

Lesson plan

Lesson 3
Trigonometry in engineering and manufacturing

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Lesson plan

Programme name	T Level: Technical qualification in design and development for engineering and manufacturing (8714)	Suggested duration	2 hours
Lesson topic	Trigonometry in engineering and manufacturing	Lesson	3 of 4

Session description and context, including any last-minute information
The lesson is designed to introduce contextualised trigonometry in engineering and manufacturing. The aims of the lesson are for learners to understand the use of angles in engineering and manufacturing and for them to be able to calculate the angles and the lengths of the sides of triangles in such contexts. This lesson is number three in a series of four. It will allow the learners to apply trigonometry to real-life settings. A great example is street lighting. Manufacturing engineers who produce modules for streetlighting columns need to know the amount of light produced so that they can calculate a safe amount of light on a carriageway. Learning outcomes By the end of the lesson learners should be able to: • calculate the angles and the lengths of the sides of a right-angled triangle • investigate examples for contextualising the application of trigonometry • solve worked examples of contextualised trigonometry. Links to the specification 4.1 Applied mathematical theory in engineering applications. Trigonometry: Pythagoras' theorem, triangle calculations, trigonometric, sine and cosine rules, and common trigonometric identities and values. Prerequisites It is expected that learners are able to use a calculator prior to starting this lesson. Lesson resources Scientific calculator Presentation slides

Timings	Slides	Teacher activity	Learner activity	Stretch and challenge
5 mins	2	Introduction to the topic.		
10 mins	3	Starter activity Encourage learners to complete the starter activity.	Learners to complete activity individually to come up with examples. Ten minutes allocated.	
45 mins	4-10	Teacher to explain how trigonometry is going to be applied during this session and the scenario examined. Explain the method used to calculate the amount of light falling onto a surface. Discuss its importance and ask learners to each think of a couple of examples where this is important. Explain the method for calculating the length of the third side to determine the new length or measurement required. Demonstrate how to calculate the amount of light falling in the second position. Teacher to ensure all learners are comfortable with the process and the method of calculation by asking both directed and open questions examples such as: - Identify the formula to be used - Identify the names of the sides of the triangle - Which side of the triangle is the vertical to the streetlamp	Learners to reproduce diagrams from slides, with their own annotations to aid future understanding and recall. Then work through the example for their own notes. Answer any open or directed questions if necessary.	More able learners to list as many situations as possible where this can be applied and to discuss the importance of the angle of light on a surface.

30 mins	11	Ask learners to complete activity 1 . Teacher to check learners are proceeding at an acceptable rate, offer support, advice and clarification if necessary, and check that more able learners are supporting their peers rather than completing the examples for them.	Learners to complete activity 1 at their own pace. Reproduce diagrams as necessary and calculate the light amounts at different points.	More able learners to offer support to their peers to reinforce their own learning.
25 mins	12	Ask learners to complete the plenary activity individually. Teacher to check learners progress and, if necessary, support and assist them. Task more able learners to use the internet to research engineering applications for similar scenarios via phones or available computers.	Learners to reproduce the diagrams from the scenario and to answer plenary activity .	If finished, more able learners to research similar engineering scenarios.
5 mins	13	Recap session. Discuss whether the learning outcomes have been met and check understanding of them.	Learners will be involved in open discussion around the contents of the session and their own thoughts on the application of trigonometry.	

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