

# 8th Standard- Maths

## Visualising Solid Shapes

Solids have a fixed shape and occupy a space.

A solid is made up of polygonal regions, which are called its faces.

**Polyhedron:** A solid shape bounded by polygons is called polyhedron (platonic solid).

A polyhedron has some number of plane faces, edges and vertices, which satisfy the relationship:

$$F + V - E = 2,$$

where

F stands for the number of faces.

V stands for the number of vertices

and E stands for the number of edges.

The relation  $F + V - E = 2$  is called Euler's formula.

**Prism:** A prism is a solid, whose side faces are parallelograms and whose ends (or bases) are congruent parallel polygons.

A prism has 2 triangular faces, 3 rectangular faces, 6 vertices and 9 edges.

**Pyramid:** A pyramid is a polyhedron whose base is a polygon of any number of sides and whose other faces are triangles with a common vertex.

A pyramid has 1 square face, 4 triangular faces, 5 vertices and 8 edges.

**Tetrahedron:** A pyramid is called a triangular pyramid if its base is a triangle. A triangular pyramid is also called a tetrahedron.

Plane shapes have two dimensions (measurements) like length and breadth whereas a solid object has three measurements like length, breadth and height (or depth). That is why they are called two-dimensional shapes and three-dimensional shapes, respectively. They are briefly named as 2-D and 3-D figures, respectively. Triangle, rectangle, circle, etc., are 2-D figures whereas cube, cylinder, cone, sphere, etc., are 3-D figures.

### **Views of 3-D Shapes**

3-dimensional objects look differently from different positions. So, they can be drawn from different perspectives like top view, front view, side view.

### **Mapping Space Around Us**

A map is different from a picture. A map depicts the location of a particular object/place in relation to other objects/places. Symbols are used to depict different objects/places. There is no reference or perspective on a map. However, perspective is very important for drawing a picture. Moreover, maps involve a scale which is fixed for a particular map.

### **Faces, Edges and Vertices**

A solid shape bounded by the polygon is called a polyhedron. The plural of the word polyhedron is polyhedra.

Faces are polygonal regions with which a polyhedron is made up. The line segments in which the faces of a polyhedron meet are called edges.

The points of intersection of the edges of a polyhedron are called its vertices. In a polyhedron, three or more edges meet at a vertex.

A polyhedron is said to be regular if its faces are made up of regular polygons and the same number of faces meet at each vertex.

A prism is a polyhedron whose base and top are parallel congruent polygons and whose lateral faces are parallelograms in shape.

A pyramid is a polyhedron whose base is a polygon (of any number of sides) and whose lateral faces are triangles with a common vertex.

