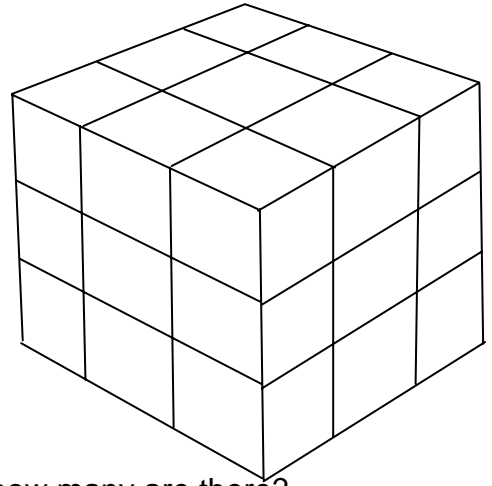


The PAINTED CUBE

Imagine a cube ($3 \times 3 \times 3$ units in length) made up from smaller cubes (which are all 1 unit in length)

Imagine that we paint the outside of this ($3 \times 3 \times 3$) cube.

If we now separate it into 27 small cubes, we will notice that some of the small cubes are painted on all 3 sides – some are painted on only 2 sides – some on only 1 side – and some have not been painted at all.



Which small cubes have been painted on all 3 sides – and how many are there?

Which are the small cubes that get painted on 2 sides – and how many of them are there?

Which of the cubes gets painted on only 1 side?

Are there any that do not get painted at all? Where are they?

FILL IN THE GRID BELOW FOR A $3 \times 3 \times 3$ CUBE.

THEN – consider a $4 \times 4 \times 4$ cube. Fill in the grid showing the number of painted cubes.

What about a $5 \times 5 \times 5$ cube? and a $6 \times 6 \times 6$ cube?

Can you predict the answers for larger cubes without having to count them all out?

CUBE SIZE	Total number of small cubes	Number of cubes painted on 3 sides	Number of cubes painted on 2 sides	Number of cubes painted on 1 side	Number of cubes <u>not</u> painted at all
$3 \times 3 \times 3$					
$4 \times 4 \times 4$					
$5 \times 5 \times 5$					
$6 \times 6 \times 6$					
$7 \times 7 \times 7$					
$12 \times 12 \times 12$					