

MATHEMATICS

Theme 1: Numbers

Children continue to strengthen their understanding about two digit numbers and extend this up to three digits. The basic properties like comparison of numbers, ordering and forming greatest and smallest three digit numbers are also to be explored in this class. At this stage child should be capable of looking into the pattern that numbers and number names have. This helps children in learning the bigger numbers.

Learning Outcomes:

Children will be able to:

- ✎ work with two digit numbers;
 - ☛ read and write numerals for numbers up to 999;
 - ☛ use place value in writing and comparing two digit numbers;
 - ☛ form the greatest and smallest two digit numbers (with and without repetition of given digits).

Numbers		
Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
<ul style="list-style-type: none"> ➤ Numbers up to 99 and their number names. ➤ Read and write 3 digit numbers up to 999. ➤ Place and face values of digits in a three-digit number. ➤ Comparison of numbers and their arrangement in ascending and descending orders. 	<ul style="list-style-type: none"> ➤ Providing opportunities to write number names based on pattern e.g. twenty-one, twenty-two..... forty-one, forty-two..... & so on. ➤ Conducting activities using place value cards (also known as arrow cards) to construct numbers with three digits along with finding out the place value and face value of digits. ➤ Using number cards from 0-9 in groups by each child to explore & make 3 digit numbers and write their number name. 	<ul style="list-style-type: none"> ➤ Place value cards, can be developed. (For e.g. 27 cards having numbers 1 to 9, 10 to 90, and 100 to 900. These are of different size as shown below: <div style="text-align: center;"> </div> <ul style="list-style-type: none"> ➤ Spike abacus. ➤ Play money notes and coins of ₹ 1, ₹10 and ₹100.

Theme 2: Number Operations

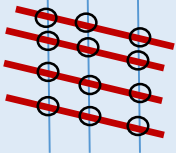
Activities that lay the foundation for work with addition and subtraction begin in children's early schooling. Once begun, work continues throughout the elementary classes. Early work with addition and subtraction with whole numbers must provide opportunities for children at this stage to see the operations used in real life situations and with a variety of manipulative material in order to learn the meanings of the operations and their algorithms. The aim of this theme in this class is that children should observe various properties of addition and subtraction of numbers like commutativity, associativity etc. in an informal way. Multiplication as another short way of repeated addition is seen in more systematic way in this class. The operation of multiplication further strengthens with experiences of skip-counting. At this stage, children must encounter familiar situations in real-life problems and pictorial representations with which they make connection between the new situation and skip counting. The division is introduced as equal sharing/distribution. Thus, before using the symbols for division as an operation on numbers it is important that children have lot of experiences of sharing objects equally. The textbooks and the classroom activities must include this aspect before formally introducing division.

Learning Outcomes:

Children will be able to:

- ☑ use place value (with regrouping) in standard algorithm for addition & subtraction;
- ☑ represent an amount up to ₹100 using 3-4 notes and coins (of same/ different denominations);
- ☑ add on zero to a number and subtract zero from a number;
- ☑ observe and generalize commutative property of addition through pattern;
- ☑ solve daily life problems / activities related to addition and subtraction presented through pictures and stories;
- ☑ construct problems that can be solved by addition & subtraction of two digit numbers;
- ☑ estimate sum and difference of two given numbers;
- ☑ construct multiplication tables of 2, 3, 4, 5 through repeated addition and different other ways like skip counting, use of patterns & broom sticks;
- ☑ use various situations on equal grouping/equal sharing that lead to repeated subtraction;
- ☑ add and subtract two digit numbers mentally.

Number Operations

Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
<ul style="list-style-type: none"> ➤ Addition and subtraction of two digit numbers with and without regrouping. ➤ Use of place value (with regrouping) in standard algorithm for addition and subtraction. ➤ Addition of zero to a number and subtracting zero from a number. ➤ Commutative property of addition through pattern. ➤ Solving daily life problems related to addition and subtraction presented through pictures and stories. ➤ Construction of problems that can be solved by addition and subtraction of two digit numbers. ➤ Estimation of the sum and difference between two given numbers. ➤ Construction of multiplication tables of 2, 3, 4, 5 through repeated addition and different other ways like skip counting, used of patterns and broom sticks. ➤ Various situations on equal grouping/equal sharing that lead to repeated subtraction ➤ Mental addition and subtraction of two digit numbers. 	<ul style="list-style-type: none"> ➤ Providing a variety of real life contexts either visually and verbally so that children also learn problem solving. ➤ Encouraging children to construct and solve problems related to operations on numbers. ➤ Conducting activities involving estimation of sum and differences of two numbers. Questions like "How did you estimate?" should trigger a detailed discussion about various ways for estimation. ➤ Involving children in development/construction of multiplication tables through various ways. (<i>Through practice multiplication facts will slowly get committed to memory</i>). ➤ Using concrete materials in classrooms to let children understand the basic idea of equal sharing/equal grouping. ➤ Encouraging children to add subtract single digit numbers through various games / activities without pen / pencil. ➤ Using charts showing addition and subtraction of two-digit number. ➤ Conducting games in which children have to do mental mathematics of adding and subtracting two digit numbers. 	<ul style="list-style-type: none"> ➤ Napier strips for multiplication of numbers. ➤ Straws or sticks. (<i>Putting one over the other to construct multiplication tables</i>) <p style="text-align: center;">e.g. 3×4 as</p> <div style="text-align: center;">  </div> <ul style="list-style-type: none"> ➤ Pebbles and other objects. (<i>These can be used for equal sharing and equal grouping</i>). ➤ Charts showing addition and subtraction of two-digit number.







Life Skills: solving daily life problems

Theme 3: Geometry

The aim of this theme is enabling children to describe 3-D objects that they have in their daily life experiences. This description includes the physical characteristics of the object like its shape, size, location and orientation which make it different and/or similar to other objects. They will also be introduced to the informal use of the geometrical vocabulary like naming shapes as rectangles, squares, triangles and circles, classifying edges as straight and curved and surfaces as curved and plane etc..

Learning Outcomes:

Children will be able to:

-  describe basic 3D and 2D shapes with their observable characteristics;
-  identify basic 3D-shapes such as cuboid, cylinder, cone and sphere by their names;
-  trace 2D outlines of 3D objects;
-  identify 2D shapes (rectangle, square, triangle, circle) by their names;
-  distinguish between straight and curved lines;
-  draw/ represent straight lines in various orientations (vertical, horizontal, slant).

Geometry		
Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
<ul style="list-style-type: none"> ▶ Creation of 2D-shapes through paper folding & paper cutting. ▶ Attribute of 2D shapes and their sides and corners. ▶ Straight lines and representing them by paper folding, straightedge objects, stretched strings etc. ▶ Draw horizontal, vertical and straight lines. ▶ Introduction to curved lines. 	<ul style="list-style-type: none"> ▶ Conducting activities on traditional paper folding for a boat, airplane etc. using various shapes like rectangle, square and triangles. ▶ Providing concrete 2D-shapes in multiple sizes colours, objects having 2D-shapes so that through observations & sense of touch, children generalize the attributes like sides, corners etc. ▶ Organizing classroom so that children create straight-edges through paper folding and trace them on a paper. ▶ Encouraging children to draw straight lines in different orientation so that they get the idea of a straight line. ▶ Discussing and giving examples of what is a straight line and what is not a straight line. ▶ Providing intuitive experiences through exploration about the shortest distance between two points. ▶ Providing opportunities to draw free hand straight line, free hand and with the help of ruler. 	<ul style="list-style-type: none"> ▶ Pastel papers sheets, cutters and gum/adhesive. ▶ Card board cut-outs of triangular, rectangular, square regions. ▶ A-4 size papers, sheets, tracing papers/ butter paper, carbon sheets. ▶ Pair of compasses, scale/straight edge and protractor ▶ Geoboard and rubber bands. ▶ Maths kit.





Integration: Arts Education

Theme 4: Measurement

The need for uniform units for measurement of some quantities through daily life experiences forms the basis for learning in class II. Length, capacity (volume) and weight are measured by applying a unit directly to the object being measured. Hence, children should be enabled to construct their own units for direct measurement of length, capacity and weight.

Learning Outcomes:

Children will be able to:

-  estimate and measure length/distances and capacities of containers using uniform nonstandard units like a rod/pencil, cup/spoon/bucket etc.;
-  classify objects as heavier/lighter than, using simple balance;
-  identify the days of the week and months of the year;
-  sequence the events occurring over longer periods in terms of hours/days

Measurement		
Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
<ul style="list-style-type: none"> ➤ Measurement of lengths and distances using uniform (non-standard) units. ➤ Compare two or more objects by their weights as heavier than/lighter than. ➤ Use of the simple balance to compare weights. ➤ Order containers based on the perception of their capacities and verifying them. 	<ul style="list-style-type: none"> ➤ Designing and conducting group/individual activities for measuring different objects, distance using uniform things like paperclips, toothpicks, a stick etc. ➤ Involving children in constructing simple objects using available materials and encouraging them to compare weights and use of vocabulary like heavy/light. ➤ Providing a number of opportunities to children to estimate lengths in their vicinity and then verify through paperclips, tooth picks, chinks et. ➤ Encouraging children (individually and in groups) to estimate capacities and to verify by actual measurement? Questions like "Find how many mugs / spoons can fill this container? And verify it by actual measurement. 	<ul style="list-style-type: none"> ➤ Paper clips, toothpicks, sticks of equal size. ➤ A measuring tape and a 15 cm scale for observation and not for measuring length. ➤ Various containers and empty cans/bottles having their quantity written on them.

Theme 5: Data Handling

Children will be enabled to explore the importance and need for collecting different data and learn to take decisions on: the type of information needed, how it can be gathered organized and ways to display and communicate the information to others. This exploration starts in an informal way in class and children learn to use tables and pictures to organize data in basic problem-solving strategies.

Learning Outcomes:

Children will be able to:

- interpret simple charts and graph;
- present information with pictograph.

Data Handling		
Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
<ul style="list-style-type: none">Simple graphs related to day to day life. For example, bus time table chart, height chart etc.	<ul style="list-style-type: none">Organizing activities with children individually and in small groups around observing various body parts and collecting information through measurement. This will help children in presenting data and drawing inferences.Conducting group activities for data collection and tabulation. Answers to questions like “which vegetables do you not like? etc.” may be explored in groups.Measuring articles like paper clips, containers to collect data.Pasting stickers of various objects to represent data pictorially by children.	<ul style="list-style-type: none">Paper clips, containers.Stickers of various objects.

Integration: Arts Education

Life Skills: Interpretation and analysis

Theme 6: Patterns

This theme aims to encourage children to develop habits of looking for using patterns as they search for a meaning in Mathematics. It is infused with patterns in numbers, number operations, measurement, geometrical ideas and data. To realize this, the teaching - learning process should allow children to observe and generalize simple patterns that exist in their daily life.

Learning Outcomes:

Children will be able to:

 observe, extend and create patterns using different objects, shapes and numbers.

Patterns		
Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
<ul style="list-style-type: none"> ▶ Observation and identification of unit of repeat in a given pattern ▶ Extension of the pattern to next few terms on the basis of the identified unit of repeat ▶ Create patterns from daily life experiences. 	<ul style="list-style-type: none"> ▶ Involving children in observing patterns created by other children to observe a unit of the repeat. ▶ Asking children to make stencils or stamps, tools by the section of different vegetables, thumb, figures, foot prints etc. and making designs. This will help them in identification of a unit of repeat in the pattern. 	<ul style="list-style-type: none"> ▶ Seasonal vegetables like ladyfinger, potato and knife (<i>to get their section</i>). ▶ Ink or Water colours and Paper. ▶ Sandpit to make patterns using hand, foot prints etc. ▶ Geoboard and rubber bands.

Integration: Arts Education, EVS