

MEASUREMENT ...

Perimeter, Area and Volume

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:

- Display same areas
- Calculate area and perimeter
- Find the area of a triangle
- Find the area of a parallelogram
- Find volume by counting cubes
- Find the volume of a cuboid

Keywords

Area: the size of a surface (2D shapes)

Perimeter: the distance around a 2D shape

Volume: the amount of 3-dimensional space an object takes up (with liquid this is called capacity)

Perpendicular: two lines that meet at 90°

Vertex: a point where two or more line segments meet

Face: any of the flat surfaces of a solid object

Edge: a line segment on the boundary joining one vertex to another

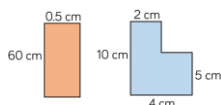
Commutative: you can swap the order around in the calculation and still achieve the same answer

Shapes with the same area

All the shapes have an area of 12cm^2 – they are all made up of 12 squares



The shapes below also have the same area



Area

Rectangle/ Square area = Base x Height

Compound Shapes

Area of A

The height of shape A is 5 cm
 $2 \times 5 = 10\text{cm}^2$

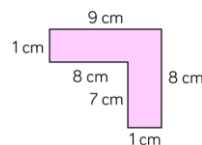
Area of B

$4 \times 5 = 20\text{cm}^2$

Total area = Area A + Area B = $10 + 20 = 30\text{cm}^2$

Perimeter

Length around the outside of the shape



In compound shapes make sure all the lengths have measurements

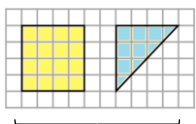
Perimeter = $9\text{cm} + 8\text{cm} + 1\text{cm} + 7\text{cm} + 8\text{cm} + 1\text{cm}$
 $= 34\text{cm}$

Perimeter often asks about boundaries or walls in questions

Area of triangles

Area can be calculated by counting squares

Often this is an estimation with triangles if it does not cut a square in half

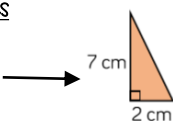


Notice the relationship between the square and the triangle.

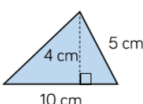
Area triangle = $\frac{1}{2}$ area of the square

Right-angled triangles

The height of a right-angled triangle



Perpendicular heights



The perpendicular height meets the base at 90°

Area = $\frac{1}{2} \times 10 \times 4 = 20\text{cm}^2$

Area triangle = $\frac{1}{2} \times \text{base} \times \text{perpendicular height}$

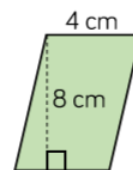
Area of parallelograms



Parallelogram = Base x Perpendicular height

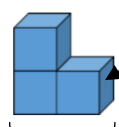
Properties of parallelograms

- Two sets of parallel lines
- Four sides (quadrilateral)
- Interior angles = 360°
- Opposite angles are equal
- 2D shape



Area = $4 \times 8 = 32\text{cm}^2$

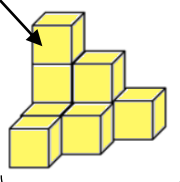
Volume (counting cubes)



Each cube has a given volume. Eg 1cm^3

Always check the units of measurement.
Volume can be mm^3 , cm^3 , m^3 , km^3

This shape is made up of 3 cubes
So the volume is 3cm^3



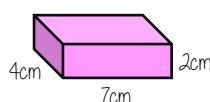
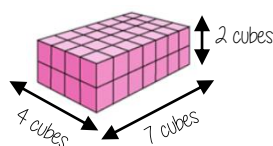
Don't forget about cubes you can't see. This is a 3D shape.

The volume of this shape is 9cm^3



Use multilink cubes to notice that volume can be any shape – it is the number of cubes that make up the value

Volume of cuboids



Properties of cuboids

- 3D shape
- 8 vertices
- 6 faces
- 12 edges

Counting cubes

Counting the cubes = 56cm^3

OR

There are 28 cubes on the bottom row and two rows
 $28 \times 2 = 56$

Volume of cuboid = length x width x height

Volume = $4 \times 7 \times 2 = 56\text{cm}^3$

Remember multiplication is commutative so the values can be multiplied in any order