

# Y10 FOUNDATION HT3B2 Volumes and Surface Areas of Prisms & Curved Shapes and Pyramids

## What do I need to be able to do?

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

- Name 2D & 3D shapes
- Recognise Prisms
- Sketch and recognise nets
- Draw plans and elevations
- Find areas of 2D shapes
- Find Surface area for cubes, cuboids, triangular prisms and cylinders
- Find the volume of 3D shapes

## Keywords

**2D:** two dimensions to the shape e.g. length and width

**3D:** three dimensions to the shape e.g. length, width and height

**Vertex:** a point where two or more line segments meet

**Edge:** a line on the boundary joining two vertex

**Face:** a flat surface on a solid object

**Cross-section:** a view inside a solid shape made by cutting through it

**Plan:** a drawing of something when drawn from above (sometimes birds eye view)

**Perspective:** a way to give illustration of a 3D shape when drawn on a flat surface

## Name 3D shapes



Cone



Cylinder



Sphere



Cube



Triangular Prism



Tetrahedron



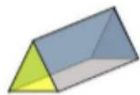
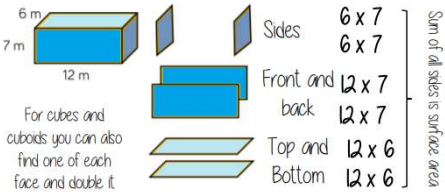
Cuboid



Square based Pyramid

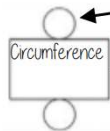
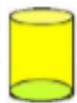
## Surface area

Sketching nets first helps you visualise all the sides that will form the overall surface area



For other shapes - not all the sides are the same, so calculate the individually

## Surface area - cylinders



The area of the circle  $\pi \times \text{radius}^2$

The width of this face is the same as the circumference  $\pi \times \text{diameter} \times \text{height}$

$$2 \times \pi \times \text{radius}^2 + \pi \times \text{diameter} \times \text{height}$$

## Volumes

Volume is the 3D space it takes up - also known as capacity if using liquids to fill the space



### Counting cubes

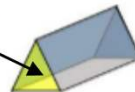
Some 3D shape volumes can be calculated by counting the number of cubes that fit inside the shape.

$$\text{Cubes/ Cuboids} = \text{base} \times \text{width} \times \text{height}$$

Remember multiplication is commutative



Cross section



$$\text{Prisms and cylinders} = \text{area cross section} \times \text{height}$$

Height can also be described as depth

Areas - square units  
Volumes - cube units

Areas and volumes can be left in terms of pi  $\pi$

Missing:

Sectors

Pyramids

Cones

Spheres