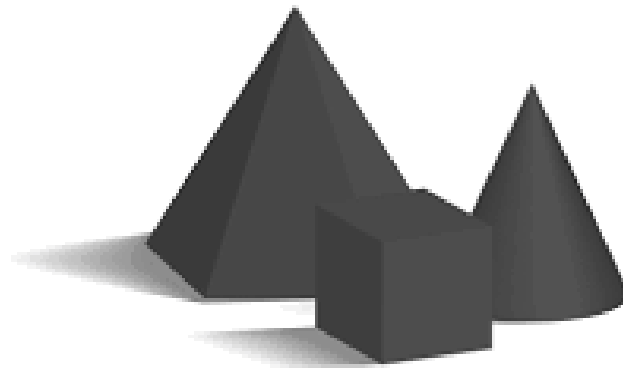


VISUALIZING SOLID SHAPES

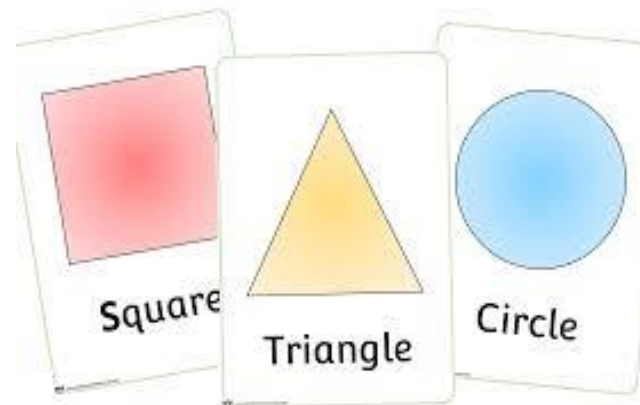


What is a shape?

- A **shape** can be defined as the form of an object or its outline, outer boundary or outer surface.
- We can find different basic **shapes** such as square, rectangle and oval (two-dimensional) or rectangular prism, cylinder, and sphere (three-dimensional) in the objects we see around us.

2D SHAPES

- A two-dimensional **shape** can be defined as a flat plane figure or a **shape** that has two dimensions – length and width. Two-dimensional or 2-D **shapes** do not have any thickness and can be measured in only two faces.



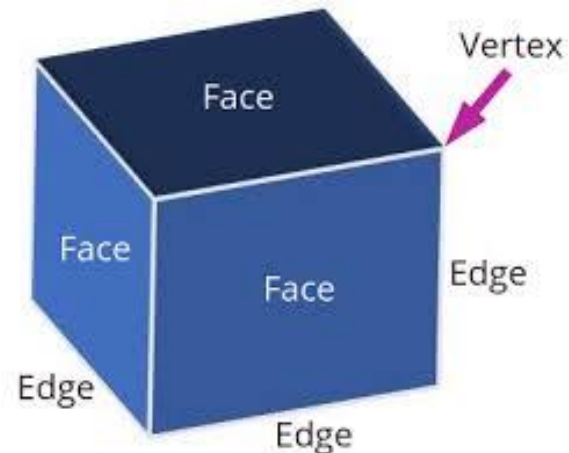
3D SHAPES

- A three-dimensional **shape** can be **defined** as a solid figure or an object or **shape** that has three dimensions – length, width and height. Unlike two-dimensional **shapes**, three-dimensional **shapes** have thickness or depth.



VERTICES

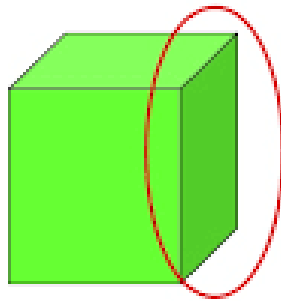
- The formal definition for the vertex meaning in Mathematics defined as a point where two or more edges meet. Vertices are the corner points.



FACES

- Every individual flat surface of a solid is called its face. Solids have more than one face.

Face

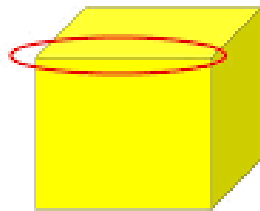


- Part of a 3D shape that is flat.
- Example: A cube has 6 faces.

EDGE

- The line segment which acts as an interface between two faces is called an edge. Sometimes it is also described as the line segment joining two vertices.

Edge



- The line where two faces meet on a 3D object.
- Example: A cube has 12 edges.

FACES, VERTICES AND EDGES OF A 3D SHAPE

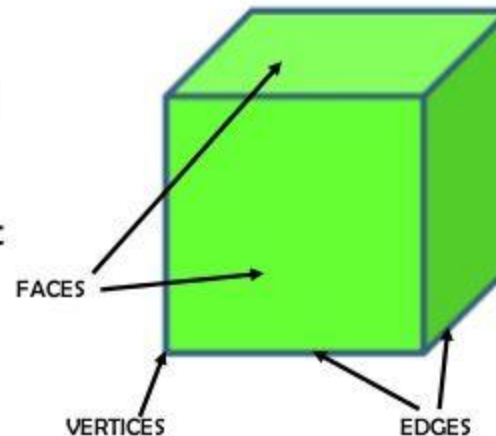
FACES, VERTICES and EDGES

3D shapes can be described in 3 ways:

Faces – the sides of the shape

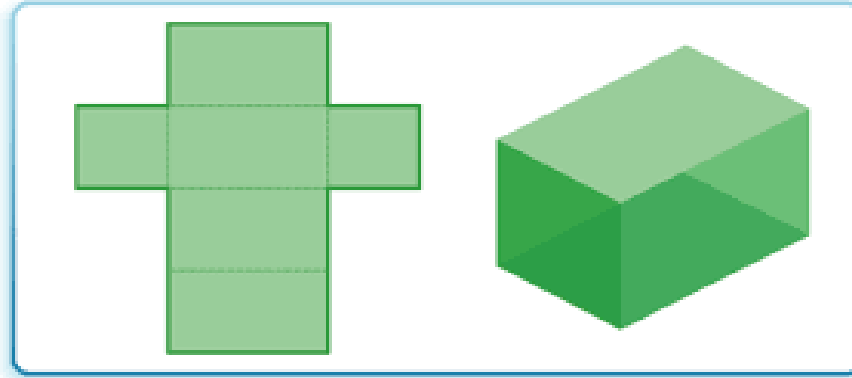
Vertices – the corners

Edges – where the faces meet



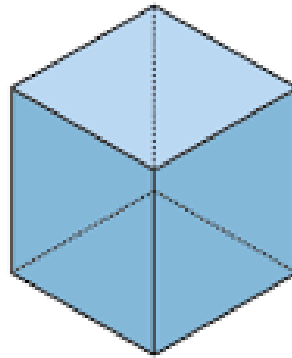
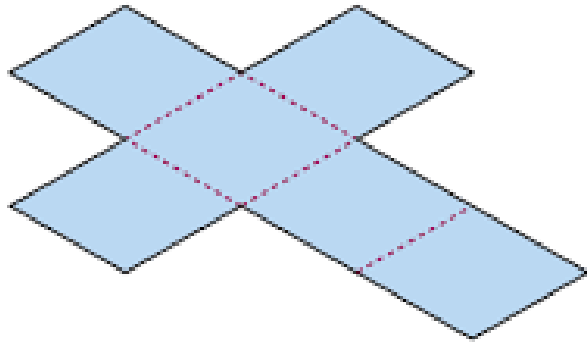
NETS FOR BUILDING 3D SHAPES

- A net is a sort of skeleton-outline in 2D which when folded results in a 3D shape.



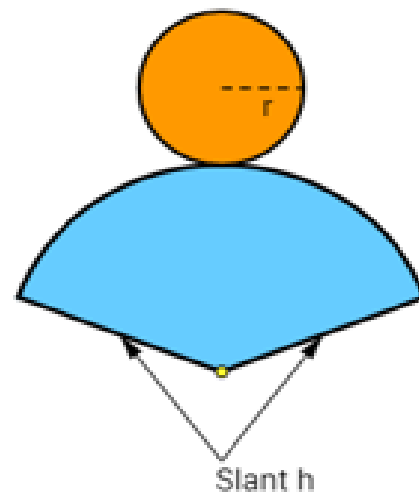
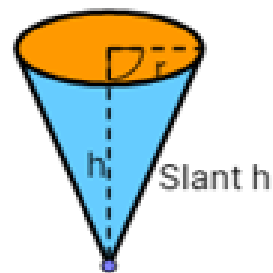
NET for CUBOID

NET for CUBE

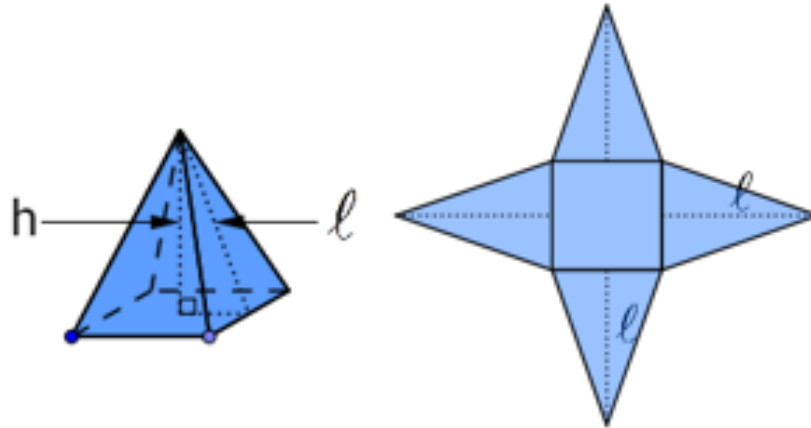


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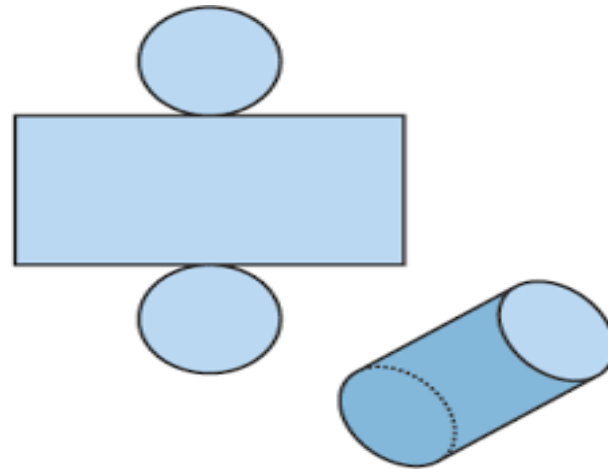
NET for CONE



NET for PYRAMID



NET for CYLINDER

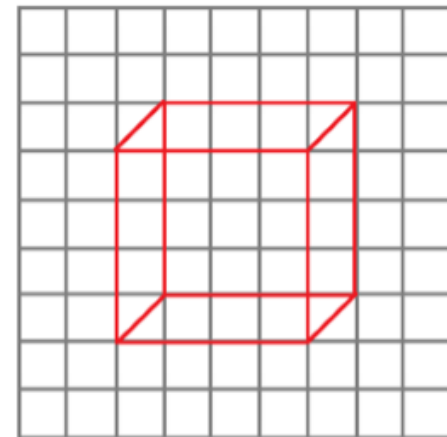


DRAWING SOLIDS ON A FLAT SURFACE (2D REPRESENTATION OF 3D SHAPES)

- As you know that the 3D shapes are the shapes which occupy some space but we can draw the 3D shapes on the flat surface also by some techniques. This is called a visual illusion.
- There are two techniques to help you understand the concept.
 - » Oblique sketches
 - » Isometric sketches

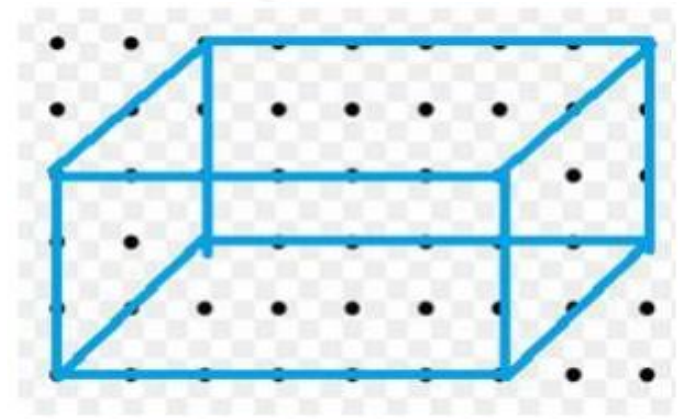
1. OBLIQUE SKETCHES

- When we draw a shape in such a way that we are not able to see some of the faces of the 3D shape and the size of the length is also not equal but we are able to recognize that this is a cube then this is called **an Oblique Sketch**.



2. ISOMETRIC SKETCHES

- The isometric sheet is the sheet made up of dots. When we draw the shape on the isometric sheet with the measurements proportional to the original figure then it is said to be **Isometric sketch**.



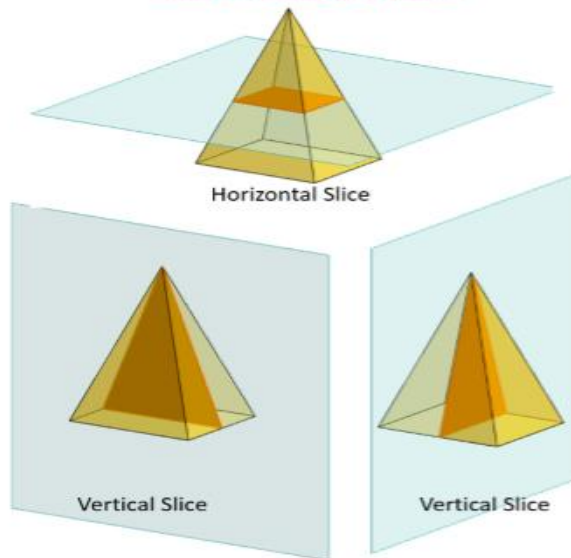
VIEWING DIFFERENT SECTIONS OF A SOLID

- There are three ways to see the different sections of the 3D shape
 - **View an object by Cutting or Slicing**
 - **Viewing an object by its Shadow**
 - **Viewing from different angles to get different views**

VIEW AN OBJECT BY CUTTING OR SLICING

- When we cut any 3D object horizontally or vertically, we get a 2D face of that figure. This is called the **Cross-section**. The shape of the cross section depends upon the type of cut like horizontal or vertical.
- If we give a horizontal cut to a rectangular pyramid then the cross section will be a rectangle in shape and if we cut it vertically then we get the shape of a triangle.

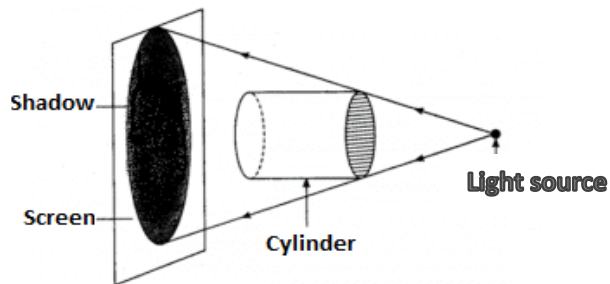
Slicing a Rectangular Pyramid



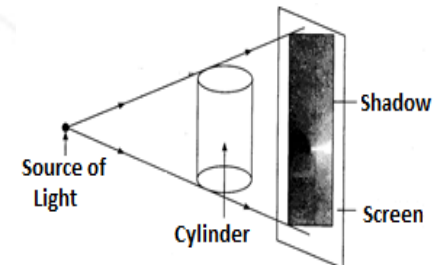
VIEWING AN OBJECT BY ITS SHADOW

#FT011

- If we throw the torchlight on any 3D object then we will get the shadow of that object on the plane in the form of 2D shape. The resultant shape depends upon the side of the object where we throw the light.



- If we throw the light on the cylinder from its circular side then we will get the image of a circle.
- if we throw the light on the cylinder while it is on standing position then its shadow will be rectangular in shape



VIEWING FROM DIFFERENT ANGLES TO GET DIFFERENT VIEWS

- All the 3D objects have a different view if we see them from different sides. By seeing them from different angles we can observe them easily.

