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Introduction:

This lesson plan aims to make students aware of the challenges of drinking water usage and wastage at a global and local level.



Objectives or Learning Outcomes

Students will be able to:

- Understand the importance of saving drinking water.
- Develop their research, presentation and digital skills.
- Make conscious choices related to water.
- Promote active citizenship.



Time required:

- Session 1 (150 min): Students conduct research in small groups about water scarcity in general and water usage at school. Then, students present their results as digital posters. Finally, students post their research on social media.



Resources required:

- Water invoice, [PPT presentation](#) and Student's Book.
- Videos: [Aquametragem](#); [Water, our future?](#)



Activity

Classroom session

1

- The teacher projects an image related to the school's water bill and asks students about activities that use water at school.
- The teacher writes students' ideas about water consumption in a projected padlet.
- The teacher asks students to establish the relationship between the waste rate and the water consumption.
- Students form groups of 4. Students research about the availability of water on Earth, the water cycle, the water sources that reach the school area and the company responsible for waste treatment. The teacher must refer them to reliable sources for this research.
- Students are asked to suggest ways to reduce water consumption and water wasted.
- Students present the results of their work to the others in the form of digital posters.
- The results are disseminated to the school community through the official ESAG communication channels - webpage, Facebook, Instagram.

Evaluation and Assessment

The teacher creates a Google Form questionnaire to verify what students have learned about the importance of preserving drinking water.

In the long term, students will check whether the dissemination of their research on sustainable water consumption management has had an impact on the water consumption and bill at school.

Suggestions of variation or further reading of the lesson plan

The lesson plan can be carried out with the analysis of domestic consumption bills so as to involve each student and his family in reducing water consumption. In order to involve other subjects, students will solve the task proposed in the slides and analyse the results in the math class.

A field trip to a Wastewater Treatment Plant, close to school, could be included.

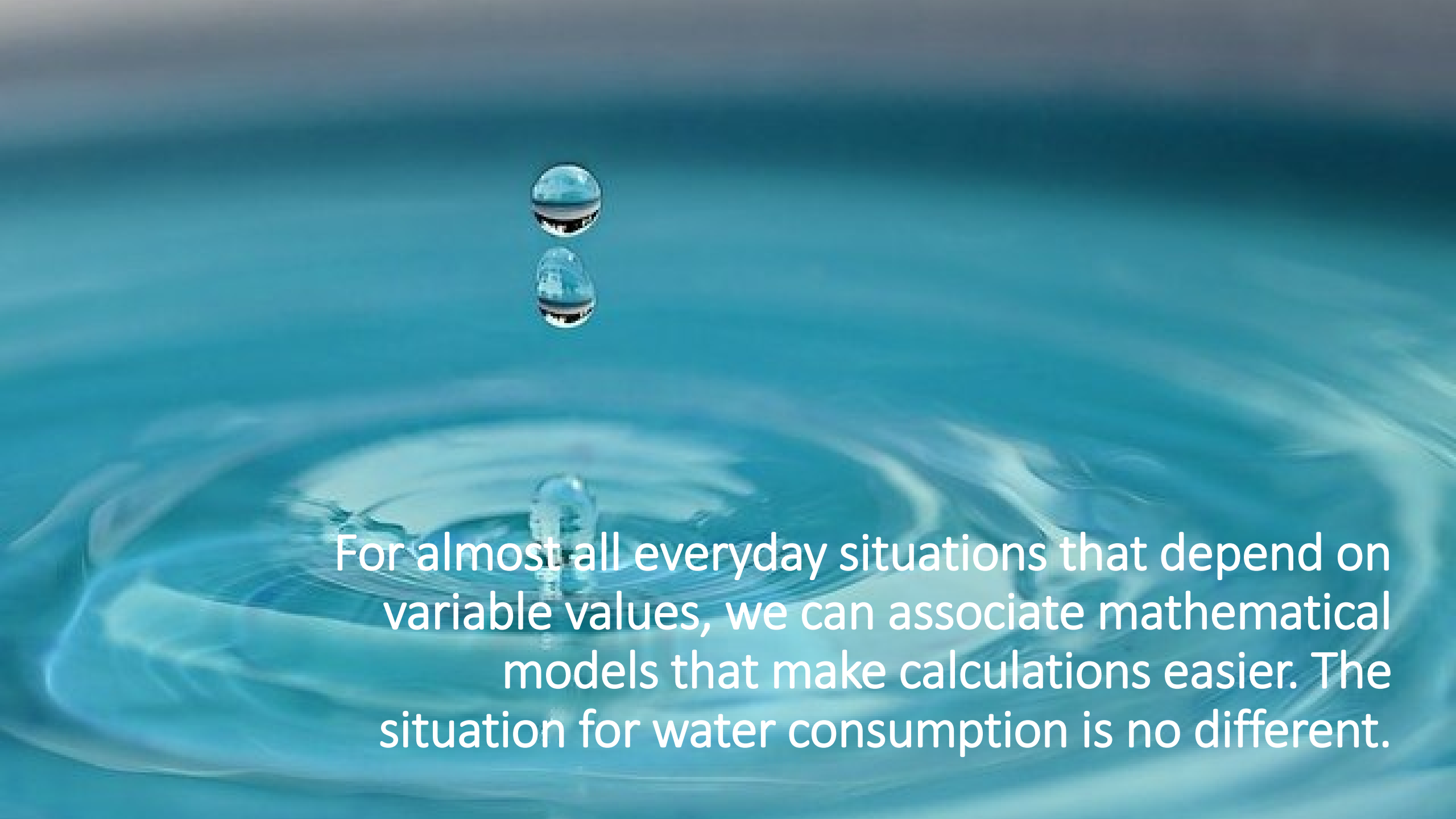
References

<https://nacoesunidas.org/conheca-os-novos-17-objetivos-de-desenvolvimento-sustentavel-da-onu/>
[https://www.infopedia.pt/\\$ciclo-da-agua-\(ou-ciclo-hidrologico\)](https://www.infopedia.pt/$ciclo-da-agua-(ou-ciclo-hidrologico))
<https://snirh.apambiente.pt/>

Videos:

<https://www.youtube.com/watch?v=5P6IA7hcUuQ>
<https://www.youtube.com/watch?v=qW1PCwOffII->

This lesson plan was selected from the [2020 Eco-Schools competition](#) in which teachers were invited to develop and submit lesson plans that promote action oriented pedagogy about specific Sustainable Development Goals (SDGs).



For almost all everyday situations that depend on variable values, we can associate mathematical models that make calculations easier. The situation for water consumption is no different.

Consider the following table for calculating the tariff for water and sanitation services for a given location:

Consumption classes $m^3/month$	Monthly Water Tariff (In euros)	Monthly Urban Solid Waste Tariff for 2020 (In euros)
$a \in [0, 10[$	Fixed value - 16,82	Fixed value - 10,62
$a \in [10, 20[$	$2,63 \times (a - 10) + 16,82$	Fixed value - 12,50
$a \in [20, 50[$	$6,57 \times (a - 20) + 16,82$	Fixed value - 16,50
$a \geq 50$	$7,24 \times (a - 50) + 16,82$	Fixed value - 17,50

To transcribe the previous table we can use the function p , (amount payable in euros), which depends on a (amount of water consumed, in m^3)

$$p(a) = \begin{cases} 16,82 + 10,62 & , se \ a \in [0, 10[\\ 2,63 \times (a - 10) + 16,82 + 12,5 & , se \ a \in [10, 20[\\ 6,57 \times (a - 20) + 16,82 + 16,5 & , se \ a \in [20, 50[\\ 7,24 \times (a - 50) + 16,82 + 17,5 & , se \ a \geq 50 \end{cases}$$

Maria knows that at her home consumption last month was $15 \ m^3$

How much did her family have to pay?



John usually leaves the tap badly closed and it loses 1 deciliter of water every quarter of an hour. How many liters of water do it lose in a week?