

# INTO Y7 — 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  $90^\circ$

**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

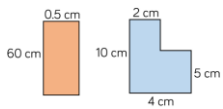
**Commutative:** you can swap the order around in the calculation and still achieve the same answer

### Shapes with the same area

All the shapes have an area of  $12\text{cm}^2$  — they are all made up of 12 squares



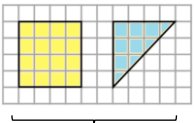
The shapes below also have the same area



### 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

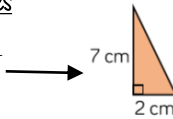


Notice the relationship between the square and the triangle.

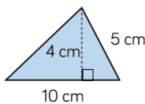
Area triangle =  $\frac{1}{2}$  area of the square

### Right-angled triangles

The height of a right-angled triangle



### Perpendicular heights



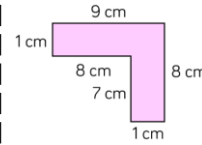
The perpendicular height meets the base at  $90^\circ$

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

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

### Perimeter

Length around the outside of the shape

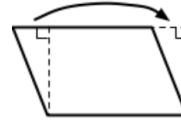


In compound shapes make sure all the lengths have measurements

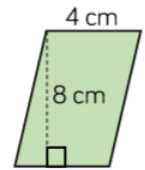
Perimeter =  $9\text{cm} + 8\text{cm} + 1\text{cm} + 7\text{cm} + 8\text{cm} + 1\text{cm}$   
=  $34\text{cm}$

Perimeter often asks about boundaries or walls in questions

### Area of parallelograms



Parallelogram = Base x Perpendicular height

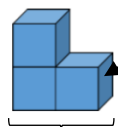


Area =  $4 \times 8 = 32\text{cm}^2$

### Properties of parallelograms

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

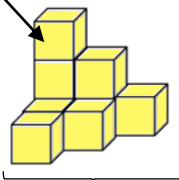
### Volume (counting cubes)



Each cube has a given volume. Eg  $1\text{cm}^3$

Always check the units of measurement. Volume can be  $\text{mm}^3$ ,  $\text{cm}^3$ ,  $\text{m}^3$ ,  $\text{km}^3$

This shape is made up of 3 cubes  
So the volume is  $3\text{cm}^3$



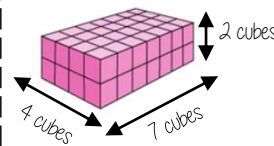
Don't forget about cubes you can't see. This is a 3D shape.

The volume of this shape is  $9\text{cm}^3$



Use multi-link cubes to notice that volume can be any shape — it is the number of cubes that make up the value

### Volume of cuboids



### Counting cubes

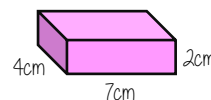
Counting the cubes =  $56\text{cm}^3$

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



### Properties of cuboids

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

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