

THREE DIMENSIONAL SHAPES

Objects with fixed shape, size, and occupying fixed space are called solids. Solid figures have three dimensions - length, breadth and height.

e.g. A ball, a brick, an ice cream cone and a can.

Face

The flat surface of a solid shape is called a face.

Edge

Any two adjacent faces of a solid shape meet on a line segment called an edge.

Vertex

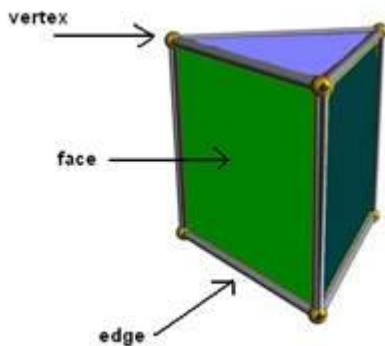
A vertex of a solid shape is a point where three or more edges meet.

A solid bounded by six rectangular faces is called a **cuboid**. A cuboid has 6 faces, 12 edges and 8 vertices.

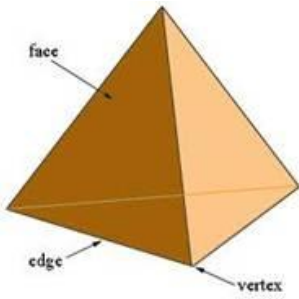
A solid bounded by six square faces is called a **cube**.

A solid whose bases are parallel plane polygons and the lateral faces are rectangles is called a **prism**. A **pyramid** is a solid whose base is a plane rectilinear figure whose lateral faces are triangles with a common vertex, called the vertex of the pyramid. Prisms and pyramids are named after their bases. The base of a prism can be of any polygonal shape such as triangle and square.

A prism with two congruent triangles as bases which are parallel to each other and three lateral rectangular faces is a Triangular prism. There are 5 faces, 9 edges and 6 vertices in a triangular prism.



There are 4 faces, 6 edges and 4 vertices in a triangular pyramid.

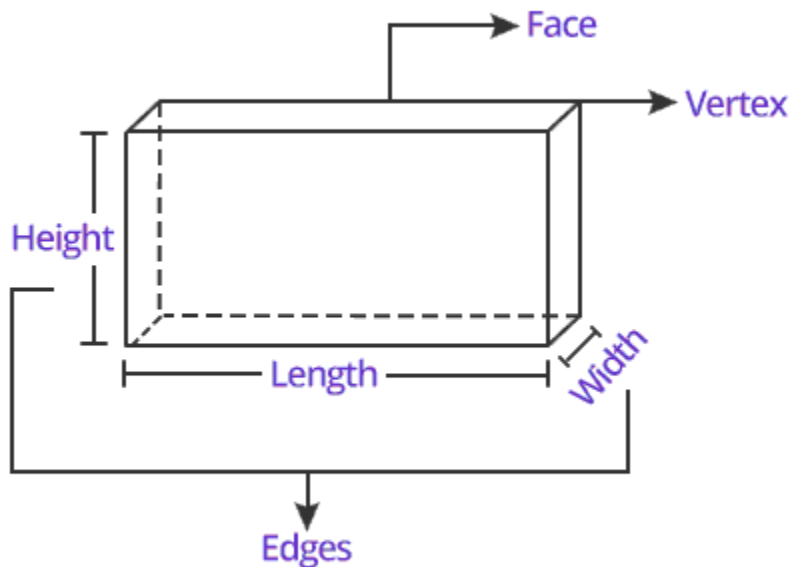


A cylinder has two circular plane surfaces at its base and top. It has a curved surface in the middle. A cylinder has 2 flat faces, 1 curved surface and 2 edges. There are no vertices in a cylinder.

A cone has 1 flat face and 1 curved surface. There are 1 edge and 1 vertex.

The ball-like shape is called a sphere. A sphere has one curved surface, no edge and no vertex. The attributes of a three-dimensional figure are [faces](#), edges and [vertices](#).

The three dimensions compose the [edges](#) of a 3D geometric shape.



A cube, rectangular prism, sphere, cone and cylinder are the basic 3-dimensional shapes we see around us.

3-Dimensional Shapes



Cube



Rectangular
Prism



Sphere

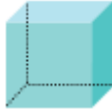

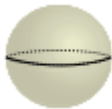




Cone



Cylinder

Here's a list of the 3-D or three-dimensional shapes with their name, pictures and attributes.

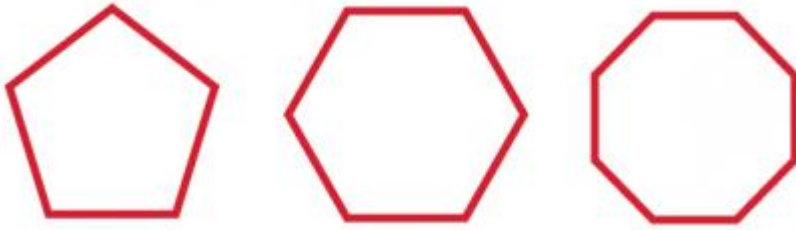
Name of 3D shape:	Picture of 3D shape:	Attributes:
Cube		Faces - 6 Edges - 12 Vertices - 8
Rectangular Prism or Cuboid		Faces - 6 Edges - 12 Vertices - 8
Sphere		Curved Face - 1 Edges - 0 Vertices - 0
Cone		Flat Face - 1 Curved Face - 1 Edges - 1 Vertices - 1
Cylinder		Flat Face - 2 Curved Face - 1 Edges - 2 Vertices - 0

REGULAR AND IRREGULAR SHAPES

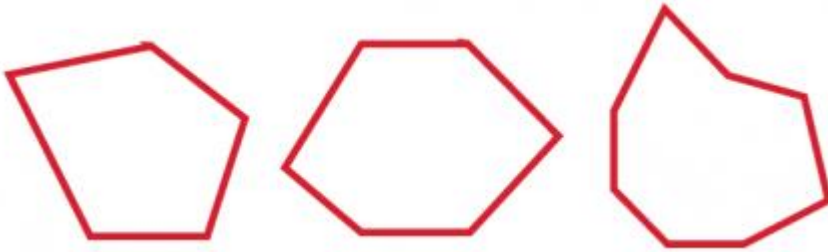
Regular shapes have sides that are all equal and interior (inside) angles that are all equal.

Irregular shapes have sides and angles of any length and size.

Here are various different shapes in regular and irregular forms:



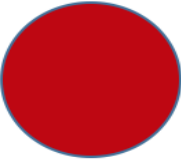
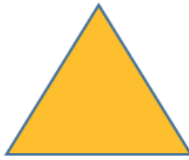




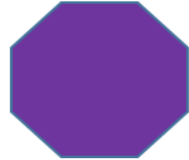
Regular pentagon, regular hexagon, regular octagon



Irregular pentagon, irregular hexagon, irregular octagon



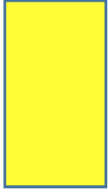



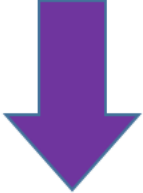
What are regular shapes?

Regular means ordered or predictable. Children are taught the names of shapes (or polygons) from a very early age and usually shown the regular version of the shapes to help with easy recognition. Here are the most common ones:

						
Circle	Equilateral triangle	Square	Pentagon	Hexagon	Heptagon	Octagon
This is a regular shape but not a polygon because it doesn't have straight sides.	Three equal length sides and three equal interior angles of 60° .	Four equal length sides and four interior angles of 90°	Five equal length sides and five interior angles of 108°	Six equal length sides and six interior angles of 120°	Seven equal length sides and seven interior angles of 128.57°	Eight equal length sides and eight interior angles of 135°

What are irregular shapes?

Irregular means not even or balanced. Irregular shapes (or polygons) are often much harder for children to name because they don't look like the more conventional regular shapes. In fact, they can be any straight-sided shape. Their name is often determined by the number of straight sides that they have, although some irregular polygons have special names like parallelograms, rhombus or kite.

						
Right-angle Triangle	Quadrilateral	Rectangle (also a Quadrilateral)	Irregular Pentagon	Irregular Hexagon	Irregular Hexagon	Irregular Octagon
This has three sides and three internal angles, one angle is always at 90°.	All four-sided polygons are called quadrilateral but some also have special names like a kite or a rhombus.		This shape has five sides and internal angles that are not all equal.	This shape has six sides and six internal angles that are not all equal.	Here is an example of a completely different hexagon.	This shape has eight sides and eight internal angles that are not all equal.

LINK OF SOME OF THE VIDEOS

<https://www.youtube.com/watch?v=f6DZoX5dKbE>

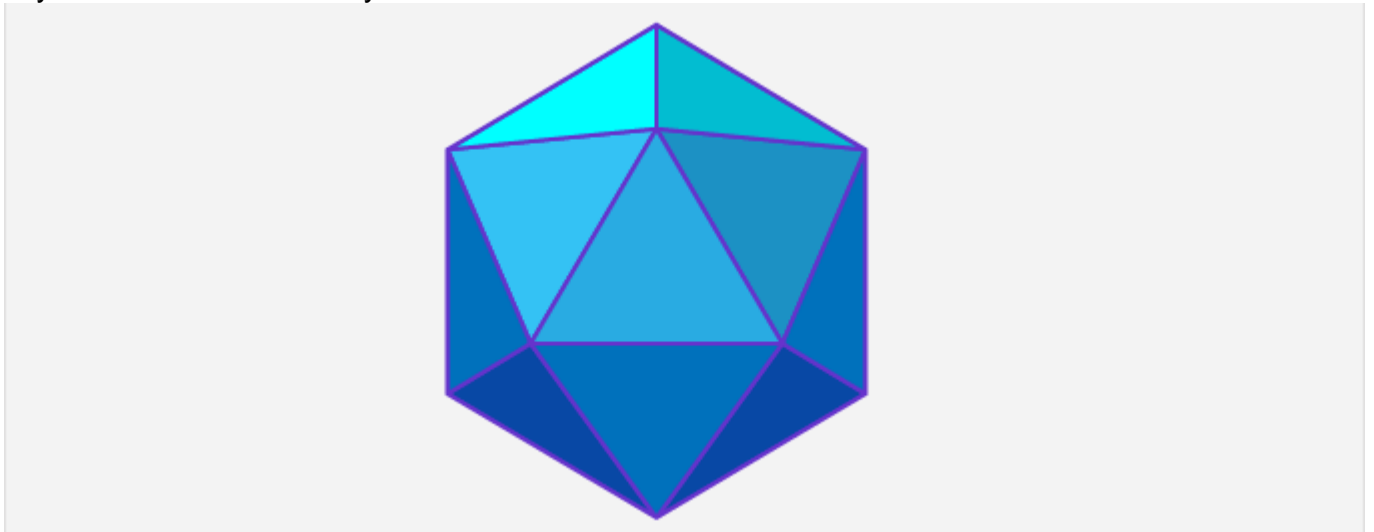
<https://www.youtube.com/watch?v=-uci89ZlbnM>

Polyhedron

A polyhedron is a 3-dimensional solid made by joining together polygons.

The word 'polyhedron' comes from two Greek words, poly meaning many, and hedron referring to surface.

The polyhedrons are defined by the number of faces it has.

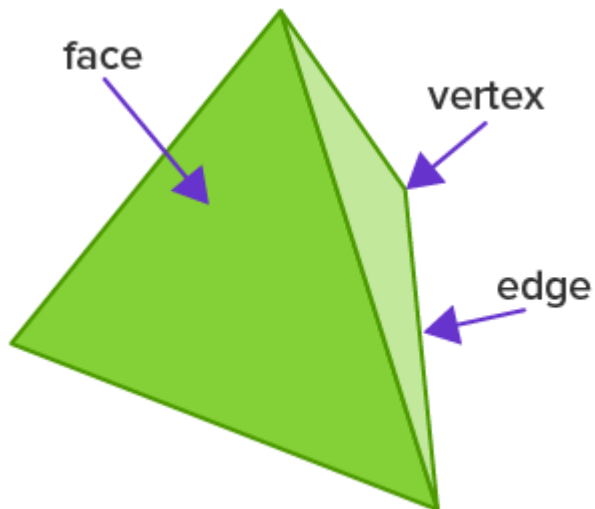


An example of a polyhedron

Parts of a polyhedron

Every polyhedron has three parts:

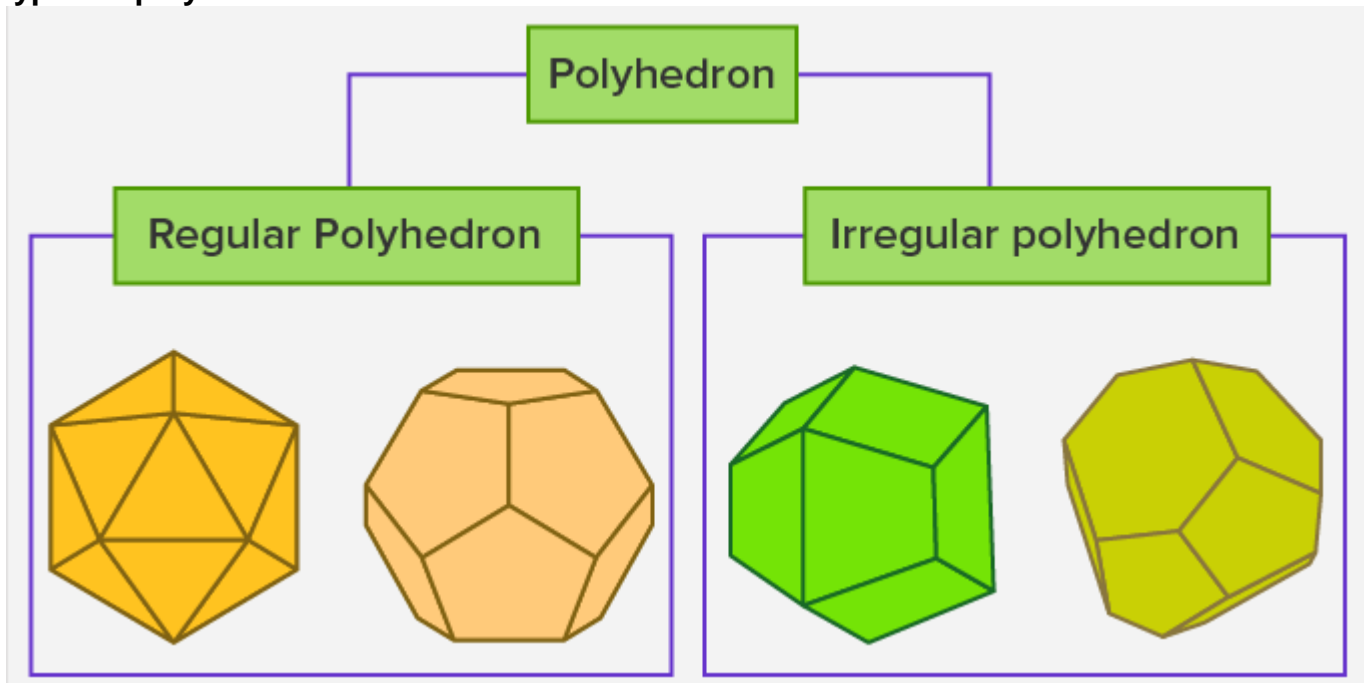
- **Face:** the flat surfaces that make up a polyhedron are called its faces. These faces are regular polygons.
- **Edge:** the regions where the two flat surfaces meet to form a line segment are known as the edges.
- **Vertex:** It is the point of intersection of the edges of the polyhedron. A vertex is also known as the corner of a polyhedron. The plural of vertex is called vertices.



The names of the polyhedrons are derived from the number of faces they have:

Name	No. of faces
Tetrahedron	A polyhedron with 4 faces.
Pentahedron	A polyhedron with 5 faces.
Hexahedron	A polyhedron with 6 faces.
Heptahedron	A polyhedron with 7 faces.
Octahedron	A polyhedron with 8 faces.
Nonahedron	A polyhedron with 9 faces.
Decahedron	A polyhedron with 10 faces

Types of polyhedron



Regular Polyhedron


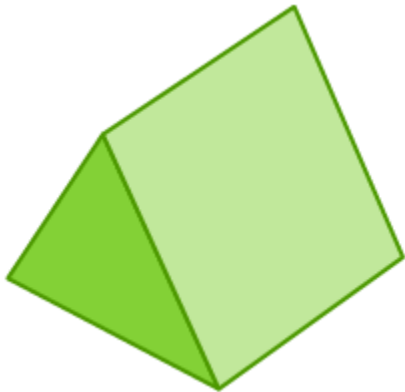

A regular polyhedron is made up of regular polygons. Such solids are also known as 'platonic solids'

Irregular polyhedron

An irregular polyhedron is formed by polygons of different shapes where all the components are not the same. This means that all the sides of an irregular polyhedron are not equal.

Some of the regular polygons are described in the table below:

Polyhedrons in everyday life

Examples	Images
Houses/Buildings: Most of the houses around us are polyhedrons as they are made of flat surfaces.	
A prism: A prism is made of three rectangles joined together with triangular bases	
A football or a soccer ball	
Pyramids: A polyhedron with four sides is a tetrahedron and is also called a pyramid.	

PROJECT FOR THREE DIMENSIONAL FIGURE

This is a take-home assignment where students are required to search for 3 dimensional shapes around their home. After identifying the shapes, students sketch them, and record their vertices, bases, faces, and edges.

Make a list of 3D figures and draw the pictures and color it. Write its faces, edges and vertices.