Author: Alessia Leone

Lesson plan Title: Phytagoras' Theorem

School	Primary		Middle		High
Year / Class	1	**2**	3	4	5
Subject :			Topic: Pythagorean theorem and its link to Euclidean Geometry.		
CLIL language			**English / Italian**		

Teacher / Teaching team profile	Teacher's role:	o **Main Teacher** o Co-teacher o Other: _____	Subject taught: **Math and Science**
	Teacher's role:	o Main Teacher o Co-teacher o Other: _____	Subject taught: _____

Student group profile (general)	CEFR Level:	o **A1** o B1	o **A2** o B2	o C1 o C2
	o Experiences of CLIL o English mother tongue o **Other mother tongue**		o Migrant background o **Special Educational Needs : 2 students 104 and 2 DSA** o Other:	

Timetable fit	o **Module** o Lesson	**Student Prerequisite Knowledge needed:** Students need to understand how to square numbers as well as the inverse operation: square roots. Students should have a list of perfect squares through 225. Students should be able to explain what a triangle is and to explain different features of a triangle. Students should understand that the hypotenuse is the longest side in a right triangle. It is also opposite the largest angle. Students should be able to explain how it is possible to calculate the area of the triangle.

		At the end of the lesson
		Students should state the Pythagorean theorem
		Knowledge of the Pythagorean equation and how to use it
		They should know the various types of triangles as well as their properties
		Future lessons: Application of Pythagorean theorem in real life situations.

Resources & tools	**Tools:** Spider Scribe (mind map software), Prezi (presentation software that uses motion, zoom, and spatial relationships), Creative commons (licenses for Images), trivia, interactive whiteboard or tablets **Webliography:** Spider Scribe http://www.spiderscribe.net/ Prezi https://prezi.com Creative commons (https://search.creativecommons.org/) https://www.quia.com/web

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	Subject	Language	Relational Competences
Students' prior knowledge, skills, competencies	square roots, to be able to explain what a triangle is and to explain different features of a triangle (right triangle and hypotenuse)	**Math Vocabulary**: polygon, right triangle, area of a triangle, base of a triangle, height of a triangle, hypotenuse… **Structure:** present tense e.g., a triangle has a right angle...; is the same..is different from, comparative forms, connectors (and, but, because, first, then, after, later, finally). **Communicative function:** • Comparing and contrasting triangles • Describing • Asking and answering questions. **Language support**: Word level: key vocabulary on board. Sentence level: hand out with sentence starters and substitution table.	Work in pairs, taking notes, developing thinking skills
Teaching Objectives:	**Content:** Knowing the Greek philosopher, Pythagorean theorem, Right-angled triangle, Problem solving. **Cognition:** Understand concepts and apply them; Make choices about how to calculate the hypotenuse; Make hypotheses and justify them; Problem-solving for triangles. **Communication**: Provide key phrases needed; sentence starters (see attached wall chart); Listing key vocabulary to use (see attached sheet); Switch from L1 to English when needed; Plenary at the end to recap and consolidate. **Culture:** Application of Pythagorean theorem in real life (home exercises for future lesson).		

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Learning outcomes	*Cognitive-linguistic competencies to develop. E.g. see the document "Critical thinking skills".*
	Content: Describe who Pythagoras was and where he lived and when, Explain the Pythagorean theorem to others by using examples, Represent visually the right-angled triangle, Hypothesize about problem solving with triangles, Memorize key vocabulary, Memorize & use key phrases.
	Cognition: Describe the Pythagorean theorem and explain how it works in problem solving, Memorize key phrases and use them in context, Reason and solve problems mathematically.
	Communication: How to describe (sentence starters), How to explain processes (how.....were discovered), How to justify/present a case, How to make suggestions/hypotheses (ideas for explaining Pythagora's demonstration), Language for group work (asking/answering questions), Understanding instructions, How to deal with not understanding.
	Culture: Some real life applications to introduce the concept of Pythagorean theorem e.g. Road Trip, Painting on a Wall, What Size TV Should You Buy, Hunting for Treasure. (future lesson)
Methodology:	*How the teacher in a particular lesson manages to integrate language and content*
	Activate prior knowledge by completing sentences (Warm-up activity) e.g which characteristic of triangles do I know? Learners need vocabulary, language focus, grammar/sentence starters in order to do pair work; the students outline what they already know and want to know about the topic.
	Students watch a video-clip demo on the Pythagoras experiment and have to manage practical skills in a group work.
	Playing games with trivia on the interactive board to put together Students' prior knowledge, skills, competencies.
	Finally a problem to solve: learners have to recall the knowledge of a math-specific vocabulary (hypotenuse, right-angle triangle and Pythagorean theorem), then they will test their thinking skills and practical skills with different sized triangles.

Activity	Activity aims	Activity Procedure	Language	Interaction	Materials (please cite all sources)	Timing	Assessment
Activity 1 Warm-up activity	*What is the purpose of this activity of the lesson.* **Know:** activating learners' prior knowledge on the features of triangles. **Be able to:** Talk about similarities and differences of polygons, triangles and right-angle triangles.	*What will happen during this stage of the lesson* **Start:** activating learners' prior knowledge - which characteristics of triangles do I know? **Individual work:** Finish the sentence using sentence starters.	*Competencies developed* **Language focus:** use the correct present tense when stating facts; use comparative forms accurately and use appropriate connectors. Recalling and thinking skills. Using sentence frames and sentence starters (see sentence starters attached).	o **Whole class** The class using sentence starters will try to recall all they know about triangles. Together examine the mind map already created by the teacher to see if all information is included.	*What materials are used during the lesson? Flashcards, pictures, songs, PowerPoint, ICT tools, etc.* *All materials should be referenced clearly paying attention to the copyright rules* I will use an interactive whiteboard, and mind gap in a Prezi presentation to recall arguments asked.	*The timing of each activity should be as accurate as possible* **10'**	*Assessment tools in relation to the learning outcomes of the lesson* 1) Ask students different questions in different steps 2) Listen attentively to others' contributions during class discussion (assessment of learners attitudes).

Activity 2 video demo	**Know:** Teacher's introduction to the students (who was Pythagoras). -about P. history, - about his theorem and why it is so important. **Be able to:** use visual organizers to record key specific vocabulary.	**Start:** video-clip demo on Pythagora's life and work; **Individual work:** note taking	**Language focus:** use the correct present tense when stating facts; use comparative forms accurately and use appropriate connectors during the writing. **Language support:** some key-specific vocabulary will be written on the board. A simplified text will be provided for students with special needs.	o **Whole class:** listen and understand the video-clip o **Individual work :** note taking	I will use an interactive whiteboard to put together information elicited. The text of the audio script will be provided.	**10'**	1) Circulate in the room to check students' work. 2) Listen attentively to others' contribution during class discussion (assessment of learners' attitudes).
Activity 3 Listening and writing	**Know:** the teacher reads the script out aloud. **Be able to:** use visual organizers to take notes	**Start:** the Teacher will hand out the text for the audio script and read the script out loud. **Individual work:** highlight key vocabulary	**Language focus:** underline verbs in the present tense and key-specific vocabulary.	o **Individual work** The students outline what they already know and want to know about the topic	I will use an interactive whiteboard to put together information gained.	**10'**	1) Circulate in the room to check students' work.

Activity 4 Learning from the clip	**Know:** -About Pythagoras's life. -About the use of maths in music and art. **Be able to:** Collaborate in pair and group work	**Start:** the teacher will hand out the worksheet to help students' fluency. **Pair work:** Recalling and thinking skills.	**Language focus:** use the correct present tense when stating facts; use comparative forms accurately and use appropriate connectors. Using sentence frames and sentence starters (see worksheet with sentence starters attached).	o **Pair work:** Talk to one to another about the clip. Learners have a worksheet with sentence starters to begin with.	A worksheet will be provided.	**10'**	1) Circulate in the room to check students work. 2) Listen attentively to others contribution during class discussion (assessment of learners attitudes).
Activity 5 Interactive game	**Know:** -About the notion of a square roots -About it's calculation. **Be able to:** Match pairs of numbers and square roots on the trivia game.	**Start:** the Teacher will ask the students about the subject-specific vocabulary such as square roots. **Individual work:** students will take turns on the interactive whiteboard	**Language focus:** use the correct present tense when stating facts; use comparative forms accurately and use appropriate connectors.	o **Individual work** students will take turns on the interactive whiteboard to play the trivia.	I will use an interactive whiteboard and a trivia game	**10'**	Listen attentively to students' contribution during class discussion (assessment of learners attitudes).

Activity 1 (Lesson 2) Play-way	**Know:** -About the new vocabulary on Pythagorean theorem -About vocabulary cards **Be able to:** Match objects with cards	**Start:** the Teacher will ask the students about the subject-specific vocabulary using images or vocabulary cards. **Pair work** Recalling and thinking skills.	**Language focus:** use the correct present tense when stating facts; use comparative forms accurately and use appropriate connectors. **Communicative function:** Describing drawings.	o **Pair work** Using flash cards online, students have to match them with the subject-specific vocabulary.	I will use an interactive whiteboard, and a quiz trivia in a Prezi presentation.	**5'**	1) Circulate in the room to check students' work. 2) Listen attentively to others contribution during class discussion (assessment of learners' attitudes).
Activity 2 (Lesson 2) Video-Demo Pythagorean theorem	**Know:** -About the new vocabulary on Pythagorean theorem -About demonstration **Be able to:** Mastering that topic before moving on to the next topic.	**Start:** the Teacher will play the video-demonstration of the Pythagorean theorem (no subtitles required) **Whole class** Listen and observe.	**Language focus:** None. **Communicative function:** None. **Cognitive skills** Reasoning and creative thinking	o **Whole class** Follow the instructions to demonstrate the Pythagorean theorem.	I will use an interactive whiteboard, and a video demo in a Prezi presentation.	**5'**	Listen attentively to others' contributions during class discussion (assessment of learners attitudes).

Activity 3 (Lesson 2) A puzzle investigation	**Know:** -About the Pythagorean theorem. **Be able to:** Recall the theorem. Construct a geometric figure.	**Start:** the Teacher will provide paper and scissors and using a dissection (cutting pieces apart) students follow instructions. **Individual work:** students will follow the instructions.	**Language focus:** None. **Communicative function:** None. **Cognitive skills** Reasoning and creative thinking	o **Individual work:** students will follow the instructions and using a dissection prove the Pythagorean theorem.	A worksheet and scissors will be provided.	**10'**	Circulate in the room to check students' work.

Activity 4 (Lesson 2) A problem to solve	**Know:** -About the Pythagorean theorem. **Be able to:** Recall the theorem. Resolve maths problems.	**Start:** - the Teacher will divide students into mixed-ability cooperative groups. - See what conclusions the students can draw about the relationship between the sum of the squares of the legs and the square of the hypotenuse. - Remind the students that the hypotenuse is the longest length because it is opposite the largest angle. - The "right" angle should be between the other two sides' lengths. **Group work** Students will test this theory with different size triangles.	**Cognitive skills** Reasoning and creative thinking	o **Group work** Students are divided into mixed-ability cooperative groups to solve the problem provided.	I will use an interactive whiteboard, and show exercises in a Prezi presentation.	**15'**	1) Circulate in the room to check students' work. 2) Listen attentively to others' contribution during class discussion (assessment of learners' attitudes).

	Know: -About the Pythagorean theorem. Be able to: - instruct others -Teaching to the class.	Start: -Assign one topic to a selected group of students. -Set the standards for the presentation (short, orally precise, using subject-specific vocabulary). Individual work: As the audience, students can take notes on what is right or wrong. End: lead a class discussion	Language focus: use the correct present tense when stating facts; use comparative forms accurately and use appropriate connectors. Cognitive skills Reasoning and creative thinking	○ Whole class	I will use an interactive whiteboard to recap in a Prezi presentation.	15'	Listen attentively to others' contributions during class discussion (assessment of learners' attitudes).
Activity 5 (Lesson 2) Students As Teachers							