



GUADARRAMA RÍO DE ARENA RÍO DE ARENA

Programa de Educación Ambiental
en el Parque Regional del Curso Medio
del Río Guadarrama y su entorno

PROGRAMA FINANCIADO POR



Dirección General de Biodiversidad
y Gestión Forestal
CONSEJERÍA DE MEDIO AMBIENTE,
AGRICULTURA E INTERIOR



Unión Europea
Fondo Europeo Agrario
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Creando oportunidades en el campo español



DESARROLLADO EN



Taking care of our rivers: Quickstart Guide

3° - 4° ESO

Hi! I'm **Guadarrama River**, one of the main rivers in the Region of Madrid. I spring in the Fuenfría Valley, in the Guadarrama mountains. I go down 132,8 km among rocks, sand and riverbank forests, until my waters flow into the Tajo River, that great river that runs into the Atlantic Ocean.

Over the last few decades, rivers have suffered many impacts from human activities. Before telling you about some of them, let's start by learning the concept "**ecosystem services**". These are the benefits that ecosystems (including rivers) provide to humans. We classify them into three types: provisioning, such as food or building materials; regulating, such as soil protection or water cleaning; and cultural, such as recreational use or the spiritual value of a natural setting. Take a look at some of the services that rivers provide:



TAKING CARE OF OUR RIVERS: QUICKSTART GUIDE

Now that you know about the services that rivers provide to the society, do you want to take action against some of the impacts we suffer?
Let's go!

MICROPLASTICS IN YOUR LAUNDRY

The textile industry is one of the biggest polluters of the planet. Clothes made of polyester pollute rivers, seas and oceans when you wash them at home. Up to 1 million microplastics are released in a single wash due to temperature, friction and abrasion. **Microplastics** are small plastics (measuring less than 5 mm) that pollute ecosystems and are ingested by living organisms through food.

Count the number of 100% polyester garments you have in your wardrobe. Calculate how many millions of microplastic fibres your clothes release each time you do the laundry by taking into account the data provided above.



If water treatment plants are not able to remove microplastics from household garments, research and propose solutions to reduce the volume of this pollutant in river's waters, and those of seas and oceans:

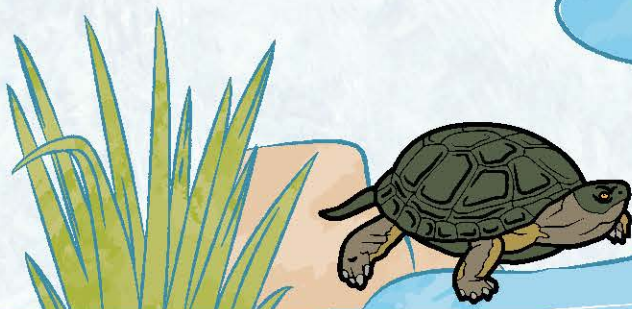
CHALLENGES TO REDUCE POLLUTION OF OUR WATERS:

Distracted tadpole

1



Research which SDG (Sustainable Development Goals) address microplastic pollution and its environmental consequences. Show the results on a mural to display in the classroom.



Smart terrapin

2

Research the harm that microplastics cause to aquatic animals and humans. Record 1 minute microdocumentaries to show the results of your research.

Powerful otter

3



Organise an information campaign at school to make the rest of the students sensitive to the origin and environmental effects of microplastics.



Aquaman

4

Organise a visit to the Guadarrama River and sample the sand on its banks using 2 mm mesh sieves. Try to identify microplastics in the sieved sand. Send us the results to the email reservas@guadarramariodearena.org.

TAKING CARE OF OUR RIVERS: QUICKSTART GUIDE

PREPARE YOUR LUNCH WITH VIRTUAL WATER IN MIND

Virtual water represents the total amount of water required to produce an item. It includes the water used during the cultivation, growing, processing, manufacturing, transport and sale of food. Some of this water comes from the extraction of water from rivers. Calculate the virtual water used in the following lunch boxes using this calculator: <https://www.waterfootprint.org/resources/interactive-tools/product-gallery/>

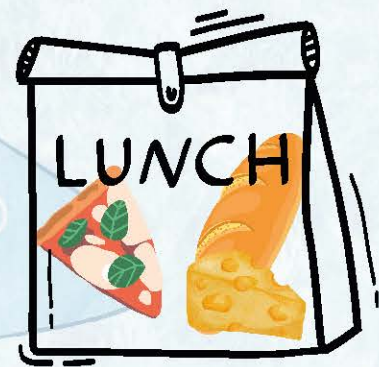
LUNCH BOX 1

Food product	Litres of virtual water
1 Apple	
2 Oranges	
1 Nectarine	
Total litres of virtual water	



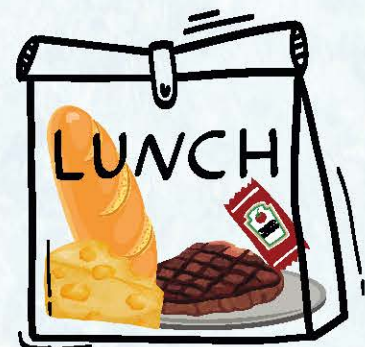
LUNCH BOX 2

Food product	Litres of virtual water
¼ Margherita pizza	
300 grams of baguette bread	
200 grams of cheese	
Total litres of virtual water	



LUNCH BOX 3

Food product	Litres of virtual water
300 grams of veal	
100 grams of baguette bread	
100 grams of cheese	
50 grams of ketchup	
Total litres of virtual water	



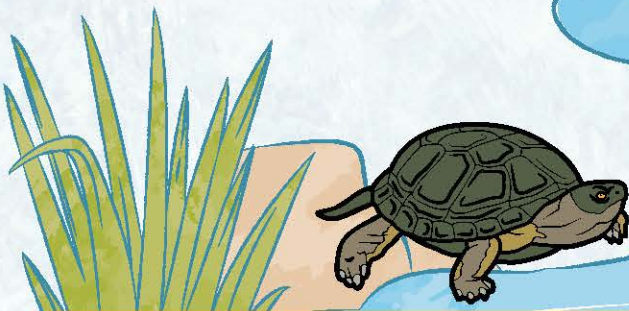
CHALLENGES TO ANALYSE IN MORE DETAIL THE PROBLEM OF WATER CONSUMPTION:

Distracted tadpole

1



Having calculated the litres of virtual water, which lunch box uses the most water? Make a visual pyramid of water consumption by food, placing those that use the least water at the bottom.



Smart terrapin

2

Research the impact of food's water footprint on the ecosystems of the Regional Park of the Middle Course of Guadarrama river and its surroundings, and make a mural in class to display in your school.

Powerful otter

3



Check the lunch that everyone in class brings to school one morning and calculate the associated virtual water consumption as a group. Are there more sustainable alternatives? Research them and try to include them into your daily lunches.



Aquaman

4



Organise a "Sustainable Lunch Day" to raise awareness of this issue among the school's students. Send the results to reservas@guadarramariodearena.org and tell us about the experience.

TAKING CARE OF OUR RIVERS: QUICKSTART GUIDE

"THE CURSE OF THE HOUSE BY THE RIVER"

In recent decades, the way cities are built has changed. Unlike older urban centres such as Madrid (high-density cities), more and more residential areas with villas are being built (low-density cities). However, are you aware of the impact that this model of urban design has on the rivers, and the water resource?

Look at the following table and **compare the water consumption figures** in two examples of residential areas in Barcelona:

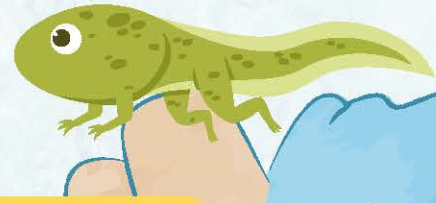
	HIGH DENSITY	LOW DENSITY
		
Water per household, annual average	112,6 m ³ /household/year	226,3 m ³ /household/year
Water per person, annual average	120,1 L/person/day	203,3 L/person/day
House size	85,6 m ²	173,0 m ²
Family size	2,7 people	3,3 people
Number of taps inside the homes	8,7	13,6
Garden water requirements, annual average	-	1,014 L/m ² /day
Pool presence	0%	21%

What conclusions do you draw from this table?

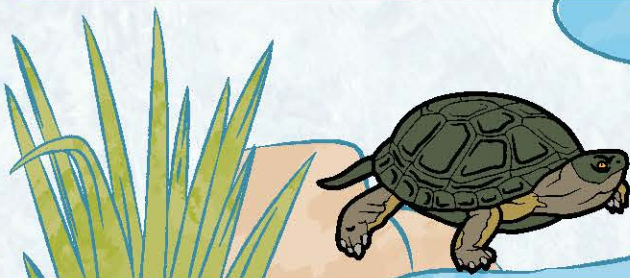
CHALLENGES FOR FURTHER RESEARCH ON THE IMPACT OF LOW-DENSITY CITY MODELS ON WATER RESOURCES:

Distracted tadpole

1



What model of city do you live in? Calculate your home's average water consumption using the following calculator: <https://www.watercalculator.org/wfc2>. Take the result to class and add up the number of litres you and all your classmates consume. How many Olympic-size swimming pools could you fill per day?



Smart terrapin

2

Go to the website <https://www.comunidad.madrid/servicios/urbanismo-medio-ambiente/parque-regional-curso-medio-rio-guadarrama-su-entorno>, and find out the main threat (and the reason for the creation) of the Regional Park of the Middle Course of Guadarrama river and its surroundings.

Powerful otter

3



Make a compilation of the impacts of building houses so close to the riverbed on the fauna and flora of the Regional Park. Also, research the risks to the human population, by searching the Internet for news about the Guadarrama River overflowing its banks in September 2023.



Aquaman

4

In class, design a play that shows the results of your research. You can divide the work into groups: one group is responsible for the script design, another for the props, another for the music and sound effects, another for the costumes... Perform it at the end of the school year in the school's assembly hall.