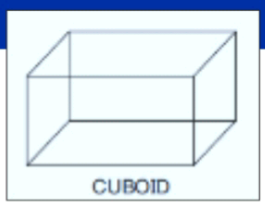
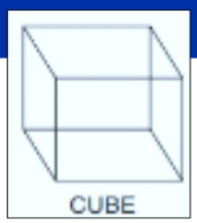
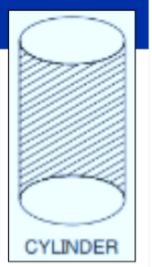
SOLID SHAPES

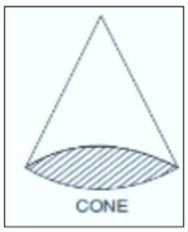
Grade 8
Subject: MATHEMATICS

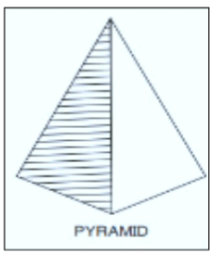
SOLID 3-D SHAPES





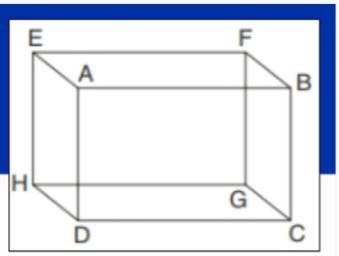






Dynos

CUBOIDS



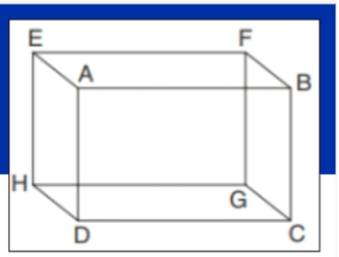
Definition :

A solid shape which is made up of six rectangular plane regions is called a **Cuboid**.

Example: Match-box, Chalk box, Tiffin box, etc.

Dynos

CONT...

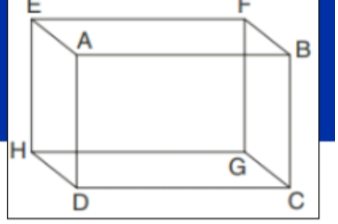


FACES:

- **Faces** are the rectangular plane regions the cuboid is made up of.
- A **cuboid** has **six faces** : ABCD, EFGH, ABFE, BCGF, CDHG and ADHE.

Dynos

CONT...

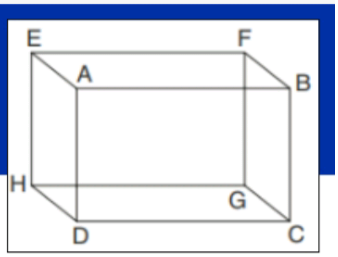


EDGES:

- The sides of a figure are called Edges.
- In given cuboid, there are twelve edges: AB, BC, CD, DA, EF, FG, GH, HE, AE, BF, CG and DH.
- Hence, Edge is a line segment where any two adjacent faces of a cuboid meet.

Dynos

CONT...



VERTEX:

- The point of intersection of three edges is called Vertex.
- The vertices of given cuboid are A, B, C, D, E, F, G and H.
- Thus, a cuboid has 8 vertices.

Dynos

BASE AND LATERAL FACES

- BASE:

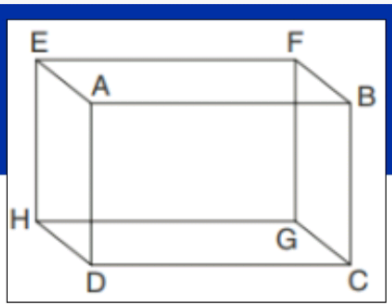
  Any face of a given cuboid is known as the Base Of The Cuboid.

- LATERAL FACE:

  The four faces which meet the base are called the Lateral Faces Of The Cuboid.

Dynos

CONT....



In given cuboid, if CDHG is the base then ADHE, ABCD, EFGH and BCGF are the lateral faces of the cuboid.

POINTS TO REMEMBER

1) A cuboid has 6 faces, 12 edges and 8 vertices.

2) A cuboid whose length, breadth and height are all equal is called a Cube.

TOTAL SURFACE AREA OF A CUBOID

Grade 8
Subject: MATHEMATICS

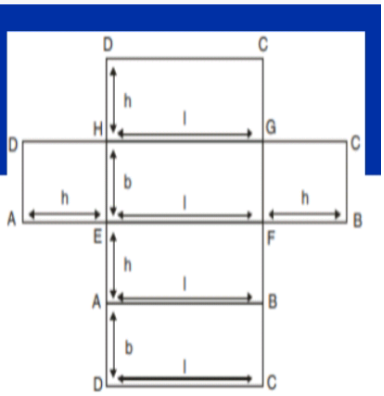
INTRODUCTION

The surface of a cuboid has six rectangular faces.

∴ The surface area of a cuboid = The sum of the areas of all its six rectangular faces

Dynos

TOTAL SURFACE AREA OF A CUBOID



Consider a cuboidal box where,

Length = l cm ; Breadth = b cm ;

Height = h cm

Hence,

- Area of face CDHG = Area of face ABFE
  = l × h

Dynos

CONT...

- Area of face EFGH = Area of face ABCD = l × b
- Area of face ADHE = Area of face BCGF = b × h

∴ Total surface area of cuboid

= Area of face CDHG + Area of face ABFE + Area of Face EFGH + Area of face ABCD + Area of face ADHE + Area of face BCGF

CONT...

$$= l \times h + l \times h + l \times b + l \times b + b \times h + b \times h$$

$$= 2lh + 2lb + 2bh = 2(lh + hb + bl)$$

Thus,

Total surface area of cuboid = 2(lh + hb + bl)

RIGHT CIRCULAR CYLINDER

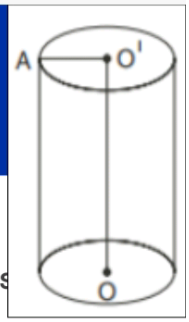
Grade 8
Subject: MATHEMATICS

INTRODUCTION

- A tin, round pillar, tube lights, water pipes are of similar shape that we know as a 'Cylindrical Shape'. These are called Cylinders.
- These solids have a curved (lateral surface) with congruent circular ends.

Dynos

CONT...



AXIS:

- The line segment that joins the centers of the two bases is called an Axis.
- In given figure, OO1 is the axis of the cylinder.
- If the axis is perpendicular to the circular ends, then the cylinder is known as a Right Circular Cylinder.

Dynos

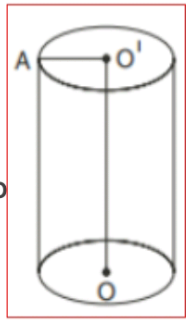
CONT...

BASE is the circular ends on which the cylinder rests.

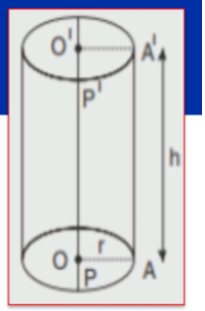
RADIUS of the circular bases is the radius of the cylinder.

HEIGHT is the length of the axis of the cylinder.

LATERAL SURFACE is the curved surface joining the two bases of a right circular cylinder.



SURFACE AREA OF A RIGHT CIRCULAR CYLINDER



Consider a right circular cylinder with ;

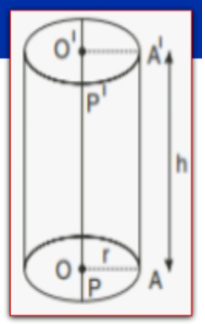
radius r and height h.

Each base is a circle of radius r.

∴ Length of each circular edge is $2\pi r$.

Dynos

SURFACE AREA OF A RIGHT CIRCULAR CYLINDER



∴ Lateral surface area of cylinder

= Area of rectangle with length $2\pi r$ and height h

$= 2\pi rh$ *square units*

Dynos

SURFACE AREA OF A RIGHT CIRCULAR CYLINDER

Each base is a circle.

∴ Surface area of one base = πr^2

So, Surface area of two bases = $2\pi r^2$

∴ Total surface area of cylinder = $2\pi rh + 2\pi r^2$ sq. units

= $2\pi r\ (h + r)$ sq. units

Dynos

SURFACE AREA OF A RIGHT CIRCULAR CYLINDER

Hence,

- Lateral surface area of cylinder = $2\pi rh$ sq. units
- Total surface area of cylinder = $2\pi r\ (h + r)$ sq. units