

**European Union** 



FUTURE CLASSROOMS' LEADERSHIP SCENARIO

# Pythagoras theorem

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**TOPIC:** Mathematics

**GRADE:** 7-8

**APPROACH:** 

### DURATION: 120min

**Summary:** This lesson plan is designed for students in grades 8-10 to learn about Pythagoras' theorem through a variety of activities. The lesson involves a warm-up activity using a game, collaborative work to discuss the definition of Pythagoras theorem, investigation work where students use rulers and measuring tapes to calculate the hypotenuse of real-world objects, practice work using ICT with an online calculator, producing work where students create posters that showcase the application of Pythagoras` theorem in real-world situations, discussion, presentations, and assessment and feedback. The lesson aims to develop students' problem-solving and critical thinking skills, as well as their understanding and application of Pythagoras' theorem in real-world situations. Overall, the lesson encourages hands-on learning and collaboration among peers.















## Learning Objectives, Skills and Competencies:

What are the main objectives? What skills will the learner develop and demonstrate within the scenario? (e.g. 21st Century Skills).

Learning Objectives:

- · Understand the concept of Pythagoras theorem
- · Apply Pythagoras theorem to real-world situations
- · Develop problem-solving and critical thinking skills

Skills:

- · Research and investigation skills
- · Problem-solving and critical thinking skills
- · Collaboration and teamwork skills
- ICT skills
- Communication and presentation skills

### Competencies:

- Scientific literacy
- Mathematical literacy
- Digital literacy
- Critical thinking
- Communication and presentation















#### Learners' role:

What sort of activities will the learner be involved in?

The learners will be involved in a range of activities in this Pythagoras theorem lesson plan, including a warm-up game, collaborative discussions, outdoor investigations, online calculator practice, producing posters, class discussions, and presentations. These activities aim to engage students in hands-on learning and encourage collaboration among peers. The activities also develop problem-solving, critical thinking, and communication skills, as well as mathematical and scientific literacy. The lesson is designed to involve learners in a variety of activities that help them to understand and apply Pythagoras' theorem in real-world situations.

## **Tools and Resources**

What resources, particularly technologies, will be required?

- Rulers and measuring tapes
- Chart paper
- Markers
- Post-its
- · Laptops, tablets, or smartphones with internet access
- Online Pythagoras calculator
- Projector (optional)
- · Copies of the student handout.

















#### Learning space

Where will the learning take place e.g. school classroom, local library, museum, outdoors, or in an online space?

- Classroom
- Outdoor environments

The warm-up activity, collaborative work, producing work, and presentations will take place in the classroom, while the investigation work will take place outdoors. The outdoor environment will provide students with the opportunity to measure the sides of buildings, trees, and other objects to apply Pythagoras' theorem in real-world situations. This setting will allow students to see how the theorem works in practice, and to gain a deeper understanding of its application. The different learning settings aim to make the lesson plan engaging and interactive and to facilitate student learning and understanding of Pythagoras' theorem in real-world contexts.

## **Future Classroom Scenario Narrative**

Describe in max 10 sentences the main ideas of the scenario

This lesson plan is focused on teaching students about Pythagoras theorem, which is a fundamental concept in mathematics. The lesson involves a range of activities, including a warm-up game, collaborative discussions, outdoor investigations, online calculator practice, producing posters, class discussions, and presentations. The activities aim to engage students in hands-on learning and encourage collaboration among peers. The resources and technologies used in the lesson plan include rulers and measuring tapes, chart paper, markers, laptops, tablets, or smartphones with internet access, and an online Pythagoras calculator. The learning will take place in both the classroom and outdoor environments, providing students with the opportunity to see how the theorem works in practice. The lesson aims to develop students' problem-solving, critical thinking, and communication skills, as well as their understanding and application of Pythagoras' theorem in real-world situations.

















Ecanning Activities	
Warm-up activity	Introduce a game about Pythagoras theorem where
(15min)	students have to solve puzzles using the theorem.
(	Divide students into small groups and provide them with
	the game. You may use the classic wooden (plastic)
	Pythagoras game, one made out of cardboard (see
	handout), or play this version online:
	https://radufromfinland.com/projects/pythagoraspuzzle
	/ Ask students to reflect on the game and share their
	experiences with the class.
Collaborative work	Divide students into small groups of 3-4 and ask them
(10min)	to discuss the definition of Pythagoras theorem.
(	Provide each group with chart paper and markers to
	write down their findings.
Investigation work	Have each group present their findings to the class
(25min)	
	The teacher will provide each student with a worksheet
	containing a set of problems to solve. The problems will
	involve measuring the lengths of two sides of a
	right-angled triangle and using the Pythagoras theorem to
	calculate the length of the third side.
	Students will be required to find objects around the
	school or local area that they can measure to complete
	the problems on their worksheet.
	These could include the length of the diagonal of a
	between two points on a map
	Once students have completed their measurements they
	will need to use the Pythagoras theorem to calculate the
	length of the missing side. This activity promotes critical
	thinking and problem-solving skills as students will need
	to apply the Pythagoras theorem correctly to arrive at the
	correct answer. At the end of the investigation work
	students will share their findings with the class,

#### **Learning Activities**

















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	Pythagoras theorem.
Practice work:	Provide students with laptops, tablets, or smartphones to
(20min)	use an online Pythagoras calculator. Ask students to solve a few problems using the calculator and write down their answers. Have students check their answers with their peers and discuss any discrepancies.
Producing work	Ask students to work in pairs and create a poster that
(20min)	showcases the application of Pythagoras' theorem in real-world situations.
	Provide each pair with chart paper, markers, and post-its. Have students present their posters to the class.
Discussion	Facilitate a class discussion on the application of
(10min)	Pythagoras theorem in the real world. Ask students to share their experiences and what they learned during the investigation and producing work.
Presentations	Ask each pair to present their poster to the class and
(10min)	explain how they applied Pythagoras theorem.
Assessment and	Use a rubric to assess each pair's work based on accuracy, creativity, and presentation skills.
feedback (10min)	Provide feedback to students on their work and what they can improve for next time.















#### Student handout for Warm up activity





















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# **Pythagoras Theorem**

Choose 3 tasks to solve in the school yard. Write your findings in the boxes bellow.

- 1.A ladder is leaning against a wall. The bottom of the ladder is 6 meters from the wall and the ladder makes an angle of 45 degrees with the ground. How long is the ladder?
- 2.A rectangular field is 20 meters long and 15 meters wide. What is the distance between the two diagonal corners of the field?
  - 3.A flagpole is 10 meters tall. The base of the flagpole is 8 meters from a wall. What is the distance between the top of the flagpole and the wall?
  - 4. An airplane is flying at a height of 3000 meters. How far away from the airplane is the horizon?
  - 5. The base of a ladder is placed 3 meters from a wall. If the ladder is 5 meters long, how far up the wall does it reach?
  - 6.A rectangular field measures 12 meters by 16 meters. What is the distance between the two corners that are not adjacent?
  - 7.A street sign is mounted on top of a pole that is 5 meters tall. If the sign is attached 2 meters from the top of the pole, how far from the bottom of the pole is the sign attached?



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