Lesson 12 Overview

Area and volume

Activity	Time (min)	Description/Prompt	Materials
Introduction	20	Check students' understanding of the terms 'area', 'surface area', volume' and 'similar' and ask them to write down everything they can about the surface area of a 20 cm by 10 cm by 18 cm cuboid. It is important to establish what students already know and support them in developing a deeper understanding. Introduce the context of soft play blocks and non-slip fabric on the base of the blocks. Compare areas where one and both lengths of the base of the block are doubled. The inclusion of a logo on the base of the blocks is intended to help with checking whether or not students recognise that similar shapes are in proportion to each other. Extend to comparing volumes where one, two and all three dimensions of the block are doubled.	Mini whiteboards Slides 2–14
Explore 1	15	Ask students to work in pairs to complete the area and volume for the two blocks represented in the grid. Then ask them to determine where Blocks 1, 2 and 3 belong and place them in the correct cells in the grid. Encourage students to explain their reasoning to each other. By asking students to work together, a collaborative culture where students share their understanding can be promoted. Ask students to complete the numbers in the row and column headers as they work.	'Soft play blocks grid' handout 'Soft play block sizes' cards Scissors Calculators Slides 15–16

Review/ Discuss 1	10	Check that students have correctly completed the missing areas and volumes and agree on where Blocks 1 to 3 belong. Discuss what students noticed while completing the task; paying particular attention to any parts of the task you noticed pairs struggling with. Identify similarities between blocks in the grid and make comparisons to explore conservation of volume. Identify the different approaches used by asking different pairs to explain their thinking. It is important to value and make sense of students' ways of working.	Slides 17–18
Explore 2	15	Ask students to draw in two other blocks in any of the empty cells C2, C3, C6, C7, C10 and C11 and work out their dimensions. You may want to choose two empty cells for students to work on rather than asking them to choose. It might also be helpful to work through the dimensions of a block together, as a class, before asking students to work in pairs on this.	Calculators Slide 19
Review/ Discuss 2	20	Discuss the dimensions for possible blocks for a couple of the spaces, focusing on the relationships between the rows and columns. A common misconception when scaling dimensions is that the scale factors for length, area and volume are the same. Examining the relationships between area and length scale factors, and volume and length scale factors provides an opportunity for students to deepen their understanding of how the area/volume of 2-dimensional and 3-dimensional similar figures are related. Generalise the effects of scaling dimensions on area and volume and use similarity to find areas and volumes of similar shapes.	Mini whiteboar ds Slides 20–27
Practice question	10	Ask students to apply what they have learned in the lesson to a practice question. It is not necessary to print this out: the question can be displayed on the board. Give students a couple of minutes to work on the question individually and then discuss their approaches.	'Practice question' handout Slide 28