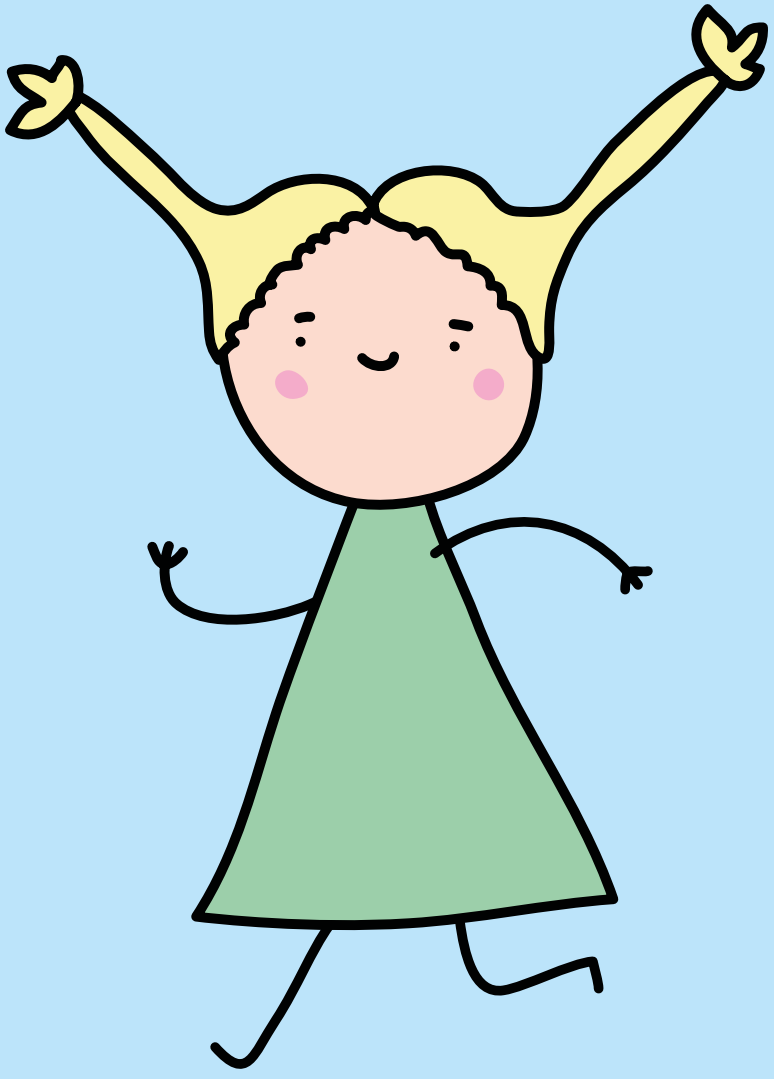
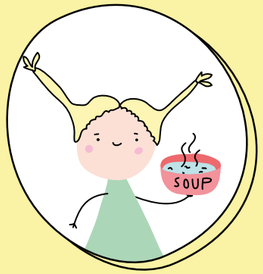


Water Cycle®

GAMES BOOKLET
Play & Learn

My daily water diary

How many times a day do you use water? **Draw or write snapshots of your own daily water uses.** The first one I have done for you. The rest you can continue…

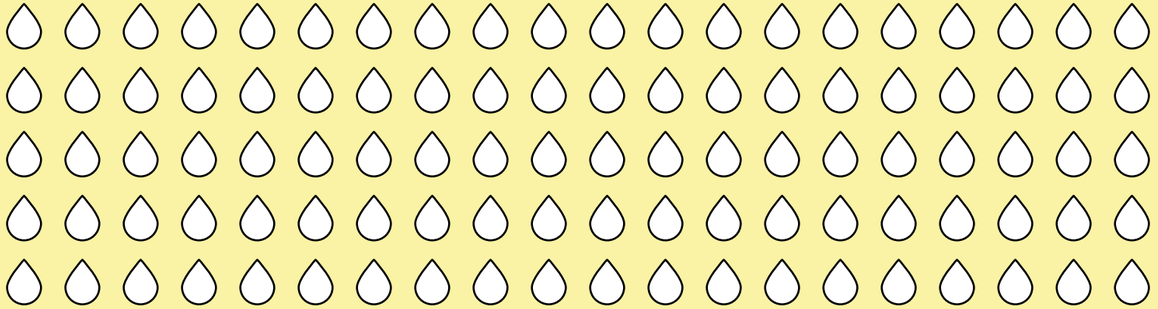


As you will discover in the following pages, we use water in **direct** and **indirect** ways. If you are out of ideas, you can leave these frames empty for now and come back later to fill them in with your own indirect water uses!

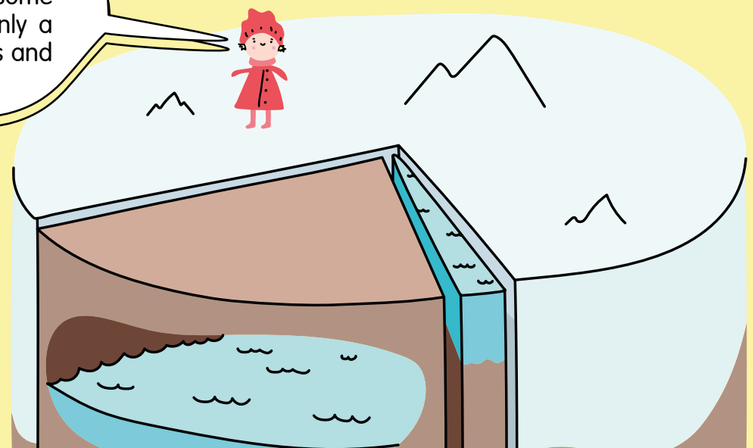
Where on earth is water?

Did you know that about two thirds of the planet's surface is water? That seems a lot, but how much of this water can we humans actually access and use? Probably less than you think!

If the total water on Earth was 100 drops, how many of these would be seawater (salty) and how many freshwater? **Colour the following drops using different colours for the seawater and the freshwater on Earth.**

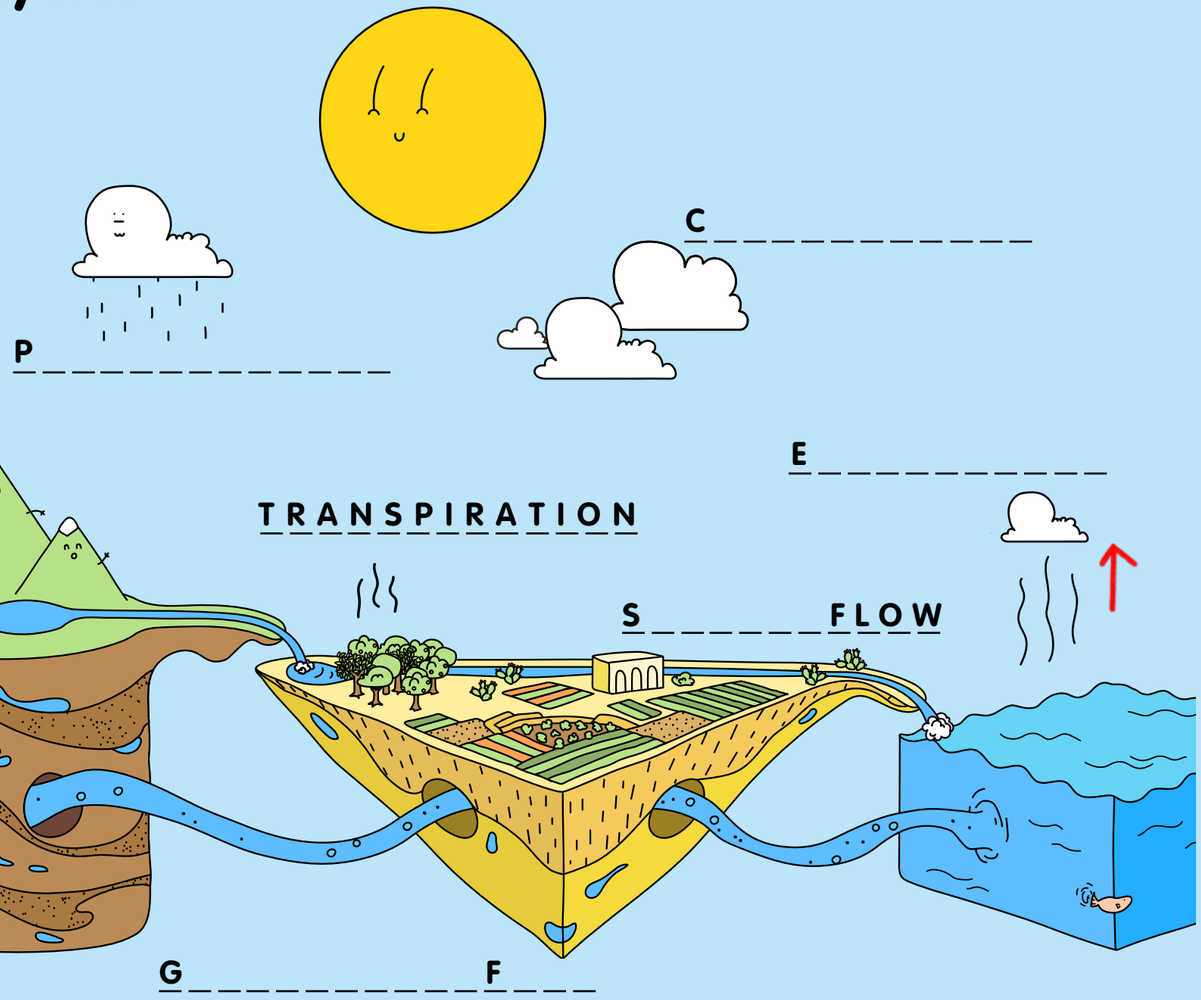


The freshwater that we can easily access is limited, as most of it is ice (69%), some of it is underground (30%) and only a small part is located in lakes, rivers and ponds (1%).



The water cycle!

Water never stops: it moves in a never ending circle.
Complete the missing words and add red arrows to make the cycle visible.



Check ☑ the right ending to the following sentence.
Within the water cycle the total amount of water on earth:

a) increases – as the rivers keep adding water into the sea ☐
b) decreases – because water evaporates from the sea ☐
c) remains the same ☐

Explain your choice

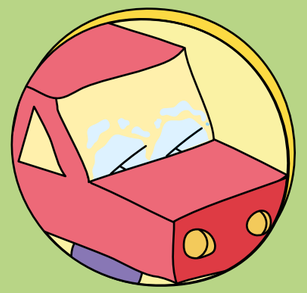
_____

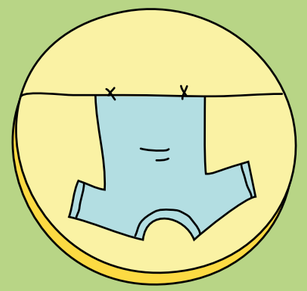
_____

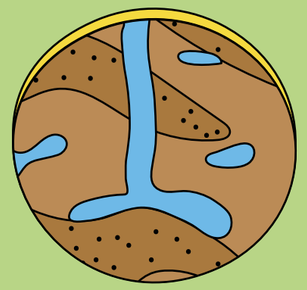
_____

The water cycle in snapshots

Water never stops moving in the water cycle. How well do you know the processes taking place within this cycle? **Match the pictures with the words.** Each word can have more than one picture.







Evaporation

Respiration

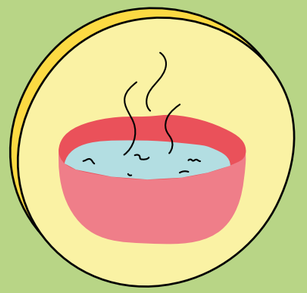
Condensation

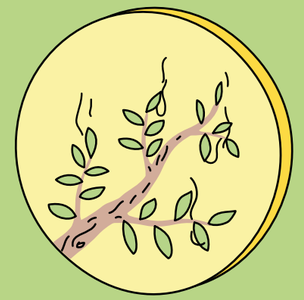
Precipitation

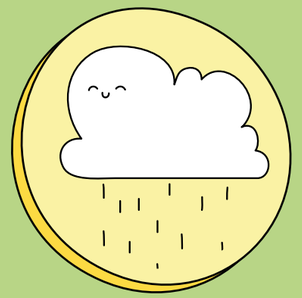
Transpiration

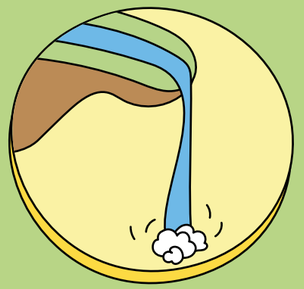
Groundwater Flow

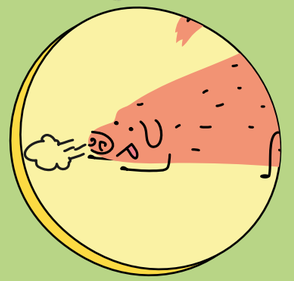
Surface Flow

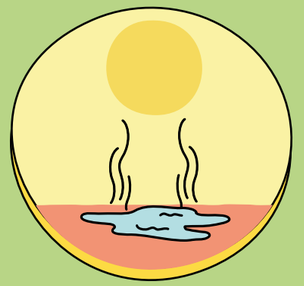












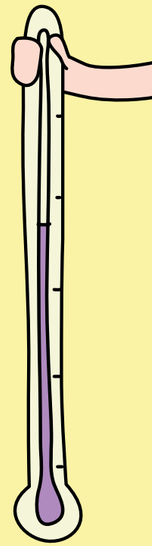
Time for an experiment

Follow the instructions to create a model of the water cycle inside a bowl.

You will need:
1 large transparent bowl
1 small transparent bowl
1 piece of plastic wrap
1 pebble
Hot water
A pinch of salt
A drop of watercolour.

Instuctions:
1. With the help of an adult, heat up half a glass of water.
2. Pour the hot water in the large bowl and add salt.
3. Place the small bowl into the large one. Be very careful not to spill any water inside the small dry bowl.
4. Cover tightly the big bowl with the plastic wrap. Ensure that there is no air leakage (you can also use a rubber band to seal the plastic wrap).
5. Place the pebble on the top centre of the wrap just above the small bowl.
6. Wait 5 to 10 minutes. Note down your observations.
7. Remove the plastic wrap and taste the water that ended up in the small bowl. Is it salty? What did you taste?
8. Repeat steps 1-6. This time add a few drops of watercolour in the water of the large bowl instead of salt. What happens now? Is the water in the small bowl coloured? Explain.

Write your observations from the experiment.



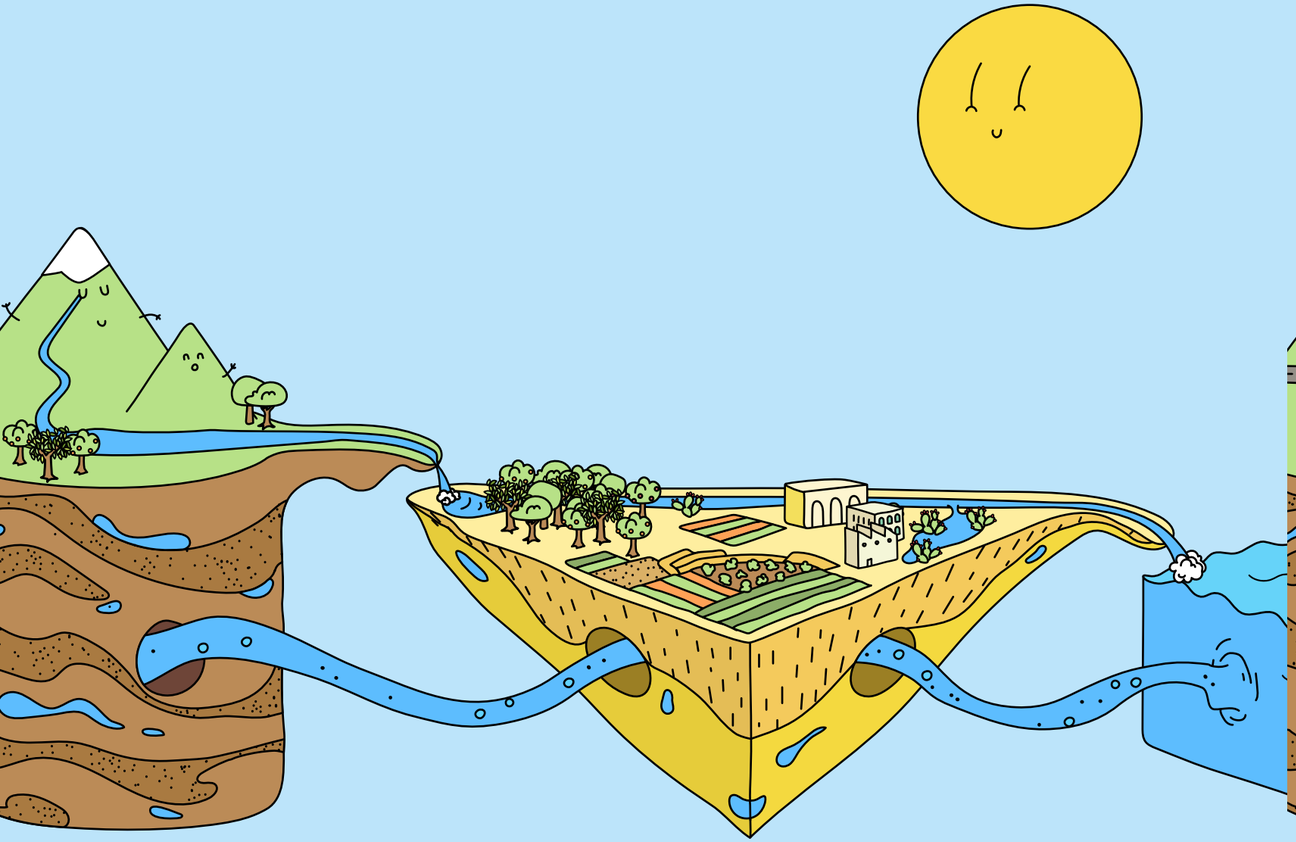
What does each element of the model represent in real life? **Do the matching:**

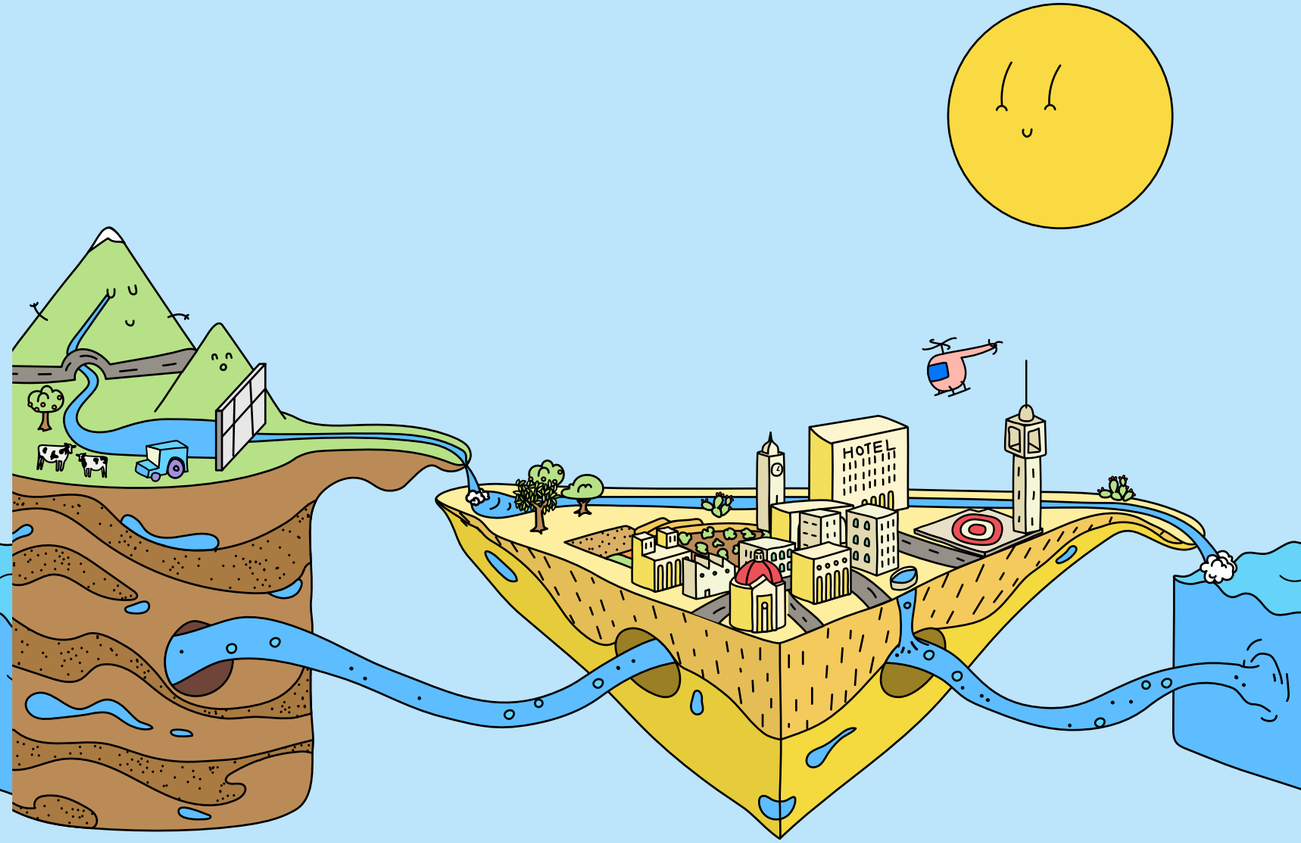
Model	**Real life**
1. The entire model (bowl & plastic wrap)	A. The sea
2. The big bowl with the salty water	B. Land or island
3. The small dry bowl	C. Freshwater on land (e.g. lake)
4. The drops falling from the plastic wrap	D. The water cycle
5. The watercolour	E. Rain
6. The water inside the small bowl	F. Pollution or other substances dissolved in water

Answers: 1D, 2 …, 3 …, 4 …, 5 …, 6 …

Our impacts on the water cycle

Spot the differences between the two images to find the human activities that have an impact on the water cycle. Are any of these activities typical of life in Malta? Are any of these somehow connected to our personal lives? E.g. How are we connected to cattle farming or land sealing?





How could we reduce our impacts on the water cycle?

Write one idea:_____

_____

_____

_____

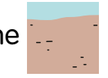
Water in the Maltese islands

Discover more about the water resources of the Maltese islands and the pressures they face, in the following exercise: **Decode the symbols!**

- Malta is one of the most densely populated countries in the  _ _ _ _ _. This means that a lot of  _ _ _ _ _ _ are living on three small  _ _ _ _ _ _ _. In Malta we do not get a lot of rain; only 550mm of  _ _ _ _ f a l l (precipitation) per year. Since we do not have any  _ _ _ _ _ _ _ _ _ the islands do not experience any  _ _ _ _ f a l l.

- In Malta and Gozo we get water from four sources: ground water, the sea,  _ _ _ _ and treatment of wastewater. Through the use of the desalination plants (with a process called Reverse Osmosis) we turn salt water into  _ _ _ _ _ _ _ water. Through the use of waste treatment plants we can also turn sewage into 'New Water' which will then be used for watering our  _ _ _ _ _ and  _ _ _ _ _. In a similar way, in our  _ _ _ _ _ _, we can treat the water from showers,  _ _ _ _ _ _ _ _ and sinks (this is called greywater) and  _ _ _ _ _ _ _ it for other uses, in which water does not have to be of excellent quality (e.g. flushing of  _ _ _ _ _ _ _ & watering the gardens).

- Water produced on the Maltese Islands goes mainly to our  _ _ _ _ _ (40%), followed by agriculture (watering the  _ _ _ _ _ – 37%). Hotels take up 4% and the industries 19%.

- In the Maltese Islands space is very limited because of the many  _ _ _ _ _ _ _ _ _ and  _ _ _ _ _. Due to this sealing of land, when it  _ _ _ _ _, the water cannot seep through the  _ _ _ _ _ _, which means that replenishment of the groundwater is reduced. This also means that water has no place where to go, so we end up experiencing flash floods in low lying areas of the  _ _ _ _ _ _.

- In recent years, climate change is causing a lot of extreme weather phenomena all around the  _ _ _ _ _. In the Maltese islands we experience extended droughts and torrential rains.

My water footprint

Have you ever thought how much water each person uses daily? Every day we need water to drink, to shower, to cook, to wash dishes, clothes and floor, water the plants and much more.

If you like taking long baths (like me), or if you live in a house with a garden you will use even more water!

Roughly how much water does a person consume every day in an average Maltese household?
Circle the right choice!

10 Litres

50 Litres

100 Litres

1,000 Litres

Apart from the **direct** uses of water, like drinking and washing, water is "hidden" in everything we eat, wear and use. This water, linked to our indirect uses is called **i v t r a l u** _ _ _ _ _ _ _ **(put the letters in the right order to find out!)**

The water footprint of a product is the sum amount of water used in all stages of its production.
Match the following food and other products to their water footprint.

food	water footprint
1 apple	2,500 Litres
1 glass of milk	255 Litres
1 beef hamburger	125 Litres

How can you decrease your diet's water footprint?

_____

_____

product	water footprint
1 pair of jeans	8,000 Litres
1 T–Shirt	1,320 Litres
500 A4 sheets	1,000 Litres

How can your use of paper contribute to decreasing your water footprint?

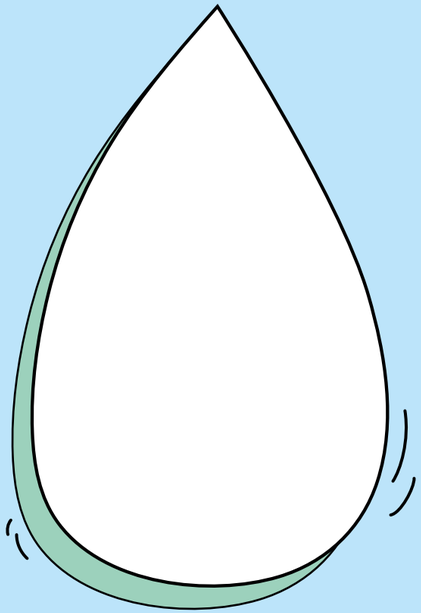
_____

_____

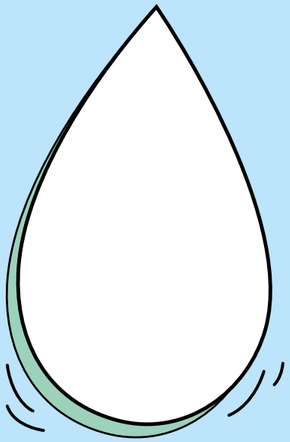
If you would like to calculate yours or your family's water footprint, there are many online water footprint calculators (more on page 19)!

Shrinking my water footprint

Go back to your water diary on the first page. After your visit to the Għajn Centre and from what you have read in this brochure so far, is there any personal habit that you could change to reduce your water footprint? Can you commit to making at least one personal change? **Draw or write your commitment.**



Up until now



From now on

Make a photocopy of this page and place it in the Letter Box of the Għajn National Water Conservation and Awareness Centre!

Name and signature:

Drop by drop

You can now become a water-champion! It's time to check your achievements in your daily life. Every day, for each good practice you can save up to 3 drops. Be honest! **Add up your drops to check your score and colour them accordingly. In the last rows write other water saving actions that you do.**

	Not really	So and so	Yes I did!
Did I close the tap while brushing my teeth?			
Did I choose to shower instead of taking a bath?			
Did I eat all my dinner and not waste any food?			
Did I use both sides of my note paper?			
Did I put my rubbish in the proper waste or recycling bin?			
Did I make sure that the water taps at school were turned off?			
Did I remind my family to fully load the dishwasher and washing machine before powering on?			
Did I talk to someone about the importance of using water responsibly?			

Today's score = ... (use a pencil to erase and check again another day).

Legend:

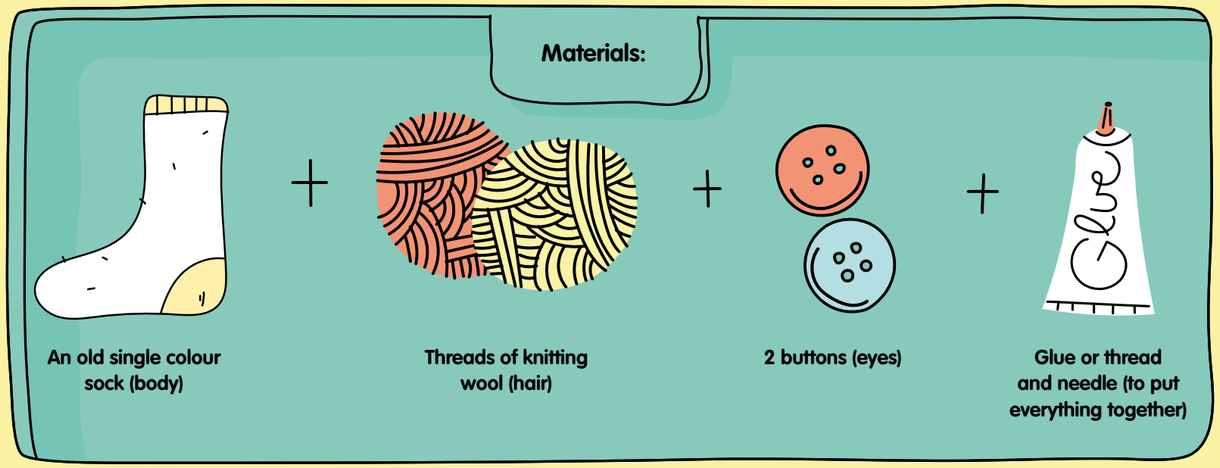
Up to 10 drops:
You need to work very hard towards conserving water. Earth really needs your help!!!

10–20 drops:
You are getting there but you need to work harder.

20-30 drops:
Well done!!! You are a great asset to this planet. You are now a water-champion!!!

How to make a puppet

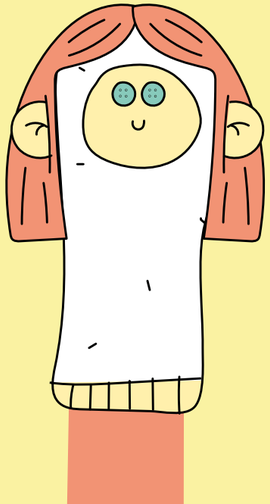
It is very simple to make your own puppets and make up your own stories together with your friends!



Instructions:
1. Cut the knitting wool thread at the desired length to represent the hair.
2. Stick, or, with a help of an adult, sew the hair on the top of the sock (close to the heel).
3. Sew or stick on the eyes and your puppet is ready to use.

Optional: You can also put a mouth on the puppet. In this case you need to attach as extra cardboard paper, cut out in oval shape, to represent the mouth.
You can also use coloured cardboard paper to cut out cheeks and a nose and then glue them on the puppet.

To animate the puppet, put all fingers in the head, or use your thumb to make its mouth move.



Answers

Page 3: Where on earth is water?
• Salt water: 97% (97 drops) - Fresh water 3% (3 drops)

Page 4-5: The water cycle!
• condensation • evaporation • transpiration • surface flow • groundwater flow • precipitation
• Within the water cycle the total amount of water on earth remains the same.

Page 6-7: The water cycle in snapshots
LEFT PAGE: stream flowing (surface flow) • car with misty glass (condensation) • Hanged T-shirt (evaporation) • water in the ground (percolation)
RIGHT PAGE: bowl with water (evaporation) • leaves of a tree (transpiration & evaporation) • rain falling (precipitation) • snow falling (precipitation) • waterfall (surface flow) • dog breating (transpiration) • water pond under sun (evaporation)

Page 8-9: Time for an experiment
1D, 2A, 3B, 4E, 5F, 6C

Page 12-13: Water in the Maltese islands
• world • people • islands • rainfall • mountains • snowfall • rain • potable • crops • houses • bathtubs • toilets • recycle • homes • buildings • roads • world.

Page 14-15: My water footprint
• 100 Lt
• virtual water
• Apple= 125 Lt • 1 glass of milk = 255 Lt • 1 beef hamburger = 2,500 Lt • 1 T-Shirt = 1,000 Lt • 500 pages of A4 sheets = 1,320 Lt • 1 pair of jeans = 8,000 Lt

References

The water footprint of products: http://www.thewaterooms.org
A water footprint calculator: http://aquapath-project.eu/calculator/calculator.html

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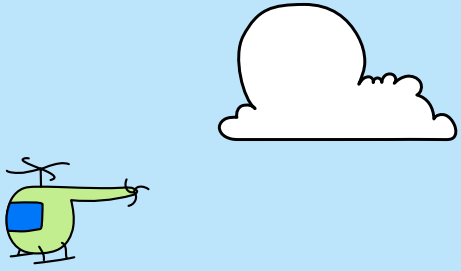

This booklet is intended for students who visit the Għajn National Water Conservation and Awareness Centre and would like to further explore the water cycle and become responsible water users. Are you one of them?

This brochure is to be used by the visitors of the 'Għajn' Water Conservation and Awareness Centre.It has been prepared by MIO-ECSDE and the Energy and Water Agency of Malta, in the frame of the LIFE 16 IPE MT 008 Project.

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