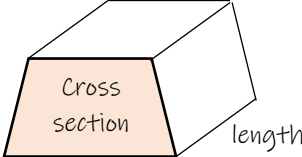


Y8 Maths Knowledge Organiser Topic 14: Surface Area and Volume

What must I be able to do?	Key vocabulary						
<p>New content:</p> <ul style="list-style-type: none"> □ Find the surface area of cubes, cuboids, prisms, cylinders, and composite solids <ul style="list-style-type: none"> ➤ Sparx M534, M661, M936 □ Find the volumes of cubes and cuboids, prisms, cylinders and composite solids <ul style="list-style-type: none"> ➤ Sparx M765, M697, M722 □ Convert between cm^3 and m^3 <ul style="list-style-type: none"> ➤ Sparx M465 	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Surface Area</td> <td>The <u>total area</u> of all <u>faces</u> on the outside of a 3D shape. This is also the total area of the net of the shape.</td> </tr> <tr> <td>Volume</td> <td>The <u>amount of space</u> that an object occupies.</td> </tr> <tr> <td>Composite solid</td> <td>A 3D shape created by <u>combining</u> other <u>3D shapes</u> together.</td> </tr> </table>	Surface Area	The <u>total area</u> of all <u>faces</u> on the outside of a 3D shape. This is also the total area of the net of the shape.	Volume	The <u>amount of space</u> that an object occupies.	Composite solid	A 3D shape created by <u>combining</u> other <u>3D shapes</u> together.
Surface Area	The <u>total area</u> of all <u>faces</u> on the outside of a 3D shape. This is also the total area of the net of the shape.						
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Composite solid	A 3D shape created by <u>combining</u> other <u>3D shapes</u> together.						

Volume of prisms

Volume of a prism = area of cross section x length



Converting units of volume

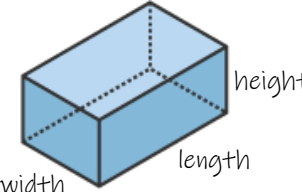
Do the length conversion 3 times, once for each dimension.

$1 \text{ m}^3 = 1 \text{ m} \times 1 \text{ m} \times 1 \text{ m} = 100 \text{ cm} \times 100 \text{ cm} \times 100 \text{ cm} = 1,000,000 \text{ cm}^3$

$1 \text{ cm}^3 = 1 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} = 10 \text{ mm} \times 10 \text{ mm} \times 10 \text{ mm} = 1,000 \text{ mm}^3$

$1000 \text{ cm}^3 = 1 \text{ litre}$ so $1 \text{ m}^3 = 1000 \text{ litres}$

Cubes/cuboids



Volume = length x width x height

Surface area:

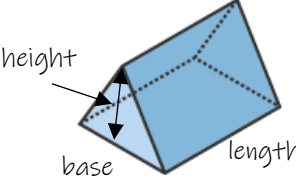
Front + back: length x height x 2 (rectangles)

Side + side = width x height x 2 (rectangles)

Top + bottom = length x width x 2 (rectangles)

Total surface area is these 3 added together.

Triangular prisms



Volume = $\frac{\text{base} \times \text{perpendicular height}}{2} \times \text{length}$

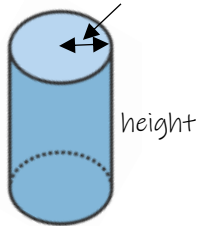
Surface area:

Area of the 2 triangles ($\frac{b \times h}{2}$ for each one)

Area of the three rectangles (note that they may all be different!)

Total surface area is all 5 faces added together.

Cylinders



Volume = $\pi \times \text{radius squared} \times \text{height}$
 $= \pi r^2 h$

The curved surface area is the rectangular part of the net of a cylinder. It has a length equal to the circumference of the circle at the top of the cylinder and a height equal to that of the cylinder.

Surface area:

Top + bottom: Area of circle x 2

Curved surface area = area of rectangle

Total surface area is both added together.

$S.A = 2\pi r^2 + 2\pi r h$

