

Unit title	Painted Cube
Topic	An investigation involving shape and space and algebraic generalisation.
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Aims of Unit	To encourage students to identify patterns and to generalise and justify their findings.
Indicative content	A cube with sides of 4 cm is made up of smaller cubes with sides of 1 cm. The 4 x 4 x 4 cube is dipped into a paint tin and covered in red paint. How many of the smaller cubes have: 3 faces painted red? 2 faces painted red? 1 face painted red? 0 faces painted red?
Resources needed	Calculators Cube made up of 64 sub cubes, tin of paint.
Teachers notes	<p>What happens if we consider a cube with side n cm? The expectation is that pupils will generalise and justify their findings.</p> <p>Learning outcomes for this activity</p> <p>All Pupils should be able to carry out this experiment and produce results which can be recorded.</p> <p>Most Pupils will be able to design a table and record these results.</p> <p>Some pupils will be able to predict the consequences of creating a larger cube and justify their conclusions.</p>

Painted Cube

A cube with sides of 4 cm is made up of smaller cubes with sides of 1 cm. The $4 \times 4 \times 4$ cube is dipped into a tin of red paint. How many of the smaller cubes will have:

3 faces painted red?

2 faces painted red?

1 face painted red?

0 faces painted red?

Investigate the problem and extend your enquiry to other sized cubes for example a $5 \times 5 \times 5$ cube. Generalise your results for an $n \times n \times n$ sized cube and try to justify your findings.