Class 6

Section I
Pedagogical processes suggested by NCERT
The learner may be provided opportunities in pairs /groups / individually and encouraged to —
Encounter situations having numbers up to 8 digits, e.g., cost of property, total population of different towns, etc.
Compare numbers through situations like cost of two houses, number of spectators, money transactions, etc
Classify numbers on the basis of their properties like even, odd, etc.
Observe patterns that lead to divisibility by 2,3,4,5,6,8,10 and 11.
Create number patterns through which HCF and LCM can be discussed
Explore daily life situations to involve the use of HCF and LCM
Create and discuss daily life situations involving the use of negative numbers
Observe situations that require the representation by fractions and decimals
Use different contexts in mathematics to appreciate the necessity of representing unknowns by variables (alphabet)
Explore and generalise the need of using variables alphabets
Describe situations involving the need for comparing quantities by taking ratio
Discuss and solves word problems that use ratios and unitary method
Explore various shapes through concrete models and pictures of different geometrical shapes like triangles and quadrilaterals, etc.
Identify various geometrical figures and observe their characteristics in and outside the classroom environment either individually or in groups
Make different shapes with the help of available materials like sticks, paper cutting, etc.
Observe various models and nets of 3-dimensional (3-d) shapes like cuboid, cylinder, etc. And discuss about the elements of 3-d figures such as faces, edges and vertices
Share the concept of angles through some examples like opening the door, opening the pencil box, etc. Students can be asked to give more such examples from the surroundings
Classify angles based on the amount of rotation

Section II	
Learning Outcomes of NCERT	**Measuring the Los**
Solves problems involving large numbers by applying appropriate operations (addition, subtraction, multiplication and division)	Applies appropriate operations (addition, subtraction, multiplication and division) in order to solve problems involving large numbers
Recognises and appreciates (through patterns) the broad classification of numbers as even, odd, prime, co-prime, etc.	Identifies number patterns through factorization in order to recognise and appreciate (through patterns) the broad classification of numbers as even, odd, prime, co-prime, etc.

Applies HCF or LCM in a particular situation	Applies the concept of HCF or LCM in order to solve problems in a real-life situation
Solves problem involving addition and subtraction of integers.	Applies addition and subtraction rules involving positive and negative integers in order to solve real life problems.
Uses fractions and decimals in different situations which involve money, length, temperature etc. For example, 7½ metres of cloth. Distance between two places is 112.5 km etc.	Calculates fractions and decimals in different real-life situations in order to identify the appropriate quantity of money, length, temperature etc.
Solves problems on daily life situations involving addition and subtraction of fractions / decimals	Calculates addition and subtraction of fractions and decimals in order to solve daily life problems involving quantities that measure between two integers
Uses variable with different operations to generalise a given situation. E.g., perimeter of a rectangle with sides x units and 3 units is 2(x+3) units	Involves use of variables with different operations to generalise a given situation in order to find a solution to a given problem
Compares quantities using ratios in different situations. E.g., the ratio of girls to boys in a particular class in 3:2	Represents the measurement as ratios in order to compare two quantities in real life
Uses unitary method in solving various word problems. For example, if the cost of a dozen notebooks is given, she finds the cost of 7 notebooks by first finding the cost of 1 notebook	Uses unitary method in problem solving to calculate the quantity for one unit in order to calculate the total quantity for larger quantities.
Describes geometrical ideas like line, line segment, open and closed figures, angle, triangle, quadrilateral, circle, etc., with the help of examples in surroundings	Provides examples from surround in order to describes geometrical ideas like line, line segment, open and closed figures, angle, triangle, quadrilateral, circle, etc.
Demonstrates an understanding of angles by a) Identifying examples of angles in the surroundings b) Classifying angles according to their measure c) Estimating the measure of angles using 45°, 90°, and 180° as reference angles	In order to demonstrate an understanding of angles: a) Identifies examples of angles in the surrounding b) Classifies angles according to their measure

	c) Estimates the measure of angles using 45°, 90°, and 180° as reference angles
Demonstrates an understanding of line symmetry by a) Identifying symmetrical 2-dimensional (2-D) shapes which are symmetrical along one or more lines b) Creating symmetrical 2-d shapes	In order to demonstrate an understanding of line symmetry a) Identifies symmetrical 2-dimensional (2-D) shapes which are symmetrical along one or more lines b) Creates symmetrical 2-D shapes
Classifies triangles into different groups / types on the basis of their angles and sides. For example- scalene, isosceles or equilateral on the basis of sides, etc.	Classifies triangles with different measurements in order to show different types of triangle based on their angles and sides.
Classifies quadrilaterals into different groups /types on the basis of their sides / angles	Classifies quadrilaterals with different measurements in order to show different types of quadrilaterals based on their sides and internal angles.
Identifies various (3-d) objects like sphere, cube, cuboid, cylinder, cone from the surroundings	Classifies commonly found 3-d objects from the surroundings in order to find sphere, cube, cuboid, cylinder, cone etc.
Describes and provides examples of edges, vertices and faces of 3-d objects	Labels different parts of a 3-d objects in order to explain edges, vertices and faces of the given 3-d object
Finds out the perimeter and area of rectangular objects in the surroundings like floor of the class room, surfaces of a chalk box etc.	Calculates perimeter and area of rectangular 2-d and 3-d objects to measure them for real life objects
Arranges given /collected information such as expenditure on different items in a family in the last six months, in the form of table, pictograph and bar graph and interprets them.	Finds out the perimeter and area of the rectangular objects in order to calculate them for commonly found objects from the surroundings like floor of the class room, surfaces of a chalk box etc.
	Arranges given /collected information such as expenditure on different items in a family in the last six months, in the form of table, pictograph and bar graph in order to interpret them.

MAPPING OF GRADE 6 MATHEMATICS TOPICS WITH NCERT LEARNING OUTCOMES			
Important Note: It must be ensured by the teachers that learners are able to use mathematical learning in day to day life and unfamiliar contexts/ situations about which they are not exposed earlier. Learning Objectives should also focus on enhancing the ability of the learner to convert a real life problem into a mathematical problem and the ability to interpret and evaluate mathematical results in the real life contexts.			
Chapter	**Content Area/Concept**	**Learning Objectives**	**Learning Outcome**
1. Knowing your numbers	Comparing Numbers	Find the place value of the digit and list total numbers.	Applies appropriate operations (addition, subtraction, multiplication and division) in order to solves problems involving large numbers
		List the total numbers which can be made from the given digits and know the place value of the digit in the number.	
		Arrange the digits of a given number and make smaller or bigger number.	
		Add 1 to the greatest 1 digit,2-digit, 3-digit number and so on and get the smallest next digit number.	
		Expand the given number and know the place value of a given digit in a particular number.	
		Write the 6 digits number in expanded form and write its number name.	
		Add and subtract one from number and find predecessor and successor of a given number.	
		Add bigger digits numbers and understand the situations dealing with larger numbers.	
		Use places of the digits of a particular number and read it easily.	
	Large Numbers in Practice	Read the given situation and find the approximately estimated number.	

		Estimate the number to the nearest tens and round off.	
		Estimate the outcome of a number and get a quick round off number.	
		Round off the numbers and find their sum and difference easily.	
		Round off the numbers and find their product easily.	
	Using Brackets	Use bracket to solve the problem and make calculation quick and to avoid confusion	
	Roman Numerals	Write numbers in the form of roman numerals and represent and interpret the numbers written in a clock, timetable etc.	
		Apply the rules of roman numbers operations and perform arithmetic operation on them	
2. Whole Numbers	Concept of Predecessor	Use the understanding of the predecessor of one and know the whole number.	-
	Whole Numbers	Explain the whole number and know the predecessor of 1 and the subtraction of the two same number.	
	The Number Line	Define 'unit distance' and construct the number line	
		Draw the Number line and represent the whole number.	
		Draw a number line and find the predecessor and successor of a given number	
		Represent the Numbers on Number line and perform number operation.	

	Properties of Whole Numbers	Apply properties of whole number and simplify arithmetic expression.	
	Patterns in Whole Numbers	Represent numbers and form line, rectangle , triangle and a square.	
		Form number patterns and verbal calculation and to understand numbers better.	
3. Playing with Numbers	Finding the factors of a given number	Arrange the numbers in a row and determine the factors of a given number.	Identifies number patterns through factorization in order to recognize and appreciate (through patterns) the broad classification of numbers as even, odd, prime, co-prime, etc.
	Factors and Multiples	Determine the numbers which exactly divide the given number and find the factors.	
	Prime and Composite Numbers	Write the factors of a given number and determine prime and composite numbers .	
	Common Factors and Common Multiples	Evaluate the factors of given two or more numbers and find the common factors and multiples.	
	Some More Divisibility Rules	Apply the rules of divisibility and find the factors of a number quickly.	
	Prime Factorization	Factories a number through prime factorization and list the primes factors.	
	Highest Common Factor	List down the common factors of given numbers and determine their HCF.	Applies the concept of HCF or LCM in order to solve problems in a real-life situation
	Lowest Common Multiple	List down the common multiples of given numbers and determine their LCM.	
	Some Problems on HCF and LCM	Apply the concept of HCF and solve related real-life problems.	
		Apply the concept of LCM and solve related real-life problems.	
4. Basic Geometrical Shapes	About geometrical shapes	Give example(s) and explain the importance of a point.	Provides examples from surround in order to describes geometrical ideas like line, line
	A Line Segment	Give example(s) and describe a line segment.	

	A Line	Give example(s) and describe a line.	segment, open and closed figures, angle, triangle, quadrilateral, circle, etc.
	Intersecting Lines	Examine the given lines and identify intersecting lines among them.	
	Parallel Lines	Examine the given lines and identify parallel lines among them.	
	Ray	Describe a ray and identify it from the given figures.	
		Compare the given figures and identify a ray, line, line segment among them.	
	Curves	Give example(s) and demonstrate an understanding of a simple curve and a curve that is not simple.	
		Describe an open curve and a closed curve and distinguish between the two.	
	Polygons	Discuss the parts of a closed curve and determine the position of a point with respect to it.	
		Examine the given curves and identify polygons and non-polygons.	
		Draw rough sketch of a polygon and label and describe its elements.	
	Angles	Identify the elements of an Angle (Vertex, arm, interior and exterior angles) for the given angles.	
		Give example(s) and name an angle in the given figure.	
	Triangles	Describe the elements of a triangle and identify it among the given figures.	
	Quadrilaterals	Describe the elements of a quadrilateral and identify it among the given figures.	

	Circles	Describe the parts of a circle and identify them in the given circle.	
		Draw a rough sketch of a circle and label and describe its elements.	
		Determine the parts of closed curves and identify the position of a point with respect to a polygon and a circle.	
5. Understanding Elementary Shapes	Measuring Line Segments	Measure the given line segments and compare them.	And demonstrate an understanding of angles: a) Identifies examples of angles in the surrounding b) Classifies angles according to their measure c) Estimates the measure of angles using 45°, 90°, and 180° as reference angles
	Angles–'Right' and 'Straight'	Examine the rotation of angles and classify angles based on the amount of rotation.	
	Angles–'Acute', 'Obtuse' and 'Reflex'	Compare the given angles and classify them as a right angle, straight angle or a complete angle.	
		Compare the given angles and classify them as an acute angle, obtuse angle or a reflex angle according to their measure.	
		Identify the different types of angles in our surroundings and demonstrate an understanding of angles.	
		Use a protractor and measure the given angle and classify its type.	
		Use a protractor and draw an angle of the given measure.	
	Perpendicular Lines	Describe perpendicular and a perpendicular bisector and identify the same in the given figure.	
		Give example(s) of perpendicular lines and demonstrate an understanding of the same.	

	Classification of Triangles	Observe the measure of sides of a triangle and classify it into different types (scalene, isosceles, equilateral) based on its sides.	Classifies triangles with different measurements in order to show different types of triangle based on their angles and sides.
		Observe the measure of angles of a triangle and classify it into different types (acute, obtuse, right) based on its angles.	
	Quadrilaterals	Examine the given figures and classify type quadrilaterals based on their properties.	Classifies quadrilaterals with different measurements in order to show different types of quadrilaterals based on their sides and internal angles.
	Polygons	Examine the given figures and identify polygons.	
		Describe polygons and classify them based on their number of sides and angles. (Up to 8 sides)	
		Give example(s) and distinguish between regular and irregular polygons.	
	Three Dimensional Shapes	Describe solid shapes and distinguish them from flat shapes.	Classifies commonly found 3-d objects from the surroundings in order to find sphere, cube, cuboid, cylinder, cone etc.
		Examine the given solid shapes and identify their type (Cubes, Cuboids, cylinder, sphere, cone, prism, pyramid)	
		Describe the faces, edges and vertices of a 3D shape and discuss the various aspects of the given 3D object	Labels different parts of a 3-d objects in order to explain edges, vertices and faces of the given 3-d object
6. Integers	I Significance of Integers	Represent integers with their signs and differentiate positive number, negative number and zero from each other	Applies addition and subtraction rules involving positive and negative integers and solve real life problems.
		Denote numbers with their signs and represent real life situations like temperature scale, credit, debit etc.	

	Integers	Represent the integer on Number Line and determine its position with respect to other integers	
		Determine one more and one less of a given integers and find its predecessor and successor.	
		Determine the order of integers and represent them on a number line and draw comparison between them.	
	Addition of Integer	Represent the integers on number line and perform arithmetic operations on them.	
	Subtraction of Integers with the help of a Number Line	Use the rules to perform arithmetic operations on integers.	
7. Fractions	Concept of Fraction	Represent a number as a part of the whole and determine the fraction	Calculates fractions and decimals in different real-life situations in order to identify the appropriate quantity of money, length, temperature etc.
	A Fraction	Determine part and whole and label numerator and denominator of a fraction	
	Fraction on the Number Line	Draw equal parts between the whole numbers and represent fractions on a number line	
	Proper Fractions	Write proper fractions and deduce that they are always less than one /numerator is less than denominator	
	Improper and Mixed Fractions	Write fractions where numerator is greater than denominator and determine improper fractions	
		Write the improper fraction in the form of mixed fraction and represent it as a combination of whole and a part	

	Equivalent Fractions	Multiply /Divide the numerator and denominator with the same number and find equivalent fractions	
		Perform cross multiplication among two fractions and verify their equivalence	
	Simplest Form of a Fraction	Reduce the fraction and determine its simplest form	
	Like Fractions	Check the denominators of the fractions in order distinguish between like and unlike fractions.	
	Comparing Fractions	Inspect the numerators of the like fractions and determine larger and smaller fraction(s).	
		Determine the LCM of the unlike fractions and compare them.	
	Addition and Subtraction of Fractions	Solve (addition /subtraction) the numerator and retain the denominator of the like fractions and perform addition and subtraction on the given fraction.	Calculates addition and subtraction of fractions and decimals in order to solve daily life problems involving quantities that measure between two integers
		Convert the given fractions into its equivalent fractions and perform addition and subtraction on them.	
8. Decimals	Decimal point	Write rupees and paisa in decimal form and know the meaning and relevance of dot point.	Calculates fractions and decimals in different real-life situations in order to identify the appropriate quantity of money, length, temperature etc.
	Tenths	Represent number in its unit and tenth part in order to write it in decimal form.	
		Determine the place value of decimal numbers up to tenth and write the number in expanded form.	
		Divide the numbers into ten equal parts and represent decimal numbers up to tenth place	

	Hundredths	Represent number in its unit and hundredth part and write it in decimal form.	
		Determine the place value of decimal numbers up to hundredth and write the number in expanded form.	
		Determine the part and whole of a given decimal number and represent it in the form of fractions.	
		Determine the place of the digits of a decimal number and write it in words	
		Compare the units and parts of the decimal numbers and compare them as a whole	
	Using Decimals	Represent /Convert the money, length and weight into smaller units and represent it into decimal form	
	Addition of Numbers with Decimals	Add and subtract the whole and parts of decimal numbers and find their sum and difference	Calculates addition and subtraction of fractions and decimals in order to solve daily life problems involving quantities that measure between two integers
	Subtraction of Decimals		
9. Data Handling	Interpretation of a table of data	Observe different tables and gather the information recorded in the table of data	Arranges given /collected information such as expenditure on different items in a family in the last six months, in the form of table, pictograph and bar graph in order to interpret them.
	Recording Data	Group and compare raw data systematically and infer the relevant information quickly	
	Organization of data	Organize raw data into a table using tally marks and organize the given data	
	Pictograph	Observe and understand pictograph representation of data and answer the question on data at a glance	
	Interpretation of a Pictograph	Analyze pictograph and reason the information presented	

	Drawing a Pictograph	Draw a pictograph and represent the given information using appropriate symbols	
	A Bar Graph	Observe bar graph and reason the information presented	
		Choose an appropriate scale and represent a given information in the form of a bar graph	
		Interpret bar graph and find the relevant information represented by the bar graph	
10. Mensuration	Perimeter	Give example(s) and define perimeter of closed figures.	Calculates perimeter and area of rectangular 2-d and 3-d objects to measure them for real life objects
		Deduce and apply the formula to determine the perimeter of a rectangle.	
		Deduce and apply the formula to determine the perimeter of a square.	
		Deduce and generalize the formula to determine the perimeter of a regular polygon	
		Give examples and defend that different shapes can have the same perimeter	
	Area	Count the squares and estimate the area of the given closed curve in the squares grid sheet	Finds out the perimeter and area of the rectangular objects in order to calculate them for commonly found objects from the surroundings like floor of the class room, surfaces of a chalk box etc.
		Deduce and apply the formula and determine the area of a rectangle.	
		Deduce and apply the formula and determine the area of a square.	
11. Algebra	Algebraic expression and arithmetic expressions	Describe algebraic expressions and distinguish them from arithmetic expressions.	Involves use of variables with different operations to generalize a given situation and find a solution to a given problem

	Matchstick Patterns	Examine patterns and identify relationship in patterns	
	More Matchstick Patterns	Introduce a variable and form a rule for the given pattern.	
	More Examples of Variable	Use variable with different operations and generalize a given situation.	
	Use of Variables in Common Rules	Use variable(s) and express some mathematical rules and formulae.	
	Expressions with Variables	Use variable with different operations and form an algebraic expression.	
	Using Expressions Practically	Change the given algebraic expression in statements and describe the situation in ordinary language.	Uses unitary method in problem solving to calculate the quantity for one unit in order to calculate the total quantity for larger quantities.
	What is an Equation?	Explain the meaning of an equation and identify equations from the given options.	
	Solution of an Equation	Use trial and error and find the solution of the given equation.	
		Evaluate the given values of variable as possible solution of the equation.	
12. Ratio and Proportion	Comparison of two quantities	Represent two quantities in same unit and compare them	Represents the measurement as ratios in order to compare two quantities in real life
		Compare two quantities and find their ratio	
	Ratio	Multiply /divide numerator and denominator by same number and find equivalent ratio.	
	Proportion	Compare ratio and determine whether they are in proportion	
		Solve the proportion and find out the missing term	

	Unitary Method	Solve daily life problems with the help of Unitary method and compute the value of one article, given the value of many.	
13. Symmetry	Concept of Symmetry	Explain the meaning of symmetry and identify symmetric figures in our surrounding.	In order to demonstrate an understanding of line symmetry: a) Identifies symmetrical 2-dimensional (2-D) shapes which are symmetrical along one or more lines b) Creates symmetrical 2-D shapes
	Making Symmetric Figures: Ink-blot Devils	Identify symmetrical 2-Dimensional shapes which are symmetrical along one line and demonstrate an understanding of the same.	
	Figures with Multiple (more than two) Lines of Symmetry	Draw line(s) of symmetry and classify the given shapes as shapes with no symmetry, one line of symmetry, two lines of symmetry or multiple lines of symmetry	
	Reflection and Symmetry	Draw the mirror image of the given 2D shapes or objects and identify objects with reflection symmetry.	
		Give example(s) and discuss the applications of reflection symmetry in real life.	
14. Practical Geometry	Construction	Discuss the different tools of construction and describe their uses.	-
	The Circle	List and execute steps of construction and construct a circle when its radius is known.	
	A line segment	List and execute steps of construction and construct a line segment when its length is known.	
		List and execute steps of construction and construct a copy of the given line segment.	
	Perpendiculars	List and execute steps of construction in order to construct a perpendicular to a line through a point on it.	

		List down and execute steps of construction and construct a perpendicular to a line through a point not on it.	
	Angles	Use a protractor and ruler and construct an angle of the given measure.	
		List and execute steps of construction and construct a copy of the given angle of unknown measure using a compass.	
		List and execute steps of construction and construct the bisector of an angle and construct angles of measures 30-degree, 45 degree and so on.	
		List and execute steps of construction and construct angles of measures 60-degree, 90 degree and 120 degree.	