



# In the shadow of the pyramids

12-13



# In the Shadow of the Pyramids

**Topic:** Mathematics

**Level:** 12/13 years old

**Concepts:** Geometry

**Time required:** +/- 45 min

**Summary of the activity:** This adventure is a part of the **Wonderful Treasures** saga. This time, a truly mysterious mission will lead you to discover famous pyramidal buildings around Europe, looking for clues to find a Roman treasure.



**Material needed:** Paper, pen, calculator, maths knowledge and your motivation!

### 1

As it has been the case for several days now, the **Wonderful Treasures** phone rings insistently at 5 a.m., waking you up at dawn! As always, an answering machine responds the same thing: "Zdlw iru ph dw wkh Orxyuh".

It seems too strange that someone calls **Wonderful Treasures** just to waste time... What does it mean? You have been thinking about it for days in vain but one morning, while brushing your teeth, you have an idea!

Pack your bags and take the first plane to:

- Paris, there is a clear clue that leads you to a precise place.  
 **Go to paragraph 15.**
- Assur, the capital of Mesopotamia, the place where many ancient amulets have been found.  
 **Go to paragraph 5.**

### 2

You hear a noise coming from a bush: a cute dog heads towards you at a safe pace. Incredible! He is also performing a task, assigned by who knows who... He carries in his mouth a box closed with a padlock.

"Hey! What does your master send me?"

BK is equal to 10. You open the lock by entering the solution of the problem and find a handwritten note: 630.2293 NEW, Ulm Library.

Your next destination and your goal are clearer than the meaning of this strange treasure hunt!

 **Go to paragraph 19.**

3

→ → → → Go to paragraph 7.

4

After typing the solution, there is a new message: "Ok! Open the closet with 0385". You follow the advice.

o → Go to paragraph 21.

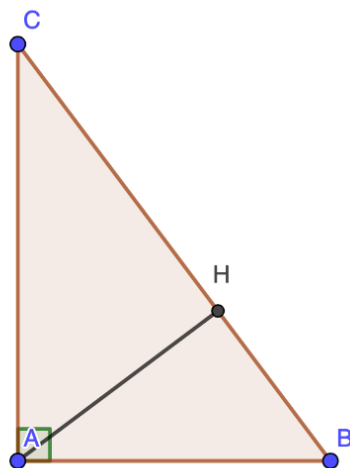
5

The flight to Assur has been cancelled. You wait 5 hours at the airport for the next flight. This long wait allows you to examine all aspects of this enigma. In an advertising poster you read a slogan: "Change your choices and you will discover new goals". It may be better to inquire about the next flight to Paris...

→ → → → Go to paragraph 15.

6

The number you got doesn't tell you anything. You try to go to the table corresponding to the solution you have obtained but the gentleman you find sitting looks at you in a bad way when you ask him if, by chance, he has something for you. There must be some mistake... You decide to retrace your steps and leaf through the book again. When you look at the index, you see that one of the paragraphs is titled: "If you need help". Go to the corresponding page and find an appoint handwritten!



$$\overline{AB} = 30\text{cm}$$

$$\overline{AC} = 40\text{cm}$$

$$\overline{BC} = 50\text{cm}$$

$$\overline{AH} = ?$$

- The solution is less than 20  
>>> → **Go to paragraph 13.**
  
- The solution is equal or greater than 24  
>>> → **Go to paragraph 20.**
  
- The solution is between 20 and 24  
>>> → **Go to paragraph 18.**

7

You hear a noise coming from a bush: a cute dog heads towards you at a safe pace. Incredible! He is also performing a task, assigned by who knows who... He carries in his mouth a box closed with a padlock.

"Hey! What does your master send me?"

You use the problem solution, but the lock does not open. Gosh! What now? The dog must have sensed that you are in trouble and seems to be guiding you to a bush. Start digging. You say to yourself you will have to compliment his master; he is a well-trained dog! You bring out a walkie talkie that was buried. A voice comes out of and tells you this odd message: "Equilateral triangle, side 11.55 cm. Find height."

- The solution is greater than 12 cm.

➡➡➡ → **Go to paragraph 23.**

- The solution is between 9 and 12 cm.

➡➡➡ → **Go to paragraph 11.**

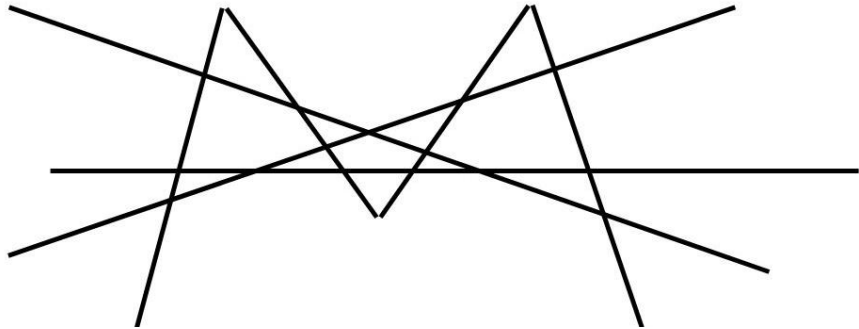
- The solution is less than 9 cm.

➡➡➡ → **Go to paragraph 29.**

8

→ **Go to paragraph 6.**

9



In fact, from the figure three straight lines allow you to get 9 triangles. You collect rather large stones from the ground and place one on each of the triangles. It's just an attempt but it could be a road... At the exact moment when you place the ninth and last stone you begin to hear a strange noise, like stones that begin to rotate and moving, making the floor tremble! Yuzo Yagi is there looking full of wonder. You suddenly hear him exclaim, "Unbelievable! A gap has opened on the floor!" That's exactly what you were hoping for! The movement of the stones has allowed you to open a secret passage, which gives access to a staircase that descends under the floor of the pyramid. Incredible! Amazement makes your heart beats wildly. You descend the secret stairs together with Yuzo Yagi and, before your eyes, a breathtaking spectacle appears. Coins, jewels, and other precious ones, which Caius Cestius had hidden on his tomb to emulate the Egyptian pharaohs! A treasure of incredible value, especially since it has remained intact and secret for more than 2000 years!

Yuzo Yagi hugs you like a child who has received the gift of his dreams would. "Thank you! Thank you! It's an exceptional discovery!!!"

The Wonderful Treasures has led to the end of another of its "impossible missions" and this fills you with pride! Tomorrow all the newspapers will talk about you, your courage, and your ingenuity! Congratulations!

**The end**

10

### PYRAMID OF AUSTERLITZ



Photo by Kattjosh on Wikipedia

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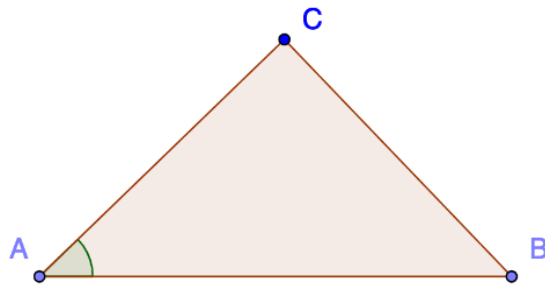
Position: Zeisterweg 98,  
Woudenberg, Netherlands

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A short search on the internet leads you to a new pyramid. The Pyramid of Austerlitz, Netherlands, is a 36-meter-high earth pyramid, built in 1804 by Napoleon's soldiers on one of the highest points on the ridge of Utrecht Hill in the Netherlands. At the top of the pyramid is a stone obelisk from 1894. At the moment, the place seems deserted, with the exception of a painter who, a little distant, is intent on drawing a canvas. May he be the next messenger?

You approach and greet him. He speaks only German, and it is difficult for you to understand. You look at his canvas. You expect to see that he is drawing the pyramid that is in front of him. Instead, there is a strange message: "I will show you my work if you give me the measure of the angle B and C".





$$\hat{A} = 44^\circ$$

$$\hat{C} = 3 \times \hat{B}$$

- $\hat{B}$  is less than  $32^\circ$  and  $\hat{C}$  greater than  $100^\circ$   
➡➡➡ **Go to paragraph 28.**
- $\hat{B}$  is greater than  $32^\circ$  and  $\hat{C}$  less than  $100^\circ$   
➡➡➡ **Go to paragraph 14.**
- $\hat{B}$  is greater than  $32^\circ$  and  $\hat{C}$  greater than  $100^\circ$   
➡➡➡ **Go to paragraph 26.**

11

The solution is 10 cm. Open the lock by entering the solution of the problem and find a handwritten note: 630.2293 NEW, Ulm Library.

Your next destination and your goal are much clearer than the meaning of this strange treasure hunt!

➡ **Go to paragraph 19.**

12

The padlock does not open. Almost at the same time, you get a message on your mobile phone. The number is unknown, but the content does not leave any doubt: "Second chance: do you know that in the Louvre there are 5 pyramids? The inverted one has a square base with a side of 13.3 meters and a height of 7 meters.

Type your solution in:

- The area is less than 47 m<sup>2</sup>

 **Go to paragraph 4.**

- The area is greater than 47 m<sup>2</sup>

 **Go to paragraph 27.**

13

You think you have the solution but the number you got once again seems to have no meaning. You look around and decide to ask for help. Among all the guests of the library choose to turn to the one that seems most inclined to the subject: a young girl carrying mathematic books. You weren't wrong! She is reading a book about Pythagoras! You show her the problem and she helps you solve it.

$$A = \frac{\overline{AB} \times \overline{AC}}{2} = \frac{30 \times 40}{2} = 600\text{cm}^2$$

$$\overline{AH} = \frac{2 \times A}{b} = \frac{2 \times A}{\overline{BC}} = \frac{2 \times 600}{50} = 24\text{cm}$$

 **Go to paragraph 20.**

14

→ Go to paragraph 28.

15

## LOUVRE MUSEUM



Photo by Guillaume Meurice on Unsplash

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Position: Rue de Rivoli, Paris, France

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You've landed at Paris Airport and now you know exactly where to go: the Louvre Museum! "Zdlw iru ph dw wkh Orxyuh" is a code using the Caesar cipher which means "Wait for me at the Louvre". But who will you have to wait? And where? Choose a bench that allows you to observe the large square in front of the Glass Pyramid, intended for the reception of visitors to the museum. The pyramid was inaugurated in 1989 and designed by the architect Ieoh Ming Pei at the request of President Mitterrand.

Your wait at the bench is short-lived. A dark car pulls over and the driver, elegantly dressed in black, gives you an envelope before leaving without saying anything. The message is still enigmatic: "Locker 15 will have no secrets if you know the area of one of the three faces of the pyramid."

You enter the museum. The lockers where visitors can leave their belongings are password-protected. You also find a brochure of the museum, where you read:

"The glass pyramid has a height of just under 22 meters while the base, with a square plan, is about 35 meters".

**Go to the locker and enter the password:**

- 0385      >>> → Go to paragraph 21.
- 2235      >>> → Go to paragraph 12.

16

## PYRAMID OF FALICON



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Position: Falicon, France

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Nice, the Pyramid of Falicon! That's where the coordinates took you.

Another pyramid! Although from a totally different era...

These mysterious ruins could be from the Roman era. At that time, the Roman legionaries spread cults and religious practices of Egyptian origin.

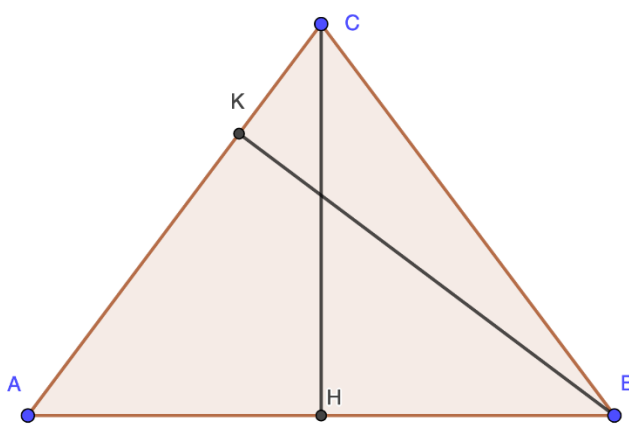
The steps leading to the lower part could correspond to the seven levels of the initiation rituals of the cult of Mithras. The scientists discovered that this

## In the Shadow of the Pyramids

pyramid was built at the beginning of the 19<sup>th</sup> Century and served as an entry to a cave.

There seems to be no one waiting for you this time.

Looking closely, you notice a hole dug in the ground, slightly hidden by vegetation. You discover the following engraving on the rock:



$$\overline{AB} = 15\text{cm}$$

$$\overline{AC} = 12\text{cm}$$

$$\overline{CH} = 8\text{cm}$$

$$\overline{BK} = ?$$

- The solution is greater than 12 cm.

➡➡➡ → **Go to paragraph 7.**

- The solution is between 9 and 12 cm.

➡➡➡ → **Go to paragraph 2.**

- The solution is less than 9 cm.

➡➡➡ → **Go to paragraph 3.**

17

The painter stands up and, in a gesture of despair, throws his hat on the ground.

As writing on the board, he writes on the sheet the solution:

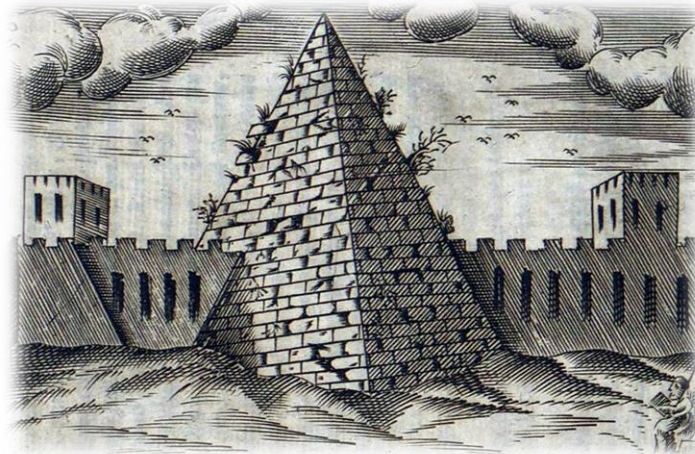
$$\hat{C} = 180^\circ - 96^\circ = 84^\circ$$

$$\hat{B} = 96^\circ \div 3 = 32^\circ$$

$$\hat{A} = 32^\circ \times 2 = 64^\circ$$

You apologise to him, but you make him understand that you will strive to review this aspect better.

He leaves his position without saying anything, perhaps implicitly authorising you to search for the next clue on your own... Confident, you come closer. You turn the canvas, and it shows a drawing this time!



It depicts a pyramid in Egyptian style, but grey, with large bricks, as if set on a wall. Near two crenellated towers. There is no doubt about it, your next destination is... Rome!

 **Go to paragraph 29.**

18

➔➔➔ → Go to paragraph 13.

19

## ULM CITY LIBRARY



Photo by Tourismus.ulm.de

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Position: Vestgasse 1, Ulm, Germany

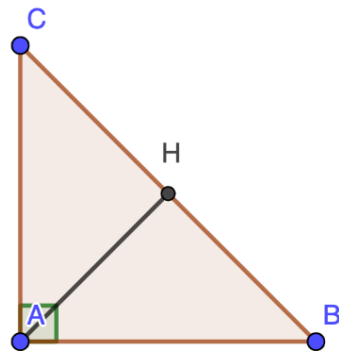
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You travel to Germany. The Ulm Library is housed in a futuristic glass building in the shape of a pyramid!

What binds all these buildings together? Why is someone taking you around Europe to pyramid-shaped places?

In this case it is a 36-meter-high building, inaugurated in 2004 on a project made by the Gottfried Böhm.

At the desk, you find a very nice lady who tells you where to find the book you are looking for. This is the New Lunar Calendar of sowing and works. The title tells you absolutely nothing, but inside there is a checkered sheet with a new geometric problem.



$$A = 200\text{cm}^2$$

$$\overline{AB} = \overline{AC}$$

$$\overline{AB} = ?$$

$$\overline{AC} = ?$$

- The solution is less than 18 cm.

→ **Go to paragraph 6.**

- The solution is equal or greater than 24 cm.

→ **Go to paragraph 8.**

- The solution is between 18 and 24 cm.

→ **Go to paragraph 20.**

20

You have the solution. If correct, this number should lead you to a new clue. Who will bring it this time? You look around. You are sure that someone knows exactly your movements. The library is very busy and there are many tables where students and readers are busy with their books. You confidently go to the corresponding table but it's empty! There is only one plaque: "Reserved for Mr. Napoleon Bonaparte, to celebrate the victory of the Napoleonic army over the Russians and Austrians in the Battle of Austerlitz." Too strange to be a joke...

→ **Go to paragraph 10.**



# 21

You open the locker, and it is empty. Has someone arrived before you? You return to the bench and shortly after, the dark car pulls over again. The driver, this time, beckons you to get on. It seems that there is no doubt, they knew you would get there, and they want you to reach a later destination. But who is the mind of this "game"?

You are certainly not letting the courage and curiosity to miss you! You decide to get into the car.

"Who are you? Where do you intend to take me?"

"Good morning would be a more courteous way to start this conversation! However, you rest assured, I just have to make sure that you have everything you need to move forward. Can you unlock this?" and as he asks, he hands you a password-protected tablet.

"Obviously", you say, and type in the solution to the Louvre riddle, "0385". The tablet unlocks, and numbers appear on the monitor: 43.75003636403877, 7.261071101050533. They are clearly the coordinates of a location...

"As you can see, you are the one telling me where I have to accompany you! Says the man in black."

"The person who sent you to me wants to entertain me... Ok, take me to the nearest airport, please."

 **Go to paragraph 16.**

22

As he guides you to the entrance of the pyramid, your guide explains that the burial chamber makes up just over 1% of the monument's overall volume. In fact, you are inside a room of about 6 meters x 4, about 5 meters high, but in the meantime... The guide is gone. It's dark. You see a shadow moving near you, the thing catches you unprepared and you make a jolt. Someone is in the room.

 **Go to paragraph 25.**

23

The solution doesn't allow you to open the lock, but the voice in the walkie-talkie starts talking again: "Ten is your number. You accept the advice and now everything seems to be working. Open the lock by entering the solution of the problem and find a handwritten note: 630.2293 NEW, Ulm Library.

Your next destination and your goal are much clearer than the meaning of this strange treasure hunt!

 **Go to paragraph 19.**

24

→ Go to paragraph 17.

25



Photo by [Lalupa on Wikipedia](#)

A man lights a torch. "Silence... no one should know I'm here".

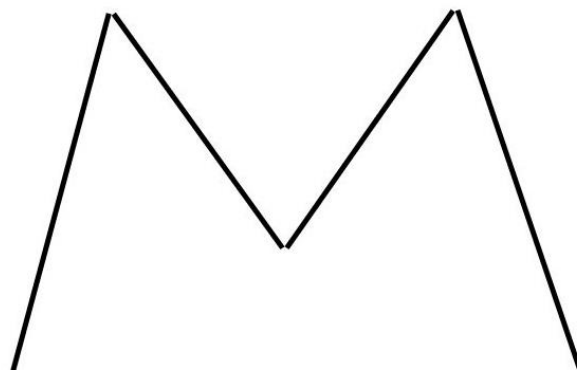
"Who are you? And why am I here?"

"My name is Yuzo Yagi, I am a Japanese entrepreneur, owner of Yagi Tsusho Ltd. Thank you for following my clues so far. In 2015 I financed the restoration of this pyramid, and I discovered something very special. I had to test your

goodwill before I could be sure you were really the right person to reveal my secret to.

The tomb was looted by treasure seekers, who dug a hole and took everything away. But probably no one has ever noticed this: 4 figures of Nike, the Greek goddess of wisdom and a personification of victory, are depicted on the vault. All 4 figures indicate with their eyes a precise point on the floor. I am convinced that it is not a coincidence..."

So, saying, he grabs a broom leaning against the wall and removes a thick layer of dust on the floor, right where the figures seem to turn their gaze. You light up with the torch and this symbol appears.



"This symbol, alone, does not seem to have any meaning, except that in the stone placed at the top of the pyramid, the following wording is reported in Latin: "3 straight lines for nine triangles". I believe that the two things are connected ..."

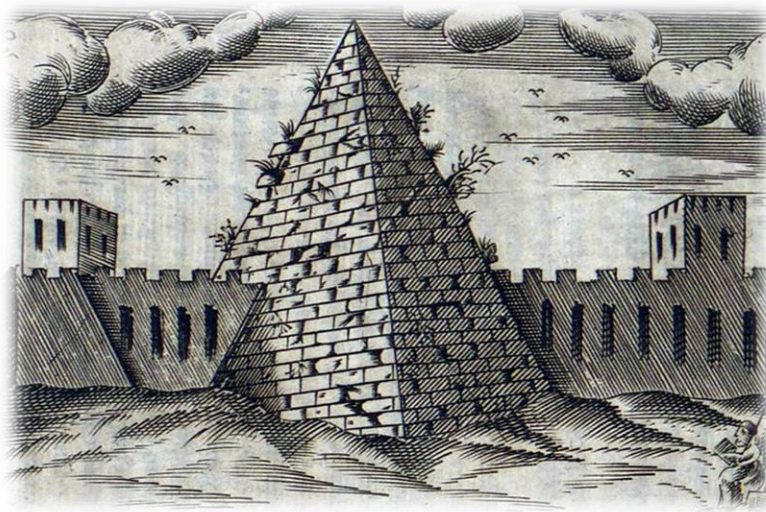
You absolutely agree with him. It is necessary to obtain nine triangles from the drawing using three straight lines... But how? Take a piece of paper and try to divide in triangles!

After solving the riddle, follow the indicate paragraph to continue the adventure...

 **Go to paragraph 9.**

26

The painter looks at you and smiles. You turn the canvas, and it shows a drawing this time! It depicts a pyramid in Egyptian style, but grey, with large bricks, as if set on a wall. Near two crenelated towers. There is no doubt about it, your next destination is... Rome!



 **Go to paragraph 30.**

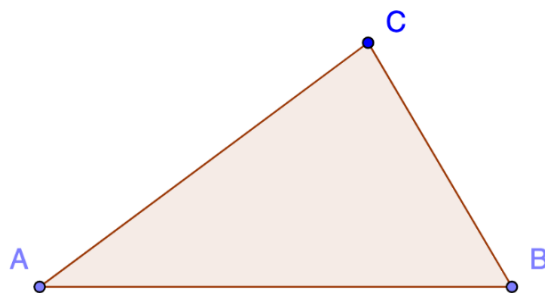
27

After typing the solution, a new message appears: "You should review this topic, the area measures 46.55 m<sup>2</sup>. To continue, open the closet with 0385". You follow the advice.

 **Go to paragraph 21.**

28

The painter is perplexed, reminding you of the expression of your professors when you give an unexpected answer. Maybe you haven't guessed the right answer. You turn the canvas, but another problem appears.



$$\hat{A} + \hat{B} = 96^\circ$$

$$\hat{A} = 2\hat{B}$$

- The angle in  $\hat{A}$  is greater than the angle in  $\hat{C}$  by  $20^\circ$

 **Go to paragraph 17.**

- The angle in  $\hat{A}$  is less than the angle in  $\hat{C}$  of  $20^\circ$

 **Go to paragraph 26.**

- The angle in  $\hat{B}$  is less than  $30^\circ$

 **Go to paragraph 24.**

29

 **Go to paragraph 23.**

30

## PYRAMID OF CESTIUS



Photo by Sergio D'Afflitto

Position: Via Raffaele Persichetti,  
Rome, Italy

The Pyramid of Cestius is the tomb of Caius Cestius, a Roman politician. It was part of a series of pyramids built in Rome in the first century BC, when, after the conquest of Egypt, the fashion of Egyptian-style funerary construction spreads. The pyramid was built in just 330 days. In fact, Caius Cestius expressly ordered in his will that the heirs would raise the pyramidal tomb to him within this period, under penalty of the loss of the rich inheritance. The inscription carved on the eastern side of the monument recalls this episode. The heirs hurried so much to execute the testamentary disposition, that it seems they had completed the construction of the pyramid a few days in advance!

A slender and short man, with large round glasses approaches and proposes himself as a tour guide. You explain that you don't have time, but he is very insistent... you decide to follow him.

➡➡➡ ➔ **Go to paragraph 22.**



Designed by 6 European organisations, the project intends to create efficient, engaging pedagogical materials and tools for teachers in order to implement an innovative gamified Homework methodology with pupils. In doing so, we wish to contribute to boosting their efficiency and engagement rate in remote work and, more specifically, in Homework.

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