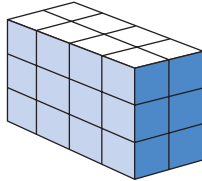


As outcomes, Year 8 pupils should, for example:

Know the formula for the volume of a cuboid and use it to solve problems involving cuboids.

Understand the formula for the volume of a cuboid by considering how to count unit cubes.

- Suppose the cuboid is l units long, w units wide and h units high.



Then:
 area of base = lw square units
 volume = area of base \times number of layers
 = lwh cubic units

Estimate volumes. For example:

- Estimate the volume of everyday objects such as a rectangular chopping board, a bar of soap, a shoe box...
 Check estimates by measurement and calculation.

Suggest volumes to be measured in cm^3 , m^3 .

Volume and displacement

In science, start to appreciate the connection between volume and displacement. For example,

- Make some cubes or cuboids with different numbers of Centicubes.
 Put them into a measuring cylinder half filled with water. How many millilitres does the water rise? What is the connection between the volume of the cube or cuboid and the volume of water displaced?
 (1 ml of water has a volume of 1cm^3 .)

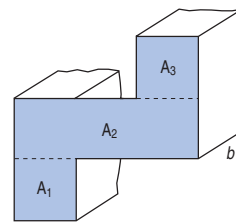
As outcomes, Year 9 pupils should, for example:

Calculate the surface area and volume of a right prism.

Know that a prism is a polyhedron of uniform cross-section throughout its length. A cuboid is a common example.

Use knowledge of prisms made up of cuboids to write an expression for the total volume of such a prism. For example:

- A prism has cross-section areas A_1, A_2, A_3, \dots , all of length b .



$$\begin{aligned} V &= A_1b + A_2b + A_3b + \dots \\ &= (A_1 + A_2 + A_3 + \dots)b \\ &= \text{total area of cross-section} \times \text{length} \end{aligned}$$

Surface area and volume of a cylinder

Know that the total surface area A of a cylinder of height h and radius r is given by the formula

$$A = 2\pi r^2 + 2\pi rh$$

and that the volume V of the cylinder is given by the formula

$$V = \pi r^2 h$$

- In geography, use a rain gauge, then estimate the volume of water which has fallen on a specified area over a given period.