

YEAR 9 — CONSTRUCTING IN 2D/3D... 3D Shapes

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

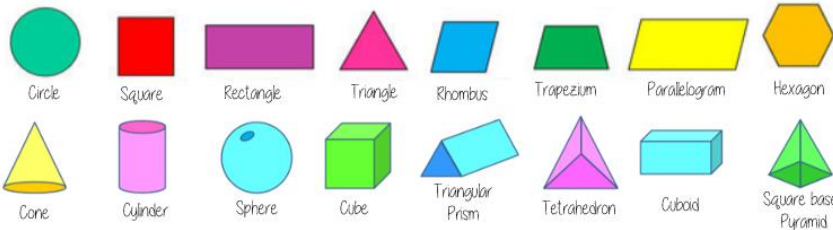
Face: a flat surface on a solid object

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)

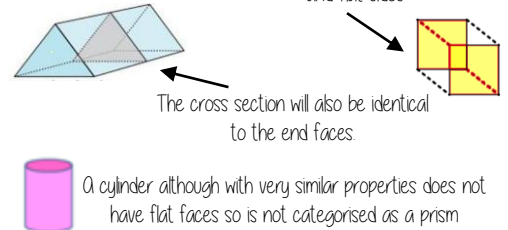
Perspective: a way to give illustration of a 3D shape when drawn on a flat surface.

Name 2D & 3D shapes

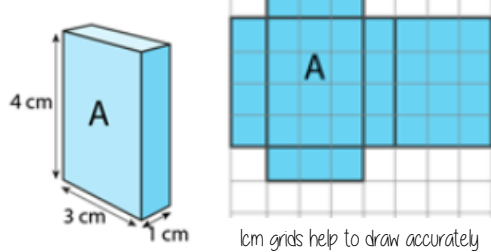


Recognise prisms

A solid object with two identical ends and flat sides

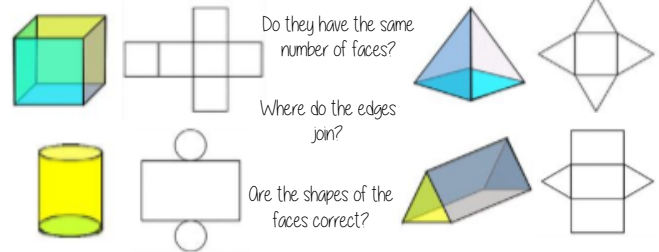


Nets of cuboids

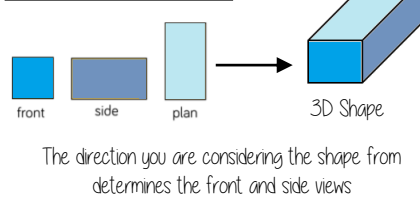


Visualise the folding of the net. Will it make the cuboid with all sides touching

Sketch and recognise nets

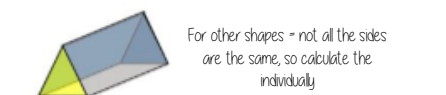
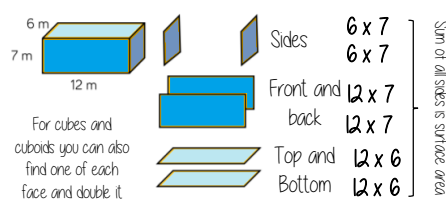


Plans and elevations



Surface area

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



Volumes

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

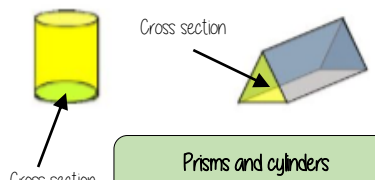


Counting cubes

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

Cubes/ Cuboids = base x width x height

Remember multiplication is commutative

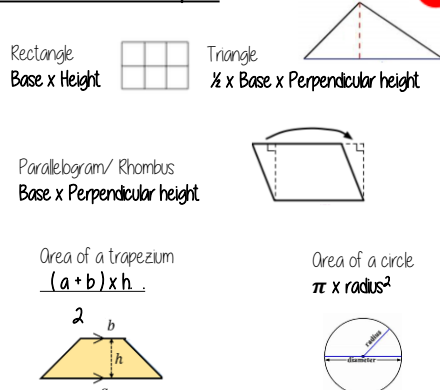


Height can also be described as depth

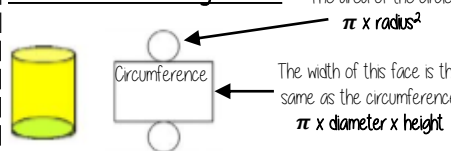
Areas — square units
Volumes — cube units

Areas and volumes can be left in terms of π

Area of 2D shapes



Surface area - cylinders



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