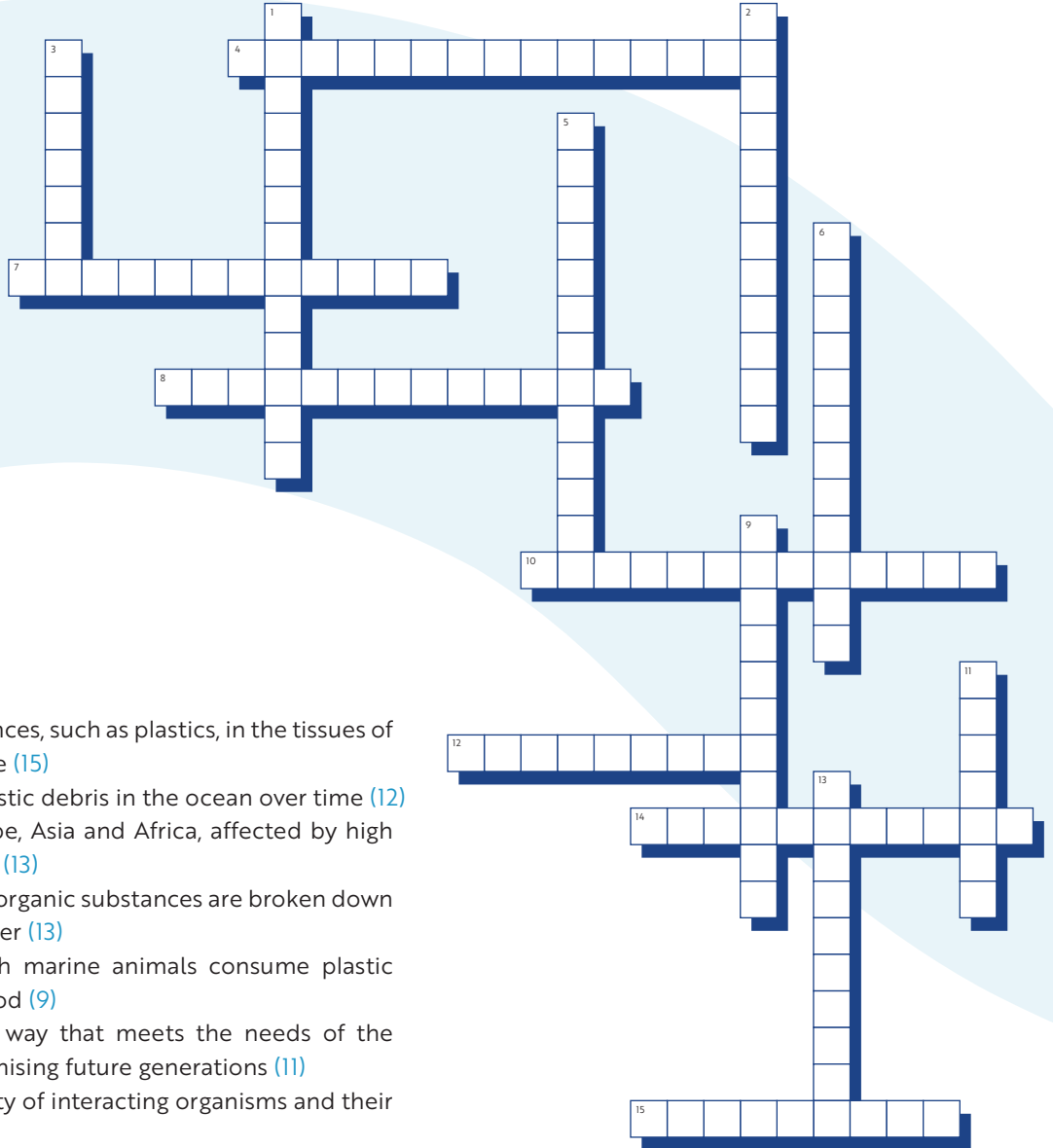
When you go to the supermarket, try to choose products that do not contain visible or hidden plastic, e.g. choose vegetables that are not pre-cut and packaged in plastic.



Visit **Friends of the Earth Malta** website for resources related to hidden plastics and alternative practices that we can adopt to reduce plastic waste.



CROSSWORD



ACROSS

- 4. The build-up of substances, such as plastics, in the tissues of living organisms over time (15)
- 7. Gradual increase of plastic debris in the ocean over time (12)
- 8. Sea enclosed by Europe, Asia and Africa, affected by high levels of plastic pollution (13)
- 10. The process by which organic substances are broken down into simpler organic matter (13)
- 12. The process by which marine animals consume plastic debris, mistaking it for food (9)
- 14. Using resources in a way that meets the needs of the present without compromising future generations (11)
- 15. A biological community of interacting organisms and their physical environment (9)

DOWN

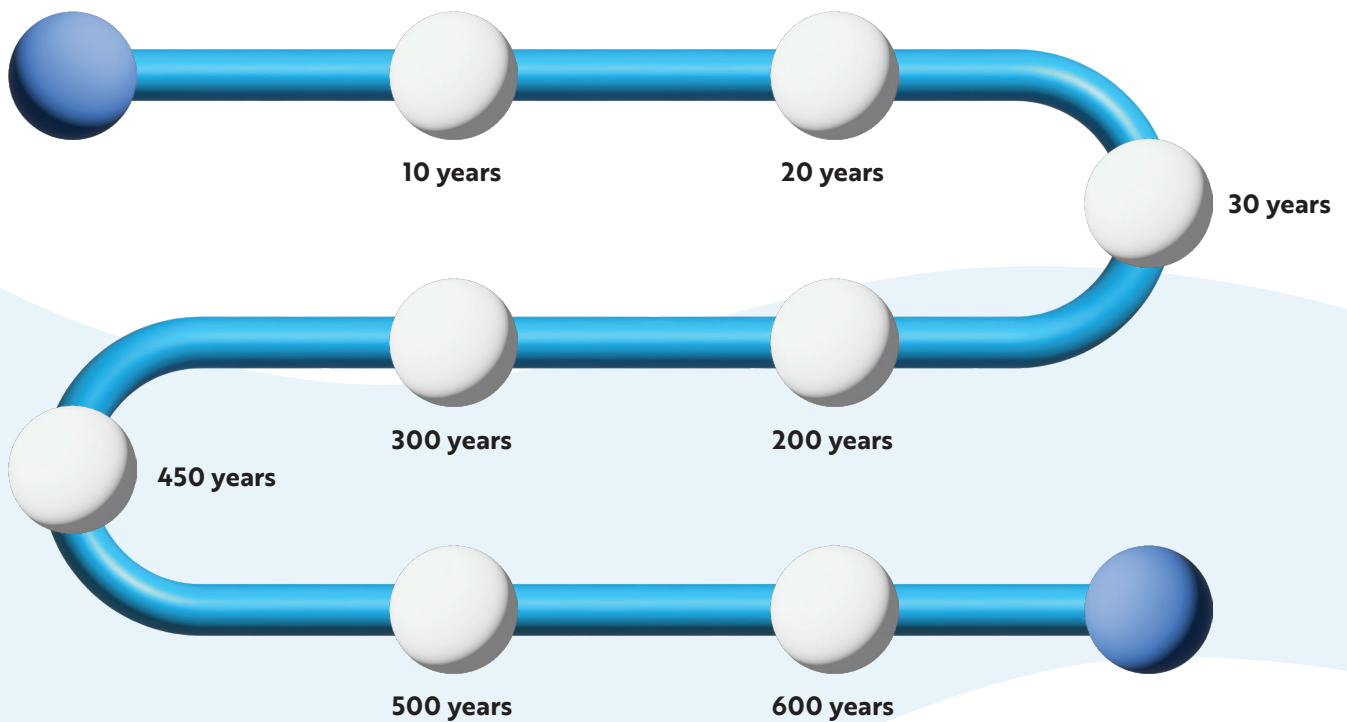
- 1. Tiny plastic fragments that result from the breakdown of larger plastic debris (13)
- 2. Hazard for marine animals caused by getting caught in plastic waste (12)
- 3. Relating to water, often used to describe environments and organisms affected by plastic pollution (7)
- 5. Capable of being decomposed by bacteria or other living organisms (13)
- 6. Extremely small plastic particles that are less than 100 nanometres in size (12)
- 9. Small floating animals that can ingest microplastics and transfer them up the food chain (11)
- 11. Small plastic pellets used as raw material in the manufacture of plastic products, often found as pollution (7)
- 13. Tiny plastic particles found in personal care products that pollute the oceans (10)

Found the clue difficult? Being an activist also involves doing your research and learning more about what you're fighting for. Go online and search for the answers you're looking for.

PLASTIC IS FOREVER

Plastic really is forever - it never decomposes fully. Instead, it just breaks down into smaller and smaller pieces (microplastics). This process can take anywhere from **20 to over 500** years, depending on the object.

Put the following objects in order of those you believe will degrade the fastest to the slowest.



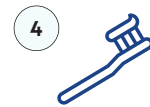
1 TAKEAWAY COFFEE CUP



2 PLASTIC BAG



3 CIGARETTE BUTTS



4 PLASTIC TOOTHBRUSH



5 FISHING LINE



6 DISPOSABLE NAPPY



7 PLASTIC STRAW










8 PLASTIC BOTTLE

WHAT TYPE OF PLASTIC AM I?

Challenge

Go on a plastic venture in your home and check what kinds of plastic packaging you have. Look at the products' packaging and see whether you can find the symbol indicating the type of plastic used. If you do, make a note of it.

	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		

Which type of plastic is most present in your home?






















On your next shopping spree, think sustainably and try to avoid unnecessary plastic packaging!

Find these objects in your home and write down the type of plastic (**1 to 7**) underneath the image of the plastic products shown below. Then use the table on the next page to learn more about the types of plastic you have found.



7 DIFFERENT PLASTIC TYPES

The Resin Identification Code (RIC) system categorises plastic into seven groups.

NAME	PET OR PETE	HDPE	PVC	LDPE	PP	PS	OTHER
RIC							
RECYCLABLE?							
DECOMPOSITION RATE	5 - 10 YEARS	100 YEARS	NEVER	500 - 1000 YEARS	20 - 30 YEARS	50 YEARS	MAJORITY NEVER
TOXICITY LEVEL							



COMMONLY RECYCLABLE



DIFFICULT TO RECYCLE



SOMETIMES RECYCLABLE



HIGH IN TOXICITY LEVEL



OCCASIONALLY RECYCLABLE



LOW IN TOXICITY LEVEL

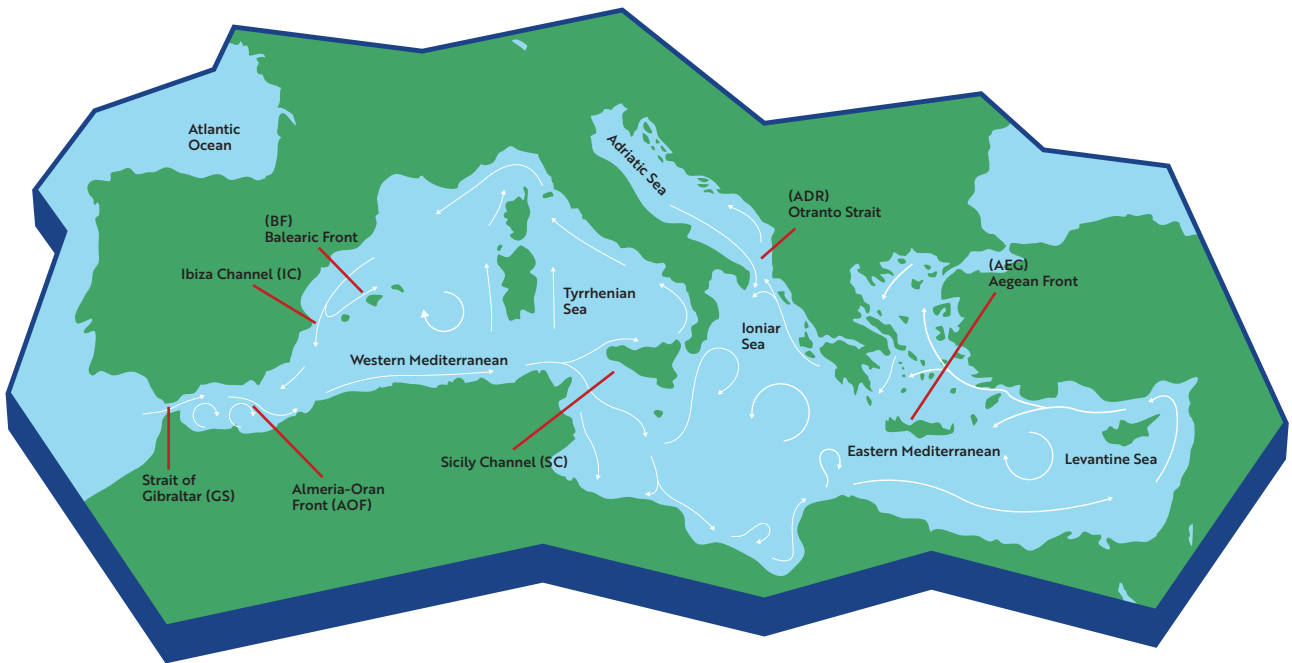
Did you know?

Did you know that a remarkable bacteria called *Ideonella sakaiensis* can break down PET plastic, offering a glimpse of nature's recycling power? However, reducing plastic use and opting for sustainable alternatives remain crucial for protecting our environment.

PLASTIC'S JOURNEY

Once plastic finds its way into the sea, currents and winds take it on a global journey. In the Mediterranean, it becomes trapped and accumulates in particular areas.

Look up the coordinates of the photos below using Google Earth. Can you predict where the currents will take the plastic waste?



1

32°45'33" N 14°00'51" E

Origin: _____
 Destination/s: _____



2

38°02'22"N 14°01'19"E

Origin: _____
 Destination/s: _____



3

35°57'06"N 14°24'35"E

Origin: _____
 Destination/s: _____



4

37°05'39"N 25°09'34"E

Origin: _____
 Destination/s: _____

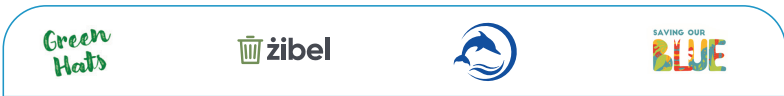
BEACH PLASTIC LITTER SURVEY

Most plastic originates on land and gets swept or blown into the sea. Clean-ups are necessary in order to retrieve this unwelcome intruder. Become an activist yourself by organising a small beach clean-up at your favourite beach to keep it clean and enjoyable for the local community. Take this sheet with you to keep track of your findings.

- Use tally marks to keep track of what you've found
- Dispose of the waste properly
- Do not touch syringes or other dangerous materials
- Leave natural items on the beach
- Avoid stepping on dunes or grass/plants
- Use gloves

Date:	Name:	Beach Name or Location:
_____	_____	_____
Start Time:	End Time:	
_____	_____	

ITEMS	TALLY	ITEMS	TALLY
PLASTIC BOTTLES		PLASTIC BAGS	
PLASTIC BOTTLE CAPS		PLASTIC CUPS	
PLASTIC STRAWS		PLASTIC PLATES	
FOOD WRAPPERS		PLASTIC CUTLERY	
PLASTIC BOXES & CONTAINERS		CIGARETTE BUTTS	
WET WIPES		NAPPIES	
CIGARETTE LIGHTERS		BANDAGES	
PIECES OF PLASTIC		UNIDENTIFIED/MISC	



Would you like to join a local cleanup instead?

Get in touch with:
Green Hats, Zibel, Coast Is Clear, Saving Our Blue



FROM YOUR HEAD TO THE SEA

How your next haircut can help protect our seas

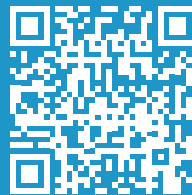
One of the major contributors to the ocean plastic crisis is ghost nets. Ghost nets are fishing nets that were once used as intended, but eventually became lost, abandoned or simply discarded in oceans or seas.

Why is this a problem? Most modern fishing equipment is made of nylon or other synthetic plastic, therefore they will not degrade naturally by time. They can actually stay in our seas for centuries and eventually become smaller and smaller pieces of plastic called microplastics. These plastics find their way into the digestive system of many marine animals, therefore polluting the food chain with plastic. Apart from this, animals can easily become entangled in these nets and do not find a way to escape. Hundreds of animals can get caught in a single net and become injured. While in the sea, ghost nets can also harm reefs as they are dragged over the sea floors thanks to currents, causing real damage while blocking much-needed sunlight from the marine life that needs it to survive.

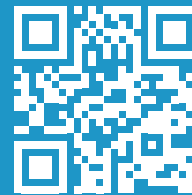
A Dutch designer called Sanne Visser is proposing an alternative material to make ghost nets out of rather than plastic. This natural material grows in abundance and is available everywhere, does not need any extra land, water or energy to grow, is lightweight but very strong, and also decays in the natural environment within two years. What is this innovative material? Human hair! Sanne is an artist who uses human hair as a medium to create anything from ropes, dog leashes and fishing nets. To do so, she collects hair trimmings from local hairdressers and volunteers and, after washing it and sorting it carefully, she uses a process that has been around for centuries to spin wool and turn hair into 'yarn'.

According to Sanne, human hair is a very valuable resource that should be taken into consideration when it comes to creating sustainable alternatives. From her point of view, it is an extremely valuable resource that goes to waste. The UK alone generates over 6.5 million kilograms of human-hair waste every year. All of this ends up in landfills, releasing toxic gases and blocking drainage systems. This is the case even though human hair has many valuable aspects such as its flexibility and oil-absorbent and thermal insulation properties. Could this be a material we see more of in our markets in the future?

For more information, please refer to the following sources:



Watch Video



Read More

What can we do to avoid ghost nets being left behind in the sea in the first place?

Why do you think it is difficult to remove these nets from the sea?

Can you name some advantages and disadvantages to using these hair fishing nets?

Do you see any ethical issues with them?

Can you think of any other alternatives to plastic fishing nets?

THE MICROPLASTICS IN YOU

Microplastics have practically taken over the planet and now they are even found in our plates! Test your knowledge on microplastics by choosing the correct response for each question provided.

1. Which ocean or sea do you think is the biggest microplastic magnet?

A North Pacific Ocean

C Indian Ocean

B Mediterranean Sea

D Caribbean Sea

2. Who's most likely to mistake microplastics for a tasty treat?

A Sea turtles, octopuses, and molluscs

C Sea mammals such as whales and dolphins

B Large fish creatures such as sharks or tuna fish

D All of the above

3. Which meal contains the most microplastics?

A Herb-crusted salmon fillet served with local baked potatoes

C Spaghetti with octopus stew

B A mixed seafood platter served with rice and fresh bread

D Fish soup (Aljotta)

4. How much plastic are we unknowingly munching on each year?

A None

C 250 grams

B 50 grams

D 150 grams

5. What are the main effects of microplastics when we ingest them?

A Scientists are still figuring this out via research

C Problems with our respiratory system

B Inflammation in the digestive system

D Skin irritation around the face and neck area

6. Which of these would be feasible solutions to the microplastics crisis?

A Banning all the seven types of plastic

C Choosing alternative products whenever possible instead of plastic ones

B Cutting back on single-use plastics in our daily lives

D Avoiding seafood products

Did you know?

Did you know that the Mediterranean Sea is one of the most polluted bodies of water when it comes to microplastics? This beautiful sea, surrounded by popular tourist destinations, suffers from an alarming level of plastic pollution, impacting marine life and eventually making its way into our food chain. By reducing our plastic use, we can help protect this vital ecosystem.

Microplastics have become a very big problem especially since they have found their way into our bodies!

A food web is a diagram that shows how different plants and animals in an ecosystem are connected through what they eat. It's like a map of who eats whom. Unlike a simple food chain, which follows one path, a food web shows multiple paths and how they overlap, demonstrating the complex relationships between various organisms. For example, a fish might eat small insects, but that fish could also be eaten by a bird or a bigger fish and the bigger fish might be hunted by a larger animal or by humans.

Assemble the food web by putting the creatures and arrows provided below in the correct place. Remember that in a food web, creatures can eat more than one type of creature. Also, mark the presence of nanoplastics and microplastics within each creature.

**TERTIARY
CONSUMERS**



**SECONDARY
CONSUMERS**



**PRIMARY
CONSUMERS**



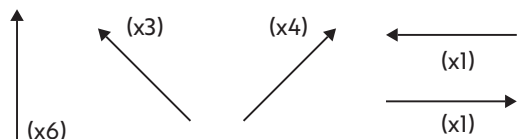
PRODUCERS



CORALS
HUMANS
PARROT FISH
NEPTUNE GRASS

SEA URCHIN
OCTOPUS
MORAY EEL
SEA SLUGS

PURPLE STARFISH
NANOPLASTICS = ●
MICROPLASTICS = ●



DOES PLASTIC AFFECT SEAWATER TEMPERATURE?

LET'S INVESTIGATE!



What do you need?

- 2 large identical containers
 - Sea water (use large amounts to avoid complete evaporation)
 - Varied plastic litter
- A digital thermometer



Method

- Fill containers with sea water.
- In one of the containers, put anything that classifies as plastic litter.
- Place both containers in direct sunlight.
- Record the temperature three times daily to be able to calculate the mean temperature of both containers.

What can you do to reduce plastic litter in the sea?

When planning your visit to the beach, avoid using single-use plastics by, for instance, taking a reusable water bottle and packing food and snacks in reusable lunch boxes.



Did you know?

This is one of the many resources from the **GLOBE Malta**.

For more information refer to QR Code



Results table

Record your temperature readings in °C for one week in the table below.

	READING 1		READING 2		READING 3		MEAN TEMPERATURE	
	WITH PLASTIC	WITHOUT PLASTIC	WITH PLASTIC	WITHOUT PLASTIC	WITH PLASTIC	WITHOUT PLASTIC	WITH PLASTIC	WITHOUT PLASTIC
DAY 1								
DAY 2								
DAY 3								
DAY 4								
DAY 5								
DAY 6								
DAY 7								

Questions to ask yourself throughout this investigation

What did you notice?

Were there any differences between the ambient temperature and that of the water in the containers?
How would you explain this?

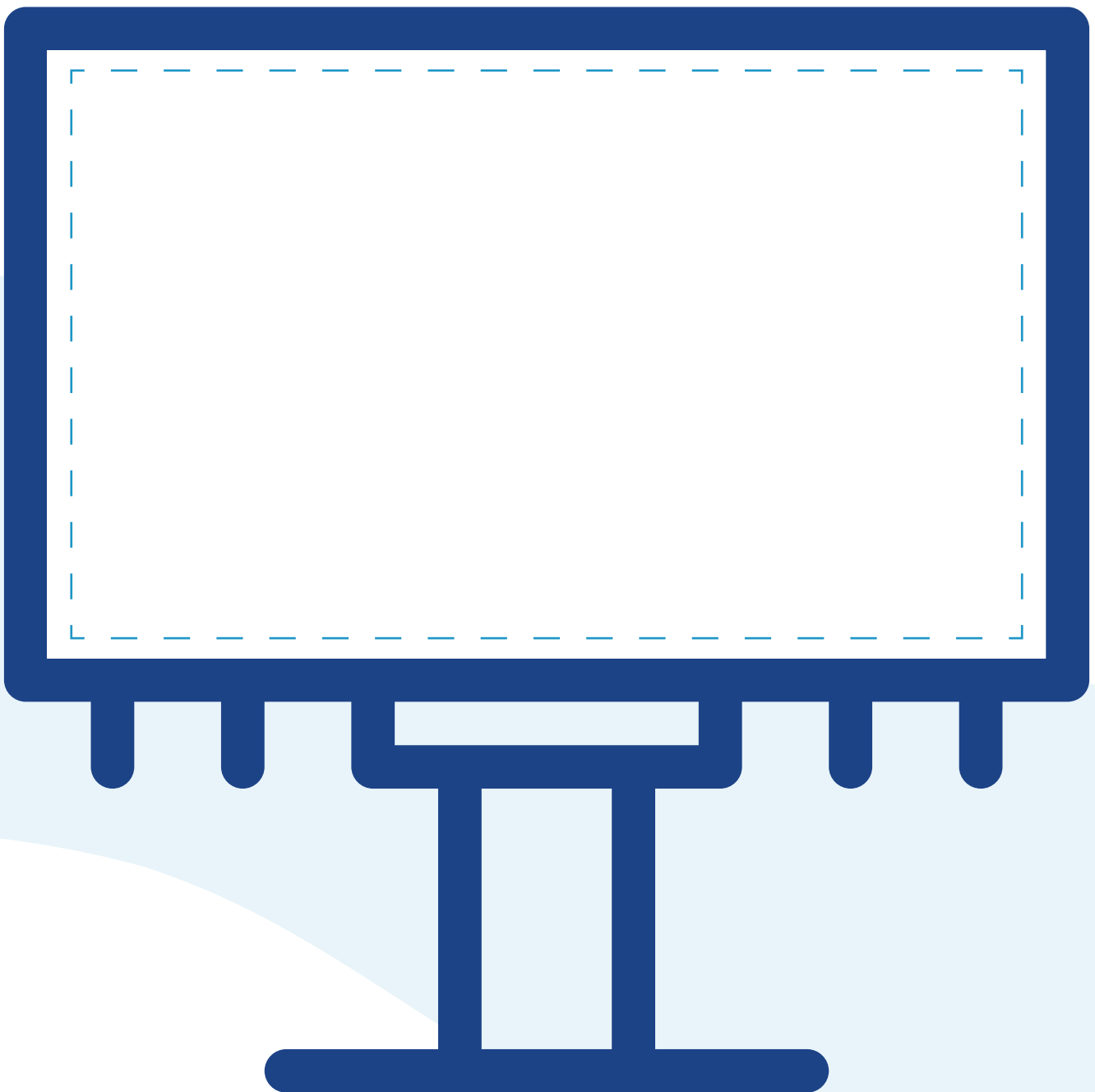
Were there any temperature differences between the two containers?

Why do you think it was important to take multiple readings?

What conclusions can you draw from this investigation?

DESIGN YOUR OWN BILLBOARD

How would you show people the negative impacts of marine plastic pollution? Design your own billboard as part of an educational campaign to encourage more people to reduce the use of single-use plastics.



HEROES IN OUR COMMUNITY



Zibel is an NGO working on reducing waste generation in Malta including marine plastic litter and ghost nets.



GLOBE Malta empowers students to become global citizens by fostering collaboration, scientific inquiry, and critical thinking skills.



Friends of the Earth Malta is a Maltese NGO that strives for environmental and social justice through a wide range of projects and advocacy campaigns.



L-Università
ta' Malta



Andromeda is a research project managed by the University of Malta Institute of Oceanography that aims to develop analysis techniques for quantifying nanoplastics and microplastics, and their degradation in the marine environment.



"Deep SEE" is a research project managed by the University of Malta Institute of Oceanography that aims to characterise the microplastic pollution of the Maltese nearshore waters, focusing on microplastic accumulation within Malta's water column.



Saving Our Blue aims to educate and encourage the public to stop littering, reduce waste generation, and opt for alternative products to single-use items. Several clean-ups are organised to reach such goals on a yearly basis.

HELP SHEET

Wait... Is that Plastic?

Foods with hidden plastic:
Milk carton
Chewing gum
Coffee bag
Shampoo bottle
Wet wipes, and
Tea bags

The Microplastics in You (Part 1)

- 1b
- 2a
- 3b
- 4b
- 5a
- 6d

What type of plastic am I?

Drinking - water bottles - Type 1
Detergent containers - Type 2
Children's plastic toys - Type 4
Trash bags - Type 5
Single-use disposable cutlery - Type 6
Fruit Juice containers - Type 1
Plastic jars - Type 1
Cling Film - Type 4
Disposable packaging - Type 6
Plastic trays - Type 6
Water dispenser bottles - Type 7

Plastic is forever

Cigarette Butts - 10 years
Plastic Bag - 20 years
Takeaway Coffee Cup - 30 years
Plastic Straw - 200 years
Plastic Bottle - 450 years
Disposable Nappy - 500 years
Plastic toothbrush - 500 years
Fishing lines - 600 years

Plastic's Journey

- 1 - Libya
- 2 - Palermo, Sicily
- 3 - Malta
- 4 - Paros, Greece

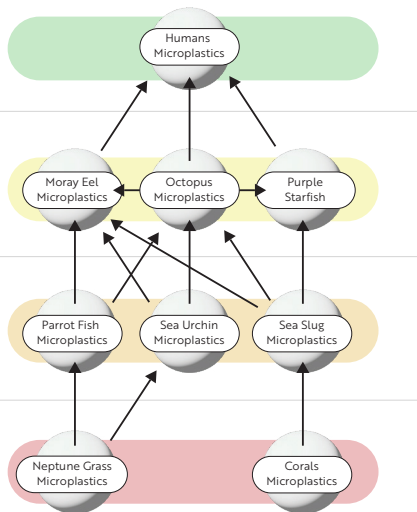
The Microplastics in You (Part 2)

TERTIARY CONSUMERS

SECONDARY CONSUMERS

PRIMARY CONSUMERS

PRODUCERS



Crossword

1. Microplastics
2. Entanglement
3. Aquatic
4. Bioaccumulation
5. Biodegradable
6. Nanoplastics
7. Accumulation
8. Mediterranean
9. Zooplankton
10. Decomposition
11. Nurdles
12. Ingestion
13. Microbeads
14. Sustainable
15. Ecosystem

ACT NOW

Have a Voice!

Friends of the Earth Malta and Żibel issue calls for volunteers on a regular basis. Volunteering with such non-governmental organisations is not only an opportunity for you to be part of a team of environmental activists that work hard towards a greener, plastic-free Malta but it is also a great opportunity for you to enhance your CV and gain new skills essential for your dream career!



esplora®



REMEDIES

MEDITERRANEAN SEA BASIN LIGHTHOUSE



RESOURCE PACK

13 - 18 YEARS

islandguardians.org



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