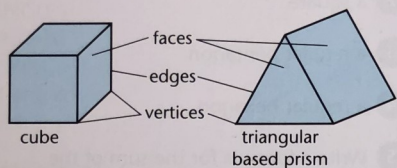


THREE-DIMENSIONAL SHAPES

TARGET To describe the properties of 3-D shapes.

POLYHEDRA

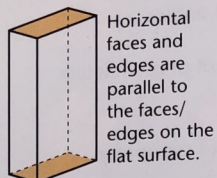
A polyhedron is a 3-D shape with straight edges.



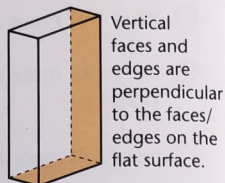
A prism has two identical end faces and the same cross section throughout its length.

PARALLEL AND PERPENDICULAR FACES/EDGES

Parallel and perpendicular faces and edges can be identified by placing one face of a shape on a flat surface.



Horizontal faces and edges are parallel to the faces/edges on the flat surface.



Vertical faces and edges are perpendicular to the faces/edges on the flat surface.

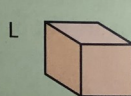
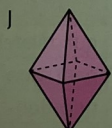
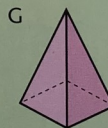
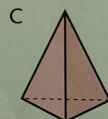
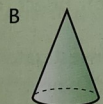
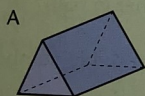
A

1 Match each of the shapes A to L with one of the names of 3-D shapes.

cone
cube
cuboid
cylinder

hemisphere
hexagonal based prism
octagonal based prism
octahedron

pentagonal based prism
square based pyramid
tetrahedron
triangular based prism



2 Copy and complete this sentence.

An octagonal based prism has identical octagonal end faces and 8 identical side faces.

3 Write a similar sentence for each of the other five prisms shown in the above diagrams.

B

1 Copy and complete this table showing the properties of nine different polyhedra.

Shape	Sides	Edges	Vertices
	7		
			4
		24	
cube		9	
			6
	8		
			8
		8	

2 For each of the shapes in the above table write down:

- how many pairs of parallel faces there are in the shape
- how many pairs of perpendicular faces there are in the shape?

C

Copy and complete the following formulae where:

S = number of sides of end face of prism

F = number of faces of a prism

E = number of edges of a prism

V = number of vertices of a prism

1 $F = S + \square$

2 $E = \square S$

3 $V = \square S$

4 $E = F + V - \square$

Use your formulae to find:

- the number of faces and edges of a prism with 24 vertices
- the number of vertices and edges of a prism with 12 faces
- the number of faces and vertices of a prism with 45 edges.

For each of the following shapes write down how many faces have:

- pairs of parallel edges
 - pairs of perpendicular edges.
- a heptagonal prism
 - a hexagonal pyramid
 - a 10 sided (decagonal) prism
 - a pentagonal pyramid
 - a 9 sided (nonagonal) prism
 - an octagonal pyramid
 - Look at the shapes in Section A.
 - Which shape has parallel edges in the shape but not in any face?
 - How many pairs of parallel faces does this shape have?
 - How many edges are there on the end face of a prism with:
 - 20 faces with parallel edges
 - 20 faces with perpendicular edges.