



Master Lesson Plan

For

Understanding Elementary Shapes

Board	Standard	Subject	Chapter	Language	Reference Link	Creation date
CBSE	STD VI	Mathematics	Understanding Elementary Shapes	English	Understanding Elementary Shapes	2020-06-20 14:10:42

Understanding Elementary Shapes

1. MS_Objectives-Understanding Elementary Shapes

OBJECTIVES

Notes to teacher:

This asset lays down the proposed plan for transacting this chapter. It states the asset objectives of the MLP. This asset is for teacher's reference and need not be taught to students.

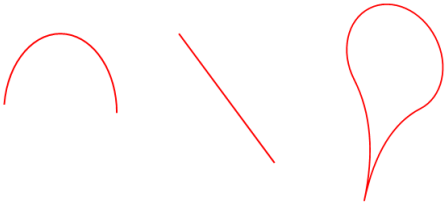
Students will be able to:

1. Relate things they see in daily life to lines and curves.
2. Define line, ray and line segment and compare the length of two line segments.
3. Define right angle and straight angle.
4. Define acute, obtuse and reflex angles.
5. Correlate right and straight angles with angles made by hands of a clock.
6. Describe the measurement of an angle using a protractor.
7. Establish the relationship between angles and sides of a triangle.
8. Define and distinguish different types of triangles on the basis of angles and sides.
9. Relate shapes occurring in symbols and the human body to triangles.
10. Define perpendicular lines and perpendicular bisector of a line.
11. Solve inquisitive questions related to angles.
12. Develop optimism by looking at situations through a broad angle.
13. Solve questions related to the measure of angles and sides of a triangle.
14. Define different types of quadrilaterals.
15. Define different types of polygons.
16. Identify three dimensional shapes and define their parts.
17. Identify the number of edges, faces and vertices of three dimensional figures.
18. Solve questions related to polygons.

Time to teach	Asset Type	Theme	SubTheme
3 Minutes	MS	Line, curve and angle	

2. DD_ Introduction to geometrical shapes

We are surrounded by many shapes. These shapes are formed by curves, lines or by both.



We see they are of different sizes.

- Roads are straight lines and in bends they are in the form of curves.



- Rivers alternatively go straight and go in curves.



- Some people have straight hair and some have curly (curve) hair.



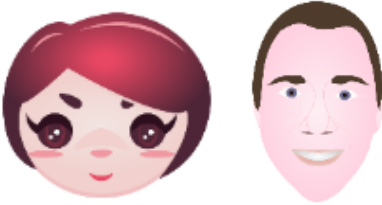
- Halls are mostly rectangular in shape.



- Our soaps are rectangular in shape.



- Some people have round shaped face and some have oval shaped face.



- Our birthday cakes are mostly round or square in shape.



- Chapatis and dosas are of round shape.



Image source:

Road Aerial View-SSSVV Gallery-Keyword- flyover

Road-SSSVV Gallery-Keyword-highway

River- SSSVV Gallery-Keyword- gorge

River-SSSVV Gallery-Keyword-stream

Long hair: <https://openclipart.org/detail/287960/girl-with-long-hair>

Short hair: <https://openclipart.org/detail/262312/mom-face-brown>

Hall: <https://openclipart.org/detail/206062/fourth489500>

Soap-SSSVV Gallery-Keyword-soap

Round face: <https://openclipart.org/detail/310598/girl>

Oval face: <https://openclipart.org/detail/171439/man-face>

Cake round: <https://openclipart.org/detail/263723/flickering-candle-birthday-cake>

Cake: SSSVV Gallery-Keyword- cake

Roti: SSSVV Gallery- Keyword-roti

Dosa: SSSVV Gallery-Keyword-dosa

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Day-to-day Relevance	Line, Curve & Angle	Angles based on direction(right, straight and complete)

3. MS_ Line, Line Segment and Ray

We see many shapes around us. These shapes are formed by curves, lines or by both. They can be of different sizes. Shapes like triangles, squares, etc, have sides and angles. We try to compare them.

COMPARISON OF LINE SEGMENT

Let us first understand the basic difference between a line, a line segment and a ray.

A straight one dimensional figure that can be extended in both directions is a line. It has no thickness.



l is a line.

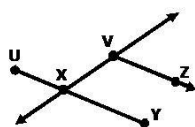
LINE SEGMENT- Part of a line that has two endpoints.



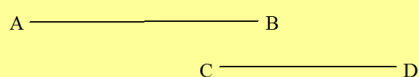
XY is a line segment.

RAY- Part of a line that has one endpoint and can be extended only in one direction.

In the figure given below, VZ is the ray.



Draw the following line segments on the board:

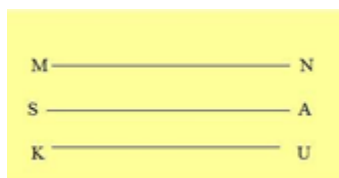


By looking at them and observing both, we can make out that AB is the longer line and CD is the smaller line.

But we can't always be sure about our judgment.

By mere observation we can say which of the given line segment is longer and which is smaller.

Now, observe the following set of line segments:



KU is the shortest of all.

Now which is the longer one?

We cannot say it. Because both appear to be of the same length.

To decide or to know exactly which is longer or shorter we can follow the methods given below:

(Teacher can help children recollect the geometrical tools present in their geometry box before she proceeds further).

Method 1: Tracing the line segment.

We will use trace paper for tracing one of the line segments. Then we place the traced line segment over the other line segment and find out which is the longer one.

Method 2: Using the ruler and the divider.

In this method, we shall use the scale (which is also known as the ruler) and divider.

We know that the scale is divided into equal parts. $1\text{cm} = 10\text{mm}$.

However, while taking the reading errors may occur.

For example:

- Position of our eye may not be exactly at the end.
- Sometimes the thickness of the scale can also affect the reading

In order to avoid these errors, we use the divider. (Divider has 2 sharp pointed ends.)

Adjust the arms of the divider and place the 2 pointed ends at the 2 ends of the line segment. Carefully place one pointer at 0 of a scale and read the marking where the 2nd pointer is on the scale.

Repeat the same for the other given line segment and note its reading.

By observing the readings we can identify the longer and the shorter line.

Image Source: Original contribution by saigaayu@gmail.com

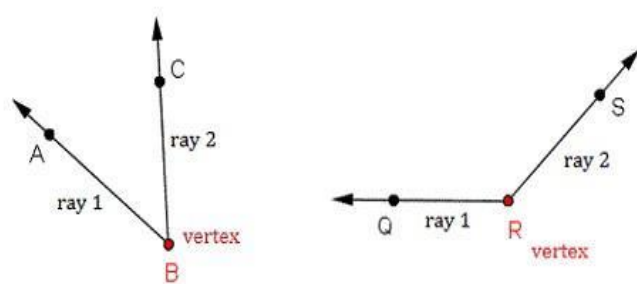
Time to teach	Asset Type	Theme	SubTheme
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15 Minutes	Main Script	Line, Curve & Angle	Measuring line segment (comparison by observation, tracing, ruler and divider)
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4. MS_Angles-Right And Straight

We begin our study of angles by learning what they are, how to name them and ways in which angles can be classified. These concepts are explained below.

An angle is formed when two rays meet at a common endpoint or vertex. The two sides of the angle are the rays, and the point that unites them is called the vertex.



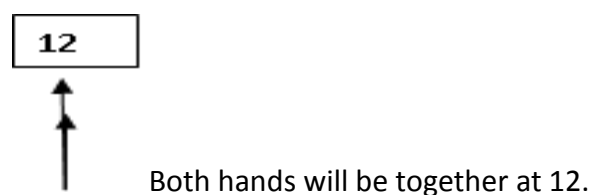
An angle is formed by two rays diverging from a common point (the vertex).

Unit of measurement of an angle is degree ($^{\circ}$).

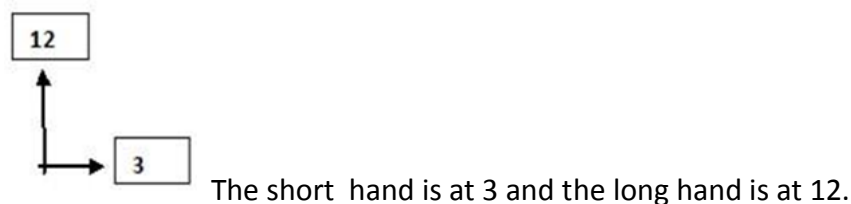
ANGLES- RIGHT AND STRAIGHT

An angle is formed when two lines or line segments or rays intersect at a point.

What is the position of the hands at 12 o'clock?



What is the position of the hands when the time is 3?



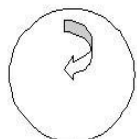
The angle formed between the hands is called 'right angle'.

We come across the right angle in life in various forms. Like:

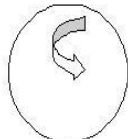
- The alphabet "L"

- The corners of the house or a room
- Turning towards west from south
- The hands of the clock at quarter past an hour

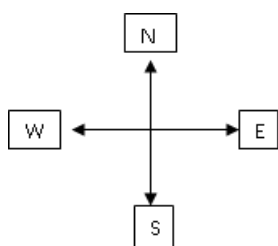
We have two type of directions called clockwise directions and anti clock directions



CLOCK-WISE DIRECTION



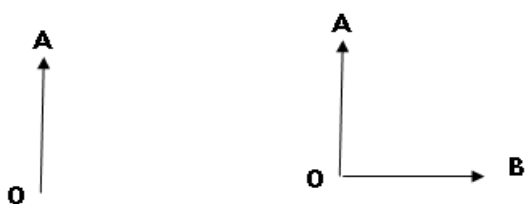
ANTI-CLOCK WISE DIRECTION



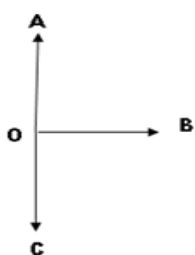
Consider the four directions - east, west, north and south. We know that if we turn through a right angle from east in the clockwise direction, we face the south. If we further turn through a right angle from south in the clockwise direction, we land at west. So, we turned through two right angles to come from east to west in the clockwise direction. It is called a **straight angle**.



Two right angles together form a straight line.

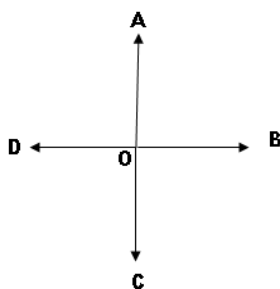


Look at the line OA. OA turns through a right angle in the clockwise direction & comes to OB.



OB turns through a right angle in the clockwise direction and comes to OC and OA turned through a straight angle.

OA & OC form a straight angle and OB & OC form a right angle.



OC turns through a right angle in the clockwise direction & comes to OD.

OC & OD form a right angle and OA & OD form a right angle.

OA has turned through one straight angle and one right angle.

If OD turns through a right angle in the clockwise direction, then it comes to the same position at A.

In this case, OA has turned through two straight angles.

When a line turns through two straight angles, it makes a full turn. This one complete turn is called **one revolution**. The angle for one revolution is a **complete angle**.

Image Source: Original contribution by saigaayu@gmail.com

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Main Script	Line, Curve & Angle	Angles based on direction(right, straight and complete)

5. DD_Clocks and Angles

Clocks and Angles

What do we see? Right angle and Straight angle?



3 O' clock (forming a right angle)



6 O'clock (forming a straight angle)



9 O'clock (forming a right angle)

Image Source:

<https://openclipart.org/detail/217065/3-oclock>

<https://openclipart.org/detail/217068/6-oclock>

<https://openclipart.org/detail/217071/9-oclock>

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Day-to-day Relevance	Line, Curve & Angle	Angles based on direction(right, straight and complete)

6. MS_ Acute, Obtuse and Reflex angles

ACUTE, OBTUSE AND REFLEX ANGLES

We studied about the right and straight angles. But, not all angles are right angle or a straight angle. If we see the leaf, which is on a tree branch, its angle is less than a right angle. If we open our pointing finger and the middle finger in our hand, we find that the angle is less than 90° . But, if we open the thumb finger and the little finger, we find that the angle is more than a right angle.

So, what do we call those angles?

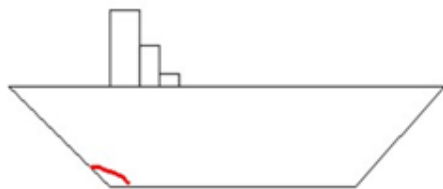
Acute angle: The angle whose measure is less than a right angle is called an acute angle.

Examples:

A shoe, a slice of pizza and a stapler.

Obtuse angle: An angle whose measure is greater than a right angle is called as an obtuse angle.

When we observe at the base of the boat we find that the angle is greater than right angle and hence, it is an obtuse angle.



Reflex angle:

The angle whose measure is greater than a straight angle is called a reflex angle.

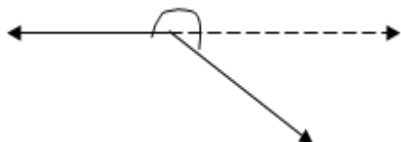


Image Source :

Original Contribution by prabha.acharya@gmail.com

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Main Script	Line, Curve & Angle	Other angles(acute, obtuse and reflex angles)

7. MS_ Measuring Angles

MEASURING ANGLES

We measure our height in cm, weight in Kg, milk in litre and so on.

Similarly, we need something to measure an angle. An angle is measured in **degrees**.

We know one complete revolution is of two straight angles or four right angles.

One complete revolution is divided into 360 equal parts. Each part is a **degree**. We write 360° to say 'three hundred sixty degrees'.

We have one instrument called a protractor to measure an angle.

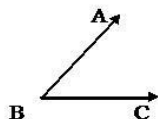
Let us see for an example, in a clock, the arms complete a full circle/revolution. This circle can be divided into 360 equal parts. Each part is called as one degree. It is denoted by the symbol ' ° '.



The protractor is divided into 180 equal parts. Each part is equal to 1° .

There are markings on the protractor from 0° to 180° , starting from left to right and vice-versa.

When we want to measure the given angle, we have to follow the following steps:



Place the protractor over the base of the given angle i.e., BC.

- Adjust the centre of the protractor to the vertex of the (given) angle, B
- BC must lie on the line joining the centre with O on the protractor.
- Read the marking on the protractor along BA

THAT READING IS THE MEASURE OF THE ANGLE FORMED BY THE LINES BA AND BC

NOTE: There are two scales- follow the scale which is having the 0 marking coinciding with the straight-edge.

When hands of a clock are on consecutive numbers they make an angle of 30° .

Example:



At 2 O'clock, the angle made by the hands is $30^\circ + 30^\circ = 60^\circ < 90^\circ$. It is an acute angle.

Image Source:

<https://pixabay.com/es/vectors/transportador-%C3%A1ngulo-geometr%C3%ADa-46461/>

<https://opencart.org/detail/217064/2-oclock>

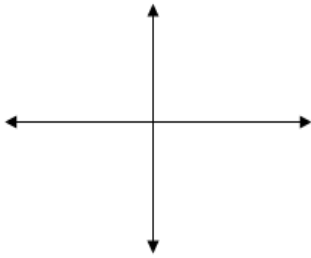
All others are original by saigaayu@gmail.com

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Main Script	Line, Curve & Angle	Measuring angles using protractor

8. MS_Perpendicular Lines

PERPENDICULAR LINES:

You might have seen the crossroads, where the four roads meet. They look like the following figure:



These roads look similar to the lines intersecting each other at a point. You observe that the angle made by the roads is equal to 90° ; i.e., a right angle.

Definition: When two lines intersect and the angle between them is a right angle, then the lines are said to be **perpendicular**.

Perpendicular bisector

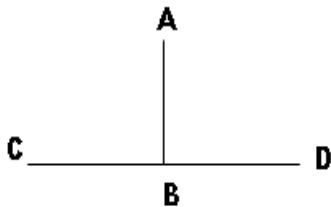
If AB and CD are perpendicular, then we say AB is perpendicular to CD and

write

$$AB \perp CD.$$

If AB is perpendicular to CD, then we can also say CD is perpendicular to AB.

$$\therefore AB \perp CD \Rightarrow CD \perp AB.$$



Suppose $AB \perp CD$ and B is a point on CD such that CB and BD are equal.

Then AB is said to be the perpendicular bisector of CD.

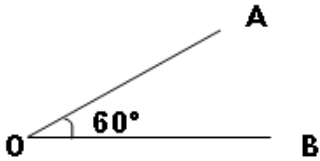
A line that is perpendicular to another line and divides it into two equal parts is the perpendicular bisector of that line.

Images original contribution by saigaayu@gmail.com

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Main Script	Line, Curve & Angle	Perpendicular lines and bisectors

9. IQ See, Listen and Answer

1.



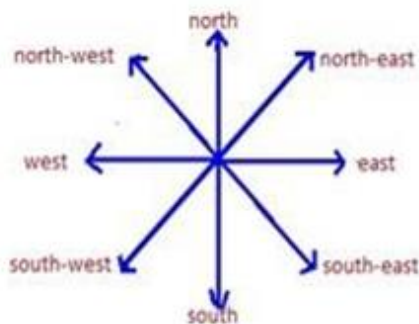
Suppose OA is rotated through a right angle in the clockwise direction and comes to a position OD. What kind of an angle is made by the lines OB and OD? Acute, obtuse, reflex?

Answer : Acute

2. Suppose OA is rotated through two right angles in the anticlockwise direction and after that turned a straight angle in the clockwise direction and comes to a position OD. Then what kind of an angle is made by the lines OB and OD? Acute, obtuse, reflex?

Answer : Acute

3. Let's find out if we can apply our understanding of angles to these different directions!



i) A man is walking towards the west. In which direction will he walk, if he suddenly changes his direction and

- Turns to the left side through one right angle.
- Turns to the right side through one straight angle.
- Turns to the left side through one complete angle.

ii)) Ramu is walking towards the north-east and Shamu is walking towards south-west. What is the angle between their directions?

Solution:

i) The angle between west and north, north and east, east and south and south and west is 90°

- Hence, if he turns to the left side through one right angle or 90° , he will walk in the south direction.
- If he turns to the right side or (left side) through one straight angle or 180° , he will walk in the east direction.
- If he turns to the left side or (right side) through one complete angle or 360° , he will make one complete revolution. Hence, he will walk in the west direction only.

ii) The angle between Ramu and Shamu's directions is one straight angle or 180° .

Images original contribution by saigaayu@gmail.com

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Inquisitive Questions	Line, Curve & Angle	Other angles(acute, obtuse and reflex angles)

10. VC_ Optimism to face challenges with hope

We have learned that the measure of a right angle is 90° and hence that of a straight angle is 180° . An angle is *acute* if its measure is smaller than that of a right angle and is *obtuse* if its measure is greater than that of a right angle and less than a straight angle.

Looking at people, things and events through a narrow (acute) angle makes us miss more important and more useful or beneficial details because we are looking from a narrow perspective. When you look at life through a narrow angle there will be lots of reasons to complain and be miserable.

On the other hand, looking at the problem from a wider angle may make the problem appear very small or insignificant. When you look at life through a wider angle which is positive and optimistic you will find better solutions for your problems and there will be lots of reasons to be enthusiastic and joyful.

A family had twin boys. They were so different from each other except in their looks. If one said hot, the other would cry cold. If one wanted the volume of the TV down, the other would claim that it needed to be turned up even more. While one was positive and cheerful, the other was always gloomy and pessimistic.

One Christmas day their father filled the pessimist's twin's room with lots of toys and games. He threw horse manure into the other kid's room. When he passed by the pessimist's room he found the kid crying bitterly.

"Why are you crying?" the father asked.

"I was thinking ---I have to read all the instructions before I start using these toys. What will happen if my toys get broken? Or worse, what if my friends feel jealous?" He started crying again.

Oh god, sighed the father. He ran to the other twin's room. He found the boy jumping with joy in the pile of manure.

"What is making you so happy?" asked the father.

"Dad look , I found horse manure here. So, that means there has to be a pony in here somewhere!"

Children! Please look at any situation from a wide (positive) angle rather than a narrow (acute) angle and you will find your answer.

Time to teach	Value Type	Value Sub Type	Value Attribute
3 Minutes	Truth	Optimism	Stories

11. SA_ Individual Activity on triangles

Aim: To enable students to identify different types of triangles

Materials required: Cutouts of equilateral triangle, isosceles triangle, scalene triangle, protractor, scale, pencil.

(Let the teacher prepare one set of cutouts and make the students prepare one set for each of them. Give one or two days time to prepare the cutouts).

Procedure:

Step 1: Name the triangle as ABC, PQR, XYZ.

Step 2: Ask the students to draw a table as follows:

Triangle	Measurement of Sides	Measurement of Angles

Step 3: Ask them to measure the sides and angles and note them in the table.

Step 4: Discussion – Ask the students to observe the values in the table.

1. If all sides are equal, then all angles are equal.

2. If all angles are equal, then all sides are equal.
3. If two sides are equal, then two angles are equal.
4. If two angles are equal, then two sides are equal.
5. If all sides are not equal, then all angles are not equal.
6. If all angles are not equal, then all sides are not equal.

Conclusion: Different types of triangles and their properties are identified.

Images original contribution by saigaayu@gmail.com

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Suggested Activity	Triangle	Special triangles(Equilateral & Isosceles triangle)

12. MS_ Classification Of Triangles

CLASSIFICATION OF TRIANGLES

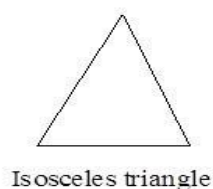
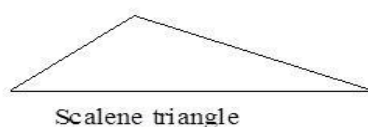
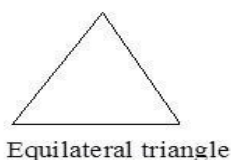
Some triangles have sides that are different, with different angle measurements. The angles and the sides are equal for some. For some, all the three sides are of different measurements.

So, we can classify the triangles based on the measure of their sides and based on the measure of their angles.

I) Classification of triangles based on the measure of the sides:

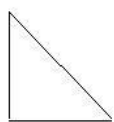
We classify the triangles into three types based on the measurement of its sides.

- a. If the measurement of the three sides of the triangle are equal then we call it “EQUILATERAL TRIANGLE”.
- b. If any two sides of the triangle are equal, we call it “ISOSCELES TRIANGLE”.
- c. If the three sides are unequal, then we call it “SCALENE TRIANGLE”.

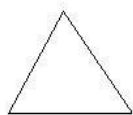


II) Classification of triangles based on the angles:

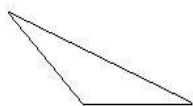
- The triangle whose three angles are acute is called as “ACUTE ANGLED TRIANGLE”
- The triangle in which one of the angles is greater than 90° is called as “OBTUSE ANGLED TRIANGLE”
- The triangle in which one of the angles is equal to 90° is called as “RIGHT ANGLE TRIANGLE”.



Right angled triangle



Acute angled triangle



Obtuse angled triangle

Images original contribution by saigaayu@gmail.com

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Main Script	Triangle	Special triangles(Equilateral & Isosceles triangle)

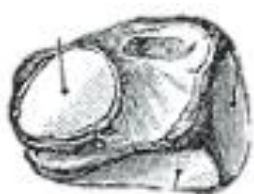
13. IA_ Attention Grabber

There is geometry in gardens and things around us.

We have also triangular parts within ourselves:

The 'triangular nerve' (the fifth cerebral nerve)

The 'triangular bone': a bone in the back row of carpal bones



The triangle (mostly regular) is used as a symbol for certain groups or organizations:

The red triangle is the symbol of the YMCA .



The blue triangle is the symbol of the YWCA



Image Source :

https://en.wikipedia.org/wiki/Triquetral_bone#/media/File:Gray223.png

<https://commons.wikimedia.org/wiki/File:RightHumanPosteriorDistalRadiusUlnaCarpals.jpg>

YMCA and YWCA symbols – OC- Radhika.bala@gmail.com

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Interesting Asides	Triangle	Special triangles(Equilateral & Isosceles triangle)

14. QA_Fill, draw and discuss

A. Fill in the Blanks

1. The triangle whose angles are less than 90° is called a _____.
2. The triangle whose angles are 90° , 45° , 45° is called a _____.
3. If the sides of a triangle are 3cm, 3cm, and 3cm, then we call it a _____ triangle.

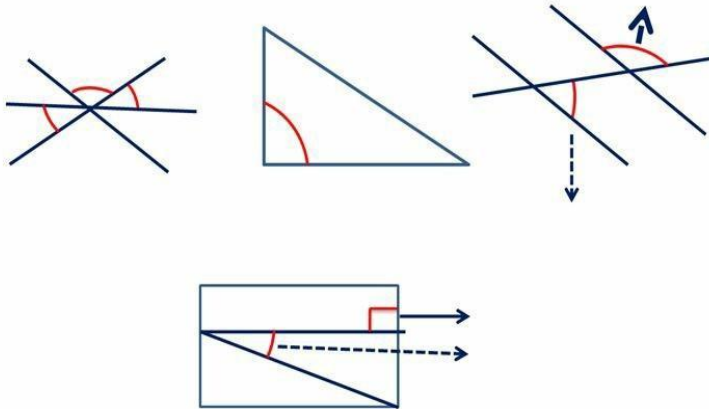
B. Draw and indicate

1. Draw an obtuse angle triangle.
2. Draw an acute angle triangle.
3. Draw a right angle triangle.
4. Draw a scalene triangle.

C. Discuss

1. Can we draw a triangle with two right angles?
2. Can a triangle be drawn with three obtuse angles?
3. Can we draw a scalene right angled triangle?

D. In the diagrams below measure the angles marked in red:



Answers:

A. Fill in the Blanks

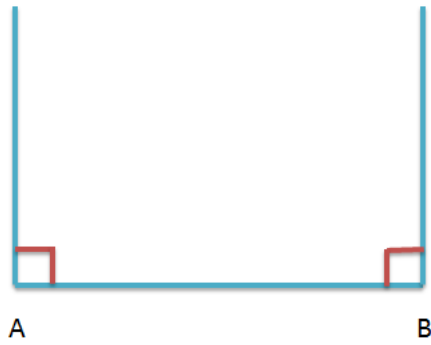
1. Acute angled triangle
2. Right triangle
3. Equilateral triangle

B. Draw and indicate:

1. Students can draw a triangle with one of the angles greater than 90 degrees
2. Students can draw a triangle with all angles less than 90 degrees
3. Students can draw a triangle with 1 angle 90 degrees
4. Students can draw a triangle with sides of different measures

C. Discuss

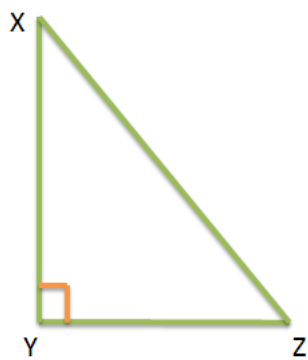
1. No. because when we draw 2 right angles on a side, the lines won't meet to form the third side.



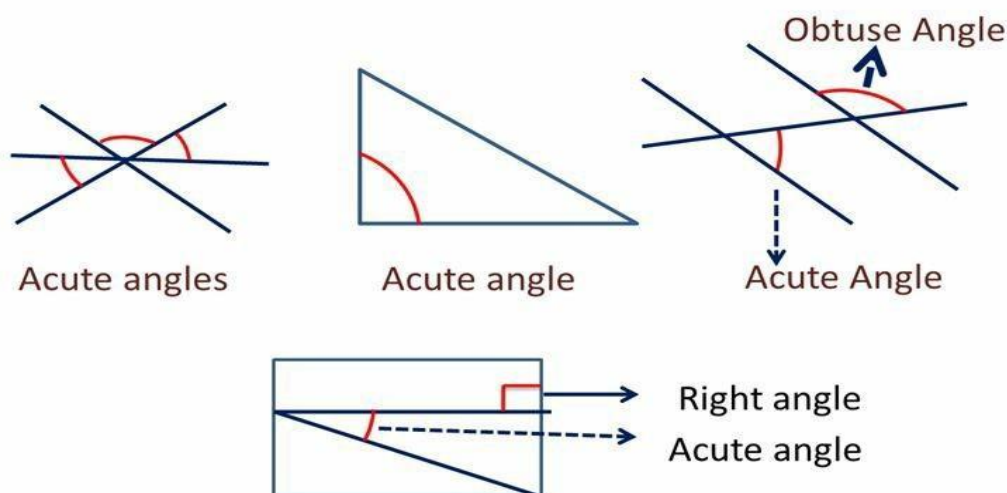
2. No. When we draw 2 obtuse angles on a side, the lines won't meet to form the third side



3. Yes. we can draw a scalene right triangle with three different measures of sides and angles



D.



All shapes original contribution by smadhavichillara@gmail.com

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Assessments	Line, Curve & Angle	Other angles(acute, obtuse and reflex angles)

15. MS_Quadrilaterals

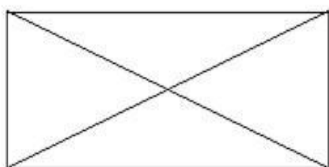
QUADRILATERAL

A polygon with four sides is called a “**QUADRILATERAL**”.

A closed figure formed by line segments is a polygon.

Various types of quadrilateral are:

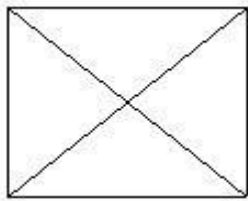
RECTANGLE:



The above picture shows a rectangle.

- Rectangle is a quadrilateral in which opposite sides are equal.
- Opposite sides are parallel.
- The angles of a rectangle are always 90° .
- There are two diagonals bisecting each other in a rectangle.

SQUARE:

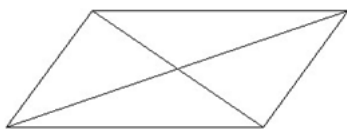


The above picture is that of a square.

- Square is a quadrilateral in which all sides equal.
- It has two diagonals. They bisect each other perpendicularly.
- The angles of the square are right angles.

PARALLELOGRAM:

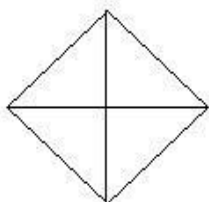
A parallelogram is a quadrilateral whose opposite sides are equal and parallel..



Its diagonals bisect each other.

The opposite angles are equal

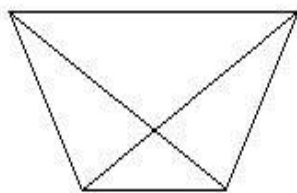
RHOMBUS:



This is how a rhombus looks.

- Rhombus is a parallelogram with all sides equal.
- The opposite angles are equal.
- The diagonals bisect each other perpendicularly.

TRAPEZIUM:



This polygon is called trapezium.

- In a trapezium, only one pair of opposite sides are parallel to each other.

The following flow-chart simplifies the different kinds of quadrilaterals:

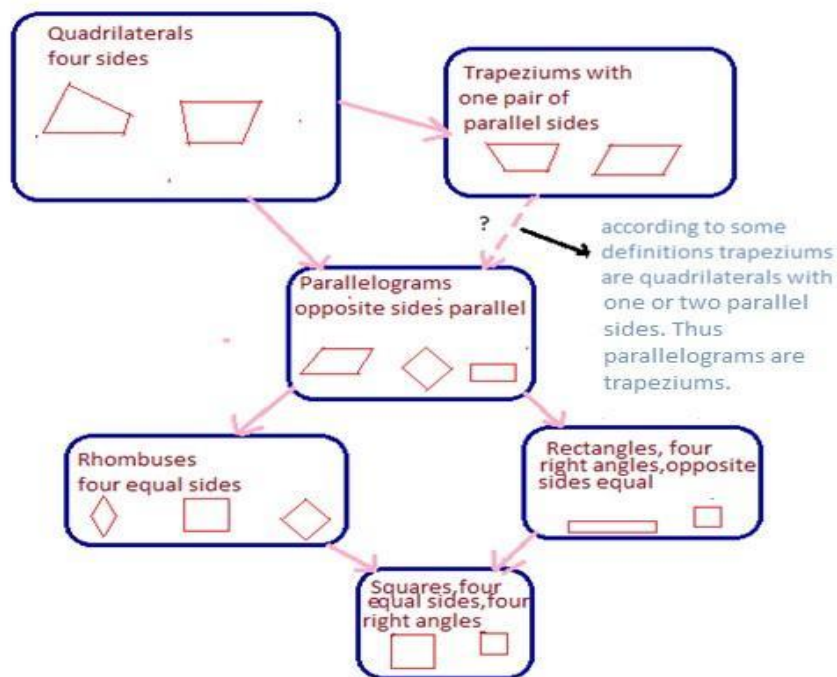


Image Source: Original Contribution by Gayathri Sai Prakash - saigaayu@gmail.com

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Main Script	Quadrilaterals	Understanding Quadrilaterals

16. MS_ Introduction to Polygons POLYGON

We know that a polygon is a closed figure, with a minimum of three sides.



The polygon with three sides is known as a "TRIANGLE".



The polygon with four sides is known as "QUADRILATERAL"



The polygon with five sides is known as "PENTAGON"



The polygon with six sides is known as "HEXAGON"



The polygon with seven sides is known as "HEPTAGON"



The polygon with eight sides is known as "OCTAGON"



The polygon with nine sides is known as "NONAGON"



The polygon with ten sides is known as "DECAGON"

We are able to name the polygons as the above mentioned based on the number of sides.

POLYGON is a two dimensional figure with straight sides.

Examples - triangles, rectangles, rhombus etc.

A regular polygon is a two dimensional figure, in which all sides and all angles are equal.

HERE ARE A FEW REGULAR POLYGONS

1. Equilateral triangle is a regular polygon as all its sides are equal and all its angles are equal.
2. Square is a regular polygon.

HERE ARE A FEW NON -REGULAR POLYGONS

1. Isosceles triangles are not regular as only two sides and two angles are equal.
2. Rectangle is not a regular polygon, though all the angles are equal, because all sides are not equal.
3. Rhombus is not a regular polygon, though all its sides are equal, because its angles are not equal.

Image Source: Original Contribution by saigaayu@gmail.com

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Main Script	Solid Geometry	Types of polygon, Types of polygon

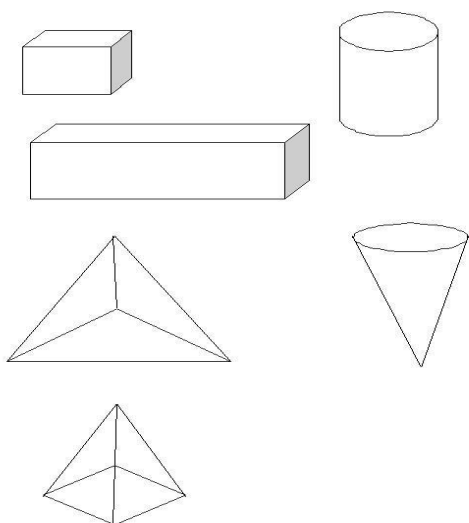
17. MS_ Three Dimensional Shapes

Three Dimensional Shapes

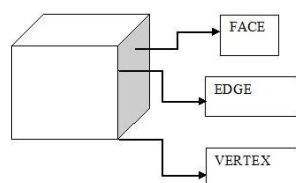
A solid figure having specific length, breadth and height is called a 3-dimensional shape.

The moment we think of 3D shapes, we get the image of a cone, sphere, sweet box, dice, cool drink cans etc. in front of our eyes.

Here are some of the pictures of the three dimensional figures:



These are the various three dimensional shapes. We can easily identify the corners for these shapes along with edges and vertices. Let us recollect what is meant by the face, edge and vertex by taking cube as an example:



The flat surface of the square is called the “FACE”.

A **face** is a 2D **shape** that makes up one surface of a **3D shape**.

Two faces meet along a line segment called “EDGE”.

Three edges meet at a point called “VERTEX”.

NOTE: THE PLURAL FORM OF VERTEX IS VERTICES.

The following picture shows a Prism and its parts.

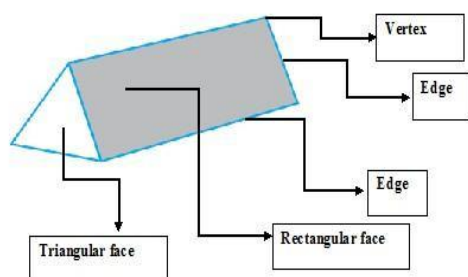


Image Source: Original Contribution by saigaayu@gmail.com

15 Minutes	Main Script	Solid Geometry	Faces, Edges and Vertices of solid shapes
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18. MS_More about 3D shapes

3D shapes and its properties

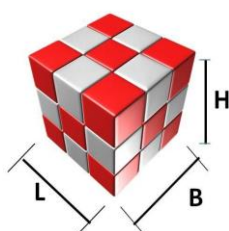
Let us see about a few 3 dimensional shapes that are seen in day-to-day life and interest us.

Cube

Cube is a three dimensional shape in which all the three dimensions are equal.

It has 6 faces, 12 edges and 8 vertices. Note that all six faces of a cube are squares.

Angle between any two edges is a right angle in any cube.

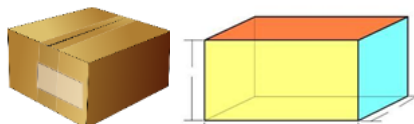


Cuboid

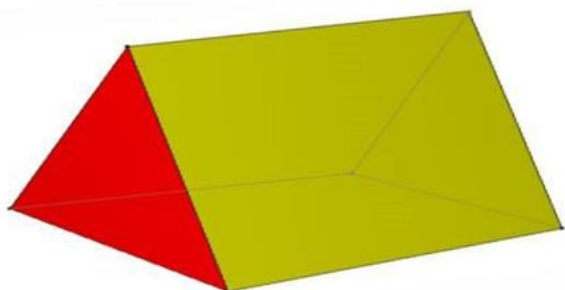
Cuboid is a three dimensional shape with different dimensions(length, breadth and height).

Cuboid is also a three dimensional shape with 6 faces, 12 edges and 8 vertices.

The difference between a cube and a cuboid is that in a cube faces are squares, whereas, in a cuboid, faces are rectangles.

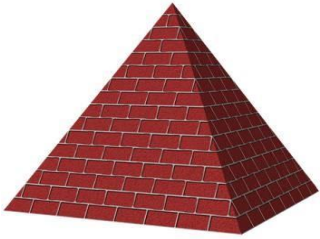


Prism



A prism is a solid object that has identical ends, flat faces and the same “Cross Section” all along its length. Here, in the given picture of a prism, when we cut along its length, we get a triangle

Pyramid



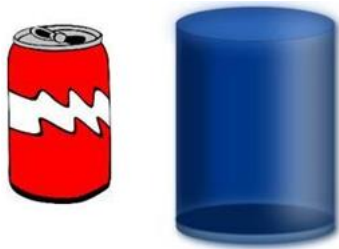
A Pyramid is a solid object where:

The sides are triangles which meet at the top (the apex).

The base is a polygon (a flat shape with straight sides),

This is a square pyramid, but there are also triangular pyramids, pentagonal pyramids, and so on.

Cylinder



Cylinder is a solid object with:

- Two identical flat ends that are circular or elliptical
- One curved side.

It has the same cross-section of a circle from one end to the other.

Cone



Cone is a solid (3-dimensional) object that has a circular base joined to a point by a curved side. The point is called a vertex.

Sphere



Sphere is a 3 dimensional shape that amazes all.

It is perfectly symmetrical

All points on the surface are at the same distance “ r ” from the center

It has no edges or vertices

It has one surface

Image Source:

<https://pixabay.com/vectors/database-cylinder-blue-container-155774/>

<https://pixabay.com/illustrations/pyramid-shape-3d-triangle-403278/>

<https://pixabay.com/illustrations/cubes-square-bricks-3d-1181579/>

<https://pixabay.com/vectors/soda-pop-can-aluminum-cola-beer-25188/>

<https://pixabay.com/illustrations/isolated-transparent-circle-sphere-1503578/>

<https://pixabay.com/vectors/box-cardboard-carton-sealed-taped-34357/>

<https://pixabay.com/illustrations/cone-shape-3d-pine-sign-symbol-1657994/>

[https://commons.wikimedia.org/wiki/File:Triangular prism wedge.png](https://commons.wikimedia.org/wiki/File:Triangular_prism_wedge.png)

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Main Script	Solid Geometry	Faces, Edges and Vertices of solid shapes

19. QA_ Summative(worksheet)

Worksheet

A. Teacher can draw some three-dimensional shapes on the board and ask students to note the number of faces, edges and the vertices in each of the given shape.

(OR) Use the chart to investigate 3-D shapes around the classroom.

Item	Shape	Faces	Edges	Vertices
Notebook				
Rubik's Cube				
Water bottle				
Birthday cap				
Ball				

Answer each question about the properties of the object and then see if you can correctly identify and name the object.

B. Identify the following shapes and mention the number of faces, edges and vertices each shape contains.

Shape	Shape Name	Faces	Edges	Vertices
				
				
				
				
				

C. How many sides? Write the number of sides each of the following shapes has.

1. An Octagon has _____ sides.
2. A Pentagon has _____ sides.
3. A Quadrilateral has _____ sides.
4. A Hexagon has _____ sides.
5. A Heptagon has _____ sides.

Answers : A.

Item	Shape	Faces	Edges	Vertices
Notebook	Cuboid	6	12	8
Rubik's Cube	Cube	6	12	8
Water bottle	Cylinder	3	2	0
Birthday cap	Cone	2	1	1
Ball	Sphere	1	0	0

B.

Shape	Shape Name	Faces	Edges	Vertices
	Cube	6	12	8
	Cuboid	6	12	8
	Cylinder	3	2	0
	Cone	2	1	1
	Square Pyramid	5	8	5

C.

1. An Octagon has 8 sides.
2. A Pentagon has 5 sides.
3. A Quadrilateral has 4 sides.
4. A Hexagon has 6 sides.
5. A Heptagon has 7 sides.

Image Source: Original Contribution by Valli - vallisairam9@gmail.com

Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Assessments	Solid Geometry	Faces, Edges and Vertices of solid shapes

20. MS_Summary-Understanding Elementary Shapes

- Things seen in daily life can be related to lines and curves.
- Line, line segment and ray can be defined.
- Right angle and straight angle can be defined.
- Acute angle, obtuse angle and reflex angles can be defined.
- Angles made by hands of a clock can be correlated to right angle and straight angle.
- Angles can be measured using a protractor.
- Angles and sides of a triangle are related to each other.
- Equilateral, isosceles and scalene triangles can be identified by measuring their sides and angles.
- Triangles can be seen in symbols and human body.
- When two lines intersect and the angle between them is a right angle, then the lines are said to be perpendicular.
- A line that is perpendicular to another line and divides it into two equal parts is the perpendicular bisector of that line.
- Inquisitive questions related to angles can be solved.
- We can develop optimism by looking at situations through broad angle.
- Questions related to measurements of angles and sides of a triangle can be solved.
- A closed figure formed by line segments is a polygon.
- A polygon with four sides is called a "QUADRILATERAL".
- Rectangle, square, parallelogram, rhombus and trapezium are quadrilaterals and can be identified with their properties.
- Polygons can be named based on the number of sides.
- A regular polygon is a two dimensional figure, in which all sides and all angles are equal.
- A solid figure having specific length, breadth and height is called a 3-dimensional shape.
- Face, edge and vertex of a 3D shape can be identified.
- Cube, cuboid, cylinder, cone, pyramid, prism and sphere are 3D shapes
- Questions based on 3D shapes can be solved.

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Main Script	Line, curve and angle	