UNIT-1

GEOMETRY

1.1 Properties of 2D Shaped objects

Let us learn the names of 2D shapes.

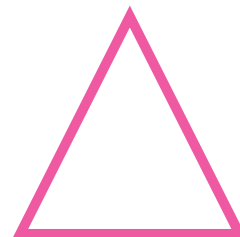Look at the picture and identify the shapes.

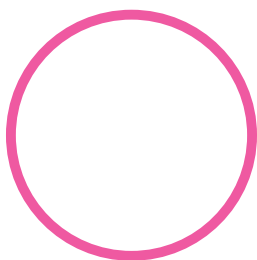**Can you identify the shapes of the objects in the given image?**

Name the following shapes and try to draw them in your note book.

_____   _____   _____

_____   _____

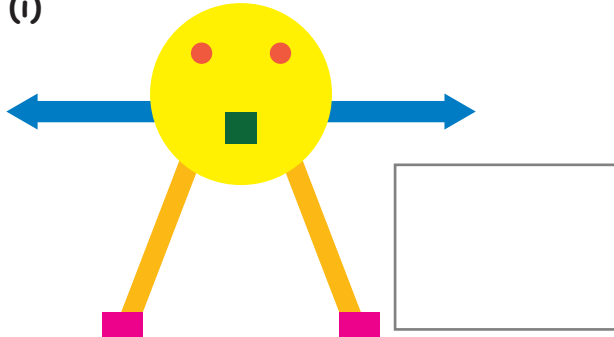Draw different shapes on the ground ask the children to stand on the particular shape which is called out by the teacher.

Make the children into groups of 3 or 4 and ask them to form different shapes.

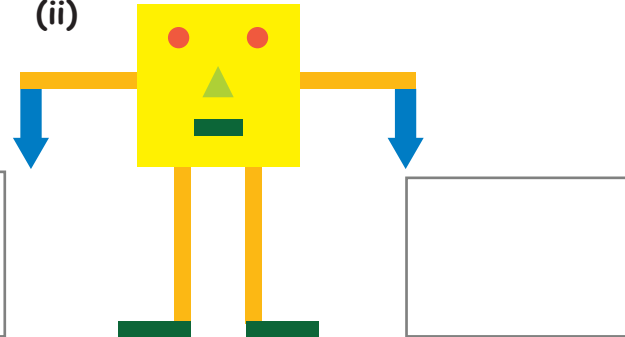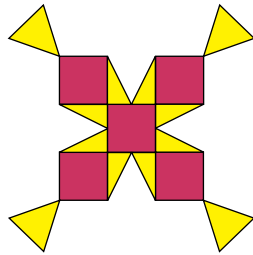**A.** Write the names of shape in the following pictures.

(i)

(ii)

B.

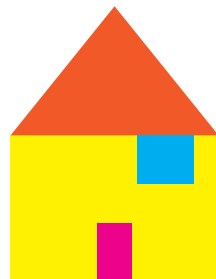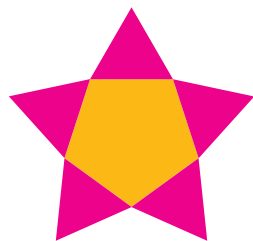| i	Write the number of squares and triangles in the given picture.
	Square ⬭ Triangle ⬭
ii	Write the number of rectangles and triangles in the given picture.
	Rectangle ⬭ Triangle ⬭
iii	Identify the shapes and write the names in the boxes given below.

Draw circles using circular objects.

Place a bangle or a coin on a paper. Trace its boundary. The picture you get is a circle.

Activity

Let us draw the circle using a pencil and thread.

1. Mark a point A on a sheet.

2. Fix the thread at the point A and tie the pencil on the other end of the thread as shown in the figure.

3. Move the pencil by keeping the thread at A. Point A is called the centre of the circle.
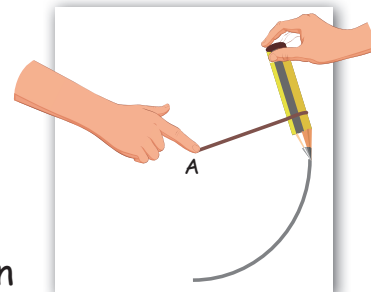
1.1.1 Draw 2D shapes in free hand with geometry tools

EXAMPLES
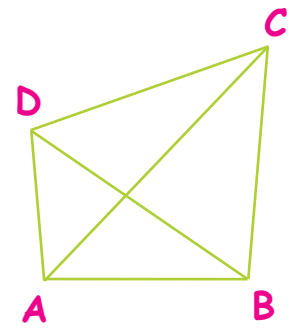

| Square | Rhombus | Rectangle | Trapezium | Parallelogram |

Quadrilateral

1. All closed four sided figures are called **quadrilaterals**
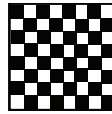2. It has four sides (AB,BC,CD,DA), four vertices (A,B,C,D) and two diagonals (AC,BD)

Square

A square has four equal sides (PQ=QR=RS=SP), four vertices (P, Q, R, S) and two diagonals (PR, QS). The diagonals of a square are equal in length (PR = QS).
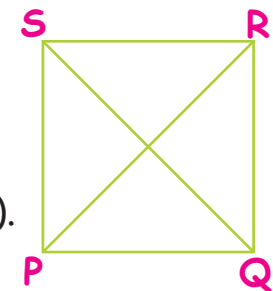
Examples

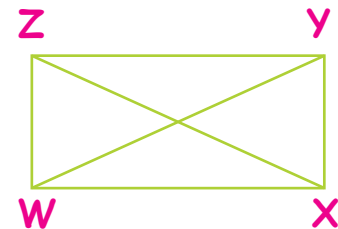Carom board   Chess board   One face of the dice

Rectangle

A rectangle has four sides (WX, XY, YZ, ZW) and four vertices (W, X, Y, Z). It has two equal diagonals (WY = ZX) and opposite sides are equal (WX = YZ ; XY = WZ).
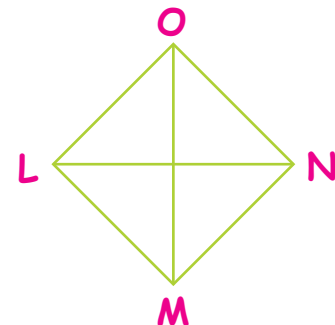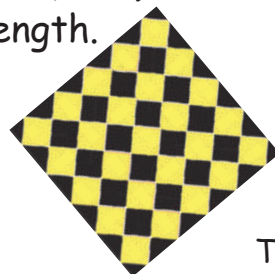
Examples

Mat   Black Board

Rhombus

A rhombus has four equal sides (LM = MN = NO = OL) , four vertices (L, M, N, O) and two diagonals (LN, MO). The diagonals are not equal in length.
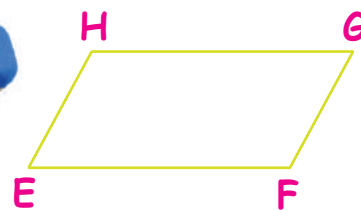
Examples

Kite   Tile

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Parallelogram

A Parallelogram has four sides (EF, FG, GH, HE) and four vertices (E,F, G, H). Opposite sides are parallel and equal in length (EF=GH; FG=HE)
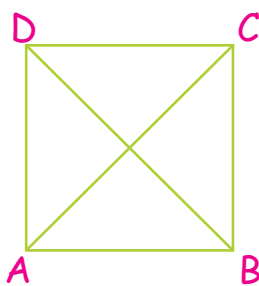
Activity

Form different shapes using Geoboard and discuss the similarities and differences among the shapes.
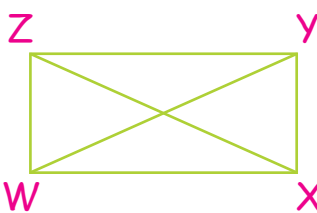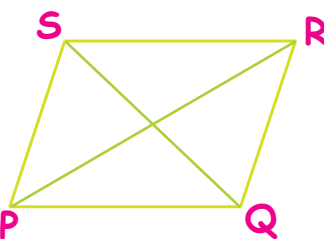
Exercise 1.2
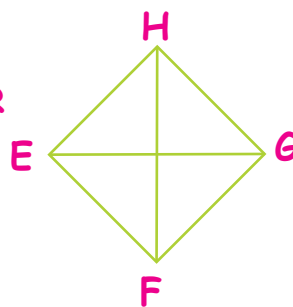
A. Fill in the blanks.

i   All closed four sided figures are called _____.

ii.   A _____ has four equal sides and equal diagonals.

iii. The opposite sides of a _____ are equal.

iv.   A _____ has no sides.

v.   Diagonals are equal in _____ and _____.

B. Write the name of the sides and diagonals.

_____   _____   _____   _____

_____   _____   _____   _____

Activity

Draw circles of different size. Measure the distance between center and a point on the circle. Find whether the distances are same.

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1.1.2 Drawing a circle using compass

A compass is a geometrical instrument which has two arms, one is a needle and the other one is a pencil holder. We use compass to draw circles.
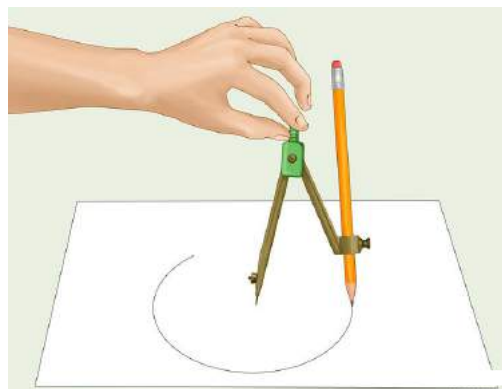
EXAMPLE

Draw a circle of radius 5cm using a compass.

Step 1 Take a compass and fix the pencil in it.

Step 2 Set the distance between two arms of the compass as 5cm using a scale.

Step 3 Fix firmly the needle of the compass on a point which is marked on the paper.

Step 4 Move the pencil around it in any direction till you reach the starting point.

Exercise 1.3

Draw circles for the following measurements.

a. 6 cm   b. 5.5cm   c. 8cm   d. 6.8cm   e. 8.6cm

1.1.3 Identifying center, radius and diameter of a circle

Circle is perfectly round in shape. It has no **sides** and no **diagonals**. 'O' is the center of the circle. The distance from the center to each of these points A, B, C, D,E is the **radius** of the circle. Radius is equal in length (OA=OB=OC=OD=OE).

All the radii are equal in length in a circle.

A Line segment AB passes through the center of the circle O .AB is the diameter of the circle. The line segments XY and LM are the **Chords** (XY, LM, AB). The longest chord of a circle is the **diameter** (AB). The radius is always half of the diameter.

Diameter is the longest chord.

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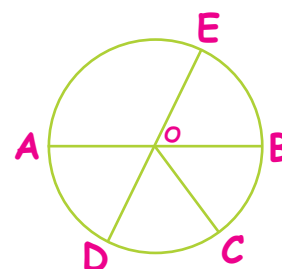
EXAMPLE

1. The radius of circle is 5cm. Find the diameter.

   Diameter = 2 x radius

            = 2 x 5

   Diameter = 10 cm

> Diameter = 2 × radius
>
> Radius = $\dfrac{Diameter}{2}$

2. The diameter of a circle is 88cm. Find the radius

   Radius $= \dfrac{diameter}{2}$ $= \dfrac{88}{2}$

   Radius   = 44 cm.

Activity

Measure the radius and diameter of the following circles.
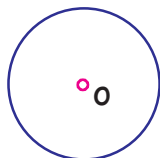
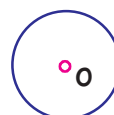Radius = ---------   Radius = ---------   Radius = ---------
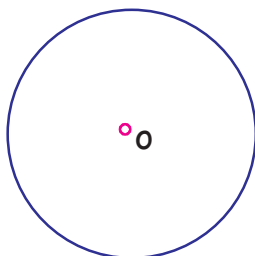
Diameter = ------   Diameter = ------   Diameter = ------

Exercise 1.4

A. Fill in the blanks.

i. All the radii of a circle are _____.

ii. The _____ is the longest chord of a circle.

iii. A line segment joining any point on the circle to its center is called the _____ of the circle.

iv. A line segment with its end points on the circle is called a _____.

v. Twice the radius is _____.

B. Find the diameter of the circle.

    i. Radius = 10cm   ii. Radius = 8cm   iii. Radius = 6cm

C. Find the radius of the circle.

    i. Diameter = 24cm ii. Diameter =30cm iii. Diameter = 76cm

Let us know

Circle

▶ A line segment joining any point on the circle to its center is called a **radius** of the circle .

▶ A line segment with its end points on the circle is called a **chord**.

▶ A chord passing through the center of the circle is called the **diameter**.
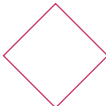
▶ The diameter is the longest chord.

Understand the properties of 2D objects.

Activity

Measure the sides and identify the names of different objects and find the differences among them and fill the table given below.

(a) Chessboard (b) Postcard   (c) Window   (g) Kite

(d) Paper   (e) Newspaper (f) Maths Kit box.

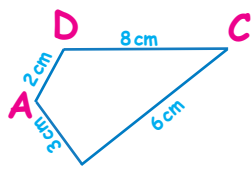| Shapes	Object in the shape	Sides	Vertices	Diagonals
Square		Four equal sides	4	Two diagonals are equal
Rectangle				
Parallelogram				
Rhombus				

1.1.4 Identify the sides and find perimeter of a quadrilateral

Perimeter

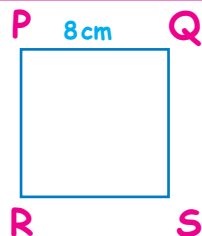The perimeter of a closed figure is the sum the lengths of its side (edges).

EXAMPLES

Find the perimeter of the following figures.

Sides = AB, BC, CD, DA

Perimeter = AB + BC + CD + DA

= 3 + 6 + 8 + 2 = 19
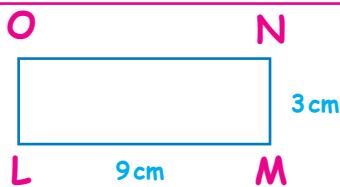
Perimeter= 19cm

In a given square all the sides are equal.
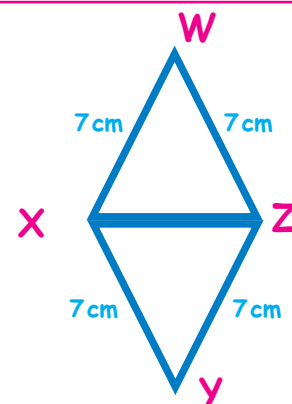
Therefore, Perimeter of a square = PQ + QS + SR + RP

= 8 + 8 + 8 + 8 = 32

Perimeter of a square = 32cm

In a given rectangle opposite sides are equal.

Perimeter = LM +MN + NO + OP

= 9 + 3 + 9 + 3 = 24

Perimeter = 24cm

Perimeter =WX + XY +YZ + ZX

=7+ 7 + 7 + 7 = 28

Perimeter = 28cm

Activity

Find the Perimeter of Table, Desk, Black board and Door in your class room.

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A. Find the perimeter of the following figures.

i.
D — 5cm — C
6cm
3cm
A
8cm
B

ii.
S — 2cm — R
7cm
5cm
P
10cm
Q

iii.
D — 7cm — C
4cm
4cm
A
7cm
B

iv.
S
R
P
11cm
Q

v.
H
G
5cm
E
10cm
F

B. Solve the following.

1. A side of a square-shaped sandbox in Gandhi Park measures 30 cm. Determine the perimeter of the sandbox.

2. Find the perimeter of a rectangle, whose sides are 12 cm and 8 cm.

3. Find the perimeter of the triangle, whose sides are 13 cm, 5 cm and 14 cm.

4. The adjacent sides of a parallelogram are 6 cm and 7 cm. What is the perimeter of the parallelogram?

5. The sides of a trapezoid measures 8 cm, 7 cm, 4 cm and 5 cm respectively. What is the perimeter of the trapezoid?

1.2 Creating objects by combining different 2D shapes

1.2.1 Uses of tangram in combining different 2D shapes.

Tangram is a thousand years old Chinese puzzle consisting five or seven geometrical pieces called **tans** put together to form different pictures.

House   House   Candle

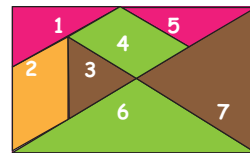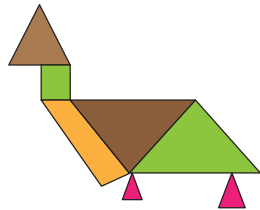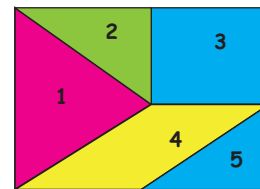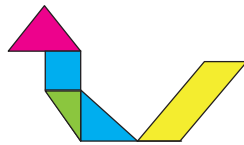Helicopter   Ship   Rocket

Boat   Fish   Horse riding
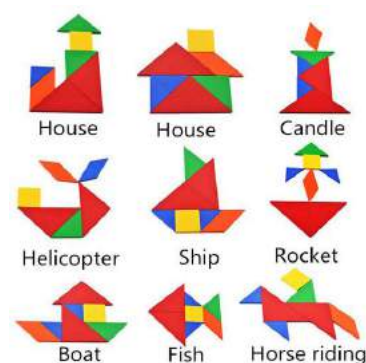
Playing with tangrams, can develop skills such as problem-solving, logical thinking, perceptual reasoning, visual spatial awareness and creativity.

EXAMPLES

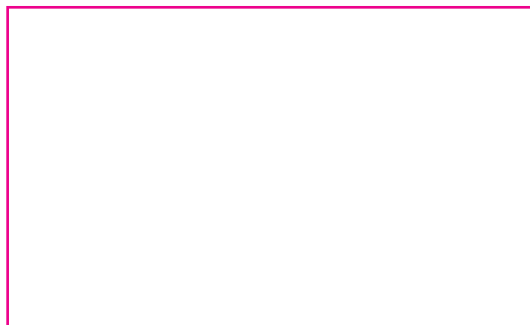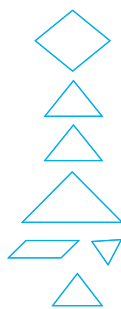1. Join the seven pieces of tangram to form the following picture.

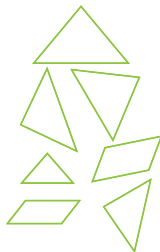
2. Join the five pieces of tangram to form the following picture.

Activity

Arrange the tangram pieces to form pictures.

1.

2.

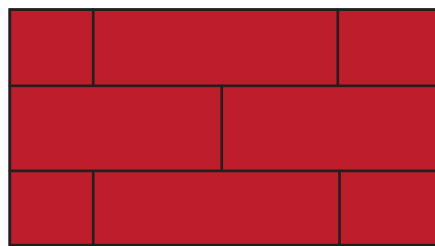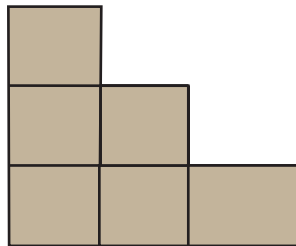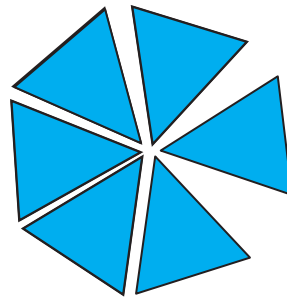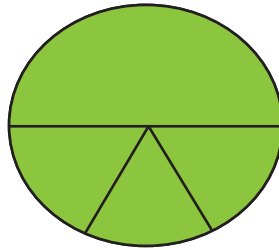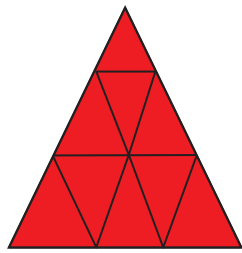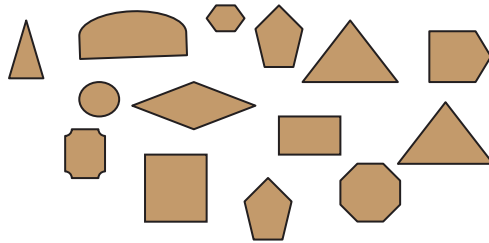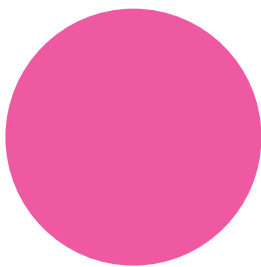**1.2.2 Fill the space with the given two or three geometrical shaped tiles.**

Let us choose and arrange these tiles to form regular shapes.

Try This

Can we fill a circle with square tiles?

No. we can't fill a circle with square tiles because circle is curved figure.

A. Fill the following diagrams with appropriate tiles.
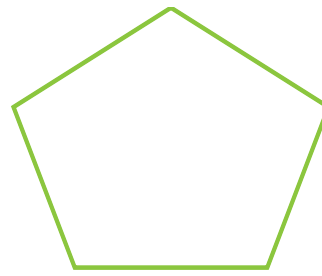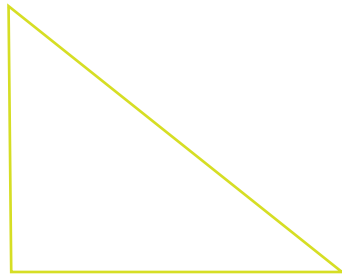
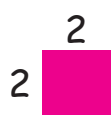## Activity 1

Which tile will you choose to fill the space given below and find how many tiles are needed to fill the given space.
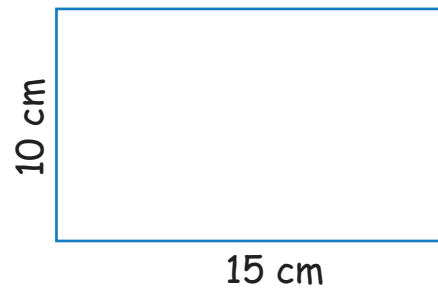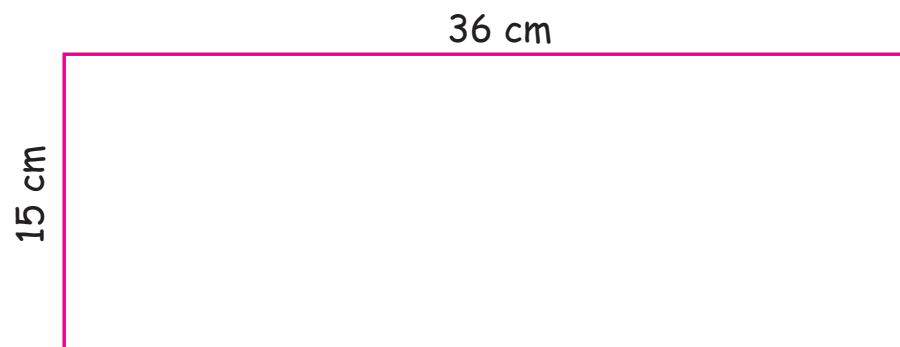
a)
3
2

b)
2
2

c)
5
2

10 cm

15 cm

Activity 2

Fill the table given below by fixing the appropriate tile in the space given below

36 cm

15 cm

S.No.	Shape of the tile	Number of tiles	Does it exactly fits the space?
1.	Triangle (4cm, 5cm, 5cm)	2	no
2.	Rectangle (3cm, 6cm)	30	yes
3.	Rectangle (6cm, 5cm)		
4.	Square (side 6cm)		
5.	Rectangle (5cm, 12cm)		
6.	Rectangle (6cm, 18cm)		
7.	Rectangle (3cm, 12cm)		
8.	Triangle (3cm, 4cm, 5cm)		

1.3 Properties of 3D objects

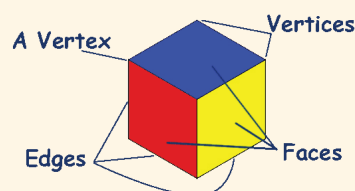**Create 3D objects using clay and paper folding.**

A figure that you can cut and fold to make a model of a solid shape is called a net. Nets are used to make floor maps of houses, layout planes of buildings, bridges and so on.

Cube

A cube has 6 plane faces, 12 edges and 8 vertices. All the six faces are equal.

Examples

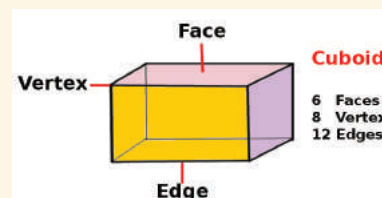Dice, ice cubes, building blocks, rubik's cube.

Cuboid

A cuboid has 6 plane faces. 12 edges and 8 vertices. Its opposite faces are equal.

Examples

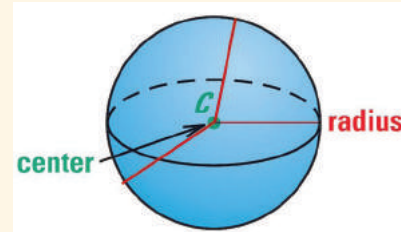Match box, bricks, eraser, book, toothpaste box.

Sphere

A sphere has only one curved surface.
It has no vertices and edges.

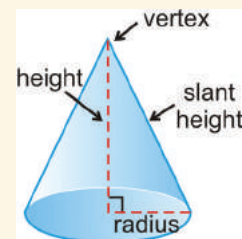**Examples**

ball, globe, laddu.

Cone

A cone has one plane face and one curved surface. It has one vertex.

Examples

Cone ice cream, party cap

Cylinder

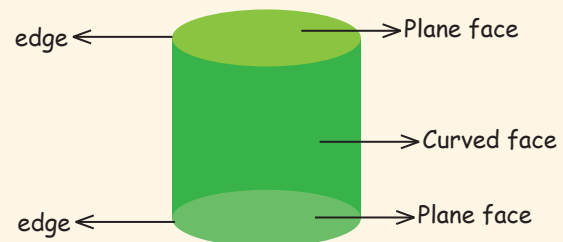A cylinder has 2 plane faces and 1 curved surface.
It has no edges and vertices.

Examples
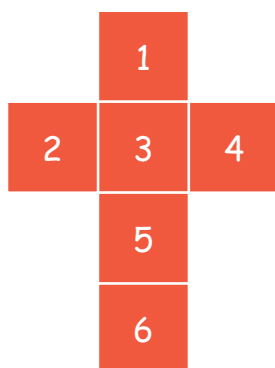
straw, gas cylinder, pipe.

Activities

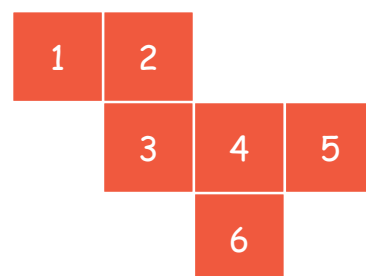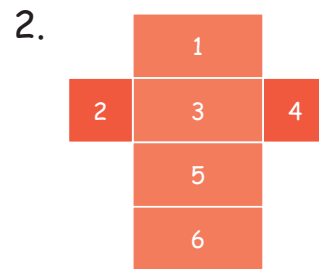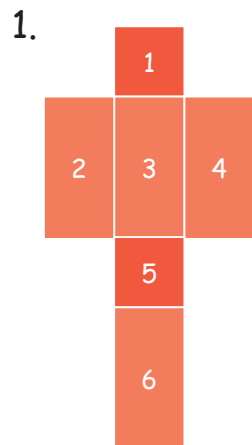a. **Form the cube by folding the nets given below.**

1.

	1	
2	3	4
	5	
	6	

2.

1	2	
	3	
	4	
	5	6

3.

1	2		
	3	4	5
		6	
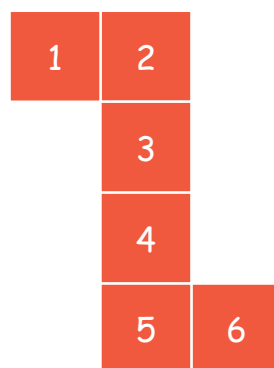
b. Use these nets to form cuboids.

1.

	1	
2	3	4
	5	
	6	

2.

1		
2	3	4
	5	
	6	

Try this

Make 3D shapes using clay.

c. Make a cone with semicircle.

d. Make a cylinder using rectangle sheet.

Exercise 1.7

A. Choose the correct answer.

i. A cuboid has _____ edges.

    a) 6   b) 8   c) 12

ii. The shape of a dice is like a _____ .

    a) cuboid   b) cube   c) sphere

iii. A _____ has a curved surface and two plane faces.

    a) cylinder   b) cone   c) sphere

iv. I have one vertex and one plane face. I am a _____ .

    a) cone   b) cylinder   c) sphere

v. A cube has _____ vertices.

    a) 8   b) 12   c) 6

Compare and differentiate 2D and 3D objects.

Concept	2D	3D
Expansion	Two dimension	Three dimension
Dimensions	Length and breadth	Length, breadth and height.
Examples	Square, rectangle, circle, triangle, rhombus, parallelograms, trapezium and quadrilateral	Cube, cuboid, cone, cylinder and sphere.

Find out 2D and 3D objects from the given pictures.