

Measuring in 3D (90 minutes)

Industry Participant

Ideal Industry Participant:

A confident Quantity Surveyor or another professional who has site experience – the session sees students step into the shoes of a Quantity Surveyor.

Example Job Titles:

Apprentice/Graduate Quantity Surveyor

Apprentice/Graduate Site Manager

Description

This 90 minutes session consists of a practical activity during which students will measure their classroom and make costing calculations. It also includes worksheet-based maths questions that are in the context of the career of Quantity Surveying.

What Year Group or Key Stage is the session targeting?

This session should be delivered to KS3 students (Years 7-9)

Maximum number of students?

This session would be ideal for 30 students. Each group would be made up of 5 or 6 students.

What is the goal of the session?

To bring students' maths learning to life in the context of quantity surveying, and raise awareness of careers within construction and routes into the industry.

Role of the Industry Participant

The industry participant will deliver the session and manage activities, as well as provide guidance and feedback during the measuring activity.

The industry participant will deliver a presentation (template provided) on their route into the industry and day-to-day responsibilities.

Resource Checklist

USB

Hard copy of PowerPoint

Electronic copy of PowerPoint

Resource 1 – Student Worksheet, Measuring in 3D Session

Resource 2 – Measuring in 3D PowerPoint

Metre rulers x 5

Tape measures x 10

Facilities Required from School	
<p>A good sized classroom which can accommodate 6 groups . Depending on the height of the room's walls, it may not be suitable for the students to take that measurement – you may need to provide this information to the students beforehand.</p>	
Learning Objectives:	
<p><u>Learners will be able to...</u></p> <ul style="list-style-type: none"> • Understand the role of a Quantity Surveyor within a construction project and about construction more generally • Understand how their maths learning can and will apply to their future careers • Demonstrate and apply their measuring and calculating skills 	
Gatsby Benchmarks	National Curriculum Links
<p>Gatsby Benchmark 2: Learning from Career & Labour Market Information (LMI).</p> <p>Gatsby Benchmark 4: Linking curriculum learning to careers.</p> <p>Gatsby Benchmark 5: Encounters with employers and industry employees.</p>	<p>Maths:</p> <ul style="list-style-type: none"> • Place value for decimals • Use the four operations, applied to integers, decimals • Use the standard units of length and other measures • Round numbers and measures (decimal places or significant figures) • Use approximation through rounding to make estimations • Use a calculator accurately • Change freely between related standard units e.g. time, length, and area.
Teaching Strategies	
<p><u>Real Life Links:</u> Activity focused on real-life duties of a Quantity Surveyor</p> <p><u>Visual:</u> Estimation activity uses visual demonstrations to explain techniques</p> <p><u>Kinaesthetic:</u> Practical measuring task is main focus of the session</p> <p><u>Auditory:</u> Instruction provided verbally throughout</p>	
Risk Assessment	
<p>Check with school regarding their DBS policy. It is necessary to explain to the students that tape measures can potentially cause harm if misused – sharp edges.</p>	

Duration	Tutor/Industry Participant Activity	Learner Activity	Resources
5 minutes	<p>Slides 1-7: Overview of the built environment PowerPoint. Industry participant to introduce themselves and to go over slides. The slides promote careers within the sector.</p> <p>Introduce the lesson – tell the students that this lesson will allow students to practice their measuring and maths skills.</p> <p>Edit Slide 3: All About Me</p> <p>After this slide, insert a new slide with images of projects that you and your company have worked on so students can find out more about your work.</p>	Students to listen	Resource 2 – Measuring in 3D Powerpoint
10 minutes	<p>Class Q&A session entitled “How can we estimate lengths?”</p> <ul style="list-style-type: none"> • Industry participant explains and demonstrates, or uses student volunteer. Goes through the following: • Ask students how we can use pacing/arm span to estimate distances. Once they have guessed, explain along the lines of: “If you know how long one of your steps is/what your arm span is, you can estimate larger distances.” • Measure shoe – heel-toe walking. “If you know the length of one of your feet, you can estimate distances by walking heel to toe.” • Know your height – measure yourself. “If you know your height, you can estimate other heights – ‘I am half the height of this 	Students to listen and take part in Q&A session.	1 x tape measure

	<p>wall, therefore the wall is X cm high.”</p> <ul style="list-style-type: none"> Demonstrate to group how to operate a tape measure and highlight the fact that they often have more than one unit. 		
5 minutes	<p>Instruct the students to turn to page 2.</p> <p>Read out the sentence at the top of the page, and then go through questions 1-6 with the whole group – ask one question at a time and encourage students to put their hands up and offer answers.</p> <p>Page 2 answers:</p> <ol style="list-style-type: none"> 100cm 10mm 1000mm Metres Millimetres Centimetres 	Students to listen and contribute answers when prompted.	Resource 1 (Student Worksheet, Measuring in 3D Session)
5 minutes	<p>Instruct the students to turn to page 3.</p> <p>Ask for a student volunteer to read out the four sentences on this page.</p> <p>Go through questions 1-5 with the whole group – ask one question at a time and encourage students to put their hands up and offer answers.</p> <p>Page 3 answers:</p> <ol style="list-style-type: none"> 660cm 800cm 250cm 140 cm 1100cm 	Students to listen and contribute answers when prompted.	Resource 1 (Student Worksheet, Measuring in 3D Session)
5 minutes	<p>Instruct the students to turn to page 4.</p>	Students to listen and contribute answers when prompted.	Resource 1 (Student Worksheet, Measuring in 3D Session)

	<p>Ask for a student volunteer to read out the two sentences on this page.</p> <p>Go through questions 1-5 (and total area) with the whole group – ask one question at a time and encourage students to put their hands up and offer answers.</p> <p>Page 3 answers and explanations:</p> <ol style="list-style-type: none"> 1. Becomes 2 x 2. Answer = 4m². 2. Becomes 9 x 5. Answer = 45m². 3. Becomes 30 x 8. Answer = 240m². 4. Becomes 50 x 5. Answer = 250m². 5. Becomes 90 x 60. Answer = 5400m². <p>Total area = 5939m².</p>		
5 minutes	<p>Pages 5 and 6 of worksheet - Organise class into 4 teams of either 5/6 pupils, Make sure roles are allocated to each member, their record tables are prepared in pencil. Give each team two tape measures. Give the ceiling height to each group if the room is too high. Number each of the walls 1-2 and allocate an order for each team to measure the walls in, including the windows and doors.</p>	<p>Students to listen to instructions of practical task.</p>	<p>Resource 1 (Student Worksheet, Measuring in 3D Session)</p>
35 minutes	<p>Teams measure the room in rotation and are moved around every 7 mins. If teams are idle they are asked to start calculating surface areas by hand.</p>	<p>Students take measurements as instructed.</p>	<p>Resource 1 (Student Worksheet, Measuring in 3D Session)</p> <p>Tape measures and metre rulers, evenly distributed amongst teams.</p>

10 minutes	Slide 8: Teams to finalise tables and calculate all areas using a calculator. Finished tables are to be handed to the industry participant who will input into slide 8, (which is not on display until totally complete). Slide 8 table containing everyone's results then revealed to class – in order to see how different groups' results vary.	Students calculate surface areas as instructed.	Resource 1 (Student Worksheet, Measuring in 3D Session) Resource 2 – Measuring in 3D PowerPoint
5 minutes	(Pg. 8 of worksheet) – Pupils fill out using the QS actual class areas from PPT table for 10 mins and Industry Participant calculates and goes over answers for 5 mins.	Students listen and contribute answers when prompted.	Resource 2 – Measuring in 3D Powerpoint
5 minutes	Q & A for the Quantity Surveyor and pack up equipment. Industry Participant to round up the session, thank the industry participants (volunteers) and students for their involvement	Students listen and take part in Q&A.	

To-Do List

Before Session:

- Request that the session take place in a good sized classroom
- Go over the session plan
- Print resources before you arrive to the school
- Make sure the PowerPoint (Resource 2) is on a USB/has been sent to the school contact

After Session:

- Collect in resources at the end of the session if necessary
- Collect in tape measures and rulers

Hints & Tips

- Here is the type of question that you may get asked:
 - What do you do on a daily basis?
 - How did you get into your career?
 - What do like about your role?

Delivery Management

- The session could be delivered by one industry participant
- The teacher will handle behaviour management
- Refer to 'How To Contextualise Curriculum' for more guidance on how to deliver this session.