

Subject: Mathematics

Topic: Stereometry. Volumes of Solids of Revolution

General competencies developed during the lesson:

Program-based thinking

Digital study materials developed for the lesson:

<https://edu.glogster.com/glog/the-main-miracle-of-our-planet/37566uw5owq>

Objectives:

1. Student understands the definition of "solids of revolution";
2. Student is able to apply basic formulas to calculate the volume and surface area of solids of revolution;
3. Student is able to analyze information and highlight the most significant information, generalize, systematize and present it in the form of a problem.
4. Student is able to present the problem in the language of Mathematics (create a Math problem).
5. Student is able to present the result of the group work through interactive board (Padlet).

A. Introduction:

- Activating pre-knowledge. The program *Kahoot* (section: "*Kahoot*") is used for the survey.

B. Guided practice:

- Application of knowledge in solving the problem (section: "*Solve the problem*"). The teacher draws the students' attention to sections "*Solids of Revolution*" and "*Directory*" which can be used as an additional material for solving the problem.

Given:

Cylinder

$d = 14,6 \text{ cm}$

$A = 443 \text{ cm}^2$

H -? V -?

Solution:

$$1. A = 2\pi RH + \pi R^2 = \pi d H + \pi R^2 ; d = 2R$$

$$H = \frac{A - \pi R^2}{\pi d} ; H = \frac{443 - \pi \cdot 7.3^2}{14.6 \pi} \approx 6(\text{ cm}) - \text{jar height}$$

$$2. V = \pi R^2 H ; V = \pi \cdot 7,3^2 \cdot 6 = 1004 (\text{cm}^3) \approx 1,004 (\text{l}) - \text{water}$$

loss per day

$$365 \cdot 1,004 = 366,46 (\text{l}) - \text{water loss per year.}$$

- Analysis and synthesis of the information received. The discussion should lead to the understanding that, as demonstrated, in case of the water leak in an apartment of 1 liter per day, the loss per year will be 366.5 liters. If to take into consideration the possibility of this problem in a city, country and so on, it becomes global. The illustration of the problem is in a 3D model of the globe (section: "*Blue planet*"), $\frac{3}{4}$ of which is covered by water and it may seem that there is a lot of water. However, the supply of fresh drinking water on Earth is

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limited and amounts to about 2-3% of the total amount of water, including glaciers.

C. Guided discussion:

According to this what conclusion can we draw? Why do we need to know this?

D. Independent Practice (can be assigned as home work):

- On the interactive poster there is a section "100 facts about water". Using this material, as well as other sources, perform the following group work (*section "Groupwork"*). An example of the assignment can also be found on the Padlet (*link "Padlet"*).