



**TEACHERS RESOURCE
MANUAL**

**Mathematics
Grade 1**

1

A Journey Before Numbers

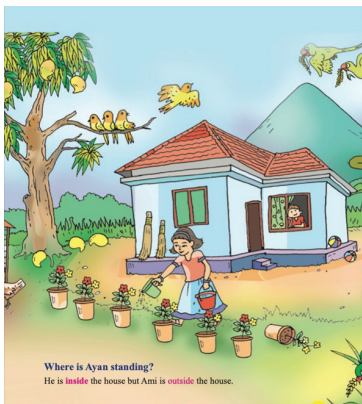
Introduction

This unit discusses vocabulary for comparing objects and describing spatial conditions, as well as naming things. Children learn to compare groups according to instructions and become familiar with words such as near, far, in front of, and behind. Words used to compare objects include smaller, bigger, more, less, taller, shorter, longer, etc. Additionally, words indicating spatial conditions such as near, distant, inside, outside, top, bottom, right, and left are analyzed in this unit. There are also opportunities in this unit to observe, compare, explain, and present causal relationships. These concepts are discussed in depth in various contexts in subsequent units..

Ideas and Perceptions	Process and Operations	Learning Achievements
<ul style="list-style-type: none"> ◆ To compare objects - terms like bigger/smaller, taller/shorter, longer/smaller, fatter/fewer are used. ◆ Words such as inside/ outside, above/below, right/ left, front/ behind, near/far are used to specify the position of objects 	<ul style="list-style-type: none"> ◆ Look at pictures, compare objects, and play games to find words used to match objects. ◆ By observing pictures and objects and engaging in games, they find appropriate words to describe spatial situations through stories and songs 	<ul style="list-style-type: none"> ◆ Matching terms are used to compare things. ◆ The most appropriate terms are used to indicate the spatial condition.

Materials:

- ◆ Collections such as pictures, manjadi, beads, earrings etc. Picture Reading(Picture in the textbook)
- ◆ The picture below is the house of Ami and Ayan.
- ◆ This activity is for picture reading



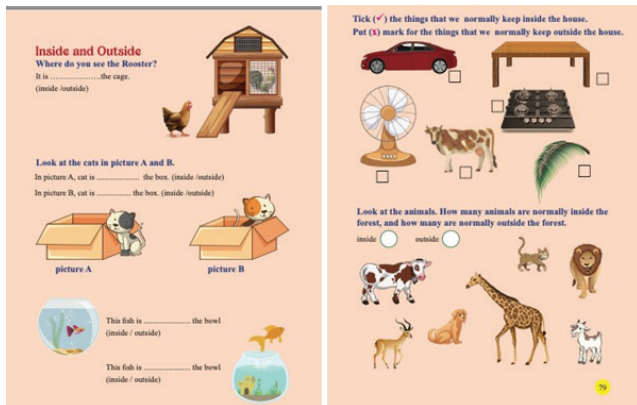
- ◆ Keeping familiar surroundings in the picture helps children effectively understand mathematical ideas depicted in subsequent parts. A picture is provided for picture reading. The child must observe and analyse this picture. The teacher should also ask relevant questions and give hints. This revision improves clarity and flow, ensuring that the message is conveyed more effectively.
- ◆ What do you see in the picture? What is Ami doing?
- ◆ Where Is Ayan?
- ◆ What are the things that you see in the picture? What colour is each one?
- ◆ The children have to respond to the questions and discuss it in the class. Children have to ask

each other questions like this and analyse the answers. Then, given some clues, the child has to find and say which object is in the picture.

- Example: I see one in the picture. A pot is fallen down. Can you show me it?
- ◆ You will give me green grass. I will give you white milk. Do you know who am I?
- ◆ The Children prepare such clues and show them to the teacher. Teacher suggests amendments and children ask the puzzles each other. Then the children compare their house with the house of Ami and Ayan.

Teacher should

- assess children’s ability to observe,
- differentiate between characteristics,
- interpret ideas and skills



- ◆ “Inside” refers to the space that is contained within the boundaries of an object, such as the inside of a house or the inside of a box. “Outside” refers to the space that is outside the boundaries of an object, such as the exterior of a house or the outside of a box.
- ◆ Ask children to do all the activities given in the text (page 78, 79) independently . Let them find more activities themselves and present in the whole class
- ◆ Give children toys (box, small cars doll etc.) and make an activity for inside and outside

Teacher should focus on that while playing children are using the words Inside and outside

Inside and Outside

- ◆ Teaching concepts to first standard kids can be a fun and extremely rewarding experience. Children at this age have short attention spans, and may have difficulty in understanding complex ideas. It’s important to break concepts down into simple, easy- to-understand pieces. Kids learn best through hands-on experiences! This could include games, craft works or experiments. Encourage your little one to ask questions and participate in discussions. This will help them feel more engaged and motivated to learn. Children at this age are visual learners, so it is be helpful to use pictures, diagrams, and other visual aids to help explain concepts.

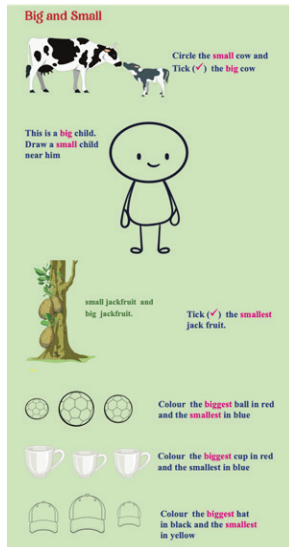
Who is inside the box?

- (This activity is to discuss the concept of inside/outside.)
- ◆ The teacher puts the candy inside a box (pencil box/tiffin box/...) and keeps it closed (children should not see it). Can you shake the box and tell what is inside?
- ◆ Let each child shake and say.
- ◆ Who was right? Let the children guess.
- ◆ Then let a child open the box and answer who? Let him show the inner object show
- ◆ How did you find the correct answer? Let’s discuss.
- ◆ Make sure children use the word “inside” during play.
- ◆ Let the children find and say the contexts for saying inside/outside such as
 - Book inside the bag
 - Pen outside the box
 - Ball outside cover
 - Children inside class
 - Rat inside the cage
 - Dog outside the kennel

Big and Small, Biggest and Smallest

- ◆ Comparing objects based on their size, quantity, and weight are some important mathematical concepts that kids must know about. Learning about these important concepts has numerous benefits for children. Some of these benefits

include enhanced problem-solving skills, developed thinking skills and it also helps in building a foundation of concept, which they will later study in detail.



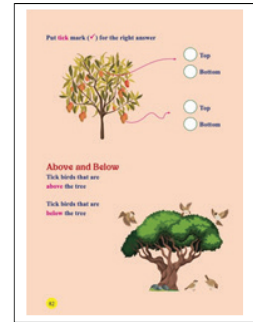
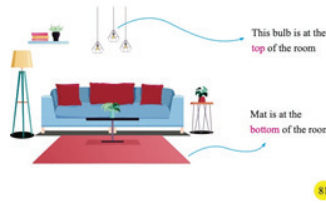
- ◆ Ask each child to circle the small cow and tick the big cow and do the other activities in the lesson
- ◆ Which is the biggest animal on the land? Which is the largest animal in your house? which is the largest vegetable in your house?

- A ✓ sign is given to whichever is greater. Let's evaluate each other's performance.
- What other activity can be given to those who have gone wrong?
- Suggest to make ✓ on small/large in the bowls in the picture.
- You can draw a small and a large picture on the blackboard. Get the big ball.
- Which is the bigger chalk?
- Name the balls that you see on the play ground
- Which is the biggest line?

Let the children come up with examples of inside/outside along with

- Take the big ball and put it inside the basket.
- Keep Small ball inside big box
- Put the smaller balls outside the bigger box.

Top and Bottom
Look at the picture



Nature observation

- ◆ Sit outside with the kids and observe nature. What are the objects above and below the tree
- ◆ See tall creatures and objects, short and creatures and objects

- Something I see at the top of the tree
- Sitting on a tree branch.
- What do I see

- Something I see
- At the bottom of the tree laying in the ground.
- What do I see

- ◆ Ask the children to prepare such type of riddles and play it in groups
- ◆ Who was able to find the answer? Above, below play
- ◆ Some of the games are given below.
- ◆ Draw a line on the board. Ask one child to draw an image below it Ask another child to draw an image above the line
- ◆ Who was able to attend the game attentively?



- ◆ Ask the children to do the work in the textbook independently

Activities

- ◆ Teacher collects objects like Toy car, doll, match box ,pencil, pen, chalk, ball, Marble etc and put it in a box.
- ◆ Teacher asks a child “put toy car on the desk.” He collects the toy car from the box and put it on the table.
- ◆ Teacher asks another child, “put the match box under the table” In this way the play repeats. Instead of the teacher, one child can ask another child to do the activity. In this way the play continues

Near and far



- ◆ When we compare the distances of two objects from a third object, we compare it using the words nearer or farther. When the object is located at a shorter distance than the other object, the object is nearer than the other object. When an object is located at a longer distance than the other object, the object is farther than the other object.
- ◆ Look at the sky, the Moon and the Sun appear at the same distance from Earth, but the Moon is near to Earth and Sun is farther away than the moon.
- ◆ Why is it important to understand near and far concept for young kids?
 - It helps them to identify the distance between two objects or people.
 - It helps them to specify near and far objects in their surroundings.

Activity

- ◆ Ask your child to go and bring you the nearest and the farthest object in the room. This activity will help the kids to identify which

object is near and which one is far, which will also help them to have basic knowledge about distance, a concept they will learn in detail in higher classes.

Activities

- ◆ Collect some of your child’s 3 favourite toys.. may be 3 different car toys
- ◆ Line them up as (as you see in the text) if they are going somewhere. This helps your child understand their positional relationship by understanding the first car in line will come before the others.
- ◆ Some other ideas for lining up the toys in this step include: Placing them in front of a gate, putting cars in front of a garage. Ensure your child knows that they are lined up to go somewhere.



1. On index cards, write the words BEFORE, BETWEEN and AFTER. Label each car with its position in the line.
2. Tell the child the position of the car using the words before, between and after. Talk to them about who will arrive at the gate first, and say that it means he comes “before” the others. Next, explain who will arrive at the gate last and say that this means the car comes “after” the others. Explain to the child that the one in the middle is “in between.”
3. Practice lining up other toys in different patterns, make sure that the toys take different positions in line. This way, the child can see that the label “before” does not apply to a specific toy but rather to the position in line.
4. Occasionally, ask the child what position a toy holds. If they cannot offer the correct answer, simply show them until they are able to answer independently.



- ◆ The words “long” and “short” may look very easy to understand but are quite difficult for little minds to comprehend. So how to teach the difference between long and short to kids?

What Is Long And Short?

- ◆ When we say something is long or short, we assess its measurement. In simple words, we can say that when we measure an object or if we say that the object is long or short, it means that:
 - We are talking about the length of the object.
 - We are concluding that an object is longer or shorter than others.
- ◆ How to teach your little one the concept of long and short? Here are some simple rules and ways in which you can teach your child this concept.
 1. Start by explaining the meaning of the terms “long” and “short” to your child.
 2. To make it easy for them, explain the meaning of the terms with their opposites: long and not long (short) and short and not short (long).
 3. Explain with the help of real-life examples to make it easy for your child to understand.
 4. Encourage children to compare two objects at every given opportunity.
 5. Allow your child to measure the objects using a span(the distance from the end of the thumb to the end of the little finger of

a spread hand)

6. Let them practice learning and understanding the terms with the help of games and activities.(as given in the text)
7. Repeat revising the concept to help kids remember and internalise new concepts.

Build A Tower

- ◆ Ask your child to build two towers of different lengths using their building blocks. Help them understand how one tower is shorter than the other.

Circle The Longer Objects

- ◆ Take a print of different objects which vary in length. Make sure that two objects are placed next to each other on the sheet. Ask your child to circle the one which is longer in length than the other.

Shadow Game

- ◆ On a sunny day take your child to the ground and ask them to stand in the sun and look at their shadow. Next, ask your child to take a look at the teacher’s shadow. Ask them which one is longer or shorter. Make your kids repeat the activity by asking them to measure the height of their toy’s shadow in the sun.

Sort The Objects

- Give the child sticks of different length. Ask your child to sort the objects by comparing the objects and keeping them in different piles. So, one pile will be of short objects, and the other pile will be long objects. Ask them to find Longest stick and shortest stick

The stick Game

- ◆ Give your child a stick and ask them to go around the school and search for five things that are longer than the given stick and five things that are shorter than the stick. Your child will have a fun time running around the school to find things. Ask them about the longest object and the shortest object collected



Nearest And Farthest Example

- ◆ When we compare distances of three or more objects, we use the words nearest or farthest. When the object is at the shortest distance among all the objects, it is the nearest. When the object is at the longest distance among all the objects, it is the farthest.

Why Is It Important To Understand Near And Far Concept For Young Kids?

- ◆ There are numerous benefits for teaching near

and far concepts to kids. Let's read about some of them.

- It helps them to identify the distance between two objects or people.
- It helps them to specify near and far objects in their surroundings.

Pick An Object

- ◆ Ask your child to go and bring you the nearest and the farthest object in the class room. This activity will help the kids to identify which object is near and which one is far, which will further help them to have basic knowledge about distance, a concept they will learn in detail in higher classes.

Circle the Objects

- ◆ On a sheet, take a print of a few things far from us, like the moon, sun, stars, etc., and a few things near to us, like a house, tree, phone, etc. Now give this sheet to your kids and ask them to circle the things that are far from us and tick the objects that are near to us.

2

Unlocking the world of single digit numbers

Introduction

In the first unit, the children learned the words used to make comparisons, familiarized themselves with numbers one to nine. Grouping of objects and the properties of groups are presented in this unit by relating them to numbers. Activities to count and record objects are included, including counting objects from one to nine and writing them using numbers. In this unit, children also get opportunities to engage in games, drawing, and singing. In this unit, children should be able to find relations of numbers .Also, order, compare, and count numbers. Subsequent units develop from this foundation.

Learning Achievement:

- Objects are classified into different groups, such as large groups and small groups.
- Compares groups ranging from one to nine. Identifies the largest and smallest groups.
- Large and small groups are identified by matching objects with each other.
- Counts the objects in the set and determines whether the group is larger set or smaller
- Recognizes, reads, and writes symbols representing the numbers one to nine.
- Numbers from one to nine can be ordered from largest to smallest and vice versa.”
- Top of Form

Concepts and Understandings:

- To compare groups, we need to know how many are in each group.
- You have to count to determine the quantity in a group, using counting numbers.
- The smallest number is one, The biggest

single digit number is 9

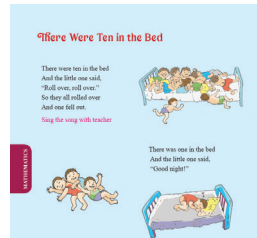
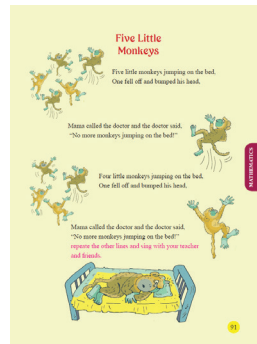
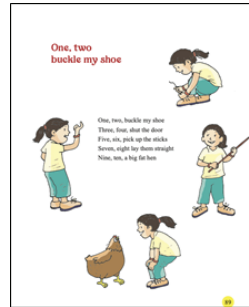
- The numbers from one to nine are represented by 1, 2, 3, 4, 5, 6, 7, 8, 9. These numbers are denoted by numerals.
- A number can be represented in various ways

Ideas and Perceptions	Process and Operations	Learning Achievements
<ul style="list-style-type: none"> ◆ To compare groups we need to know how many are in the group. ◆ To know how many are in the group we have to count ◆ Numbers are used to count. ◆ The smallest number is 1. ◆ The numbers one to nine are represented by the numerals 1, 2, 3, 4,5 6,7,8,9,. 	<ul style="list-style-type: none"> ◆ Discover the characteristics of groups by observing the environment and playing games. ◆ Grouping objects into groups, sorting the groups according to their properties, comparing the groups and connects them to numbers. ◆ Draw pictures, play games, count, learn numbers from one to nine, write and read them 	<ul style="list-style-type: none"> ◆ Objects are sorted into groups of 1 to 9 and the largest and smallest groups are found and compared. ◆ Associate them with numbers. ◆ Objects are enumerated as part of games and narrative. ◆ Grouping and comparing objects. ◆ Recognizes, reads and writes numbers from one to nine

The Importance of Number Rhymes

- ◆ What are number rhymes?
 - Number rhymes are songs that involve numbers.
 - They usually have a simple tune, similar to nursery rhymes, and are used to support young children to practise early maths skills.
 - You can start singing number rhymes to your child from birth and continue to sing them for as long as your child enjoys them!

- ◆ Why are number rhymes so important?
 - Number rhymes are amazing. They help children to develop number sense in a fun and low pressured way.
 - Children learn through repetition, so singing number rhymes will help them to become familiar with numbers and the patterns between them.
 - Different number rhymes will help children to develop different mathematical skills. There are number rhymes to practise counting forwards, counting backwards, skip counting and subtraction
 - While singing number rhymes, try showing the numbers on your fingers. This will help your child start to link the number to the amount.
 - Also help to develop a wide range of mathematical skills. Number rhymes further support language development, social and emotional skills and listening skills.
 - Only two stanzas of the rhyme Five Little Monkeys are given in the lesson. Let the children sing. The rest of the line. It can be presented to those who fall from bed.



The full rhyme is below

*There were TEN in the bed and the little one said,
 'Roll over, roll over!'
 So they all rolled over and one fell out...
 There were NINE in the bed and the little one said 'Roll over, roll over!'
 So they all rolled over and one fell out...
 There were EIGHT in the bed and the little one said 'Roll over, roll over!'
 So they all rolled over and one fell out...
 There were SEVEN in the bed and the little one said 'Roll over, roll over!'
 So they all rolled over and one fell out...
 There were SIX in the bed and the little one said 'Roll over, roll over!'
 So they all rolled over and one fell out...
 There were FIVE in the bed and the little one said 'Roll over, roll over!'
 So they all rolled over and one fell out...
 There were FOUR in the bed and the little*

one said 'Roll over, roll over!'
 So they all rolled over and one fell out...
 There were THREE in the bed and the little one said 'Roll over, roll over!'
 So they all rolled over and one fell out...
 There were TWO in the bed and the little one said 'Roll over, roll over!'
 So they all rolled over and one fell out...
 There was one in the bed and the little one said,
 'Good night!'

Comparing groups

- ◆ In the three activities below child has guess which group is large not by counting objects one by one but by observing the two groups

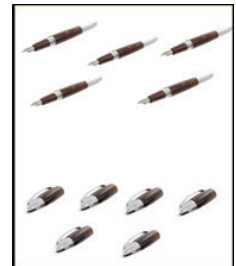


- ◆ Comparing groups here does not mean comparing the number of objects in each group by counting. Rather, it is observing the groups and matching the objects in each group to each other to find out which is more and which is less. There are 5 different ways to compare
 - One-to-one correspondence (pairing)
 - Matching (notices how things go together)
 - Subitizing (knowing without counting)
 - Knowing the same and different (intuitively)
- ◆ The activities in these two pages are the same as comparing groups but the difference here is we are asking the child "How many more". In the classroom we want to use physical objects such as pen and its top, pebbles, mochadi etc. to do the activity.



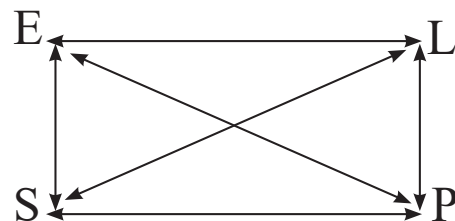
Pen and Top

Which is the larger set top or pen? Children guesses individually. The pen and the top are joined by a line to find the larger group. Circle the ones that come up the most.. Then put the pen and the top into different groups as seen in the worksheet. Another worksheet is presented below which shows which group is bigger by adding pen and top.



How does a child develop abstract thought?

- ◆ There are 4 steps for concept formation in mathematics
- ◆ We can represent this using the diagram given below



- ◆ Here this way of concept formation is called ELPS
 - E - Experience with physical objects,
 - L - Spoken language that describes that experience,
 - P - Pictures that represent the experience,
 - S - Written symbols that generalize the experience.
- ◆ Let us trace this sequence for a child's learning about the concept '1(One)':
 - E - He sees, feels, tastes, holds, rolls and

drops the 1. He has ‘fun’, and learns about many of its properties,

- L- He associates the sound of the word ‘one’ with his toy. This is useful. If he says the word, he may be given the one ball, one umbrella One pencil etc.
- P - He recognizes the picture of the one ball, one umbrella One pencil etc..
- S - Much later, he learns the symbol of one as 1 that we write to represent the sound ‘one’.

- ◆ As we proceed to analyse the stages that children need to progress through in attaining mathematical understanding and competence, we shall often refer to the sequence of abstraction, E-L-P-S. A mathematics textbook for children, however carefully prepared, can be concerned only with the first two items of the sequence, pictures and symbols. No book for young children can start where they need to start, namely with experience and spoken language.

Math kit

Each child should have a growing math kit as part of the classroom activity. This math collection should include manchadi, Sticks shells, pictures, shapes etc. and their self-made products that can be used for learning math. As the learning process progresses, the mathematical repertoire should also grow. This collection should be helpful for effective learning using these materials in classroom activities.

Presentation of numbers

- ◆ Below are the various steps that can be taken to introduce numbers in class 1.
 - Child can find more/less by observing distinctly the different groups.
 - You have to find a way to make a group smaller or larger. (taken, changed or added).
 - 1 to 5 provide opportunities to observe, analyze and classify different groups.

These groups are associated with numbers. That number is the number of the group,

- Groups 1 to 5 are arranged on a more/less basis. In this way groups up to 9 are introduced and arranged in relation to numbers (1 to 9).
- A large group formed by the joining of two different groups is introduced. (Amount adds up to 9). By subtracting from a set, the set is known (subtraction).
- A group of 10 and smaller groups are added to it to form new groups. Find the number of those groups (10 to 19). Let’s introduce the number of large groups formed by groups of tens
- Phu (10, 20, 30,, 100) by adding 1 to 9 to 20 and getting to 21 to 29.
- In the same way, groups of 1 to 9 are added to groups of 10 to form numbers up to 99.

Introducing numbers 1 to 5

- ◆ Here, teacher should introduce numbers in the way of concept formation E-L-P-S
 - **Stage 1 E** - Experience with physical objects, teacher should provide physical objects like balls, pebbles toy cars different color tokens etc. ask the child to take ‘one blue ball’, ‘Take 2 tokens One red and one green token etc.
 - **Stage 2 L** - Spoken language that describes that experience children have to sit in groups and ask them to say one sentence about one. Example There is one head and one nose for human. There is one Sun and one Moon in the sky etc. I have two eyes and ears
 - **Stage 3 P** : Pictures that represent the experience, In the page there is space for colouring one star and colour two different things
 - **Stage 4 S** - Written symbols that generalize the experience.
 - In this stage children have to write the symbol and circle the symbol 1. A pack of number cards are given (same number repeat several times) and

children re arrange the cards in order
 ♦ In this way we can introduce 3,4 and 5
 Remember to follow the E-L-P-S diagramm

- ♦ Sing this song along with students
- ♦ Ask children to make such songs themselves

- ♦ There are 3 activities given. The first and second are count and match game.
- ♦ Find the corresponding number from the

picture in the first column and match it with a line. You can ask children to make their own activities like this. In the third activity. Pictures of creatures are given on the right side. Count and see how many there are of each. Write how many there are of each creature on the left column provided.

Word Problems

- ♦ Now children want to do some Word problems 3 word problems are given here. .
- ♦ Discuss with children how to solve each problem The steps of problem solving are given below. follow the steps to solve each

Problem solving

- ♦ How to solve this problem? Children present their method. (No need to find the answer to the problem at this stage)
- ♦ Teacher intervention
 - What is to find out?
 - What all have been provided for that?
 - Is any other data needed?
 - How to find out?

A Math Word Problem Fosters Conceptual Thinking and understanding

- ♦ This strategy of selecting and teaching word

problems guides students to develop their understanding of math concepts. While giving word problems we want to see the characteristics of such problems

- Is the task open or closed? Open tasks provide multiple pathways to foster a deeper understanding of mathematical concepts and skills. Closed tasks can still provide a deep understanding of mathematical concepts and skills if the task requires a high level of cognitive demand.
- Does the task encourage critical thinking and problem-solving skills?
- Will the task allow students to see the relevance of mathematics to real-world situations?
- Does the task promote creativity and encourage students to make connections between mathematical concepts and other areas of their lives?



◆ This activity is the same as the activity given above

As we discussed earlier the numbers 6,7,8,9 can be introduced in the same way.



Now can we do some activities using numbers up to 9



- ◆ Let children do these activities themselves
- ◆ These type of activities we discussed while introducing numbers 1 to 5

DISCOVERING THE VISUAL POETRY OF GEOMETRICAL SHAPES

Introduction

Learning shapes is one of the earliest concepts we teach Children. Children have dynamic learning capabilities that are enhanced by their observation skills. However, teachers need to take timely steps while teaching children. Basic shapes and colours' impact children. They try to understand their surroundings by looking at the different objects around them. All kinds of objects and structures help children in learning shapes. As a Teacher one should introduce different shapes for children at an early age. There are various shapes activities for children in first standard that can help them learn and understand basic shapes.

Rectangular doors to triangular roofs, circular wheels and square Chessboards—shapes are everywhere. Learning shapes not only helps children identify and organize visual information, it helps them learn skills not only in mathematics but in science as well and in areas like reading, drawing etc. For example, an early step in understanding numbers and letters is to recognize their shape. Learning shapes also helps children understand other signs and symbols. A fun way to help your child learn shapes is to make a shape hunt game. Cut a shape out of paper and have fun searching your house or neighbourhood for objects that match that shape. Or, gather a number of different objects, and help your toddler sort them into piles according to the shapes.

Children are first introduced to basic shapes like rectangles, triangles, circles, and squares. After a kid has mastered the categorization and naming of these shapes, they are introduced to more complicated shapes. A lot of time needs to be spent on basic shapes for kids. This is due to the fact that all of the shapes are taught at a later level based on the concepts formed while the children learning fundamental shapes.

Learning Achievement:

Rectangle

- ◆ Definition: A rectangle is a shape with four sides.
- ◆ Properties:
 - It looks like a door or a book.
 - It has four corners, and each corner is the same (they are all “L” shaped).

Triangle

- ◆ Definition: A triangle is a shape with three sides.
- ◆ Properties:
 - It looks like a slice of pizza or a roof of a house.
 - It has three corners.

Circle

- ◆ Definition: A circle is a round shape.
- ◆ Properties:
 - It looks like a ball or a wheel.
 - It doesn't have any corners or sides.

Square

- ◆ Definition: A square is a shape with four equal sides.
- ◆ Properties:
 - It looks like a box or a checkerboard square.
 - All four sides are the same length, and it has four corners.

Rolling

- ◆ Definition: Rolling is when something moves by turning over and over.
- ◆ Example: A ball rolls on the ground.
- ◆ Description:

- When you push a round object like a ball, it rolls away.
- Rolling is like when you turn a wheel or roll a toy car.

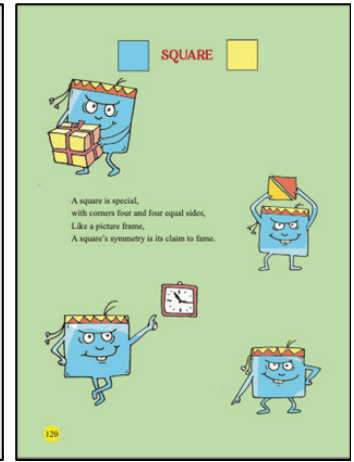
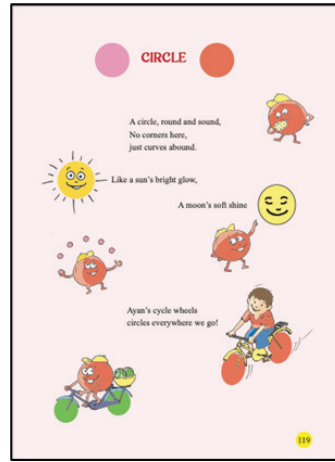
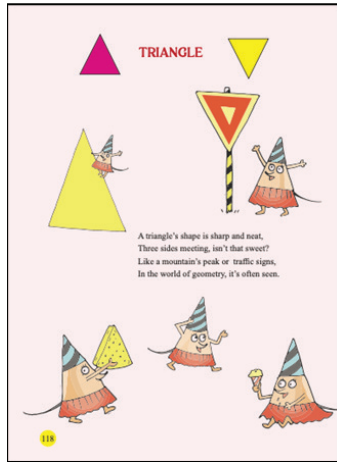
Sliding

- ◆ Definition: Sliding is when something moves smoothly across a surface without turning.
- ◆ Example: A book slides across a table.
- ◆ Description:
 - When you push a flat object like a book, it slides.
 - Sliding is like when you go down a slide at the playground.

Ideas and Perceptions	Process and Operations	Learning Achievements
Familiarise different basic 2D shapes Understands the properties of different shapes such as Rectangle, triangles, circles and squares Familiarise the basic 3D shapes Understands the difference between rolling and sliding of different objects.	Discover the characteristics of different shapes by observing the environment and playing games and collecting different shapes in surroundings Drawing basic shapes and coloring them, Engage in activities like Shape Hunt in Your Home, Shape Sorting Game, Making Shapes with Geoboards etc. Discover the characterises of basic 3D shapes. Colour and count the shapes as shown in the pictures.	Recognition: Being able to recognize and name the shape in various contexts and objects. Drawing: Demonstrating the ability to draw the shape accurately. Properties: Understanding and describing the properties of the shape (e.g., number of sides and corners). Comparison: Comparing and contrasting different shapes (e.g., how a square is different from a rectangle).

- ◆ When kids learn to identify shapes, they also learn to distinguish between objects and categorize things
- ◆ Learning shapes can help kids with counting, problem-solving, patterns, and spatial recognition
- ◆ Teachers can help by pointing out shapes in everyday life, providing toys that use shapes, and playing games that teach shapes with their kids
- ◆ A play-based activity can help kids recognize shapes and develop the other essential building blocks of learning





In the four rhymes children get an idea of the basic shapes rectangles, triangles, circles and squares. Say the rhyme with children two or three times. Let one child say the rhyme and other children to repeat.

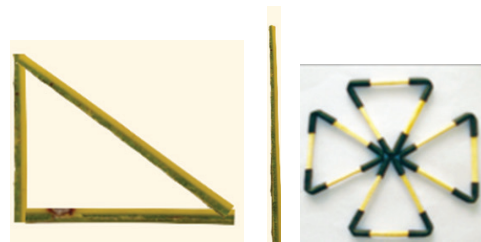
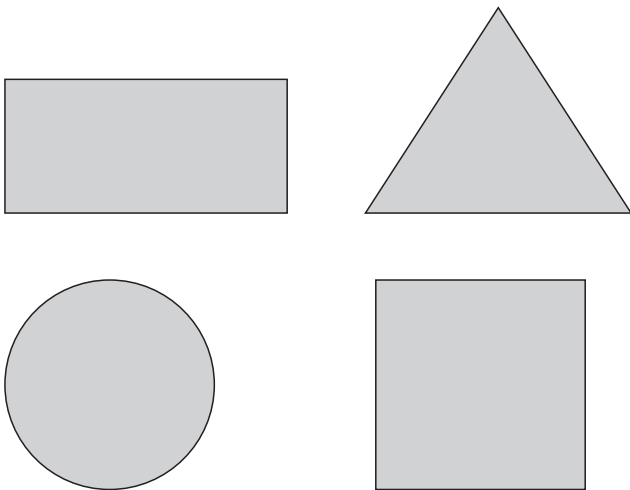
Show them a shape and ask them to identify the shape.

Guessing game

I have a shape in my mind it has 4 sides, and it is a shape like a door can you say which is that shape?

Finding shapes in home and surroundings.

What are the objects that you see in your house in the shapes shown below



Telling activity

Show a shape and ask the child to say something about that shape

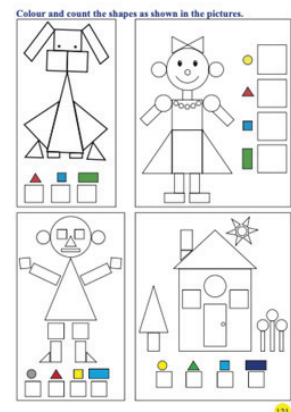
Making shapes

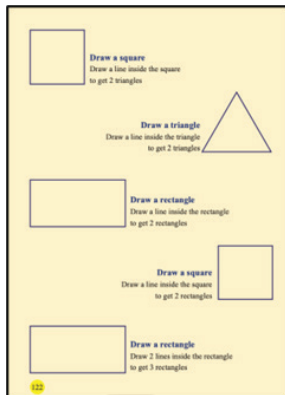
Give children piece of Eerkil (coconut leaf stick) or match sticks and ask them to make th shapes

Drawing Circles

Give children bangles or coins to draw circles

Ask the children to Colour and count the shapes as shown in the pictures





Draw a square

This is a square children can draw a line inside the square to make two triangles. Check the alternative ways they use to make the triangles.

Draw a triangle

Here children can draw a line inside the triangle to make two triangles. How many ways they use to do it? Discuss with children before doing the activity

Draw a rectangle

In this rectangle children should draw a line inside it to make two rectangles. Encourage the children to do it in different ways.

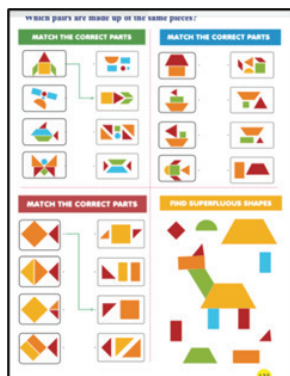
Draw a square

This activity is same as the activity ‘Draw a rectangle’

Draw a rectangle

If we draw two lines inside the rectangle how many rectangles we get? Think of different ways of drawing the lines.

This activity is to develop observation skill among the children. A picture and its parts are given side by side. They have to match the picture and parts by drawing arrows



Basic 3D shapes are introduced for children. They include Cylinder, Cone, Cube, Sphere and Cuboid .

Young children need repeated hands-on play with different 3D objects to understand them, and they need clear, accurate information from their

teachers to avoid the confusion between surface or two-dimensional shapes and three-dimensional shapes that exists in many young children.

Play a game of ‘Guess Who?’ with shapes. The children can only ask yes/no questions of each other to work out the shape. Let children collect common 3D shapes in and around the classroom and surroundings. Sort the objects with similar shapes.



Rolling is when a thing turns over and over

If something slides, it just goes down without any turning.

Let children gather some classroom materials and make predictions about which objects would slide and which would roll.

Encourage children to describe the difference between the movements. Possible discussion ideas:

- Which object moves more easily on a ramp?*
- Which object requires more force to make it move?*
- Why do you think so?*

Bring out an object that will roll (cylindrical block) and an object that will slide (rectangular block).

Get children predict how each block will move. Discuss children's predictions. Possible discussion ideas:

Why do you predict that the (cylindrical/ rectangular) block will (roll/slide) like the (ball/ box) did?

Who thinks the cylindrical block and the rectangular block will both roll?

Does someone have a different prediction? If so, why did you make that prediction?

What do you observe about the shape of each block that makes you think it will roll or slide?



You can see 6 pictures on the left;
 Which will roll?
 Which will slide?
 Which objects both roll and slide?
 Number the Objects 1,2 Etc.

Rolling	sliding	Both rolling and Sliding

Join the dots and draw these shapes.

Can you draw circles by joining these dots?

Let children draw rectangles, Squares and Triangles in the dotted sheet How many different types of each figure they draw?
 Why can't they draw circle in the dotted paper with joining all dots.
 Discuss with children.

Introduction

In the previous chapter we learned numbers one to nine. Now we want to learn the number zero. The number 0 might mean nothing, nil, or null. The most concrete ways to help young children grasp the concept of zero is to play a game of “takeaway”. Start out with things they really like— toys, candies, books, etc.— and then playfully take them away. First they had some, now they have none! Then let them do the same for you. Place a few of your favourite items in front of you, and let them take it all away. Use such words as zero, nothing, and none. Have them repeat sentences after you—like, “I had some of my things right here and now that you have them, I have none left!”

Aim and Objective:

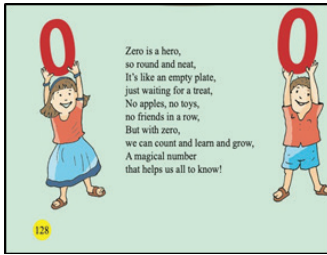
Aim: To introduce the ‘zero’

Objective:

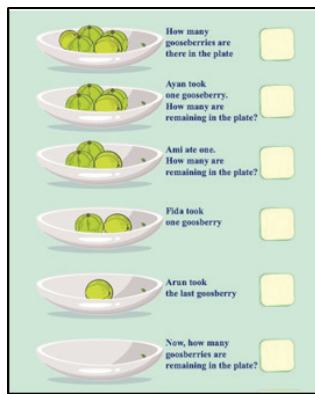
- ◆ To help them Improve counting skills with the help of zero.

- ◆ To help them Improve their math skills with help of zero.
- ◆ To develop activities that enable the child to understand the Value of zero
- ◆ To write the symbol of zero and write it in words.
- ◆ To do activities using numbers 0 to 9

Ideas and Perceptions	Process and Operations	Learning Achievements
<ul style="list-style-type: none"> ◆ To understand the meaning of zero ◆ To Improve counting skills with the help of zero. ◆ To develop activities that enable the child to understand the Value of zero ◆ To write the symbol of zero and write it in words. 	<ul style="list-style-type: none"> ◆ Sings Rhymes in groups about zero ◆ plays the game of “takeaway”. To understand the meaning of zero. ◆ Writing the symbol of zero in worksheets ◆ Doing activities such as writing phone numbers to include numbers 0 to 9 	<ul style="list-style-type: none"> Understands the meaning of zero Doing activities using numbers 1 to

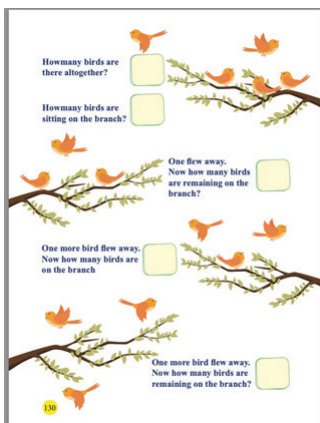


- ◆ Let the children sing the rhyme along with the teacher. Then ask each child to say the rhyme individually
- ◆ What are the things that you see zero in this rhyme?
- ◆ Can you add few lines in this rhyme to represent zero?



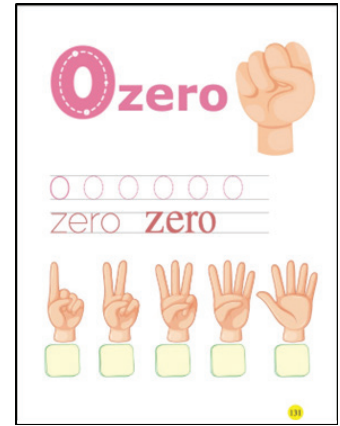
This is the takeaway activity. Let children fill the blank columns. Teachers can recreate this activity using Paper plates and beads. Children are arranged in groups of two. Keep the plate in the middle of them and put 4 beads in the plate one child

can take a bead and write the remaining number of beads in their notebook. Then the other repeat the game. The winner is the one who collects the last bead
Now how many beads remaining in the plate?



This activity is same as the activity above. Ask a child to do the activity and explain this to others. Children should understand that when all birds flew away there is “zero” birds on the branch.

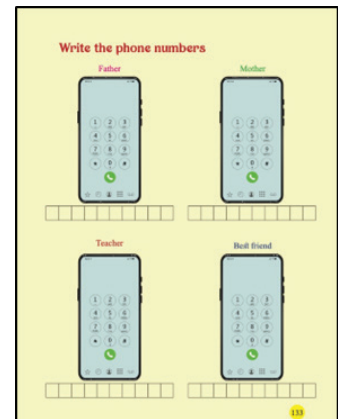
This activity is same as the activity above. Ask a child to do the activity and explain this to others. Children should understand that when all birds flew away there is “zero” birds on the branch.



This is the reinforce activity for understanding zero. Let the children do this activity and make another such activity on their own



Now the children learned the ten number symbols from zero to nine. In this activity they should use the numbers 0 to 9. Ask them to fill the phone numbers of their teacher, parents and the best friend. Let them remember these numbers also.



What are the other numbers the children need to child want to remember in their daily life.

- ◆ Postal code number
- ◆ Vehicle Number
- ◆ House number
- ◆ Bank account number
- ◆ Adhar card number
- ◆ Id card number

Make a list of all these numbers and keep with you

Introduction

In this small chapter we are introducing the number 10. We are introducing this as a number like 8 and 9 Don't think of it as a two digit number using 1 and 0. Just like other numbers being introduced the teacher should introduce the 10 number also in the way of concept formation E-L-P-S. Using Ten Frames (a 2x5 grid and counters) is the best way to learn the concept of ten. Place counters in the frame to show different combinations that make ten.

- ◆ Help students understand ways to make ten.
- ◆ explain that ten ones are equal to one ten,
- ◆ Allow students to practise visually by using ten frames.
- ◆ Give students a lot of opportunities to practise.
- ◆ Model how to do it mentally.
- ◆ Involve students by asking questions.

Ideas and Perceptions	Process and Operations	Learning Achievements
Develop the concept of number 10 Explain that ten ones are equal to one ten, Explains that 10 is one more than 9 The smallest two digit number is 10. Count groups of ten	By counting the objects, observing the environment and playing games makes the number sense of 10 introduce 10 in the way of concept formation E-L-P-S. Draw pictures, play games, count, learn numbers from one to ten , write and read. Number Bonds: Create diagrams showing number bonds for 10, where students can see pairs of numbers that add up to ten.	Write number 10 Find how number 10 is developed Explain the various ways for making 10 Recognizes, reads and writes numbers from one to ten



Let some objects be placed on a table or ground. The maximum number of one object is 10. Ask children to count all objects. How many objects are 8. How many objects are 10 ?

Now let them count number of lady bugs. Ask children to observe 10 and count the number of children standing near 10. Colour 10 leaves in the picture. Write 10 in words and in symbol. Circle number 10 in the bottom right corner.



Look at the picture, count and write how many Ants, Butterfly's, flowers and ladybugs. In the activity 2 let children complete the 10 frames. Write how many they added in the blank columns

Fill the blank columns

6 □ 4	10 □ 5	8 2 □	9 7 □	7 2 □	9 1 □	5 0 □	4 2 □
10 1 □	8 □ 3	7 4 □	10 6 □	8 2 □	10 5 □	9 4 □	5 □ 3
7 □ 4	10 □ 3	9 □ 0	6 □ 0	6 2 □	7 1 □	8 6 □	10 2 □
9 □ 3	7 □ 6	10 □ 8	8 6 □	9 7 □	10 6 □	10 1 □	9 □ 3

Now we can give few more activities to understand 10

Make ten by putting numbers in blank circles

1	+	9	=	10
2	+	-	=	10
-	+	7	=	10
-	+	-	=	10
5	+	-	=	10
-	+	4	=	10
7	+	-	=	10
-	+	2	=	10
9	+	-	=	10
-	+	10	=	10

Make ten by putting numbers in blank circles

$\begin{array}{c} \text{○} 2 \\ \text{○} \end{array} \rightarrow \text{○} 10$	$\begin{array}{c} \text{○} 5 \\ \text{○} \end{array} \rightarrow \text{○} 10$	$\begin{array}{c} \text{○} \\ \text{○} \end{array} \rightarrow \text{○} 10$
$\begin{array}{c} \text{○} \\ \text{○} \end{array} \rightarrow \text{○} 10$	$\begin{array}{c} \text{○} \\ \text{○} \end{array} \rightarrow \text{○} 10$	$\begin{array}{c} \text{○} 6 \\ \text{○} \end{array} \rightarrow \text{○} 10$
$\begin{array}{c} \text{○} 0 \\ \text{○} \end{array} \rightarrow \text{○} 10$	$\begin{array}{c} \text{○} \\ \text{○} \end{array} \rightarrow \text{○} 10$	$\begin{array}{c} \text{○} \\ \text{○} \end{array} \rightarrow \text{○} 10$
$\begin{array}{c} \text{○} \\ \text{○} \end{array} \rightarrow \text{○} 10$	$\begin{array}{c} \text{○} \\ \text{○} \end{array} \rightarrow \text{○} 10$	$\begin{array}{c} \text{○} \\ \text{○} \end{array} \rightarrow \text{○} 10$

Tick which is correct for 10

$\begin{array}{c} \triangle 10 \\ 9 \\ 7 \\ 4 \\ 8 \\ 5 \end{array}$	$\begin{array}{c} \triangle 8 \\ 3 \\ 6 \\ 4 \\ 2 \\ 1 \end{array}$	$\begin{array}{c} \triangle 5 \\ 1 \\ 2 \\ 0 \\ 3 \\ 4 \end{array}$
$\begin{array}{c} \triangle 6 \\ 4 \\ 1 \\ 2 \\ 3 \\ 5 \end{array}$	$\begin{array}{c} \triangle 7 \\ 4 \\ 2 \\ 6 \\ 5 \\ 3 \end{array}$	$\begin{array}{c} \triangle 9 \\ 6 \\ 7 \\ 8 \\ 5 \\ 3 \end{array}$

ADDITION AND SUBTRACTION A GRACEFUL AND HARMONIOUS DANCE AMONG NUMBERS

Introduction

This unit focuses on the addition and subtraction of single-digit numbers and number interpretation. The unit covers the addition of one-digit numbers (up to 9), writing a given number as the sum of two numbers, and interpreting a one-digit number in different ways. Zero is introduced along with subtraction. Mathematical symbols (+, -) are introduced, and children are given the opportunity to verbally present statements written with these symbols and to write the symbols as presented. This unit also includes practical problems to be solved using addition and subtraction operations.

The teacher should ensure that necessary additions to the story in this lesson are made and connected it with language activities in each context. Special care should be taken to provide additional activities, as this unit introduces mathematical symbols

Learning Achievements

- ◆ It is found that adding another group to one group results in a larger group.
 - ◆ A given number can be written as the sum of two numbers in different ways.
 - ◆ Various idioms denoting addition include total, sum, and add.
 - ◆ Subtraction is explained in terms of how much one group is reduced by another group.
 - ◆ Recognizes the words remainder, subtract, and subtraction to indicate subtraction.
 - ◆ Mathematical statements written with the symbols -, +, and = are verbalized.
 - ◆ Addition, subtraction, and inclusion to solve practical problems.
 - ◆ It is recognized that adding one to a number gives the next number.
 - ◆ Recognize that alternating numbers in consecutive sequences are obtained by adding two each
 - ◆ Zero is recognized by the verb reduce and applied in various contexts.
- ◆ Zero is explained by the fact that if you take away all of a group, there is nothing left.
 - A number is the sum of two numbers below it.
 - The '+' sign is used to indicate a compound verb.
 - A small group can be picked out from a large group.
 - A smaller group is obtained by removing a small group from a larger group.
 - Use the symbol '-' to denote the subtraction.
 - Different small groups are taken from a large group.
 - The sign '0' is used to denote the remainder when the same number is subtracted from a number.
 - If you add one to a number, you get the next number.
 - Adding two to consecutive numbers results in alternating numbers.

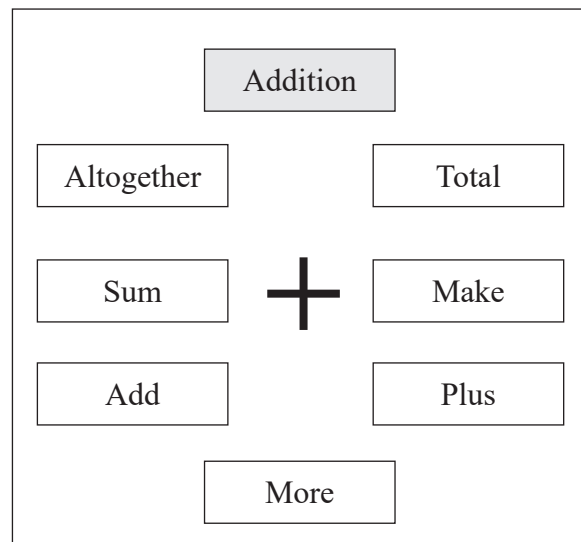
Unit frame

Ideas and Perceptions	Process and Operations	Learning Achievements
<p>If you add one to a number, you get the next number.</p> <p>Adding two to consecutive numbers results in alternating numbers.</p> <p>It is found that adding another group to one group results in a larger group.</p> <p>A given number can be written as the sum of two numbers in different ways.</p>	<ul style="list-style-type: none"> ◆ A number can be interpreted as the sum of different numbers. ◆ Uses analytical skills to solve problems. ◆ Analyzes practical problems involving abstraction arising from various contexts and determines solutions. ◆ Uses objects and pictures to extract different small groups from a larger group. ◆ From contexts and concrete objects, we discover that a large group is composed of other smaller groups. 	<p>A given number can be written as the sum of two numbers in different ways.</p> <p>Subtraction is defined as the process of removing a smaller group from a larger group and calculating the remainder.</p> <p>Recognizes different words that refer to subtraction (remainder, subtract, etc.).</p> <p>Arithmetic statements are verbalized using the symbols ‘-’, ‘+’ and ‘=’.</p> <p>Mathematical statements written with symbols are expressed verbally.</p> <p>Solves practical problems involving addition and subtraction.</p>



In this activity we are introducing addition of two numbers. Ayan and Ami are collecting match boxes to play a game. Ayan collected 4 match boxes and Ami collected 3. Altogether how many match boxes they collected? Ask children to find the answer. Let them say that 4 match box and 3 match box makes 7 match box. They can

also say this using the other addition words like altogether, total, sum, make, plus, add and more. In the same way let them do the other activities.



After these activities we can give some other group activities

Activity

Let's Find Friends

Each child is given a badge with a number from 1 to 9. The children run in a circle. The teacher calls out a number. The children must form groups such that the sum of the numbers on their badges equals the number called out by the teacher! The badge holders must hold hands. For example, if the teacher calls out 8, the group could be 1 and 7, or 2 and 6, etc. Those who cannot form such groups will be out of the game.

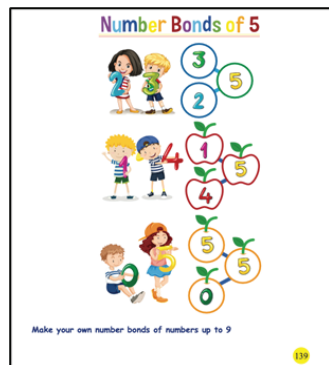
Activity

How Many Are Left?

The following activities are designed to help understand the concept of subtraction. The teacher calls nine children to the front of the class. The teacher names five of them and asks the class to observe them closely while they are sent out of the classroom without being seen by the other students. The teacher then asks, "How many children are left inside?" The process is repeated with different numbers of children being sent out.

What Are Number Bonds?

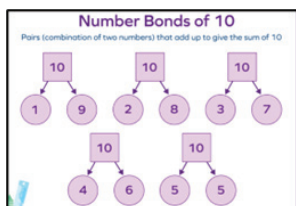
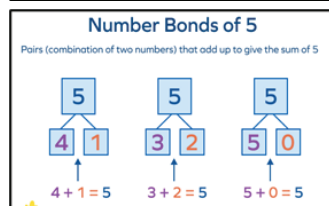
A number bond is a pair of numbers that add up to give the sum as a specific number. Using



number bonds, one can instantly tell the answer without the need for the actual calculation

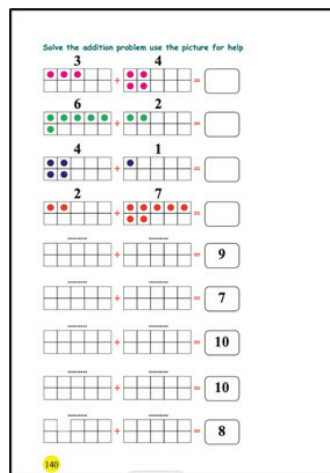
Number bonds can be given in different ways as shown below.

Now let children make number bonds up to 9



Ten-Frame

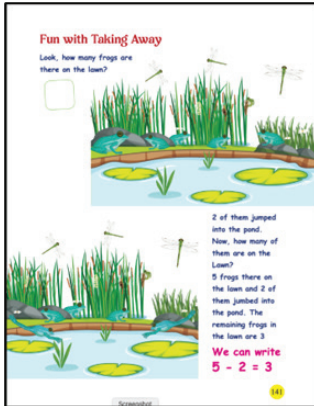
Find out what ten frames are and how they're used to support children's Maths and Numeracy learning. We're looking at simple addition and subtraction using ten frames and featuring some fabulous resources you can use in class and at home.



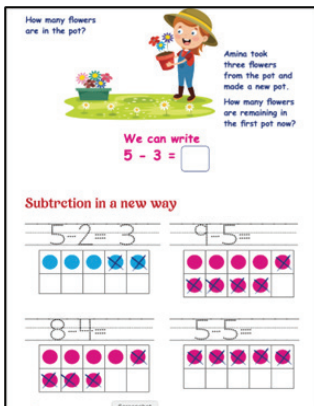
A ten frame is a simple tool for teaching Maths. It helps children develop number sense and early numeracy skills. Number sense develops gradually in children from birth to five. The more young children encounter numbers and how they interact with each other, the more their number sense and skills grow.

This provides many ways through which you can use a ten frame to help children learn addition and subtraction, as well as lots of handy resources to take their learning further. Ten frames are two-by-five rectangular frames that serve as a base for placing objects like counters. Using this device, youngsters can practice with numbers from one to ten. By using ten frames, children can develop number sense in a visual and physical way, which is great for their memory and cognition as it activates all parts of the brain. Ask children to do the activities on their own. Let them read their answers and see how many different ways they can arrive at the answer. For example, one child may write 9 as 4+5, while another may write it as 6+3, and so on.

When Should Children Learn Subtraction?

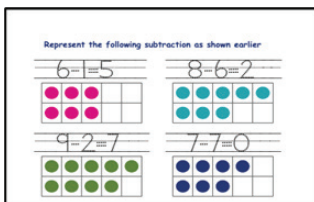


Children should start learning subtraction between the ages of 5 and 6. Basic subtraction is one of the first math concepts children begin to study alongside addition. Subtraction should be taught gradually and usually begins in primary classes.



Introduction to Gains and Losses:

- ◆ Explain subtraction through everyday scenarios of gains and losses.
- ◆ Use visual aids and interactive activities to make the concept clear.



Association with Numbers and Items:

- ◆ Help children associate numbers with physical items.
- ◆ Use objects like toys, fruits, or pictures (e.g., frogs on a lawn) to represent numbers.

Jumping Frogs Activity:

1. Show the children an image with a certain number of frogs on the lawn.
2. Ask them to count how many frogs are on the lawn.
3. Ask how many frogs jump into the pond.
4. Let the children count the remaining frogs on the lawn.

Representation of Subtraction:

- ◆ Demonstrate how to represent this subtraction visually:

For example, if there were initially 5 frogs on the lawn and 2 frogs jumped into the pond:

- ◆ $5 \text{ frogs} - 2 \text{ frogs} = 3 \text{ frogs}$ remaining on the lawn.
- ◆ This can be written as $5 - 2 = 3$.

Practice Activities:

Have the children practice similar activities with different numbers of frogs. Use the visual method to help them understand subtraction better. This approach helps children grasp the concept of subtraction in a tangible and engaging way, making the learning process enjoyable and effective.

Exercise 1:

- ◆ Show the children an image and ask how many frogs are on the lawn.
- ◆ Ask how many frogs jumped into the pond.
- ◆ Let the children count the remaining frogs on the lawn.
- ◆ Write the equation to represent the subtraction (e.g., $6 \text{ frogs} - 3 \text{ frogs} = 3 \text{ frogs}$).

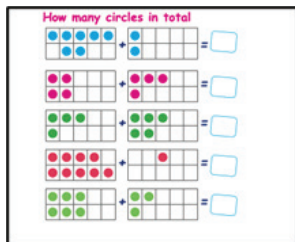
Exercise 2:

- ◆ Ask the children to draw a picture of a certain number of frogs on the lawn (e.g., 7 frogs).
- ◆ Let them decide how many frogs will jump into the pond (e.g., 4 frogs).
- ◆ Ask them to count the remaining frogs and write the equation (e.g., $7 - 4 = 3$).

Exercise 3:

- ◆ Provide a different number of frogs (e.g., 10 frogs).
- ◆ Ask the children how many frogs they want to

jump into the pond (e.g., 5 frogs).
Let them count the remaining frogs and write the equation (e.g., $10 - 5 = 5$).



This activity is the same as ten frame activity

Activity Explanation

1. Objective:

- ◆ To help children understand counting and addition by visualizing groups of circles.

2. Instructions:

- ◆ The activity consists of several rows, each with two sets of circles (in different colors) inside a grid.
- ◆ The task is to count the circles in each set and then add them together to find the total number of circles in each row.

Step-by-Step Guide for Each Row

1. Count the Circles in the First Set:

- ◆ Look at the first group of circles in the row.
- ◆ Count the number of circles and note the count.

2. Count the Circles in the Second Set:

- ◆ Look at the second group of circles in the row.
- ◆ Count the number of circles and note the count.

3. Add the Two Counts Together:

- ◆ Add the number of circles from the first set to the number of circles from the second set.
- ◆ Write the total in the box provided at the end of the row.
- ◆ Encourage the children to count out loud as they go through each set of circles.

- ◆ Use colourful markers or stickers to make the activity more engaging.
- ◆ Provide assistance as needed to ensure that each child understands the process of counting and adding the circles.

Example Breakdown

Let's go through the first row as an example:

1. First Set of Circles:

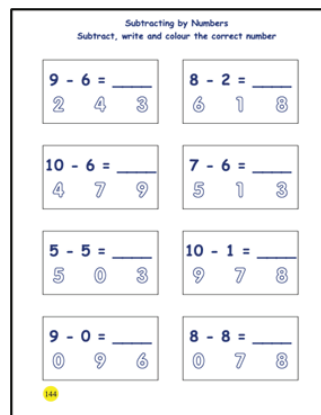
- There are 2 blue circles.

2. Second Set of Circles:

- There are 3 blue circles.

3. Total Number of Circles:

- 2 (first set) + 3 (second set) = 5 .
- Write the number 5 in the box provided at the end of the row.



1. Objective:

- ◆ To help children practice basic subtraction and identify the correct difference by subtracting the second number from the first.
- ◆ Each problem consists of a subtraction equation (e.g., $9 - 6 =$).

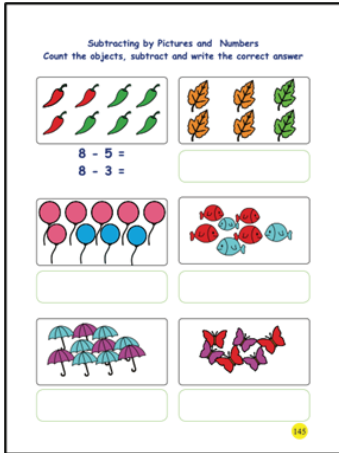
- ◆ Children need to solve the equation, find the correct answer among the multiple-choice options, and then colour the correct number.
- ◆ Use visual aids or objects (e.g., toys, fruits) to demonstrate subtraction in a tangible way.

2. Group Activity: Allow children to work in pairs or groups to discuss and solve the problems together.

Encouragement: Praise correct answers and provide gentle guidance for mistakes to reinforce learning.

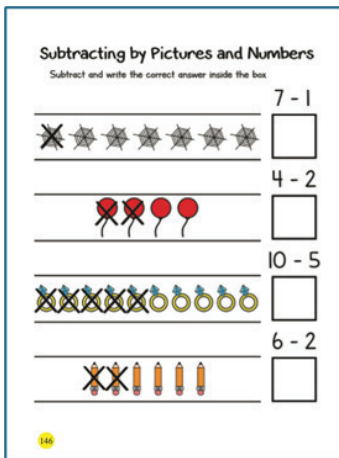
1. Objective:

- To help children practice basic subtraction by counting objects in pictures and writing the correct answer.



2. Instructions:

- Each problem presents a set of pictures with a subtraction equation.
- Children need to count the objects, subtract the given number, and write the correct answer in the blank space provided.



3. Use Real Objects:

If possible, use real objects (like toys or fruits) alongside the pictures to demonstrate subtraction physically.

4. Interactive Counting:

Encourage children

to use their fingers or a number line to count backwards when subtracting.

5. Reinforce with Examples: Provide additional examples and practice problems to reinforce the concept.

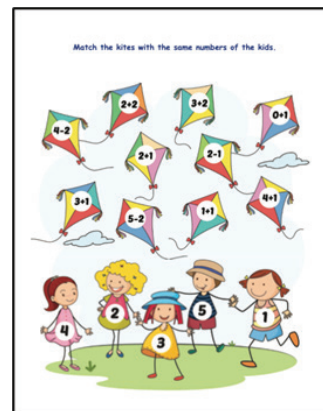
6. Positive Reinforcement: Praise the children for correct answers and provide supportive feedback to guide them through mistakes.

Understanding the Task:

- The title of the worksheet is “Subtracting by Pictures and Numbers”.
- The instruction is to subtract and write the correct answer inside the box provided.

Purpose of the Worksheet:

- This worksheet helps children visualize subtraction by associating numbers with physical objects.
- It reinforces the concept of subtraction by showing what happens when items are taken away from a group.
- Overall, the worksheet is designed to make the concept of subtraction clearer by using colourful and relatable images. Children are encouraged to count, subtract, and write the correct answers, enhancing their mathematical skills through interactive learning



The image depicts an educational activity designed to help children practice and reinforce their understanding of basic arithmetic (addition and subtraction). Here’s a detailed explanation of the concepts and how they are represented:

Visual and Interactive Learning:

- Kites with Arithmetic Operations:** Each kite has a mathematical expression (e.g., 1+1, 2+2, 3-1). These kites represent different arithmetic at problems that need to be solved.
- Children with Numbers:** Each child is holding a number that represents the result of one of the arithmetic problems shown on the kites.

Concept Explanation:

1. Addition and Subtraction:

- Addition (e.g., 1+1, 2+2, 3+2):** This is the process of combining two or more numbers to

get a total sum.

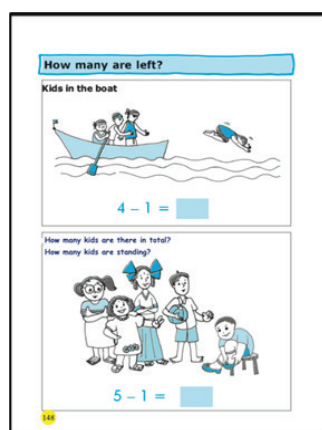
- ◆ Subtraction (e.g., 5-2, 2-1): This is the process of taking one number away from another to get the difference.

2. Matching Activity:

- ◆ The objective is for children to match each kite with the correct child based on the result of the arithmetic operation.
- ◆ For example, the kite with “1+1” should be matched with the child holding the number “2” because 1+1 equals 2.

Educational Value:

- ◆ **Reinforcement of Basic Math Skills:** This activity helps children practice basic addition and subtraction, which are foundational skills in mathematics.
- ◆ **Visual Learning:** By using visual aids (kites and children with numbers), children can better understand and remember the concepts.
- ◆ **Engagement and Fun:** The playful nature of the activity (kites and children) makes learning fun and engaging for young children.



The image consists of two subtraction problems that are illustrated with pictures to help children understand and solve the problems.

Problem 1: Kids in the Boat

Illustration: There are four kids in a boat. One kid is diving into the water.

Subtraction Problem: $4 - 1 = ?$

- **Explanation:** There were originally 4 kids in the boat. After 1 kid jumping out, we need to find out how many kids are left in the boat.

- **Solution:** $4 - 1 = 3$
- **Result:** There are 3 kids left in the boat.

Problem 2: How Many Kids Are Left?

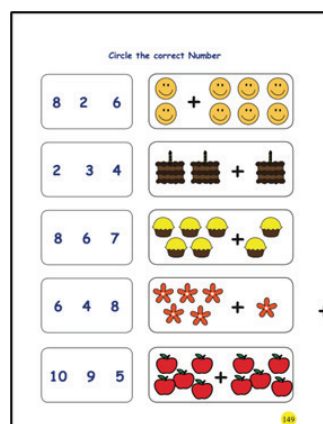
Illustration: There are five kids, with one child sitting on a chair and the rest standing.

Subtraction Problem: $5 - 1 = ?$

- ◆ **Explanation:** The problem asks how many kids are there in total and how many are standing. There are 5 kids in total. Since 1 kid is sitting, we need to find out how many kids are standing.
- ◆ **Solution:** $5 - 1 = 4$
- ◆ **Result:** There are 4 kids standing.

Educational Value:

- ◆ **Subtraction Concept:** These problems help children understand subtraction by taking away from a group and seeing what remains.
- ◆ **Visual Representation:** The pictures provide a visual context, making it easier for children to grasp the subtraction concept.
- ◆ **Real-World Connection:** Using scenarios like kids in a boat standing/sitting helps children relate math to real-world situations.



◆ **Visual Representation:** Using images helps children to visually count and add the items, reinforcing the concept of addition.

◆ **Practice Addition:** This activity provides practice in basic addition, helping children to recognize and understand sums.

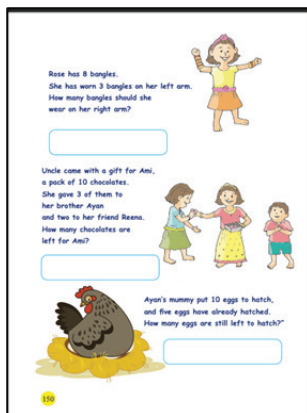
- ◆ **Engagement:** The use of colorful and familiar items makes the learning process engaging and fun for young children

Problem 1: Bangles

- ◆ **Scenario:** Rose has 8 bangles. She has worn 3 bangles on her left arm.
- ◆ **Question:** How many bangles should she wear on her right arm?
- ◆ **Explanation:** To find out how many bangles Rose should wear on her right arm, we subtract the number of bangles she has on her left arm from the total number of bangles.
 - Calculation: 8 (total bangles) - 3 (bangles on left arm) = 5
 - Solution: Rose should wear 5 bangles on her right arm.

Problem 2: Chocolates

- ◆ **Scenario:** Uncle gave Ami a pack of 10 chocolates. Ami gave 3 chocolates to her brother Ayan and 2 chocolates to her friend Reena.
- ◆ **Question:** How many chocolates are left for Ami?
- ◆ **Explanation:** To find out how many chocolates are left for Ami, we subtract the chocolates she gave away from the total number of chocolates she received.
 - Calculation: 10 (total chocolates) - 3 (chocolates to Ayan) - 2 (chocolates to Reena) = 5
 - Solution: Ami has 5 chocolates left.



Problem 3: Eggs

- ◆ **Scenario:** Ayan's mummy put 10 eggs to hatch, and 5 eggs have already hatched.
- ◆ **Question:** How many eggs are still left to hatch?
- ◆ **Explanation:** To find out how many eggs are still left to hatch, we subtract the number of eggs that have already

hatched from the total number of eggs.

- Calculation: 10 (total eggs) - 5 (eggs already hatched) = 5
- **Solution:** There are 5 eggs still left to hatch.

- ◆ **Subtraction Practice:** These word problems help children practice subtraction in real-life contexts.
- ◆ **Comprehension and Calculation:** Children must understand the scenario, identify the relevant numbers, and perform the subtraction to find the solution.
- ◆ **Engagement:** The use of familiar situations (bangles, chocolates, eggs) makes the problems relatable and engaging for young learners.

How to Solve the Activity:

- ◆ **Identify the Math Problem:** Look at each card and read the arithmetic problem displayed.
- ◆ **Perform the Calculation:** Solve the problem to find the result.
- ◆ **Find the Matching Number:** Locate the corresponding number in the middle set of circles.
- ◆ **Draw a Line:** Connect the card to the matching number.

Educational Value:

- ◆ **Arithmetic Practice:** This activity reinforces basic addition and subtraction skills.
- ◆ **Number Recognition:** Helps children recognize numbers and connect them with arithmetic results.
- ◆ **Engagement:** The colorful and playful design makes learning math fun and engaging.



Teaching problem-solving methods to children involves guiding them through a series of steps that help them understand and solve word problems. Here's a structured approach to teaching problem-solving

using the given word problems:

Step-by-Step Problem-Solving Method

1. Understand the Problem:

- ◆ Read the problem out loud with the children.
- ◆ Discuss what the problem is about and identify the main question.

2. Identify Important Information:

- ◆ Highlight or underline key information and numbers in the problem.
- ◆ Ensure children understand what each number represents.

3. Plan the Solution:

- ◆ Discuss possible strategies to solve the problem (e.g., drawing a picture, using objects, writing an equation).
- ◆ Choose the most appropriate strategy for the problem.

4. Solve the Problem:

- ◆ Use the chosen strategy to solve the problem step-by-step.
- ◆ Write down the steps clearly.

5. Check the Solution:

- ◆ Review the solution to ensure it answers the question.
- ◆ Verify the calculations by doing them again or using a different method.

Applying the Method to the Given Problems

Problem 1: Bangles

- ◆ Understand the Problem: Rose has 8 bangles. She has worn 3 bangles on her left arm. How many bangles should she wear on her right arm?
- ◆ Identify Important Information: Total bangles = 8, Bangles on left arm = 3.
- ◆ Plan the Solution: Subtract the bangles on the left arm from the total bangles.

- ◆ Solve the Problem: $8 - 3 = 5$. Rose should wear 5 bangles on her right arm.
- ◆ Check the Solution: Review the subtraction to ensure it is correct.

Problem 2: Chocolates

- ◆ Understand the Problem: Uncle gave Ami a pack of 10 chocolates. Ami gave 3 chocolates to her brother Ayan and 2 to her friend Reena. How many chocolates are left for Ami?
- ◆ Identify Important Information: Total chocolates = 10, Chocolates given to Ayan = 3, Chocolates given to Reena = 2.
- ◆ Plan the Solution: Subtract the chocolates given away from the total chocolates.
- ◆ Solve the Problem: $10 - 3 - 2 = 5$. Ami has 5 chocolates left.
- ◆ Check the Solution: Verify the subtraction steps.

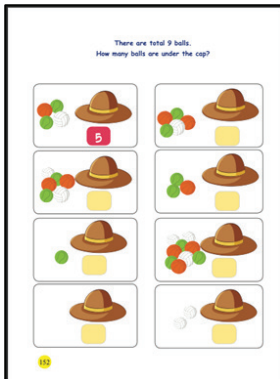
Problem 3: Eggs

- ◆ Understand the Problem: Ayan's mummy put 10 eggs to hatch, and 5 eggs have already hatched. How many eggs are still left to hatch?
- ◆ Identify Important Information: Total eggs = 10, Eggs hatched = 5.
- ◆ Plan the Solution: Subtract the hatched eggs from the total eggs.
- ◆ Solve the Problem: $10 - 5 = 5$. There are 5 eggs still left to hatch.
- ◆ Check the Solution: Ensure that the subtraction is correct.

Teaching Tips:

- ◆ Use Visual Aids: Draw pictures or use physical objects to represent the problem.
- ◆ Encourage Discussion: Let children explain their thinking process and reasoning.
- ◆ Practice Regularly: Provide different problems for children to practice and improve their skills.
- ◆ Be Patient: Allow children to take their time to understand and solve the problem.

Problem Explanation:



1. Understand the Problem:

- ◆ There are a total of 9 balls.
- ◆ Some balls are visible outside the cap.
- ◆ The remaining balls are hidden under the cap.

2. Identify the Important Information:

- ◆ Count the number of visible balls in each picture.
- ◆ Subtract the number of visible balls from the total number of balls (9) to find out how many balls are under the cap.

Step-by-Step Solutions:

1. First Row, Left:

- Visible balls: 4
- Calculation: $9 - 4 = 5$
- Balls under the cap: 5 (as shown by the number 5 in the box).

2. First Row, Right:

- Visible balls: 3
- Calculation: $9 - 3 = 6$
- Balls under the cap: 6

3. Second Row, Left:

- Visible balls: 2
- Calculation: $9 - 2 = 7$
- Balls under the cap: 7

4. Second Row, Right:

- Visible balls: 1
- Calculation: $9 - 1 = 8$
- Balls under the cap: 8

5. Third Row, Left:

- Visible balls: 1
- Calculation: $9 - 1 = 8$
- Balls under the cap: 8

6. Third Row, Right:

- Visible balls: 4
- Calculation: $9 - 4 = 5$
- Balls under the cap: 5

7. Fourth Row, Left:

- Visible balls: 1
- Calculation: $9 - 1 = 8$
- Balls under the cap: 8

8. Fourth Row, Right:

- Visible balls: 2
- Calculation: $9 - 2 = 7$
- Balls under the cap: 7

Educational Value:

- ◆ **Subtraction Practice:** This activity reinforces subtraction skills by requiring children to subtract the visible balls from the total.
- ◆ **Counting and Number Recognition:** Children practice counting the visible balls and recognizing the number of balls under the cap.
- ◆ **Problem-Solving Skills:** Children learn to apply mathematical operations to solve real-world problems.

By completing this activity, children enhance their ability to perform subtraction and understand how to distribute a total number of items into parts. This hands-on and visual approach makes learning of math engaging and effective.

Section 1: Create a Word Problem



Instruction: Write a word problem which gives the answer $1 + 4 = 5$.

Example Problem:

- ◆ Word Problem: "John has 1 apple. His friend gave him 4 more apples. How many apples does John have in total?"
- ◆ Solution: $1 + 4 = 5$
- ◆ Explanation: By creating a story involving the addition of objects, children can relate to real-life scenarios and understand the concept of addition.

Section 2: Balloon Problem

Problem: There were 7 balloons with Anna. Faisal gave her 6 more balloons. Then, Shameer borrowed 5 balloons from her. How many balloons are left with Anna now?

Steps to Solve:

1. **Initial Balloons with Anna:** 7
2. **Balloons given by Faisal:** 6
 - Calculation: $7 + 6 = 13$ (Anna now has 13 balloons)
3. **Balloons borrowed by Shameer:** 5
 - Calculation: $13 - 5 = 8$ (Anna has 8 balloons left)
4. **Answer:** 8 balloons

Section 3: Addition Sentence

Instruction: Write the addition sentence that fits this: "Saleem brought 3 chocolates for his sister Amina. Already she has 9 chocolates, now she has a total of 12 chocolates."

Steps to Solve:

1. **Chocolates Saleem brought:** 3
2. **Chocolates Amina already has:** 9
3. **Total chocolates:** 12
 - Calculation: 3 (brought) + 9 (already has) = 12
4. **Addition Sentence:** $3 + 9 = 12$

Section 4: Cricket Bats and Hockey Sticks

Problem: There were 12 cricket bats and 9 hockey sticks. How many more cricket bats are there than hockey sticks?

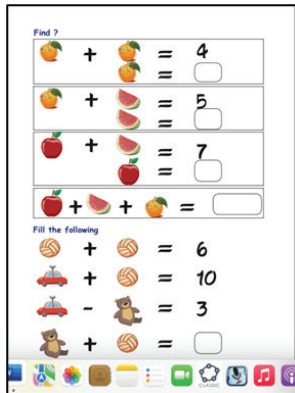
Steps to Solve:

1. **Total Cricket Bats:** 12
2. **Total Hockey Sticks:** 9
3. **Difference:**
 - Calculation: $12 - 9 = 3$
4. **Answer:** There are 3 cricket bats more than hockey sticks.

Educational Value:

1. **Creating Word Problems:** Encourages children to think creatively and apply mathematical operations in real-life scenarios.
2. **Solving Problems:** Helps reinforce arithmetic skills (addition and subtraction) by applying them to solve word problems.
3. **Understanding Context:** Teaches children how to interpret word problems and extract relevant information to solve them.
4. **Practice and Engagement:** Makes learning math engaging through storytelling and practical examples.

Step-by-Step Problem-Solving Approach



1. Understand the Problem:

- Read each equation carefully.
- Identify the unknown values represented by the pictures of fruits and objects.

2. Identify Known Values:

- Use given information to find the values of unknown items step-by-step.

3. Formulate Equations:

- Write down the mathematical equation represented by each line.

4. Solve for Unknowns:

- Use basic arithmetic to solve for the unknowns.

Detailed Explanation:

Top Section: Finding the Value of Each Fruit

1. First Equation:

- ◆ Equation: Orange + 3 Oranges = 4
- ◆ Steps:
 - Combine like terms: 4 Oranges = 4
 - Divide both sides by 4: Orange = 1
 - Value: Orange = 1

2. Second Equation:

- ◆ Equation: Orange + Watermelon = 5
- ◆ Known Value: Orange = 1
- ◆ Steps:
 - Substitute the value of Orange: 1 + Watermelon = 5
 - Solve for Watermelon: Watermelon = 5 - 1 = 4
 - Value: Watermelon = 4

3. Third Equation:

- ◆ Equation: Apple + Watermelon = 7
- ◆ Known Value: Watermelon = 4
- ◆ Steps:
 - Substitute the value of Watermelon: Apple + 4 = 7
 - Solve for Apple: Apple = 7 - 4 = 3
 - Value: Apple = 3

4. Fourth Equation:

- ◆ Equation: Apple + Watermelon + Orange = ?
- ◆ Known Values: Apple = 3, Watermelon = 4, Orange = 1
- Steps:
 - Substitute the values: 3 + 4 + 1 = 8
- ◆ Answer: 8

Bottom Section: Fill the Following

1. First Equation:

- ◆ Equation: Ball + Ball = 6
- ◆ Steps:
 - Combine like terms: 2 Balls = 6
 - Divide both sides by 2: Ball = 6 / 2 = 3
 - Value: Ball = 3

2. Second Equation:

- ◆ Equation: Car + Ball = 10
- ◆ Known Value: Ball = 3
- ◆ Steps:
 - Substitute the value of Ball: Car + 3 = 10
 - Solve for Car: Car = 10 - 3 = 7
 - Value: Car = 7

3. Third Equation:

- ◆ Equation: Car - Teddy Bear = 3
- ◆ Known Value: Car = 7
- ◆ Steps:
 - Substitute the value of Car: $7 - \text{Teddy Bear} = 3$
 - Solve for Teddy Bear: $\text{Teddy Bear} = 7 - 3 = 4$
 - Value: $\text{Teddy Bear} = 4$

4. Fourth Equation:

- ◆ Equation: $\text{Teddy Bear} + \text{Ball} = ?$
- ◆ Known Values: $\text{Teddy Bear} = 4, \text{Ball} = 3$
- ◆ Steps:
 - Substitute the values: $4 + 3 = 7$
- ◆ Answer: 7

Teaching Tips:

- ◆ **Visual Aids:** Use drawings or physical objects to represent the items and help children visualize the problem.
- ◆ **Step-by-Step Guidance:** Encourage children to solve one part of the problem at a time.
- ◆ **Check Work:** Have children double-check their calculations and reasoning.
- ◆ **Encourage Explanation:** Ask children to explain their thought process as they solve the problem to reinforce understanding.



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**TEACHERS RESOURCE
MANUAL**

**Mathematics
Grade 2**

1

NUMBERS BEYOND 100

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Read and write numbers up to 999 ◆ Interpret numbers according to their positions ◆ Split a number as a combination of 100,10 and ones ◆ Compare numbers and find the larger and smaller in a group and add symbol for greater than and less than. ◆ Explain the concept of ordinal numbers and find the number of place or order using it.. ◆ Explain the concept of odd and even numbers and classify them. 	<ul style="list-style-type: none"> ◆ 10 tens make 100. ◆ $99+1=100$ ◆ $90+10=100$ ◆ 100 is the smallest 3digit number ◆ 9 times 100 is:900 ◆ A three digit number reads beginning from 100 ◆ If there is no number on a position zero is added. ◆ The place in the left side of a 3 digit number is 100 ◆ In a 3 digit number the number with large digit in the 100 place is the larger. ◆ Ordinal numbers are used to indicate the place or order. ◆ Numbers which can not be divided in to equal groups are odd numbers and the others are even numbers. ◆ The digits in the ones place of odd numbers will be 1,3,5,7 and 9 ◆ The digits in the ones place of even numbers will be 0,2,4,6 and 8 	<ul style="list-style-type: none"> ◆ Identifying three digit numbers and the relation of a three digit number with 100 through plays and life situations. ◆ Find the relations of numbers in context of money transactions . ◆ Find the total amount of rupees from the denomination of notes and find different combinations of notes for a fixed amount. ◆ Find the largest and smallest number through plays money transactions. ◆ Comparing 3digit numbers during play and life situations. ◆ Analyze the place or order in life situations ◆ Find the odd and even numbers through plays. ◆ Analyze the odd and even numbers and find the peculiarities of ones place.

What is in this unit?

In this unit children go through the numbers from 100 to 1000. They have studied numbers up to 100 in previous class. They can read, write and interpret numbers up to 100. They can add and subtract numbers up to 20. They will add more than two one digit numbers. They are familiar with the signs of addition, subtraction and equal . They are interested in playing with numbers. They can compare two digit numbers. They are able to solve problems including addition and subtraction of numbers up to 20.

CLASS ROOM PROCESS.

Ensuring current ability level.

- ◆ Make sure that children are able to read ,write and interpret numbers up to 100.
 - Give objects and ask them to count and take.
 - Teacher says a number- students write in

note books

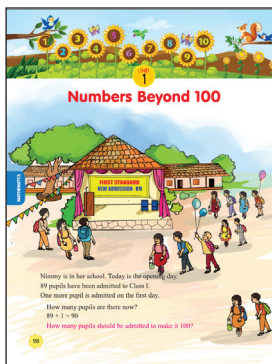
- Write some numbers on the BB. Ask them to read it from smallest to largest.
- Give number and ask them to split it as ones and tens.
- Give them number cards and let them arrange increasing or decreasing order.
- Give them two numbers like 10,20,30 etc

and ask them to add.

- Give additional support to those who are still standing below current ability level.

School opening day.

- ◆ This activity is to understand 100 as ten tens.
- ◆ Ask children to observe the picture and say some thing about it. Emphasis should be given to mathematical elements in the picture. Description should be in such a manner. If necessary some questions should be asked.



- What do you see in the picture?
- How many children are there?
- How many of them are boys?
- How many of them are girls?
- How many of them are holding water bottles in their hands?
- How many balloons are there?
- What is written on the banner?
- What is the number on the banner?

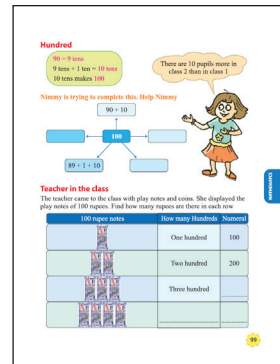
- ◆ Allow them to say more findings.
- ◆ Then come to TB and ask them how many pupils are admitted in 1st standard in total. $89+1=90$. ie 8 tens + 9 ones +1 one = 8 tens +1 ten= 9 ten= 90. Then ask them what is $9+1$. It is 10. $19+1=20$ $29+1=30$

Hundred

- ◆ Then come to the statement of the girl that 10 more than class 1 is in class 2. How many are there in class 2?
- ◆ 10 more than 90 is, 9 ten +1 ten =10 ten. It is 100.
- ◆ Then ask them to complete the web individually. Write all the combinations they found on the BB and let them write down.
 - $99+1=100$ $98+2=100$
 - $80+20=100$ $50+50=100$
 - $10+10+10+10+10+10+10+10+10+10=100$
 - $20+20+20+20+20=100$

Teacher in the class

- ◆ This is to understand the 100s name. one hundred, two hundred, three hundred etc. Give 100 rupee play notes in the groups and ask them to find how many rupees did they got. Then find which group has got more. Then fill the table in page 99 and 100 by counting 100 rupee notes.



Class library

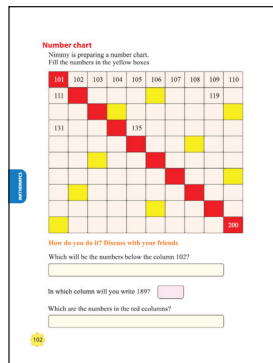
- ◆ This activity is to write numbers from 101 continuously. It should be understood that $100+1$ gives 101, $100+2$ gives 102..... $100+10$ gives 110, $100+11$ gives 111 and so on. Why there is zero in tens place should be cleared. When a number less than 10 is added to 100, zero will be there in tens place, because there is no tens in the number. Check self and each other. Then ask them to see the table showing the numbers of books given to other classes and write the numbers serially in the boxes. Teacher make sure that they have written correctly, especially after 99, 199, 299, 599, 699 etc.
- ◆ Then ask them to find how many books are issued for each class. Let them make a table as below and check self and each other. Before giving the table a discussion about writing these in a table should be held and format should be decided.

Class	Sl. No of books	Number of books
1	95 -104	10
2		
3		
4		
5		
6		

- ◆ Then an analysis of the table should be held.
- ◆ How many books in class 2. 190 to 200 may be said as 10. But actually it is 11. Same is the case with 191 to 301 and 360 to 371. Pupil may say it is 11. But it is 12. Later it will lead to find a way to find how many numbers are there within two numbers. This is just a start.
- ◆ Then let them fill the missing numbers. Check each other.

Number chart

- ◆ First teacher prepare a grid like this. Teacher say a number and ask them to locate the column. Then ask them to say the numbers under the number 105 without writing other columns. Then they will get a pattern. 105, 115, 125, Then find other patterns also by writing the numbers under other numbers. Writing numbers in yellow columns is to identify who are able to locate the number very easily. Then ask them to find the numbers in red boxes. They will get a pattern. Ask them to define the pattern. Then write the answers for the questions in page 102. Discuss the answers in the class. Check self and each other.

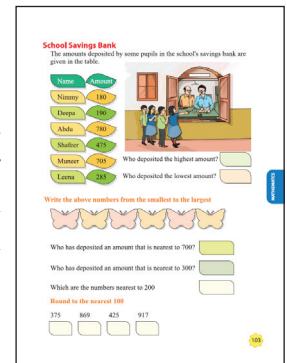


peer evaluation. This is called ‘meta thinking’ or thought about thought. This will help the child to correct the thinking process and the product. Only correction in answer or product will give nothing in the learning process.

- ◆ First teacher prepare a grid like this. Teacher say a number and ask them to locate the column. Then ask them to say the numbers under the number 105 without writing other columns. Then they will get a pattern. 105, 115, 125, Then find other patterns also by writing the numbers under other numbers. Writing numbers in yellow columns is to identify who are able to locate the number very easily. Then ask them to find the numbers in red boxes. They will get a pattern. Ask them to define the pattern. Then write the answers for the questions in page 102. Discuss the answers in the class. Check self and each other.

School savings bank

- ◆ This is to compare the numbers. First read the table and answer the questions. Then write the numbers in ascending order.
- ◆ Ask children to say the reasons.
 - Why do you say 780 is larger than 285?
 - Why do you say 780 is larger than 705? etc.
- ◆ Give other set of numbers and ask them to find smallest and largest and to write in ascending order. The nearest amount to 700 is 705. Let them understand 780 is nearest to 800. The nearest amount to 300 is 285. 180 and 190 are nearest to 200. Then write the nearest 100 for the given numbers.



Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to count continuously from 100.
 - the ability to read and write 3 digit numbers.
 - the ability to locate a number in a grid.
 - ability to add and say a two digit number to 100.

Self Evaluation and Peer Evaluation.

- ◆ Both are very important in constructive paradigm. Not only the products are evaluated, but the process of thinking also should be evaluated. Child can understand that, what is the mistake in his thought and how it is to be corrected. This should be the aim of self and

Match box tain, School camp, Number pattern

- ◆ Write the numbers from 100 to 111 on the

match boxes. Complete the number chains. Complete the patterns. Prepare number cards in which 3 digit numbers are written. Put the cards from smallest to largest. Then go to groups of 5 or 6. Check who has one the largest number in the group.

Play the Manchadi game in the leisure times and make tables of points. The table may be evaluated as a product of game.

Evaluation.

◆ **Teacher evaluate,**

- The ability to write 3 digit numbers continuously.
- the ability to compare 3 digit numbers.

What comes after and what comes before.

- ◆ Do the activity in TB.
- ◆ Give a number card / token to every child. Then ask them that number and the number before and after that number. Check each other. Then fill the blanks in page 106.

What comes after and what comes before

What comes after 50? $50 < 100$

What comes before 500? $100 < 500 < 500 < 500 < 500$

Fill in the blanks

Previous (Before) Next

428 429 430

856 857 858

899 900 901

710 711 712

Bigger and smaller

Which is the larger? 356, 387

387 is greater than the number 356 $387 > 356$

It can also be explained like this 356 is less than 387 $356 < 387$

Add the correct symbol

881 _____ 811 400 _____ 405

799 _____ 699 909 _____ 605

Bigger and smaller.

- ◆ Teacher writes two numbers on the board. 452 and 875. Teacher says 472 is smaller than 875 and 875 is greater than 472. Then introduce the symbol to show this and write between the numbers. By saying 472 is smaller than 875 , teacher writes $472 < 875$ and , by saying 875 is greater than 472 teacher writes $875 > 472$. Then let them read the TB and add correct symbol.

Evaluation.

◆ **Teacher evaluate,**

- the ability to use symbols
- The ability to write compare numbers..
- To find the number before and after.

Count and write, Cubes and rods

- ◆ These activities are to write a number as hundreds, tens and ones and to write a number in words.
 - Ten ones =10 Ten tens=100.
 - First number is 3 hundreds, 4 tens and 3 ones.
 - 343. Three hundred and forty three.
 - Write all the numbers given in the table like this. (page107)
- ◆ Cubes and rods also is the same activity.
- ◆ Let them write the numbers. (page108)
- ◆ After that give some works.
 - Write the numbers.
 - Ex. 3 hundreds 5 tens and 8 ones.
 - Split and write
 - Ex. 968.

At the bank

- ◆ This is to analyze a table and find cumulative total of three digits and two digit numbers. First let them say the information given in the table.
- ◆ Ask some questions to elicit the data.
 - ? How much is the amount deposited in December?
 - ? How much is the amount deposited in October and November together?
 - ?
 - ?
 - ?
- ◆ Then let them fill the table. Allow them to add the numbers mentally. Don't add by writing according to place value now.
 - Ex. $150+200= 100+200+50=350$
 - $350+250= 300+200+50+50= 600.$
 - $600+170== 600+100+70=770$ etc.

At the bank

Do you have a piggy bank? Nimmu deposits money in the bank every month. Look at what Nimmu has deposited from August 2023 to January 2024. Study the table and complete it.

Month and Year	Deposit	Deposit account in words	Total	Total in words
2023 August	100		100	
2023 September	50		150	
2023 October	200			
2023 November	250			
2023 December	170			
2024 January	80			

Build a house

Annna has no home. Let us help her build a house.

The money given to Annna by Nimmu and friends is given below.

Robu	₹750
Ummu	₹500
Asha	₹350
Banu	₹215

Let's add our friends' money together.

Build a house

- ◆ First ask them to say how much each one get. Then ask to write receipts. Along with this activity a discussion about the need of helping

others should be held in the class. Do the works in Pages 109 and 110. Check self and each other.

Evaluation.

◆ **Teacher evaluate,**

- the ability to interpret tables
- The ability to add numbers in mind.
- Read and write three digit numbers.

First day, Standing broad jump, Calandar math

- ◆ All these three activities are to introduce the ordinary numbers. Number used hitherto is counting numbers. Here it is used for another function of numbers. The ordinary function. It is used not as one, two,..... But first, second, third etc.
- ◆ Ask pupils to come in the class one by one.
 - Then who came first?
 - Who came second? etc.
- ◆ After that do the above works .

Odd and even.

- ◆ This game should be played in the class making the pupils pair.
- ◆ Then write the numbers in the table.
- ◆ Then introduce odd and even.
- ◆ After the game ask

Write the names of the months in order, then write the corresponding ordinal numbers.

Odd and even (Game)

Two players can play. The first one takes some Tokens. The second player divides these tokens into groups of 2. If he can make groups of two, he will get one point. If he cannot make groups of two, one point is given to the first player. Whoever gets more points within the given round wins the game. In the first game, Some get 18 tokens. Will they get a point? In the second game, Some get 9 tokens. Will they get a point? Let's play and find the numbers that can be divided into equal groups of two and the numbers that cannot be divided, and write them in the table.

Numbers that can be put into the group of two	Numbers that cannot be put into the group of two

Counting numbers that can be put in to group of two are called **Even numbers**

Counting numbers that can't be put in to group of two are called **Odd numbers**

children to write odd numbers and even numbers up to 50 in two columns. Then ask them to check the ones place of odd numbers and write it. Then check the even numbers and check the ones place of them and write it. Ask them to find which are the digits in the ones place of an odd number and which are in even numbers. Let them write their findings.

- ◆ Then ask them to write odd numbers and even numbers from the given numbers.
 - Ex. 321, 456, 485, 478, 154, 145, 123, 321, 190, 589, 588, 357, 162

Evaluation.

◆ **Teacher evaluate,**

- the understanding of ordinal numbers.
- The understanding about odd and even number.
- The ability to classify the odd and even numbers.
- The ability to think logically.
- The ability to make conclusions.

- ◆ Let's revisit should be done individually and should discuss in groups and in class.
- ◆ Same type of questions can be used for unit test along with multiple choice questions.

2

RUPEES AND PAISE

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Identify the notes and coins ◆ Find different combinations of notes and coins for a particular amount. ◆ Solve problems involving notes and coins and money transactions. 	<ul style="list-style-type: none"> ◆ Existing coins in circulation are 1,2,5,10 and 20. ◆ Existing currencies in circulation are 1,2,5,10,20,50,100,200,500 and 2000. ◆ An amount of money can be paid in different ways. 	<ul style="list-style-type: none"> ◆ Familiarize the notes and coins by analyzing the life situations and practical problems. ◆ Find different combinations of coins and notes to pay for things to be purchased and for other transactions. ◆ Solve problems related to life situations.

What is in this unit?

This unit deals with Rupees and Paise. Children are familiar with existing coins and currency notes. They are used to make transactions in daily life. They can handle currencies and coins. They can read and write numbers up to 1000. They can do simple additions and subtraction in their minds. They are familiar with simple problems using money transactions.

CLASS ROOM PROCESS

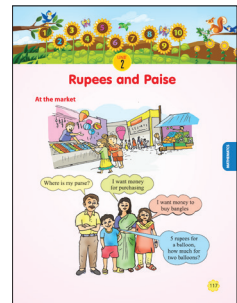
Ensuring current ability level

- ◆ Make sure that children are able to read, write and interpret numbers up to 1000.
 - Ask them to identify the currencies and coins up to 500 rupees.
 - Give coins and ask to count it.
- ◆ Provide additional support to those who are still performing below their current ability level.

At the market.

- ◆ This activity is an entry activity in to this unit.
 - What do you see in the picture?
 - What are the things do you see in the shops?
 - What do you want to bring with you to buy things from the market?
 - How do you get money?
- ◆ Lead a discussion with students about money, transactions, type of currencies and coins, getting change for a particular currency or a coin.....

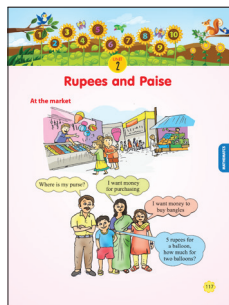
- ◆ Then ask them to read the family picture and the dialogues.
 - What do you understand from the picture?
- ◆ This is to collect data from the dialogues. If they are not able to find the data themselves, ask questions and elicit it.
 - Where are the family going?
 - What is father saying?
 - What are the uses of a purse?
 - What does mother want?
 - What does the girl needed?
 - How much does a balloon cost?
 - How many balloons does the boy want?
- ◆ Thus make the children talk about the picture. Ensure that they are using mathematical elements in their description as far as possible.
- ◆ Then say the answers and write.
 - The cost of bangles is.....
 - The cost of balloon is



- What would be the amount needed for the mother? Why?
- ◆ It is more than 100. Because she has 100 rupees already with her. It is not enough. It is less than 200 ,because she wants 100 more. So the amount she wants may be 101 to 200. This type of thinking and explaining skills should be developed from very early stages. As far as possible, a question beginning with “why” should be asked with a question beginning with “what”. This will help them to think rationally.

The savings box, Indian coins

- ◆ These are intended to find the total amount of coins and to familiarize the existing coins. Answer the questions and there after give play coins in groups and count it. Then ask them to take a particular amount from the given coins.
- ◆ Take 20 rupee coins for 100 rupees.
 - How many 10 rupee coins are needed to make 100 rupees?
 - How many are needed if it is 5 rupee coins?
- ◆ Ask them to make a table for this.



100 rupees

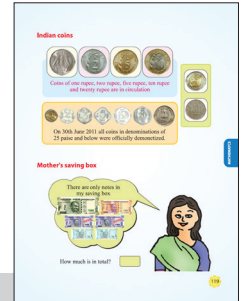
20 rupee coins	10 rupee coins	5 rupee coins	2 rupee coins	1 rupee coins
5	10	20	50	100

- ◆ Ask them to find the relations. Also ask them what would be the number of coins if it is 200 rupees/ 50 rupees. Let them say using the above table.
- ◆ If it is 200, the number would be the double and If it is 50 the number would be the half. But 50 rupees can not be taken by using only 20 rupees. This type of thinking should be promoted.
- ◆ Then ask them to make a collection of coins

including the outdated coins and foreign coins. This should be evaluated as a part of ‘portfolios’”

Mother savings box, Indian coins

- ◆ These are to find the total amount of currencies and to familiarize existing currencies up to 500.
- ◆ Repeat the activities done as above .



Evaluation.

◆ Teacher evaluate,

- Understanding about the coins and currencies.
- The ability to find the relation between coins..
- Participation in discussions
- Ability to formulate arguments.

ANALYSING THE PROBLEM

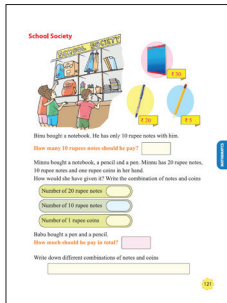
The first step for solving a problem is to understand the question. For this it is better to write the data in such a manner which can be understood easily. It is better to practice writing the data very briefly. We can say this write up as the ‘synopsis’ of the question or the problem. So the first thing we want to practice is writing the ‘synopsis’. Then it should be explained.

- ◆ First, teacher says the question.
- ◆ Then she asks them to read it. Again she asks,
 - “What do you understand from the question?”
- ◆ Asks them to write;
 - The price of a pen and a book is 50. Price of a book is 10 more than the price of a pen. Let them think individually about the solution. Then discuss it in groups and present it in the class. 10 rupee is more for

a book. So take away 10 rupee from 50 and halve the remaining amount. Then we get 20 rupees. Add the amount taken away to 20. Then we get $20+10=30$. Therefore, the book costs 30 rupees, and the pen costs 20 rupees

School society

- ◆ Let them read the questions and do the task individually. Then discuss in the groups and present it in the class. Discuss different ways to find the answer.
- ◆ Changing currency notes, use of school development fund and shopping are the some of activities to find various combinations



of notes and coins for an amount. Discuss and let all the pupils understand the combinations.

Evaluation.

◆ **Teacher evaluate,**

- Understanding about the coins and currencies.
- The ability to find different combinations of notes and coins of an amount.
- The ability to analyze problems.

Let's revisit

- ◆ Revisit is to be done individually and the discuss it in the groups and in the whole class.
- ◆ Money game is illustrated there in TB. Let them play it

UNIT GRID

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Interpret a 3 digit number in different ways. ◆ Describe the place value of a number and write them according to place value. Write the expanded form of a given number and the number for given expanded form. ◆ Compare the 3 digit numbers. ◆ Form 2 digit and 3 digit numbers from given digits. 	<ul style="list-style-type: none"> ◆ A 3 digit number can be split as 100s, 10s and ones. ◆ A 3 digit number can be expanded in different ways. ◆ The first place of a 3 digit number is the 100 s, the last place is of the ones and the middle is the tens place. ◆ The 3 digit number in which the digit in the 100s place is the largest is the biggest number. ◆ 2 different 2 digit numbers can be formed using 2 digits, with out repeating the digits. ◆ 6 different 3 digit numbers can be formed using 3 digits without repeating the digits. 	<ul style="list-style-type: none"> ◆ Analyze the numbers in context of money and other life situations. ◆ Find place value of numbers by analyzing numbers the using an Abacus and as well as by solving life related problems. ◆ Compare , find the largest and smallest numbers and write the numbers in ascending and descending order in various contexts. ◆ Forming numbers as a part of plays and puzzles.

What is in this unit?

This unit deals more with on 3 digit numbers. Pupils have already studied about 3 digit numbers. They can read and write 3 digit numbers well. They can split a 3 digit number as 100s, 10s and ones. They are able to compare the numbers and use symbols of greater than and smaller than. In this unit all these areas are revisited and presented deeply. Place value and interpretation of numbers in different ways are given. Forming numbers using digits , some patterns and solving problems are also mentioned. Activities for developing various skills, some additions and subtractions

also are there in this unit. At the end of this unit pupils will be able to handle 3 digit numbers in at maximum.

CLASS ROOM PROCESS.**Ensuring current ability level.**

Make sure that children are able to read ,write and interpret numbers up to 1000.

- ◆ Give number cards and ask them to read , write and to find larger and smaller numbers
- ◆ Give work to write in words and vice versa.
- ◆ Write numbers continuously from a given number

Give additional support to those who are still below current ability level.

Number on steps.

Ask them to observe the steps. Then ask them to describe it.

If necessary ask questions like:

What do you see on the steps?

How are the numbers written?

What is the relation of the numbers on the steps and the 100s in the columns?

How will you write the right side of the step?

Can you say how many 100s are there in the columns in total without counting them?

Then write the answers for the questions and write numbers on all steps.

How many match boxes.

Let pupils explain the way they counted it. One method is there. Made all the lines 10 and put the remaining on the top.

Let them know that it is the total of numbers 1 to 11.

Explain them that 6 tens + 6 ones is 66

Bundles of rods

This is to understand a two digit number as tens and ones.

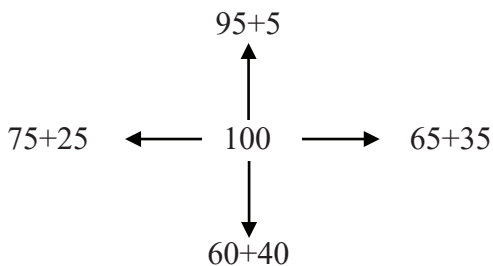
2 tens + 3 ones = 23. 3 tens + 2 ones = 32 Total = 5 tens + 5 ones = 55

55 + 5 ones = 5 tens + 1 ten = 6 tens.

Ammu brought 4 tens more. Now there are 10 tens that is 100. Then write more combinations of 100.

Ask them to make webs like the one in the TB with other combinations.

How many webs did each one make. Check their webs in groups.



Then write the following numbers by looking at the bundles of 100s, 10s and ones. 334 and 551. Use the cubes rods and plates, as given in the TB to say about the numbers as a combination of 100s, 10s and ones. This is the first stage to understand the place value of numbers.

Library fund

This is to say about the amount from the given notes and coins. Pupils know that 3 hundreds + 4 tens + 2 ones = 342 and so on.

Hand made chalks

This activity also is to write numbers from the given combinations. Then find the greatest and the smallest number. 65 is to be written as combination of 10s and ones. They have to know that there is no 100s in 65. So there is no bundles of 100. Find the numbers individually and share it in groups. Present the findings in the whole class.

MATHEMATICAL COMMUNICATION

Mathematical communication is a very important skill. So child should get are experiences for speaking in the class. Questions like How did you get it?, Why do you say so? ... etc may be asked and answers should be elicited.

Evaluation. Teacher evaluates,

- ◆ Ability to read and write 2 and 3 digit numbers.
- ◆ Ability to split a number into 100s 10s and ones.
- ◆ Ability to communicate
- ◆ Ability to formulate arguments.

Number on abacus

This activity should be done in the class using Abacus. Show a number on Abacus and ask to say the number. Supply give Abacus in groups and ask them to show a 3 digit number and say like, 6 hundreds 5 tens and 4 ones = 654. Write the numbers shown on Abacus in the TB. Arrange the numbers given in the TB Page 132

Onam celebrations

This is to add 100s , 10s and ones in your mind. Don't suggest adding this by writing according to place value. Such task can be given.

Eg. $600+20+4$ $500+80$ $400+3$ etc.

One number many forms.

It is to interpret a number in different ways. 961 is written there. It is 9 hundreds . 6 tens and 1 one . It can be interpreted in many other ways. 3 forms are given there. Other forms can also be written. Ask students to write in more different ways.

- ◆ 8 hundreds+ 16 tens + 1 one
- ◆ 7 hundreds +26 tens + 1 one
- ◆ 7 hundreds + 25 tens + 11 ones
- ◆ Then write 825 in different ways. Check it in groups and find all the different ways. Let them explain the ways. Give other numbers also. Eg . 548,687,985
- ◆ Pupils have to get the following ideas after doing all the tasks.
- ◆ One hundred can be replaced with 10 tens or 100 ones.
- ◆ One ten can be replaced with 10 ones. Eg. 564-
- ◆ 5 hundreds+ 6 tens+ 4 ones
- ◆ 4 hundreds+ 16 tens+ 4 ones
- ◆ 5 hundreds + 5 tens+ 14 ones
- ◆ 4 hundreds + 6 tens+ 104 ones.

Evaluation. Teacher evaluates

- ◆ Ability to interpret a number in different ways.
- ◆ Ability to draw conclusions.

Many numbers

How many two digit numbers can be formed using 1 and 2. They are 12 and 21. If one digit is repeated two more numbers are possible, 22 and 11. By using 1,2,and 3 how many 3 digit numbers can be formed without repeating?

123, 132, 213, 231, 312 and 321

If repeated 27 numbers can be formed. Try to write all numbers and check it with your friends.

Place value, Expanded form

Do the tasks under this heads to introduce place value and expanded form.

Who has more weight

Is to compare 2 digit and 3 digit numbers. Do the tasks in page 135 and 136., and evaluate each other.

Sports meet.

Let pupils read all the numbers. Find all numbers that are in between 700 and 900. There is only one number in between 800 and 900 and so it is the largest. Then find the other numbers and write in descending order. Ask the pupils to explain how they found it.

Greatest and smallest numbers

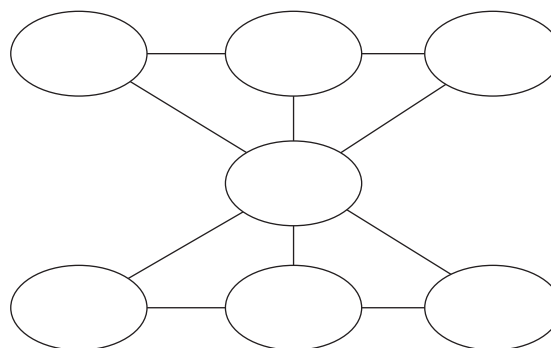
page 136 is to be done in the class through detailed discussion. Then do the works in Page 137 Works in page 136 and in page 137 is to be done individually and discuss it in the class.

Evaluation. Teacher evaluates

- ◆ The ability to compare numbers.
- ◆ The ability to form largest and smallest numbers using given digits.
- ◆ The ability to split according to place value.
- ◆ The Ability to write numbers from their expanded forms.

Games.

- ◆ Tokens written numbers from 1 to 10. Pupils have arrange the token in a line in such a way that no nearest numbers will come near.
- ◆ Numbers 1 to 7 have to be written in the circles , so as to get the sum in lines equals 12.



LET'S REVISIT

Revisit is to be done individually and discuss it in groups and in the whole class.

UNIT GRID

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Compare the length of objects using non standard units. ◆ Measure objects using meter scale and small scales. . ◆ Find the relation between metre and centimeter. ◆ Guess the length of an object. ◆ Solve problems involving length measurement. 	<ul style="list-style-type: none"> ◆ Foot span, hand span and cubit are the non standard units. ◆ Metre is the unit of measurement of length. ◆ Centimeter is used to measure small lengths. ◆ 100 cm= 1 metre ◆ Some strategy should be adopted to guess the length. ◆ Lengths more than 100 cm can be expressed in metres and centimeters together. 	<ul style="list-style-type: none"> ◆ Measure various objects with different non standard units. ◆ Measure objects using scales. ◆ Find the relationship between units of measurements for length by analyzing real life situations. ◆ Guess and measure objects using scales. ◆ Analyze the life situations and word problems.

What is in this unit?

This unit is for measurement of length. Pupils can identify longer and shorter from the group of things. They can check the length by overlapping the objects. They have seen measuring length using tape and scale. In this unit measuring with non standard units and standard units are introduced. Metre and centimetre are given here. Some word problems are also done in this unit.

CLASS ROOM PROCESS.**Ensuring current ability level.**

Ensure that children are able to say which them is longer and which item is shorter.

Give additional support to those who are still below current ability level.

Introduction

Qutab Minar is only an introductory activity. Don't say about explain metre or any other units. It is only to compare the heights of Qutab Minar and class room. Class room is about 3 or 4 metres high. But this is about 72 metre high. This is the point of discussion. New observe the surroundings and compare various heights and lengths.

Length of a bench.

Observe the benches in the class. Which is longer? Are they all the same length? Let's measure the length. How can we measure it? Discussn . First we measure with hand spans. Let them measure and write it in books. Why is it different for different children, - Discussion. Hand spans are not same. Then discuss the situation TB. Page 141.

After that discuss the Non standard units of length in page 142. Measure the class room with foot span and find the difference in measurements. This discussion will lead to the need of an object to measure. Then measure the bench and the class room using sticks with the same length. If still difference in measurement exist discuss why and see that the measurement was not taken correct. Then discuss what care should be taken when measuring.

- ◆ Straight stick is needed
- ◆ Finished edges should be there.
- ◆ Mark correctly the places where the stick is put.
- ◆ Count with care

The last one is not measured fully with the stick. –Discussion. Need of other small or large stick. This leads to “meter scale” or ‘tape’.

MetreMetre

Observe the situation in page 143. Ask them to mention the situations saying length in metres. 100 mtrs race, 200 mtrs race, etc. Then show the meter scale and measure the class room using it. Now leave the balance length less than one metre, if any. Now use other measurements given in the TB.

More or less

is to classify more than or less than one metre. Find other objects from the surroundings and say whether more or less.

Evaluation. Teacher evaluates,

- The ability to compare length by guess.
- The ability to measure with non standard units.
- The ability to measure using meter scale.

Length of a pencil.

It is to say that a smaller length can not be measured using a meter scale. So a smaller unit is needed. Ask them to find the length of their pencil or any other objects less than one metre using a meter scale. Then they will be come aware of a smaller unit. First introduce the centimetre on

metre scale. Let them see it on small scale in their geometrical box. Then ask them to measure objects using centimeter. Activities in page 145 are to guess 1 metre. Ask them to find how many centimeters are marked on one metre.

The shorter line can be made by drawing another longer line. That is to say, the long and short are relative.

Which is longest

It is to guess and measure, The activities in page 145 are to do individually. Then share the findings in groups and discuss in the class.

Evaluation. Teacher evaluates,

- Understanding about metre centimeter relation.
- The ability to measure using small scale.
- The ability to find relations.
- The ability to solve problems

Let's revisit is to be done individually and discuss in groups and in the class.

UNIT GRID

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Add 2 digit numbers in different ways ◆ Add 3 digit numbers in different ways ◆ Solve problems including addition of two digit and 3 digit numbers 	<ul style="list-style-type: none"> ◆ To add two digit numbers Tens and ones are to be added separately. ◆ To add 3 digit numbers. Hundreds , tens and ones are to be added separately. ◆ Addition is for finding total 	<ul style="list-style-type: none"> ◆ Analyzing life related situations, money transactions, points in game etc and find different ways for calculating the sum of 2 or more two digit numbers including mental calculation. ◆ Analyzing life related situations, money transactions, points in game etc and finding different ways for calculating the sum of 2 or more three digit numbers involving mental calculation. ◆ Analyzing life related situations , money transactions, etc and solve problems.

What is in this unit?

In this unit children go through the addition of two digit and three digit numbers. Children can read and write numbers up to 1000. They can say the place value of digits in 3 digit numbers. They can expand a number according to place value. They have experienced interpreting a number in different ways. Comparison of numbers and adding symbols of $<$, $>$ have been studied. This unit is to add two or more numbers in different ways. Besides the addition they go through with practical problems. Activities for thinking logically and find relations are also included in this unit.

CLASS ROOM PROCESS.

Ensuring current ability level.

Make sure that children are able to read ,write and interpret numbers up to 1000.

- ◆ Say a 3 digit number and ask them to write.
- ◆ Expand the number according to place value.
- ◆ Interpret a number in different ways.
- ◆ Compare numbers and add symbols.
- ◆ Add numbers like $300+50+4=354$
- ◆ Say place value of digits in a number.
- ◆ Teacher says a number- students write it in note books
- ◆ Write some numbers on the BB. Ask them to read it from the smallest to the largest.
- ◆ Give a number and ask them to split it as

hundreds ones and tens.

- ◆ Give them number cards and let them arrange the cards in increasing or decreasing order.

Give additional support to those who are still below the current ability level.

How many match boxes

This is to solve problem and to add 2 two digit numbers. What should we have to find the answer? This is the first discussion. The question is to find total. To find total the numbers should be added. What do you understand from the question. ? let them say and write.

Match boxes with selina= 16

Match boxes with Sneha= 21

Total = 16+21

Ask them to find the answer individually. Then make groups and ask them to share the way they found the answer.

What should we have to find the answer? This is the first point of discussion.

What may be the ways?

Sharing the thoughts

Sharing the thoughts in groups is very important in constructive paradigm. This will help the child to understand the merits and demerits of his thoughts and how it is modified. This is called 'meta thinking'. That is thought about ones thought. What mistake he did is understood by him and , he can evaluate himself. Thus the self evaluation itself becomes learning. This is called assessment as learning.

- ◆ Counting all the match boxes together.
- ◆ $20+10+1+6 = 30+7=37$
- ◆ $21+10+6= 31+6= 37$
- ◆ $20+16+1=36+1=37$
- ◆ One 10+2 tens=3tens . $6+1=7= 3 \text{ tens} + 7 \text{ ones}$.

Whatever may be the way the child adopted it should be described in his/her own words. Teacher do not compel any one to accept any particular way. Show all the ways in the class discussion. Let

them allow to accept his/her own way. Importance should be given to mental math. The child does not think that the only way to addition is by writing according to place value and then adding It is only one way. The conceptual understanding is very less in this way. Gradually it will be come mechanical.

Class library

Process of this task is also the same as the last one. Ask them what they have understood?

Let them write it in their note books.

Books already had= 32

Books collected =26

Total books= $32+26$

Pupils do it mentally as $32+26= 30+20+2+6 =50+8 =58$.

Then discuss all other ways. $32+26$

(This is 2 ones + 6 ones =8 ones. 3 tens + 2 tens = 5 tens. Teacher 58 should say that two added to 6 is 8 and 30 added to 20 is 50.

Then give other numbers and ask them to explain.

Ex. $54+43= 50+40 +6+3= 90+9=99$

Buying chocolate

Continue the above process. Different ways are given in TB

Doing mentally should be done individually and discuss it in the class.

$7+9+3= 7+3+9$ is easy to find. $7+3=10$. $10+9= 19$.

$6+8+2= 6+10=16$

$27+ 12+3= 27+3+12 =30+12=42$

Let them do the works in page 150 and 151 as directed. Give more work to do as work sheet.

Evaluation. Teacher evaluates,

- ◆ The ability to add 2 digit numbers in mind.
- ◆ The ability to add 2 digit numbers in different ways.

Playing with cubes

This is to introduce addition of two digit numbers with carry over. There is no need to differentiate with carryover and without carry over to children . Because the process of addition is the same. First, child should be aware of that In this question , total is to be reckoned and so addition is to be done.

Then add it as done earlier.

$$17+15= 10+10+7+5= 20+12=32.$$

Remember that $7+5$ was done as $7+3+2=10+2=12$. So here it is $10+10+10+2=32$. After doing this method, this can be brought to writing according to place value and add. The same process is in it. $7+5=12$. $10+10=20$. Add 10 in 12 to 20 and get 30. Then $30+2=32$.

$$17+15$$

(This is 7 ones + 5 ones =12 ones .That is 1 ten + 2 ones 32

$$10+10+10= 30. 30+2=32$$

Adding by writing in cells and without writing in celles are given there. Discuss it in the class.

Emphasis should be given to do the calculations mentally in mind. Other methods are only for understanding; they can also be done.

Foot ball tickets

The Process is given there. Discuss it in the class. Next two works are for the same purpose. First let children to do and share it in groups. Then discuss it in the class.

Do the works in page 154 and 155 as directed.

Evaluation. Teacher evaluates

- The ability to add 2 digit numbers in mentally.
- The ability to add 2 digit numbers in different ways.
- The ability to add 3 two digit numbers.

At the toy shop; Money matters.

These are intended to add 3 digit numbers. As the process is same as in the previous works there is no need to explain it. It is explained in the TB in detail. Give more work and extend additional support to those who are backward.

The activities should be discussed in the class and make sure that every child in the class is able to do the tasks.

Problem making.

Ask pupil to frame problems involving addition of numbers below 1000.

Making Questions

Making Questions is a very important strategy in Mathematics learning. To make a question higher thinking than Problem Solving should be applied. Divergent thinking process is needed to make a question. When making questions following points are to born in mind.

- ◆ All the questions should not be in the same pattern or style.
- ◆ Questions having answer hints are to avoided.
- ◆ “Yes” or “No ’ questions should not be encouraged.
- ◆ Questions should as far as be helpful in promoting logical thinking.

Some problems

$125+199 =$ This can be done easily as $125+200-1= 224$

- ◆ What is one more than the sum of $549+99$? It is 649. Because one more than the sum is equal to $549+100= 649$.
- ◆ What is 2 less than $321+98$? It is $321+100-2= 419$
- ◆ What is $198+198$. It is $400-4=396$

This type of problems should be discussed.

Puzzles can be solved.

- ◆ $43+86=129$. No digit is repeated in this. Write this type of addition problems.
- ◆ Make magic squares.
3x3 Sum 15.

1	8	6
3	5	7
4	9	2

Write numbers continuously in same order. Then a magic square will be formed. 4x4 sum 34

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

First write numbers continuously starting from any number.

Then interchange the corner numbers.

16	2	3	13
5	6	7	8
9	10	11	12
4	14	15	1

After words interchange the middle corner numbers

16	2	3	13
5	11	10	8
9	7	6	12
4	14	15	1

Try with using other numbers.

Evaluation. Teacher evaluates,

- The ability to add 3 digit numbers in mentally.
- The ability to add 3 digit numbers in different ways.
- The ability to add more than 3 numbers.
- The ability to find the relations with numbers and explain them.

Let's revisit

should be done individually and then discuss it in groups and in the whole class.

Same type of questions can be used for unit test, along with multiple choice questions.

UNIT GRID

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Subtract 2 digit numbers in different ways ◆ Subtract 3 digit numbers in different ways ◆ Finding relations with numbers and rearranging the numbers, so as to make the subtraction easy. ◆ Solve problems involving addition of two digit and 3 digit numbers ◆ Interpreting and analyzing tables. 	<p>Subtraction may be for,</p> <ul style="list-style-type: none"> ◆ Finding balance. ◆ Finding the difference ◆ Finding How much more?/ How much less? <p>◆ When digits in the tens place ones place or the both places of larger number is greater than that in the smaller number, the larger number should be rearranged before subtracting</p> <p>◆ Datas arranged in a table is very easy to understand.</p>	<ul style="list-style-type: none"> ◆ Analyzing life related situations, money transactions, points in game etc and to find different ways for calculating the difference of 2 two digit numbers involving mental calculation. ◆ Analyzing life related situations, money transactions etc and finding different ways for calculating the difference of 2 three digit numbers involving mental calculation. ◆ Analyzing life related situations, money transactions, etc and solve problems. ◆ Analyzing and interpreting tables related to lifesituations.

What is in this unit?

Subtraction of 2 digit and 3 digit numbers is discussed in this unit. Children have learned how to add numbers and solve problems involving addition. They can read and write 3 digit numbers. They can interpret numbers according to place value. They have studied to write a number in different ways. They can find the difference of the numbers up to 20. All these are used in this unit to understand the concept of subtraction. Writing in Mathematical language, analyzing tables, interpreting tables etc. are also included in this

unit.

CLASS ROOM PROCESS.

Ensuring current ability level.

Make sure that children are able to read, write and interpret numbers up to 1000 and add numbers up to 999.

- ◆ Expand the number according to place value.
- ◆ Interpret a number in different ways.
- ◆ Add numbers like $300+50+4=354$
- ◆ Say place value of digits in a number.
- ◆ Write some numbers on the BB. Ask them to

read it from the smallest to the largest.

- ◆ Give numbers and ask them to split it as hundreds ones and tens.
- ◆ Give some works to add in mind and with paper and pencil.

Give additional support to those who are still below current ability level.

Milk booth

Ask pupils to read about the situation. Then ask them to say what is given the problem and think about what is to be done to solve it. Then discusses how to do it? 30 rupees taken away from 50 rupees is 20 rupees. $50-30 = 20$. 5 tens -3 tens = 20. If necessary show it using play currency notes.

Students in the class

This is to subtract a two digit number from another 2 digit number. Two problems are discussed in detail. It is important to understand that the problems are to find the difference, and to find difference of two numbers, subtraction is to be done. Discuss all the methods for subtraction and allow the child to accept the method he likes. Do the works in page 161 and 162.

Let them check each other.

Evaluation. Teacher evaluates,

- ◆ The ability to subtract 2 digit numbers mentally.
- ◆ The ability to analyze problems
- ◆ The ability to solve problems

Price of snacks

Let them discuss how can they find $50-34$ in the class.

- ◆ $50-34 = 50-30-4 = 20-4 = 16$
- ◆ $50-34 = 50-40+6 = 10+6 = 16$
- ◆ 49-
34
 $15+1 = 16$
- ◆ $49-33 = 16$
- ◆ 50-
34
10+6

4 can not be subtracted from zero. So 50 should be splitted as $40+10$ and then subtract. It is not borrowing. It is re arranging. This should be very clear to the pupils. Don't make it as a mechanical process.

How many remain?

SUBTRACTION IN DIFFERENT CONTEXTS

Subtraction may be used for;

- ◆ Finding the balance. (How many is remaining? What is the balance? How many is left?) if is taking away the smallest from the largest.
- ◆ Finding on the difference? (What is the difference of the age?)
- ◆ How many more?/ How many less?(He has 20.How many is needed to make it 100?)

Here in the first question how many remains is to be found.

$40-40+3-7$ cannot be subtracted from 3
 $30+13-27$ $20+7$ So split $40+3$ as $30+13$
 $20+7-10+6 = 16$

In the second question context is to find how many is needed? It is also subtraction.

$55-50+5-6$ cannot be subtracted from 5 $40+15-16$
 $10+6$ So split $50+5$ as $40+15$
 $10+6 = 39$

In the previous class children have experienced to find the difference. This should be remembered here.

$13-7 = 13-3-4 = 10-4 = 6$ or $10-7+3 = 3+3 = 6$
 $15-6 = 15-5-1 = 10-1 = 9$ or $10-6+5 = 4+5 = 9$

Let them do the works in page 163 and 164. First do re arrange and subtract in page 164. Then do the find the difference in page 163.

$75-36 = 70+5-60+15$ c ($15-6 = 15-5-1 = 10-1 = 9$)
 $30+6$ $30+6$
 $30+9 = 39$

$$84-48 = 80+4- \quad 70+14 \quad (14-8= 14-4-4= 10-4= 6)$$

$$40+840+ 8$$

$$30+ 6 = 36$$

Give more tasks to do and make sure that all have got the conceptual understanding rather than mechanical operation.

Evaluation. Teacher evaluates,

- ◆ The ability to subtract 2 digit numbers .
- ◆ The ability to find put the relation and re arrange numbers .
- ◆ The ability to explain the way of finding the difference.
- ◆ The ability to solve problems

School math fair.

This is to find out how many more? Find 384-256 It is explained in TB. Here rearrangement is needed for 84. 84 is written as 70+14. So the number is 370+14. Give more examples.

Then ask to find the difference in page 165.

How much taller?

This is to find our how many is needed? $105+5 = 110.$ $110+60=170$ $170+6=176.$ Height needed is $5+60+6= 71$ 176- 105 is explained in TB. No re arrangement is needed here as all the digits in larger number are more than in the smaller number. (in same places) Ask to do the problems in page 166

Look at the problem, first think whether the rearrangement is needed or not.

In 678-347 , 8 is larger than 7 (in ones place) and 7 is larger than 4 (in tens place) So no rearrangement is needed.)

In the problem 400-348 0 in tens place and ones place is smaller than 8 and 4 . So re arrangemnt is needed. $400- 400-(300+40+8) = 300+90+10-348$ $300+ 40+ 8$ $50+2 = 52$

Instad of rearranging it can be done as 399- 348+ 1 or 399-347. It is very easy to do , if there is conceptual understanding.

Mental calculation .

75-43. and 203-99 are explained there. Ask pupils

to say their own ways and give explanation for it. Then say answers for the questions in page 166. Find the missing numbers in page 167.

Vegitable shop.

This is to collect data from a table and solve problems. Let pupils observe the table. Then ask questions.

- ◆ How many columns are there in the table?
- ◆ How many rows?
- ◆ What are given in the first column?
- ◆ Which are the days given?
- ◆ Which day is absent in the table?
- ◆ What are given in the second column.?
- ◆ In which days second columns are empty?
- ◆ How can we find the amount of onion sold? (third column)
- ◆ How can we find the stock?(first column)

All about solving problems and table should be discussed in detail in the class. Don't leave it as a subtraction problem. Pupils have to acquire many skills from this problem.

Evaluation. Teacher evaluates

- The ability to subtract numbers mentally.
- The ability to find the difference in different ways.
- The ability to interpret tables.
- The ability to find relations with numbers and explain them.
- The ability to solve problems.
- The ability to explain with logical reasoning.

Let's revisit should be done individually and discuss it in groups and in the class. Same type of questions can be used for unit test along with multiple choice questions.

The last problem to write in mathematical language is a very important activity. Child should understand what he is writing using symbols as mathematical language.

2 and 4 makes 6 is common language. When we say 2 added to 4 is equal to 6 , it is mathematical language and the correct simplified form of this language is $2+4=6$. Teacher should come to mathematical language from common language instead of introducing mathematical language first.

UNIT GRID

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Identifies 2D shapes ◆ Make various pictures using tangram pieces. ◆ Draw lines using scale / ruler ◆ Recognizes different types of lines. ◆ Interpreting and analyzing tables. ◆ Draws lines of symmetry. ◆ Recognizes 3 D shapes ◆ Colour the patterns 	<ul style="list-style-type: none"> ◆ Rectangles, squares, triangles and circles are 2 D shapes . ◆ We can make various attractive pictures using tan gram pieces. ◆ Many lines can be drawn through one point. ◆ Only one line can be drawn through two points. ◆ Lines are classified as sleeping lines/ horizontal lines, standing lines / vertical lines and slanting lines ◆ Datas arranged in a table is very easy to understand. ◆ Symmetrical lines make the figure two equal figures of same size and shape. ◆ 3D shapes have length , breadth and height. ◆ Tiling patterns are very attractive 	<ul style="list-style-type: none"> ◆ Recognizes different 2 D shapes from a complex figure. ◆ Draws 2 D shapes free hand.. ◆ Making pictures using tangram and display on display boards. ◆ Drawing lines through one point and two points using scale/ruler. ◆ Find examples for different lines from surroundings and draw various types of lines. ◆ Find the line of symmetry and draws it. ◆ Complete the figure of symmetry ◆ Observe the objects in surroundings and classify them according to their shapes. ◆ Name the given objects according to their shapes. ◆ Colour given patterns and evaluate your self and each other.

What is in this unit?

2D shapes, 3D shapes, different types of lines and tiling patterns are discussed in this unit. Children can recognize the 2 D shapes and they learn the names of them. In this unit they recognize the shapes from a complex figure, make different complex shapes using tangram pieces, introduced to various types of lines and draw and colour tiling patterns.

CLASS ROOM PROCESS.

Ensuring current ability level.

Make sure that children are able to recognize rectangle, triangle and circle. .

Give additional support to those who are still standing below current ability level.

My home.

Observe the house in the TB. Let them draw it free hand. Then colour it as directed. Then count and write the number of shapes. Check each other. Then draw their own house free hand and check in groups .

Check your self

- ◆ There is rectangle in my picture. Yes /No
- ◆ There is square in my picture. Yes /No
- ◆ There is circle in my picture. Yes /No
- ◆ There is triangle in my picture. Yes /No
- ◆ My picture is good Yes /No

Tangram

Do the works as directed. Paste the constructed pictures on a display board. Evaluate it as portfolio.

Polygons

Count and write it. Then do, For fun



Evaluation. Teacher evaluates,

- The concept of triangles, rectangles, squares and circles.
- The ability to draw pictures.
- The ability to make pictures.
- The ability to make shapes using 2 D shapes.

How many lines.

This is to draw lines using a scale without measurements. First say to draw a line. Then mark a point in the middle of it. Then draw lines through that point. Let them know that many lines can be drawn like this. Give works to find that that only one line can be drawn through two points.

Straight and slanting. Vertical and horizontal lines, trace the line.

This is just to introduce straight lines, slanting lines, vertical lines and horizontal lines. Discuss the instrument for checking vertical or not.

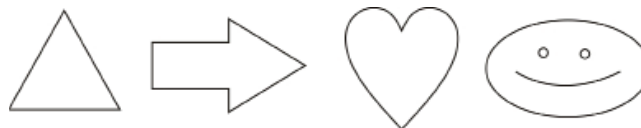
Draw the lines according to the colour key given. Match tricks triangle : ask them to try to solve it. Discuss in group and evaluate each other.

Evaluation. Teacher evaluate,

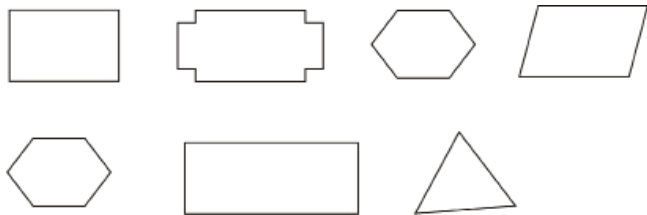
- ◆ The concept of different types of lines.
- ◆ Logical thinking ability.
- ◆ Ability to formulate arguments.

Symmetry

It is just an introduction to symmetry. Give this picture in groups and say to fold through dotted lines. Let them see both sides are same in shape and size. This figure is symmetrical. draw the line of symmetry in page 175. Give other simple figures also to draw line of symmetry.



In the following figures more than one line of symmetry can be drawn. Draw them.



Evaluation. Teacher evaluates,

- ◆ The concept of symmetrical lines.
- ◆ The ability to draw symmetrical lines.

Symmetry 2D shapes, sides and vertices

This is only an introduction to polygons. Just say, what is polygon and what are sides and vertices.

Indicators	My figure	Friend's figure
Colour combination in my pattern is attractive.	Yes/No	Yes/No
I have given colours within accuracy	Yes/No	Yes/No
Colours are correctly in the boundaries of the shape.	Yes/No	Yes/No
It looks 3D in shape	Yes/No	Yes/No
The pattern is neat	Yes/No	Yes/No

The drawn patterns should be displayed on the display board. Evaluate as a part of portfolios.

Evaluation. Teacher evaluates,

- ◆ The ability to colour patterns.
- ◆ The accuracy and neatness in drawing.
- ◆ The ability for modeling.

Then give the pupils some figures and ask them to find sides and vertices.

This will continue in the next class. So detailed explanation is not needed.

Three dimensional shapes.

$15 + 1 = 16$ $49 - 33 = 16$ Just introduce the name of shapes. Then do the works in page 176. Evaluate each other.

Evaluation. Teacher evaluate,

- ◆ The concept of 2D shapes, 3D shapes, side, vertex, etc.

Tiling time.

Let them colour it as they like and then evaluate themselves and with others.

Let's revisit

should be done individually and should discuss in groups and in the class. Same type of questions can be used for unit test along with multiple choice questions.



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**TEACHERS RESOURCE
MANUAL**

**MATHEMATICS
Grade 3**

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Read and write numbers up to 10000 ◆ Write a 4 digit number as combination of hundreds ◆ Interpret numbers according to their positions ◆ Explain the place value of the digits in a four digit number. ◆ Compare numbers and find the larger and smaller in a group ◆ Explain how to form largest and smallest numbers using given digits. ◆ Add 100, 1000 etc mentally to a number. 	<ul style="list-style-type: none"> ◆ 10 hundreds make 1000. ◆ 1000 is the smallest 4 digit number ◆ 10 times 1000 is ten thousand. ◆ 100 times 100 is 10000. ◆ 20 times 500 is 10000 ◆ 50 times 200 is 10000 ◆ Reads a four digit number beginning from 1000 ◆ If there is no number on a position zero is added. ◆ The place in the left side of a 4 digit number is 1000 ◆ In a 4 digit number the number with large digit in the 1000 place is the larger. ◆ To form largest number without repeating the given digits, write the digit in descending order . ◆ To form smallest number without repeating the given digits, write the digit in ascending order . ◆ To add 1000 to a number add only the digits in the 1000 place. 	<ul style="list-style-type: none"> ◆ Identifying three digit numbers and the relation of a three digit number with 1000 through games and life situations. ◆ Find the relations of hundreds to thousands in context of money transactions . ◆ Arranging a 4 digit number on the abacus, find the total amount of rupees from the denomination of notes and find different combinations of notes for a fixed amount. ◆ Find the place value of number through plays and ◆ arranging the number on abacus. ◆ Comparing 4digit numbers during play and life situations. ◆ Form the largest and smallest numbers as a part of games and life situations. ◆ Add 100, 1000 etc in life situations.

What is in this unit?

This unit deals with the numbers up to 10000. All the concepts, abilities and values already developed up to numbers 999 will be extended up to 10000 in this unit. At the end of this unit students will be able to read write and interpret any four digit number. They will be able to do some addition and subtraction of numbers like 100, 1000, 1500 etc. using number interpretation.

CLASS ROOM PROCESS

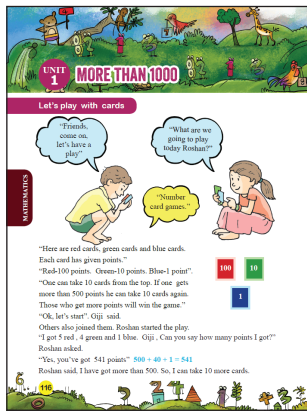
Ensuring current ability level.

Make sure that children are able to read, write and interpret 3 digit numbers.

- ◆ Teacher says a number- students write in note books
- ◆ Write some numbers on the BB. Ask them to read it from smallest to largest.
- ◆ Give number and ask them to split it according to place value.

- ◆ Let them make three digit numbers using given digits.
- ◆ Give them number cards and let them arrange increasing or decreasing order.
- ◆ Give additional support to those who are still below current ability level.

Let's play with cards.



This activity is to understand 1000 as ten hundreds and to find difference of a three digit number from 1000.

Make children groups of 3 or 4. Give them 10 number cards as given in TB. Give cards in such a way to get total points below 1000. Each student has to make columns in their note books to write number of cards and points. Discuss about what should be the format to write this and finalize.

Play No	100	10	1	Total

After 4 or 5 plays let them check with other groups and make corrections if any. Make sure that they are doing addition without writing according to place value but in mind. $500+40+2=542$. Now don't ask them to find total points of all games.

After ensuring that all children are able to find the points got in each play and write it in the columns, ask them to find the points Roshan got, after describing the situation. Then ask them to find the total points Roshan got from two plays.

Let them do as they like. After discussion they will get to know all the methods and they will find the easiest. Ask them which may be the cards Giji got. Let them write in their note books. Then ask them to find the total points of Suvarna.

Observe how they find it. Let them explain the way they found the total. They can find it either by totaling the cards or by adding the points mentally.

$$\begin{aligned} \text{Total cards} &= 8+9+10 = 800+90+20= 910 \\ 782+148 &= 700+100+80+40+2+8= \\ & 800+120+10=930. \end{aligned}$$

Let them say 910 is 9 hundred and one ten. Then how many is needed to make it 10 hundred. It is 9 tens. Then introduce 10 hundred is 1000.

Then ask them to find how many is needed to make the points of Linisha to make 1000. (990 is 9 hundreds and 9 tens. One ten will make it 10 hundred) Now ask them to make a table of their points in each play and how many is needed to make it 1000.

Play No	Points	Needed to make it 1000

Let them explain how they found it. Suppose the point is 460. The process to find how many is needed to make it 1000 is, 40 is needed to make it 5 hundreds and again a 500 is needed to make it 10 hundreds. Total needed is 540. (460 is to be rounded to 500. If the number is 419, it should be rounded to 400 and find the difference. 600 is needed to make it 1000. But 19 is already here. So $600-19= 581$ is needed. $600 -19= (600-$

$$20) + 1 = 580 + 1 = 581.$$

Then ask them to fill the table in TB. Then evaluate in peer groups.

Both are very important in constructive paradigm. Not only the products are evaluated, but the process of thinking also should be evaluated. Child can understand, what the mistake in his thought and how it is to be corrected. This should be the aim of self and peer evaluation. This is called “meta thinking” or thought about thought. This will help the child to correct the thinking process and the product. Only correction in answer or product will give no good in the learning process.

Teacher evaluate,

- ◆ the ability to read and write 3 digit numbers
- ◆ the ability to round a number to the nearest 10 or 100
- ◆ the ability to add three digit numbers mentally.
- ◆ the ability to find difference of a three number to 1000.

Aswin and father in the watch shop

- ◆ This activity is to understand the relation of hundreds to thousands.
- ◆ Explain the situation. Let them find the answers individually.
- ◆ Explain how they found the answers. Discuss in groups.
- ◆ 10 hundred is 1000. So 100 times 100 is 10000. That is ten thousand is 10000. Same way 30 times 100 is 3000.
- ◆ There are some combinations of 10000 in TB.

Ask them to write some more combinations. Ex.

$$8000 + 2000 = 10000$$

$$0:9500 + 500 = 10000,$$

$$5000 + 5000 = 10000$$

etc.

- ◆ Make children two groups and have a play. One group will say a number and the other will say how much is needed to make it 10000.
- ◆ Explain, 10000 - 3000 - 1500 can be done as 10000 - 4500. It is explained in the TB. If necessary explain this through simpler cases.
- ◆ Arun had 15 rupees with him. He bought sweets for Rs 5 and gave Rs 6 to his friend. How many is remaining. We can subtract 5 from 15 and again subtract 6 from 10. Or we can subtract $5 + 6 = 11$ from 15. The concept is this.
- ◆ Instead of subtracting two numbers from a number one by one, subtract the sum of the numbers.
- ◆ Child can accept any method to find 10000 - 4500. One method is given there. Let them explain their own ways. Don't stick on any single method.
- ◆ Let children find how many 500 rupees for 5500 rupees. Then discuss in groups and share the way in which they found it. One method is given there.
- ◆ Then with the same process find how many notes of Rs 200 will be there if 70,100 Rupee notes are changed. Don't treat it as a division problem.
- ◆ 5 times 200 will make 1000, so 35 times 200 will make 7000.
- ◆ 2 times hundred rupee notes will make one 200. So 35, 200 rupees will be there in 70 hundred rupees.
- ◆ During the discussion the following concepts should be formed.
- ◆ $10000 = 20 \text{ times } 500, 50 \text{ times } 200, 10 \text{ times } 1000 \text{ and } 100 \text{ times } 100.$

Here are the points that some children received.
Find out how many more points are needed to make it 1000.

Student	Points	Points to make 1000
Anil	500	
Hafal	800	
Gokul	750	
Ketu	225	
Jimmy	870	
Shantanu	999	
Johi	899	

Aswin and his father in the watch shop

Aswin wants a watch. He asked his father to buy a watch for him. Father agreed. They went to the town.
Aswin asked his father, "How much rupees do you have?"
Father said, "I have 100 notes of ₹ 100 each."
How much does it make?
"Ten thousand rupees", Aswin said.

10 notes of 100 rupees make 1000 rupees.
100 notes of 100 rupees make 10000 rupees.

Ten times 1000 make ten thousand.
It is 1000 more than 9000.
 $9999 + 1 = 10000$
 $9990 + 10 = 10000$
 $9900 + 100 = 10000$

- ◆ Any other way can be used and illustrated. Whatever the way child adopted should be explained.
- ◆ Ask the textile problem. Let children explain how they found it. Discussion should be carried out to get the different ways to all children.
 - $4 \times 500 - 250 = 2000 - 250 = 1750$ (250 gave back)
 - $3 \times 500 + 250 = 1500 + 250 = 1750$ (only 250 rupees is taken from the 4th 500)
 - Give some more problems to interpret numbers.
 - What is the total of 4 times 500 and 2 times 1000?
 - ◆ $2000 + 2000 = 4000$
 - ◆ 4 times 500 is 2 times 1000. So the total is 4 times 1000 = 4000
 - ◆ 2 times 1000 is 4 times 500. So total is 8 times 500 = 4000
 - Sisili has 8000 rupees. What is the combinations of notes
 - ◆ If it is 500 rupees?
 - ◆ If it is 200 rupee notes and 100 rupee notes?
 - ◆ If it is 500, 200 and 100 rupee notes?
- ◆ Let them write the number in figures and letters. (Page 121)
- ◆ Evaluate themselves and in peer groups.

Evaluation

Teacher evaluate,

- ◆ the ability to write a 4 digit number as combination of hundreds.
- ◆ The ability to write 4 digit number names.

Kiran with abacus

- ◆ This activity is to enable the students (children) to write a four digit number according to their positions.
- ◆ Let the children read and write the number on abacus. Give abacus in groups.
- ◆ Ask them to arrange beads according to the given number.

- ◆ Let the other groups to say the number one group formed.
- ◆ Then ask them to draw pictures according to the given number. (Page 122)
- ◆ After that write the numbers and number names on abacus. (Page 122)
- ◆ Ask them why zero is there in some places? Discuss in the groups.
- ◆ Pupils have to understand that a four digit number is read starting from thousands. 5805 is read as five thousand...

Write the number in figures and letters.

40 hundreds =	4000	Four thousand
25 hundreds =	2500	Two thousand five hundred
9 five hundreds =		
75 hundreds =		
18 hundreds =		
9 thousands =		
60 hundreds =		
12 five hundreds =		
20 hundreds =		
25 two hundreds =		

Kiran with abacus
Kiran is very interested in doing Maths activities. Today he came with an abacus and some beads.
"Soby, can you say which is the number on abacus?"
"Sure", Soby said. "It is 4352."
"4 thousands, 3 hundreds, 5 tens and 2 ones."
 $4000 + 300 + 50 + 2 = 4352$

Th	H	T	O
4	3	5	2

4352 - Four thousand three hundred and fifty two.
Then Soby asked, "If you remove one bead each from all beads, what will be the number?"

Ask them to write the number with 5 thousands, 3 tens and 9 ones. Some times they may write it wrongly as 539. Pupils should understand that, there are 4 digits in this, as there are thousands. Only 3 digits are given. So there is one zero in this. The place in which no digit is hundred. So zero is in the place of hundreds.

Friends in the shop

- ◆ This activity is to find total amount, if the combinations of notes and coins are given and to write number names. Also aim at writing numbers according to their places..
- ◆ Teacher explains the situation of 'friends in the shop' and ask them to read. Then fill the table individually. Write the number names. Check each other and evaluate them selves.

Friends in the shop
Nandan, Sidhu and Shamala are in a shop. They have gone to buy a gift for Kiran. His house warming is tomorrow. The currency notes they have with them are given in the table.

Find the total amount each one has.

Name	₹ 500	₹ 100	₹ 200	₹ 10	₹ 1	Total amount
Nandan	8	5	10	9	6	6596
Sidhu	5	15	20	15	16	
Shamala	10	4	12	21	10	

Write the total amount in words.
Nandan : Six thousand five hundred and ninety six.
Sidhu :
Shamala :

Split and write the above numbers.

6596 - 6 thousands, 5 hundreds, 9 tens, 6 ones.	Th	H	T	O
	6	5	9	6

Teacher gives necessary support to those who are not able to go forward. Teacher can ask some questions to lead them.

- ◆ How did you find the total amount of 8 five hundred rupees?
- ◆ 2 times 500 is 1000. So 8 times 500 is 4 times 1000=4000 or any other way they find.
- ◆ How did you find the total amount of 10, two hundred rupees?
- ◆ One 200 is 200, So ten 200 is 2000 or any other way they find.
- ◆ Let them check in groups and review the process if necessary.
- ◆ Do the remaining works in page 123, 124, and 125.
- ◆ Writing the number in boxes is to understand the position of the digits. (Page 123)
- ◆ The combination of notes and coins is to be discussed in the class. (page124)

“How many students ?” is to find how many numbers are there in between 2 numbers. Give more works and let them find it is “larger number-smaller number+1”. $2612 - 2591 = 21 + 1 = 22$.

Evaluation

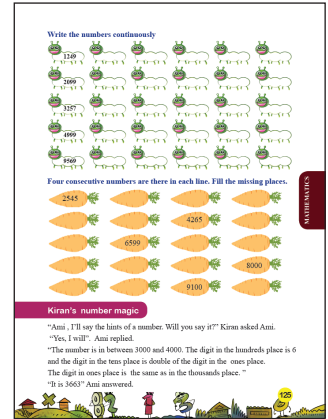
Teacher evaluate,

- ◆ the ability to write a 4 digit number according to their positions.
- ◆ The ability to read and write 4 digit number .
- ◆ The ability to write 4 digit numbers continuously.
- ◆ To find missing numbers where it is written in order.
- ◆ The ability to find how many numbers are there between two numbers.

Kiran’s number magic

- ◆ This activity is to recognize place value and face value.

- ◆ Teacher give hints (as in Kiran’s magic) of a number and pupils say the number.
- ◆ Then let children read ‘Kiran’s magic’ and say the number.
- ◆ Then make 5 groups. Each group make questions or hints. Other groups should say the number.
- ◆ Introduce place value and face value.
- ◆ They have rounded off three digit numbers earlier. Here rounding off a four digit number to nearest to 10,100, and 1000 are given.
- ◆ Do the work in page 126 and 127
- ◆ Answer the questions in the box and discuss in the class.



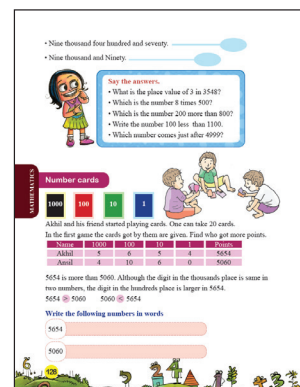
Evaluation

Teacher evaluate,

- ◆ the ability to write a 4 digit number according to their positions.
- ◆ The ability to split a 4 digit number according to place value.
- ◆ The ability to write numerals for a number.

Number cards

- ◆ This activity is to compare numbers and use of symbols to show larger and smaller.
- ◆ Let children play the card game and find who got more points.
- ◆ Introduce the symbols for, greater than and less than. Then do the works in the TB page 129



Sonu in the shop

- ◆ This activity is to form numbers with given denominations of notes.
- ◆ let them do it individually and discuss in groups.

Rivers in the world

- ◆ This activity is to compare the length of rivers. (integration with Geography)
- ◆ Find answers individually. Discuss in the class. Let pupils explain how comparison is done.
- ◆ Let them make questions and ask each other.

Heights of peaks

- ◆ This activity is to compare the heights of peaks (integration with Geography)
- ◆ Find answers individually. Discuss in the class. Let pupils explain how comparison is done.
- ◆ Let them make questions based on the table and ask each other.

Making Questions

Making Questions is a very important strategy in Mathematics learning. To make a question is higher thinking than Problem Solving should be applied. Divergent thinking process is needed to make a question. When making questions following points is to be borne in mind.

- ◆ All the questions should not be in same pattern or style.
- ◆ Questions having answer hints is to be avoided.
- ◆ “Yes” or “No” questions should not be encouraged.
- ◆ Questions should be as far as helpful in promoting logical thinking.

- ◆ Do the problems in Page No128 and 129

Forming numbers

- ◆ Forming largest and smallest numbers with given digit is there. Make children sit in groups and give them 4 cards in which digits are written. Ask them to make 4 digit number with this cards. Who gets largest number will win the game.
- ◆ Let children to find the way to find it easily.
- ◆ Teacher asks them questions to lead.
- ? Which card will you put in the place of 1000?
- ? What will you do if zero is there?

Amana's Savings

- ◆ This activity is to add mentally 100, 1000, 1500 etc to a number.
- ◆ Explain the situation and ask children to answer mentally. Explain how they found it.
- ◆ Answer the questions in page and

Evaluation

Teacher evaluate,

- ◆ the ability to compare numbers.
- ◆ The ability to explain symbols.
- ◆ To analyze a problem
- ◆ To make questions.
- ◆ To find relations.
- ◆ To add 100 ,1000 etc mentally.

Roman numbers

- ◆ The letters used for Roman numbers and the combinations of letters up to 10 is given here. Just introduce it. Along with these explain the Indian numeral system. In our number system there are 10 digits and these digits are used to write very large numbers .

“Think and Do” questions are higher order thinking questions. Let them do as home work and later discuss in the class. The process for finding answers and different methods if any should be discussed.

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Measure the length of an object using scale or measuring tape. ◆ Solve problems involved measurement of length. ◆ Use the concept of measuring the length in life situations. 	<ul style="list-style-type: none"> ◆ The units of length are centimeter, meter, millimeter and kilometer. ◆ 100 cms make 1 metre. ◆ 10 mms make 1 cm. ◆ 1000 meters make 1 kilometre. ◆ 1 metre = 1000 mm ◆ Sum and difference of length can be found in different ways. ◆ In our life we have to find and analyze the length for various purposes. 	<ul style="list-style-type: none"> ◆ Measuring the class room and various objects. ◆ Analyzing the situations which involves measuring the length. ◆ Comparing the length of objects. ◆ Convert the units according to needs. ◆ Guess and check the length. <ul style="list-style-type: none"> ● Solve problems. ● Make questions ● Interpret tables ◆ Discussion of life situations ◆ Concept used in other subjects ◆ Project works

What is in this unit?

This unit deals with the measurement of length. Pupils have understood need of measuring length and how it is measured using non standard units. They can compare the length of objects by overlapping, and by measuring with non standard units. They can guess and say which is longer and shorter.

In this unit measuring the objects using standard units is introduced. The units of length and their relation are discussed. Pupils get experience in measuring with accuracy and to guess and check the length of objects, class room etc. Changing the units from smaller units to bigger units and vice versa is introduced. Practical problems using the operations of length is given in this unit. There is also an opportunity to analyze and solve problems using the concept of length while going through this unit.

CLASS ROOM PROCESS

Ensuring current ability level.

- ◆ Teacher shows two sticks and asks which one is longer.
- ◆ Find the shortest from a group of pencils.
- ◆ Discuss how to find the longest bench or any

other object.

- ◆ Let them find which has more length, using non standard units.
- ◆ Let them guess and check the length.
- ◆ Give additional support to those who are still below current ability level.

Measuring the class.

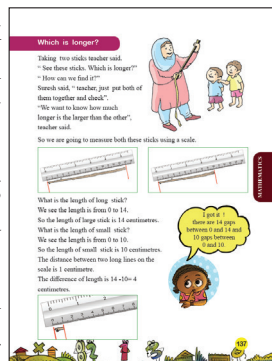
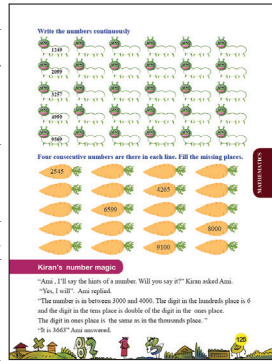
- ◆ This activity is to get an idea about the need of a standard unit.
- ◆ Ask pupils to say which side of the class is the longest. Make children into groups. Then ask them measure the class room (or any other) using sticks of different lengths.
- ◆ When measuring teacher should make sure that they are doing it correctly. Let them leave the length if the part length got last time is less than half of the stick. Then write the lengths in a table on a chart or board.

Group	Side 1	Side 2
1		
2		
3		
4		
5		

- ◆ Then discuss why the length got is different and conclude that all sticks should be with the same length. Then let them measure again with sticks of same length and make table again. If difference is found measure again with the help of other groups and correct it.
- ◆ Then read the book (page 139).

Which is longer?

- ◆ Take two sticks and ask children to find which is longer. Discuss how will find it. Conclude that while over lapping we can understand which is longer. But we can not say how much longer it is. So we want a measurement. We use a scale to measure length. First introduce scales of 15 cms and 30 cms. Take sticks which are

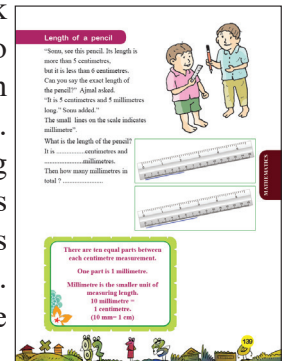


able to say with correct centimeter length and ask them to measure. Let them understand the length between two long lines is one centimeter.

- ◆ Make sure that they are measuring from zero. If they are putting the edge on any other number, the length is less than the number on the other edge. Then read the book (page 140) and write the length of the objects. (Page 141)
- ◆ Give them experience in measuring objects. If the length is not correct to cm, let then say more than 4, less than 6 etc.

Length of a pencil.

- ◆ Take a pencil or a stick which is not correct to cm. and open a discussion about the length of it. Conclude by saying millimetre and how it is measured. Then read this part and do the works. Find the length of the objects attached to scale. Then measure accurately the length of the lines. Make sure that they are measuring the length correctly. Let them check each other and evaluate themselves. Let them find the relation of millimeter with centimeter. Fill the blank columns in page 143.



Currency notes

- ◆ This activity is to guess the length. One group guess and the other check by measuring. Take objects other than in the table and guess.

Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to measure with accuracy.
 - the concept of centimeter and millimeter.
 - ability to guess the length.
 - participation in group activities.
 - participation in discussions and ability to formulate arguments.
 - rigour and integrity in communication.

Measurement of rain

This should be discussed by integrating with EVS. The height of the water level is the measurement of rain.

Sharing the ribbon.

- ◆ This activity is to add and subtract two lengths. Two methods are given.
 - Changing the centimeter and millimeter in to millimetre and add again change in to centimeter and millimeter.
 - Add centimeters together and millimeters together. Then convert in to centimeter and millimeter.
- ◆ Let children do as they like.

Triangles, rectangles and squares, Do these problems.

- ◆ Let children do these problems individually and discuss in groups. Discuss the different ways in the class. Evaluate each other.

Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to add and subtract the length.
 - to explain the different ways.
 - the ability to solve problems.

Making Abacus

- ◆ This activity is to introduce meter. First child knows $25\text{cm}+25\text{ cm}+25\text{cm}+25\text{cm} =100\text{ cm}$ and it is 1 metre. Then show 1 metre on the scale and measuring tape. Then ask them to find objects from surroundings which are less than 1 metre and more than one metre. Let them mark 1 metre on the wall. Ask them to guess their height. Such activities should be done to have a clear idea about one metre.

Sports meet

- ◆ The activities under this head is to convert units and to find sum and difference of the length. Let them fill the columns and check each other.

After completing the table ask them to make questions based on table other than those given in TB.

- ◆ Before giving the work for finding total length of the rope make a situation in the class to add and subtract lengths and discuss it. Let them explain the different ways as explained earlier.(Activity. Sharing the ribbon)
- ◆ Ask them to do works for conversion of units in TB Page 148. Evaluate in groups.

Sports meet!

School sports meet is going on. The distance covered by some athletes in long jump is given.

Name	Distance covered	Distance to run	Rank
Anoop	2 m 85 cm		
Rohit	3 m 5 cm		
Poojara	3 m 45 cm	200 cm	
Geeta		200 cm	
Sushma	3 m 45 cm		
Simi	3 m 1 cm	200 cm	

Who is the winner in long jump?
Who was the second place?
Who came last?

Physical Education teacher brought a rope to draw line on the ground. It was 35 metres and 85 centimetres long. But it was not sufficient. He brought 45 metres and 95 centimetres rope again.

What is the total length of the rope?
35 metres and 85 centimetres + 45 metres and 85 centimetres = 80 metres and 120 centimetres = 81 metres and 20 centimetres.

In discuss three Anjula cleared 12 metres and 70 centimetres. Rani cleared 11 metres and 45 centimetres.

What is the difference in the distance cleared?

Let's guess and measure

- ◆ Children have to understand as length and height, depth and round are also measured using units of length. Give chance to measure and guess such lengths such as kitchen utensils. Then observe the things in the table and fill the guess column. Then measure them. How the measurement will be taken is to be decided through discussion. Then solve the problems.
- ◆ Then introduce Kilometre by asking them about long distance and creating such a situation to say length in Km. The questions in the box will help for this. No correct answer is needed for this questions. Only say more than two kms, about 3000 kms etc. Ask them to convert units.

Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to measure.
 - to convert the measurements as directed.
 - the ability to add and subtract the length.
 - The ability to make questions.
 - the ability to solve problems.
- ◆ "Some facts" should be integrated with EVS.

Project.

- ◆ Make students groups of 4. Each group finds the heights of all members and write it in a chart. All groups display the charts. Ask all pupils to

make a table showing the heights of all pupils. Then let them write their findings and discuss in groups. Present it in the class.

Evaluation.**◆ Teacher evaluate,**

- the participation in the project work.
- The ability to make a table.
- the ability to draw inferences from a table.
- The ability to present the conclusions and give evidence for their arguments

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Add four digit numbers by splitting according to place value- mentally and by writing. ◆ Guess the sum of two four digit numbers and explain the strategy used. ◆ Explains the logics behind finding two numbers to get the given number as the sum of that numbers. ◆ Solve problems including addition of four digit numbers ◆ Draw inferences from a collected data. 	<ul style="list-style-type: none"> ◆ When two four digit numbers are added, the digits in the same places are added. ◆ There are some strategy behind guessing the sum. ◆ to get the given number as the sum of two numbers first check the unit place (the sum is matched or not) ◆ To find the total of ◆ Two numbers the numbers should be added. ◆ Sum of two consecutive numbers are always even. ◆ Sum of two odd numbers are always even. ◆ Sum of two even numbers are always even. 	<ul style="list-style-type: none"> ◆ Find sum of four digit numbers through solving problems and involving in plays. ◆ Find the sum in mind by splitting them according to place value. ◆ Guess the sum through analyzing ◆ Practical situations. ◆ Solving puzzles and finding the numbers. ◆ Analyze problems and make questions involving practical situations. ◆ Doing project works and finding number relations.

What is in this unit?

Children have gone through the four digit numbers . They can read, write and interpret four digit numbers. They can split a four digit number in different methods. This unit deals with the addition of four digit numbers. Pupils get experiences in addition of numbers in different methods and to solve problems involving addition. They get experiences in adding mentally and guess the sum. They also get chance to interpret tables and choose data from a table. By doing the project they get experiences in collecting data, analyzing data, drawing inferences from the given data and making conclusions and to generalizing.

CLASS ROOM PROCESS

Ensuring current ability level.

- ◆ Give the problems including addition of three digit numbers.
- ◆ Give number cards with four digit numbers and ask them to read and put in order.
- ◆ Ask them to say sum mentally. Ex. $325+100$; $1254+1000$; $5421+100$
- ◆ Ask them to split a number according to place

value.

- ◆ Give additional support to those who are still standing below current ability level.

Number card game

- ◆ After explaining the rules of play teacher explains the cards received by Anusha (TB) to understand the rules. She has got 9500 from 3 cards and 500 is there in blue cards . So she

will get one point.

- ◆ Let pupils play the game in the class. Prepare pink cards and blue cards. Put pink cards upside down on the table with out seeing the number. Put blue cards spread on the table so as everyone the number. One pupil comes and takes 3 cards from the top of pink cards. Then he should take one card from the blue so as to make the sum of 4 cards 10000. If he can he will get 1 point. If he can not take ask him why he was not able to take the fourth one. Two reasons are possible.
- ◆ Already got 10000 or more from three cards.
- ◆ There is no card in blue cards to make 10000.
- ◆ Whatever be the reason child has to explain it.
- ◆ After one round of play in the class teacher can ask them to play it in intervals and leisure times. This will help them to develop the mental ability finding sums.
- ◆ Then ask them to find the 3 possibilities of card Suhaira got in the boxes.
- ◆ It may be $3500+300+200$, $2000+1500+500$ or any other. Child has to explain why she will not get point. There is no card 6000 in the blue cards. Let children explain their findings. The chance for mathematical communication should not be left.
- ◆ Likewise discuss Aswin's cards also. Then fill the table and find the sum. Note that this activity is meant to get practice in mental calculation and estimation. So, as far as possible sum should be calculated in mind.

Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to calculate mentally.
 - the ability to estimate the sum.
 - ability to analyze problems .
 - the ability to find sum of four digit numbers.
 - ability to formulate arguments.
 - rigour and integrity in communication.

Gopu and friends in furniture shop.

- ◆ This activity is to find sum of 3 numbers and to collect data from a table. This also aims to make estimations related with addition. One

situation is solved and then three questions are given.

- ◆ Let them read the question and lead a discussion in the class. Ask them some questions before solving it.
- ◆ What is your guess about the total amount? Is it more than 10000? (They can guess it only adding thousands place and hundred place. $3+3+2=8$. (8000) The hundred place is $5+2+5=1200$. It is less than 2000. $8000+1200=9200$. So the answer is less than 10000)
- ◆ Is it more or less than Gopu paid? (it is more than Swapna paid , All the three numbers are 4 digit numbers and two of them are more than 3000. In Gopu's case one number is three digit and one is less than 2000. Only one number is more than 3000. Pupils can find their own arguments to prove their findings. However a discussion should be carried out in the class.
- ◆ The next problem is to find combinations of items less than 9500 rupees . There are more than one combinations. Find all them and select the highest amount from it. Then we will get the items which can be bought with maximum price. Instead of adding all the three items , first let them make a guess about it and check it.
- ◆ The items Surekha bought is for 9068 rupees. They have to find 3 numbers which have the sum 9068. Ask them how they worked with it. Instead of checking all numbers they can find it by checking one's digits only. The sum of one's digit should be 8. Select only such 3 numbers and check. If it is not correct make necessary changes in selection
- ◆ Then let them do find the sum and find the missing numbers. 'Take two numbers from the boxes below to get these sums', is to be done and explained.
 - Ex. Which are the numbers to be taken to get the sum 3925. First check which two of the numbers in the boxes will give sum 5 in ones place. They are 2974, 6254,951 and 2471. 6254 can be avoided because it is more than 3925. 2974 and 2471 can not be taken, as their sum is more than

4000. So the chance goes to 2974 and 951. Check these. $2974+951= 3925$. Children can adopt any other way to find it, but the technique they used should be explained.

$$9998= 4546+5452$$

$$4928=2457+2471$$

$$7923=5452+2471$$

$$9499=3245+6254$$

- ◆ Ask them to fill the pattern individually and check each other. Let them explain the logic.

Air journey

- ◆ Children have to find the data to solve these from the picture given. Then solve it by adding three numbers.

Evaluation.

◆ Teacher evaluate,

- the ability to find the relations of the numbers.
- the ability to estimate the sum.
- ability to analyze problems .
- the ability to collect data.
- the ability to think logically
- ability to formulate arguments.
- rigour and integrity in communication.

Project

- ◆ First the problem should be discussed in the class.

- What is the peculiarity of the sum of two consecutive natural numbers?
- How can we find it?
- Take pairs of two consecutive numbers and find the sum and write it in a table?
- How should be the tables?
- How many columns?

- ◆ After discussion form a common table.

First number	Second number	Sum
1	2	3
4	5	

- ◆
- ◆ My findings.
- ◆ The sum of two consecutive numbers will be an odd number.

Project evaluation.

- Data collection.
- Table making.
- Data analyzing.
- Draw inferences.
- Explaining conclusions
- Making reports.
- ◆ Ask them to do ‘think and do problems’ and discuss in groups.

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Identifies rectangles, triangles, squares and circles. ◆ Identifies standing lines, sleeping lines and slanting lines. ◆ Identifies straight lines and curved lines. ◆ Identifies closed figures and open figures ◆ Measure a line segment using scale and draws lines with correct measurement. ◆ Describes the peculiarities of 2D geometrical shapes. ◆ Describes the peculiarities of 3D geometrical shapes. 	<ul style="list-style-type: none"> ◆ Shapes can be classified according to their number of sides ◆ Lines can be classified as standing lines , sleeping lines and slanting lines according to their directions. ◆ Lines can be classified as straight lines and curved lines. ◆ Figures are either closed or opened. ◆ The units of measuring length of a line segment is centimetres and millimetres. ◆ A rectangle has 4 sides and 4 corners. ◆ Opposite sides of a rectangle are equal ◆ 4 sides of square are equal. ◆ A triangle has 3 sides and 3 corners. ◆ A circle has neither sides nor corners. ◆ If a rectangle is cut through a line drawn from a corner to the opposite corner ◆ The triangles got will be equal in size. ◆ If a square is cut through two lines drawn from corners to opposite corners ◆ The triangles got will be equal in size. ◆ A cube has 6 faces 12 edges of same length and 8 corners. ◆ A cuboid has 6 faces 12 edges and 8 corners. ◆ A cylinder has 2 flat faces , 1 curved face and two curved edges. ◆ A sphere has only one curved face. ◆ A cone has 1 curved face , 1 flat face , 1 curved edge and 1 vertex. 	<ul style="list-style-type: none"> ◆ Find out the various shapes from a complex figure and name them. ◆ Find out various types of lines from a figure. ◆ Classify straight lines and curved lines from a group of lines. ◆ classify closed figures and open figures ◆ Measure the length of line segments given in the textbook and other lines drawn note books. ◆ Draw lines with correct measurements in various contexts. ◆ Observes and draws 2 D geometrical shapes and lists out the specifications. ◆ Observe 3 D geometrical shapes from surroundings and list out the specifications.

What is in this unit?

Children have gone through the four digit numbers . They can read, write and interpret four digit numbers. They can split a four digit number in different methods. This unit deals with the addition of four digit numbers. Pupils get experiences in addition of numbers in different methods and to solve problems involving addition. They get experiences in adding mentally and guess the sum. They also get chance to interpret tables and choose data from a table. By doing the project they get experiences in collecting data, analyzing data, drawing inferences from the given data and making conclusions and to generalizing.

CLASS ROOM PROCESS

Ensuring current ability level.

- ◆ Give shapes and ask them to classify according to their sides and other specialties.
- ◆ Identify the shapes from a complex picture.
- ◆ Give tangram pieces and make various pictures.
- ◆ Give chance to identify various types of lines.
- ◆ **Give additional support to those who are still below current ability level.**

Meenu's House

- ◆ This activity is to revisit the concepts they have already experienced in previous classes. First ask them to observe the house and say something about Meenu's house. Each should say minimum one point.
 - There are many shapes in this.
 - There are rectangles.
 - There are triangles.
 - There are circles.
 - There are standing lines.
 - There are sleeping lines.
 - There are slanting lines.
 - There are vertical lines.
 - There are horizontal lines.
 - The shape most seen is rectangles.
 - Two circles are small and one is big.
- ◆ Then ask them to draw Meenu's house. Before drawing a discussion should be held in the class. This is to understand them planning of something. Whatever is doing a planning is necessary.
 - What are the instruments needed? Scale, pencil, eraser etc

- Where should it be drawn? Paper or note book.
- What should be the size of the picture? Full page or half.
- Is any colour pencil or crayons needed?
- Which line will be drawn first?
- How can we draw the corners correctly?

- ◆ After discussion let them draw the house. Ask them to talk about their picture. Then let them examine in groups and evaluate each other. If necessary ask them to re-draw. Then ask them to give numbers for the lines as directed in TB.

Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to draw lines and shapes.
 - Participation in the discussion
 - ability to use instruments
 - neatness and accuracy of the drawing
- ◆ Then make them fill the columns. It is noted that there are no squares in this picture. So they have to write 0 in that column. Discussion should be there why the windows are not squares. There are 3 triangles in this. It should be identified by them.
- ◆ Next work is to just understand straight line, curved line, closed figures and open figures.

Drawing Lines

- ◆ This is to get an idea about,
 - line segment , which is a line between two points.
 - naming a line segment

- measuring a line segment and
- drawing a line segment with measurement.

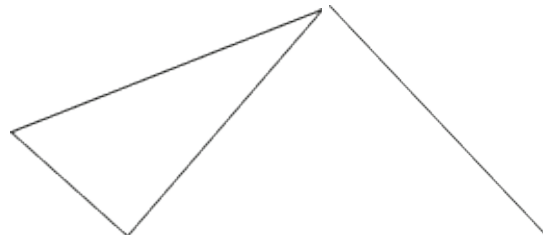
- ◆ Teacher asks pupils to put two points in their note book. Then tells them to guess the length in cm. Then make groups of 3 and check the guess in groups. Draw a line joining the points. Then measure and check the guess. Ask them to give names to the points. The line segment is named by the names of these points. Repeat this process so as to get them an idea about the length in cm. One child guesses and the other measures. Repeat this.
- ◆ Then find the length of the line obtained by joining the points given in TB. Help them to measure correctly. Let them measure the lines in Page No.163.
- ◆ Ask them to draw lines with measurements given in TB. It should be recognized that 7 m and 4 mm(3rd one) can not be drawn in the note book . It can be done in the class room or in the ground. So draw 7 cm and 4 mm in the note book. Then ask them to find the maximum length of the line that can be drawn in their note book. First guess and then measure.

Evaluation.

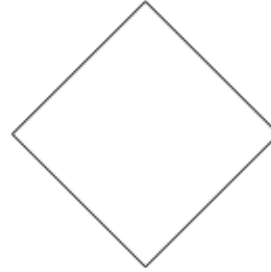
- ◆ **Teacher evaluate,**
 - the ability to measure length
 - ability to use instruments
 - accuracy in measuring.

Sides and Corners

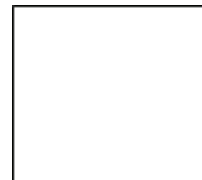
- ◆ These activities are meant to get more idea about rectangle, square, triangle and circles.
- ◆ Why the figures are not rectangles. Let pupils find their own reasons and explain.
 1. Opposite sides are not equal. Corners are not same. One line is a slanting line.
 2. Only three sides
 3. Same as in 1
 4. It is not closed.
- ◆ Let's explain the triangle. Then draw triangle only with slanting lines. One slanting, one sleeping and one standing.



- ◆ Then examine a square and find the peculiarities. Then begin the discussion whether this is a square or not.



- It has 4 sides
- All sides are equal
- All corners are same
- ◆ If it is turned a bit it will be like this.



- ◆ Then introduce circle and how to draw it using objects. The mistakes suppose to take place while drawing is to be discussed. It is for this purpose the cartoon is given.

Cutting a shape

- ◆ These activities are to be done in the class and detailed discussion should be held. For this activity, rectangles and other shapes cut from cards or any other materials should be issued to children.
- ◆ Can you make a rectangle using these 4 triangles?
- ◆ Ask children to try this and explain.

Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to identify the shapes
 - the ability to think logically

- ability to formulate arguments
- the ability to communicate with reasoning.

Project.

- ◆ Before doing the project a discussion is necessary.
 - How do we find it?
 - Where do we collect data?
 - How do we record it?
 - How should be the table?
- ◆ Decide the format of table through discussion.

Name of object	Shape

- ◆ Then explain their conclusions and write.
- ◆ Let them evaluate each other.

Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to collect data
 - the ability to make tables
 - ability to analyze data.
 - The ability to make conclusions

3D shapes

- ◆ It is explained in TB. Show them the shapes and find similar shapes from surroundings. Then let them give tick mark to the correct statements.
- ◆ Then let them to do the works in page 168.
- ◆ Let them check self and each other.
- ◆ Teacher evaluate whether the concepts of edges, vertices and corners are achieved or not.
- ◆ Introduce the road signs as given the TB.

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Explains the different methods for subtraction. ◆ Guess the difference of 2 numbers. ◆ Find the number relations to make subtraction easy. ◆ Analyze and solve 	<ul style="list-style-type: none"> ◆ Some re-arrangements in the large number is necessary while subtracting a number from another, if the digit in a place of the smallest number is greater than the digit in the same place of the largest number. ◆ Some strategy should be adopted to guess the difference of two numbers. ◆ Subtraction can be made easy, if some suitable relations are formed. <ul style="list-style-type: none"> ● Ex. 8000-4567 can be done easily if it is written as 7999-4566. 	<ul style="list-style-type: none"> ◆ Analyze and solve the problems related with daily life which includes subtraction. ◆ Solve problems including the possibility to make guess. ◆ Solve problems and find easiest way to reach the answer. ◆ Do word problems.

What is in this unit?

Children can read and write four digit numbers. They can interpret the numbers according to place value and according to the need of the situations. They can add four digit numbers and analyze problems. They can draw inferences from given data. They have the ability to find relation with numbers and do subtraction of 3 digit numbers .

CLASS ROOM PROCESS

Ensuring current ability level.

- ◆ Give word problems including addition of four digit numbers and subtraction of 3 digit numbers.
- ◆ **Give additional support to those who are still below current ability level.**

Neighbors in the town.

- ◆ This activity is to introduce subtraction of 4 digit numbers which can be done in mind without writing. These problems give emphasis on problem solving. In each situation pupil has to think
 - how can the answer be found,
 - What data should be collected from the situation to find the answer

- And what is the relation of datas.
- ◆ Children can do it in their own ways and explain it. Whatever be the way they adopted should be explained by them.
- ◆ Explain the situation and let them read it. Then ask them to find the amount remaining with Harshan. It can be found in two ways.
- ◆ Teacher asks, “How can we see the remaining amount?”
- ◆ It is noted that to find the sum the numbers are added while to see the remaining amount, the difference or how much is needed, the smaller number is subtracted from the larger. Along with the subtraction , for what purpose subtraction is done also should be discussed.

$8000-2000= 6000. 6000-1500=4500$

8 thousand - 2 thousand is 6 thousands.
 6 thousands - 1500 = 6000 - 1000 - 500 = 5000 - 500 = 4500

8000 - 3500 (spent amount is 2000 + 1500 = 3500)
 8000 - 3000 = 5000 5000 - 500 = 4500

◆ Then ask them to find the balance amount with Suman.

◆ It is either
 $5000 - 1250 = 3750$. $3750 - 1750 = 2000$.

Or

$5000 - (1250 + 1750) = 5000 - 3000 = 2000$.

◆ Then see the next problem that Suman gave 750 in the vegetable shop. The remaining amount is $2000 - 750 = 1250$.

◆ All these problems are to subtract two numbers to see the remaining amount. The next one is to find how much is needed. It is also a situation for subtraction.

◆ Then see the amount needed for Suman to make the amount equal to Harshan.

◆ It is $4500 - 1250 = 4000 - 1000 = 3000$. $500 - 250 = 250$. $3000 + 250 = 3250$. Or they can do it in other way. Ex. $4500 - 1000 = 3500$. $3500 - 250 = 3250$.

◆ All these should be done in mind.

◆ The next one is to add 2000 and 1250. It is experienced earlier. (3250)

◆ The amount with Harshan is $4500 - 2000 = 2500$. While solving these child has to look for what was the amount remaining with Harshan before giving to Suman. He has to think where he should get the data from.

◆ The total amount with them = $2500 + 3250 = 5750$.

◆ Note. After reading all these children can make a short note of these problems to make the analysis easy.

Ex. Harshan. 8000. Spent. $2000 + 1500$. Gave to Suman 2000

Suman. 5000. Received. 2000

Spent. $1750 + 1250 + 750$.

Balance Harshan $8000 - 3500 - 2000 = 2500$

Suman . $5000 + 2000 - 3750 = 7000 - 3750 = 3250$

◆ Making this type of short notes or 'synopsis' will help to find the data and relations easily.

◆ Then do the works in page 174. All should be done in mind. They should explain the way they found it.

Ex. $3654 - 1654 = 2000$. (All the digits in the places except 1000s place are same.)

$4500 - 800 - 700 = 3000$ ($800 + 700 = 1500$, so it is $4500 - 1500 = 3000$)

Evaluation.

◆ **Teacher evaluate,**

- the ability to analyze problems.
- The ability to find relations with data.
- ability to find sum and difference mentally.
- ability to communicate.

Play with tokens

◆ This is to subtract number from a larger number. Different methods are given. What ever be the method adopted by the students , the concept should be formed well.

◆ All the three situations given on page 176 is without carryover. So it is very easy to do. Let them do the works in page 177.

Evaluation.

◆ **Teacher evaluate,**

- the ability to analyze problems.
- ability to find difference .

Boys and Girls

◆ The problems in these section need carryover. This has been experienced in early classes. It is explained there. While doing $3254 - 1768$, 8 can not be subtracted from 4. 6 can not be subtracted from 4 and 7 can not be subtracted from 1. So 3254 is to be splitted as $2000 + 1100 + 140 + 14$. This is the basic idea and pupils should get this is when borrowing. The borrowing should not be a mechanical process. Don't compel them to write as this always, but to get an idea some are given there on page 180 to split and subtract. They should be understand that while

borrowing one from 10th place, it is splitting 54 as 40+14. While borrowing one from 100th place, it is splitting 254 as 100+140+14. While borrowing one from 1000th place, it is splitting 3254 as 2000+1100+140+14. Then it can be done easily. Another way also is illustrated there. $3254-2169=(3000-2000)+(254-169)$ All these are given to have a well understanding of subtraction instead of a mechanical process. Finally they can do it as usual, but with conceptual understanding.

- ◆ See what is the process of doing it.

6	5	4	8
4	2	8	9
6	4	13	18

- ◆ 9 can not be subtracted from 8 So it is 18. ($48=30+18$)
- ◆ 8 can not be subtracted from 3 So it is 13 tens.
- ◆ 9 can not be subtracted from 8 So it is 18. $6548=6000+4000$
- ◆ 2 can be subtracted from 4 So it should not be splitted.
- ◆ 4 can be subtracted from 6 So it should not be splitted.

$$6548 = 6000 + 4000 + 130 + 18$$

- ◆ In the last on

9	0	0	0
7	5	8	6
8	9	9	10
4	2	8	9

- ◆ 9 can not be subtracted from 0 So it is 10ones
- ◆ 8 can be subtracted from 9 it should not be splitted.
- ◆ 2 can be subtracted from 7. It should not be splitted.
- ◆ 4 can be subtracted from 8 So it should not be splitted.

$$9000 = 8000 + 900 + 90 + 18$$

- ◆ It is very easy to do these type of numbers is subtracting 4289 from 8999 and add one to the resulting number.
 - $9000-4289= 8999- 4289= 4710+1=4711$
- ◆ Let them do the problems from page 181 to 184.
- ◆ Page. 181. How much is needed to make 100, 1000 and 10000.
 - 50-50. 500-450. 5000-4500
 - 25-75. 250-750. 2500-7500
- ◆ Let them find the relation with each answer. Check these. Page 181.
- ◆ 6000-2541 is 5999-2540 (One each is deducted from both. So the answer is same.) $10000-6589= 9999-6588$ (One each is deducted from both. So the answer is same.)
- ◆ $5432-2354= 4999-2354+433$. (5432 is splitted as 4999+ 433. So the answer is same.)
- ◆ $3547-2457=2999-2457+548$ (3547 is splitted as 2999+ 548. So the answer is same.)

Which is longer? (page 182)

- ◆ 3564-2154 or 6524-4350. The process is 3000-2000 is less than 6000-4000. Then check.
- ◆ Take two numbers (page 182)
 - $1645= 3645-2000$
 - $1900=3650-1750$
 - $942= 6354-5412$
- ◆ Find the answer mentally (page 184)
- ◆ $6542-300-242= 6542-542= 6000---$
- ◆ $3255+1500-1400 = 3255+100= 3355$ (1500-1400=100)
- $3214+5500-5000= 3214+500=3714$ (5500-5000=500) Let them do the think and do the problems and discuss in groups.

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Find and explain the continuation of a number pattern and the relation between the numbers.. ◆ Draws and explains figure patterns. ◆ Colour the tiling patterns ◆ Draw and explain the line of symmetry. ◆ Draw the picture of an object from various angles. 	<ul style="list-style-type: none"> ● There is a relation with the numbers in a pattern. ● By analyzing the figure patterns we can draw the next figures. ● The line of symmetry makes a shape two identical shapes. ● The picture of an object will not be same from different views. 	<ul style="list-style-type: none"> ◆ Find the relation of numbers in a pattern through plays. ◆ Analyzing the figure patterns. ◆ Works to colour the tiling patterns. ◆ Works to draw line of symmetry. ◆ Drawing pictures from different view points.

What is in this unit?

Pupils have experienced number patterns and geometrical patterns in previous classes. They can fill simple patterns and find the continuation of geometrical patterns. They can colour simple tiling patterns also. They have acquainted with symmetrical shapes.

In this unit continuation of all the above items are given. Number patterns are explained with the help of pictures for better understanding. Geometrical patterns and symmetrical shapes are explained and they will get experience in colouring tiling patterns. View of an object from different angles also is given in this unit.

CLASS ROOM PROCESS

Ensuring current ability level.

- Fill the simple patterns and define them.
- 1, 2, 3, 4, (Pattern of natural numbers)
- 2, 4, 6, 8, (Pattern of even numbers)
- 1,3,5,7,9..... (Pattern of odd numbers)
- 10, 20, 30, 40 (pattern of numbers ending in 0)
- 5, 15, 25, 35..... (pattern of numbers ending in 5)

- ◆ Give additional support to those who are still below current ability level.

Arranging the tokens.

- ◆ This activity is to illustrate how a pattern is formed and how the remaining numbers in a pattern is found.
- ◆ First let them see the arrangements given in the TB. Ask them how it is arranged. Discussion should go on to get the points given there in the TB. Pupils have to get an idea about how the continuation of a pattern is found by checking all its aspects and how it can be explained.

- ◆ Then ask what is the arrangement of next pattern demonstrating the process. Then ask what should be there in the tenth group and 20th group. Let them find it individually and discuss in groups. Let them explain.
- ◆ Then examine the next arrangement and, lead a discussion in the class to get an idea of the pattern. It is 1×1 , 2×2 , 3×3 , and 4×4 . So the next is 5×5 . And the tenth group is 10×10 . Then let them explain it.
- ◆ Same way the two patterns also should be processed in the class. Discussion on each arrangement is necessary. Then explain to them the pattern of even numbers and odd numbers. Then do the works in Page 188.
- ◆ Let them check individually and in pairs other. Explain why the pattern is so.

Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to find relations.
 - ability to explain the patterns.
 - ability to think logically.
 - ability to find cause and effect.
 - ability to communicate with rigour and integrity..

Figure Patterns

- ◆ All the figure patterns on page 189 and 190 should be done individually. As did in the previous tasks, first find the style of arrangement and then find the next. Let them evaluate individually and each other.

Evaluation as learning, for learning and of learning.

Children should be permitted to discuss with their friends and make necessary changes in their thinking process. Child should be clear about the mistake in his thinking process and how it should be corrected. This is the aim of checking oneself and each other. It is the peer evaluation. This evaluation is the evaluation for learning. Here evaluation is learning also. So we can say it is evaluation as

learning. Learning and evaluation go together. When teacher evaluates not only the product or answer is evaluated but the thinking process also should be evaluated. For this teacher should let them explain the process through which the answer was obtained. Teacher evaluation will be either for learning or evaluation of learning.

Geometrical Patterns

- ◆ Ask students to observe various tiling pattern in their surroundings. Then look at the pattern given on page 90. Then take the copy of page 191 and 192 and do the activities in the boxes. Then check it each other and find what changes should be done. Final work is to be done in TB. Let them exhibit it in the class, which were done in the copies.

Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to select colour combinations.
 - the ability of accurate colouring.
 - creativity in colouring.
 - the participation in the exhibition.

Symmetry

- ◆ They are familiar with symmetrical figures and line of symmetry. Just recall it. Then ask them to draw symmetrical lines and check each other.
 - Where are you looking from.
- ◆ This work is for the development of spatial intelligence. First ask them to draw the objects in the class from various angles and then let them to do the works in TB on pages 191 and 192

Evaluation.

- ◆ **Teacher evaluate,**
 - the ability to make models.
 - the ability to draw with accuracy and neatness.



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GRADE - 1



**TEACHERS RESOURCE
MANUAL**

**Mathematics
Grade 4**

GRADE - 4



LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Read and write numbers up to 100000 ◆ Find relations with numbers ◆ Interpret numbers according to their positions ◆ Explain the place value of the digits in a five digit number. ◆ Compare numbers and find the larger and smaller in a group. ◆ Explain how to form largest and smallest numbers using given digits. ◆ Round a 5 digit number to nearest 10,100,1000 and 10000 ◆ Use $>$,$<$ symbols in appropriate places. ◆ Find out number relations and explain with conceptual clarity . 	<ul style="list-style-type: none"> ◆ 10 thousands make 10000. ◆ 10000 is the smallest 5 digit number ◆ 100000 is the smallest 6 digit number ◆ There are ten 10000 in 1 lakh ◆ 100 times 1000 is 1 lakh.. ◆ 100 times 100 is 10000. ◆ 20 times 500 is 10000 ◆ 50 times 200 is 10000 ◆ A five digit number reads beginning from 10000 ◆ If there is no number on a position zero is added ◆ The place value in the left side of a 5 digit number is 10000 ◆ In a 5 digit number the number with large digit in the 10000 place is the larger. ◆ To form largest number without repeating the given digits, write the digit in descending order . ◆ To form smallest number without repeating the given digits, write the digit in ascending order . ◆ Rounding helps to compare a number easily. ◆ When rounding , 5 and more is considered as next number. ◆ $>$ is used to denote greater than and $<$ to denote less than. ◆ Number of types an even number can be written as sum of two natural numbers is half of the number. ◆ Number of types an odd number can be written as sum of two natural numbers is half of one less than the number. 	<ul style="list-style-type: none"> ◆ Identifying five digit numbers through plays and life situations. ◆ Understands 1 lakh as 100 thousands through solving life related problems and using currency notes. ◆ Find the relations of thousands to tenthousands and lakh in context of money transactions ◆ Write a number as combinations of various numbers as a part of problem solving. ◆ Arranging a 5 digit number on the abacus, find the total amount of rupees from the denomination of notes and find different combinations of notes for a fixed amount. ◆ Find the place value of numbers through ◆ arranging the number on abacus. ◆ Comparing 5 digit numbers through life situations. ◆ Form the largest and smallest numbers as a part of plays and life situations. ◆ Round off numbers according to needs as a part of solving life related problems. ◆ Use symbols and explain larger and smaller . ◆ Find out number relations by doing project works .

What is in this unit?

This unit deals with the numbers up to 100000. All the concepts ,abilities and values already developed up to numbers 10000 will be extended up to 100000 in this unit. At the end of this unit students will be able to read, write and interpret any five digit number. They will be able to do some addition and subtraction of numbers as a part of number interpretation.

CLASS ROOM PROCESS.

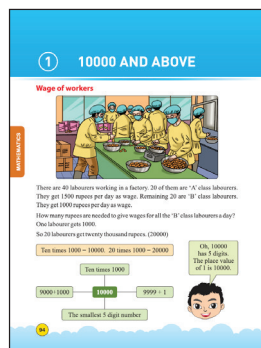
Ensuring current ability level.

- ◆ Make sure that children are able to read, write and interpret 4 digit numbers.
 - Teacher says a number- students write it in their note books
 - Write some numbers on the BB. Ask them to read it from smallest to largest.
 - Give number and ask them to split it according to place value.
 - Let them make four digit numbers using given digits.
 - Give them number cards and let them arrange the cards in increasing or decreasing order.
- Give additional support to those who are still below current ability level.

Wages of workers

- ◆ This activity is to understand five digit numbers- how it is formed and how it reads and writes.
- ◆ Ask pupils to read the situation individually. Then let them write it in the note book.
 - There are 40 laborers
 - There are 20 A class laborers. Their wage is 1500 each .
 - There are 20 B class laborers. Their wage is 1000 each.
- ◆ This can be written in short form as following to understand the connection between the data very well.

A class-20-	1500
B class-20-	1000
- ◆ Once this is written there is no need to read question again. Child can collect necessary data to solve the problem from this short writings.



understand the question. For this it is better to write the data in such a manner which can be understood easily. It is better to practice writing the data very shortly. We can give an instruction to write up the 'synopsis' of the question or problem. So the first thing we want to practice is writing the 'synopsis'. Then it should be explained

- ◆ Then let them explain how it is found. Teacher can ask some questions for understanding of every one.
 - What is the wage of one B class laborer? 1000
 - What is the wage of 2 B class laborers? 2 thousands. 2000
 - What will be the amount if laborers are 10? 10 thousands. 10000
- ◆ Then, how many is needed to give for all B class laborers?

10000+10000 = 20thousands. 20000
- ◆ Let them explain 10 times 1000 is 10000 and 20 times 1000 is 20000. $9000+1000=10000$. $9999+1=10000$. So there are 5 digits in 10000.
- ◆ It is the smallest 5 digit number. place value of 1 in 10000 is ten thousand. All these concepts should be explained here.
- ◆ Gopal's wage is 23 times 1000. It is 23000. Here 2 is in ten thousands place and 3 is in 1000 place. The fourth and fifth place is read as thousands. This should be emphasized.
- ◆ Then ask them to read the remaining questions one by one individually and find the answer. Then discuss it in groups of 4 or 5. Let the group explain their ways ,how they found the answer. Teacher consolidates the discussion.
- ◆ The last answer is 22500. Here there are digits other than 0 , in 3 places. 4th and 5th places are of 1000 and 3rd one is hundreds.
- ◆ Four solving all these problems the data can be collected from the 'synopsis' prepared earlier.

Currency notes

- ◆ This activity is to form numbers as combinations

of various notes and coins. By finding total amount child forms 5 digit numbers ,reads and writes numbers in words and figures. At the end of the activity (one lakh (100 thousand) is introduced.

Currency notes

The number of currency notes with Sumith and his friends are given in the table

Name	500 rupee notes	200 rupee notes	100 rupee notes
Sumith	60	20	8
Runais	50	30	17
Shadi	70	30	17
Rohith	48	30	35

How many rupees does each one have?

Sumith 60 notes of 500, 2 notes of 500-1000, 60 notes = 30000 rupees
30000 is 3 ten thousand.

Runais 25000 + 4000 + 1800 = 29800
25000 notes 500-2000, 20 times 200-4000 and 8 times 100-800
29800 = 2 ten thousands, 9 thousands and 8 hundreds.

Shadi

Rohith

- ◆ The amount with Sumith and Runais is to be discussed in the class. Let the groups explain different ways to find the total amount.
 - Ex. 60 notes of 500 rupees. 6 notes of 500 = 3000. So 60 notes of 500 = 30000.
 - or 2 notes of 500 = 1000. 60 notes of 500 = 30 x 1000 = 30000
 - or 10 notes of 500 = 5000. 60 = 6 x 10. So 6 x 5000 = 30000.
- ◆ After that ask them to find the amount with Shadi and Rohith and explain.
 - Shadi. 70 times 500. 7 times 500 is 3500. So 70 times 500 is 35000.
 - 30 times 200. 3 times 200 is 600. So 30 times 500 is 6000.
 - 17 times 100. 1700. 42700. No need to write according to place value and find the sum. Let them think as 35 thousand + 6 thousand is 41 thousand . 41000 + 1 thousand is 42 thousand and get 42700, when 700 is added.
- ◆ This type of addition is to be utilized for interpreting numbers other than addition.
- ◆ Pupils can adopt any other way to find the answer.
- ◆ Teacher asks next question. What is the total of Sumith and Runais. Let them find and discuss in the class.
 - 30000 + 29000 = 59000. 59000 + 800 = 59800. (Do mentally)
 - Or 30000 + 30000 = 60000. The answer is 200 less than 60000. It is 59800.
- ◆ Then find the answer for the question , how much more is needed to make it 1 lakh. It is explained in TB. Let them find and discuss in groups.

- ◆ Next two activities are to explain the place value of the digits in a number.
- ◆ Let them do the works, complete the series and write 8 numbers.
- ◆ Check each other and correct if necessary.

Self Evaluation and Peer Evaluation.

- ◆ Both are very important in constructive paradigm. Not only the products are evaluated, but the process of thinking also should be evaluated. Child can understand that , what is the mistake in his thought and how it is to be corrected. This should be the aim of self and peer evaluation. This is called “meta thinking” or thought about thought. This will help the child to correct the thinking process and the product. Only correction in answer or product will give nothing in the learning process.

Evaluation

- ◆ Teacher evaluate,
 - the ability to read and write 5 digit numbers
 - the ability to write numbers continuously .
 - the ability to interpret a number as sum of two numbers.
 - To say the place value of a digit in a number

Number on abacus

- ◆ It is to understand place value and arrangement of numbers on an abacus.
- ◆ Give abacus in groups and ask them to arrange numbers as directed. Arrange numbers on abacus and ask them to write it In their note books.
- ◆ Pupils should understand that if a number has five digits , it is read from ten thousands. Suppose we ask them to write forty two thousand and sixty four in figures , first child has to get the idea that it has 5 digits as it is

Which is the number shown on abacus?

From thousands: 5 thousands + 4 hundred + 5 ten + 9 ones.
Eighty five thousand four hundred and fifty nine.

T	TH	H	T	O
8	5	4	5	9

941-10 991-1-100 9991-1-1000 99991-1-10000 999991-1-100000

1 added to the largest 4 digit number (9999) gives the smallest 5 digit number 10000

1 added to the largest 5 digit number (99999) gives the smallest 6 digit number 100000

TASK

100 thousands
hundreds
ten thousands

T	TH	H	T	O
1	0	0	0	0

What is the number on abacus?
It starts from ten thousands. So there will be 5 digits in it. The digit in the 100's place is 4.

T	TH	H	T	O
2	4	0	6	4

Twenty four thousand and sixty four

started from 4 ten thousands. 42 thousand and 64 has 5 digits. But here only four digits are there. So 0 is needed in a place. Here there is no digit in 100 place. So this is written as 42064. This should be the way of thinking child has to accept

- ◆ Say pupils to add 1 to 9, 99,999,999 and 99999.
- ◆ Child understand from this activity that.
 - 1 added to the largest one digit number is the smallest 2 digit number,
 - 1 added to the largest two digit number is the smallest 3 digit number... and so on.
 - 1 added to the largest 5 digit number is 1 lakh. Let them show 1 lakh on abacus.
 - Then write 1 lakh as different combinations. 100000 ones, 10000 tens, 1000 hundreds, 10000 tens.
- ◆ The next activity is to be discussed in the class.
 - 24064 is on the abacus. What will be the number on abacus if one is removed from ones hand and put it on 100 s hand. It is 24163. What is the difference of the new number to previous number? it can be found by subtracting. But it can be found easily by thinking that 1 is reduced and 100 is added. Then the difference is 99.
- ◆ Then ask some more questions like this.
 - 12548 is on abacus. What will be the number if 1 is taken from 100 place and put it on 10000 hand. It is 22448. What is the difference of the new number to previous number? 100 is reduced and 10000 is added. So it is 9900 more than the previous number.
- ◆ Then ask what will happen when one bead is taken from 10000 hand and put it on ones hand?
 - It is 10000 less than and one more than of the previous number. That is 2549.
 - It is 9999 less than the previous number.
- ◆ The number on page number 100 is 54299. How many is needed to make it 1 lakh. If all the hands have 9 beads it will be 99999. 1 lakh is one more than that. So needed to make it 1 lakh is $40000+5000+700+1= 45701$. ($4+5+7$

beads will make it 99999. It is 45700. Then 1 also is needed to make it 100000)

- ◆ Let them do the works in page 100 and 101. Check each other.

At the bank

- ◆ This activity is to write a number as combinations of various numbers.
- ◆ At the end of the activity child should understand that to find how many 10000s, all the remaining places should be left. In 21345 there are 2 ten Thousands. 1345 should be left. To find how many thousands consider 21 and 345 should be left and so on.

Write the numbers

5 ten thousands, 4 thousands, 6 hundreds, 4 tens, 9 ones	
4 ten thousands, 2 hundreds, 7 tens, 2 ones	
15 thousands, 5 tens, 3 ones	
9 ten thousands, 2 thousands, 6 hundreds	
10 thousands, 4 hundreds, 8 tens, 5 ones	
8 thousands, 9 tens, 9 ones	
1 ten thousand, 8 thousands, 5 hundreds, 3 tens	
25 thousands, 1 hundred, 5 ones	

Split and write according to the place value

2568 2908 6580 3045 6507 1203

Write place values of the underlined digits

5824 35024 8957 1680 6504 8957 2540 54021

At the Bank

Mohan went to the bank. He wanted 75000 rupees. He got 100 rupee notes for 75000 rupees. How many 100 rupee notes did he get? 10 hundred rupees will make 1000 rupees. 750 times 100 will make 75000. Can you say how many tens are there in 75000?

Evaluation

- ◆ Teacher evaluate,
 - the ability to read and write 5 digit numbers
 - the ability to write numbers according to place value.
 - the ability to interpret a number.
 - to arrange numbers on abacus.
 - the ability to think logically

Paddy Cultivation

- ◆ This activity is to write numbers in words and to compare numbers.
- ◆ How to compare numbers is illustrated there. Then introduce symbols $>$, $<$.
- ◆ Ask them to do the works in page 104 and 105.

Nearest rounded number.

- ◆ This work is to round a number. It should be noted that rounding will make comparing by estimation easy. Next work population math is done for this purpose.

Evaluation

- ◆ Teacher evaluate,
 - the ability to compare 5 digit numbers
 - the ability to round numbers .

Project

- ◆ This project is to find how many types a number can be written as sum
- ◆ of 2 natural numbers. First a discussion should be done.

$$2 = 1+1 \quad 3 = 1+2 \quad 4 = 1+3, 2+2$$

- ◆ Then do it up to 20. Before it prepare a table format through discussion.

Number	As sum of 2 numbers	No . of types
2	1+1	1
3	1+2	1
4	1+3 2+2	2
5	1+4 2+3	2
6	1+5 2+4 3+3	3
7		3

- ◆ Check the table in groups.
- ◆ After writing up to 20 ask them ,how many types 30 and 31 can be written.
- ◆ Let them find the relation of number and types and apply the findings in 30 and 31 and check.

Population math
The population of some municipalities in Kerala (Kozhikode district) according to 2011 census is given in the table.

Sivassur	15,264
Koyilandy	71,873
Ponke	56,674
Poyyil	49,430
Koduvally	46,687
Makkam	46,670
Kannanthakam	35,937

Round off the numbers to the nearest thousands and compare the population.

Project
2 can be written as $1+1=2$
3 can be written as $1+2=3$
4 can be written in two different types, $1+3=4$, $2+2=4$
Then $5=1+4$, $5=2+3$
 $6=1+5$, $6=2+4$, $6=3+3$ (3 types)
Write numbers up to 20 as sum of 2 natural numbers.
What is your findings. How can we find, how many types a number can be written as sum of two natural numbers?

Think and Do

- Which is the largest 5 digit number that can be formed using 2, 4, 6, 8, 9?
- How many sum can these in 456789?
- Which is the smallest five digit number that can be formed using 1, 2, 3, 4 and 0?
- How many thousands are there in one lakh?

The conclusion.

- ◆ If the number is odd types is found by subtracting 1 from it and making it half.
- ◆ 7 can be written 3 types. $7-1=6$ half of 6 is 3
- ◆ If the number is even types is half of it.
- ◆ 8 can be written 4 types. Half 8 is 4.
- ◆ Then 30 can be written 15 types and 201 can be written 100 types.

Project Evaluation

- ◆ Teacher evaluate,
 - the involvement in discussions.
 - the ability to make tables.
 - the ability to collect data.
 - to draw inferences from given data.
 - the ability to think logically.
 - the ability to explain
 - the ability to communicate with clarity
 - the ability to prove with reasons.

“Think and Do” questions are higher order thinking questions. Let them do as home work and later discuss in the class. The process for finding answers and different methods if any should be discussed.



2

LENGTH AROUND

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Explain and classify polygons. 	<ul style="list-style-type: none"> ◆ Shapes which are made by three or more straight lines are called polygons. ◆ Polygons can be classified according to their number of sides. ◆ The point where two sides joins is vertex. ◆ Number of vertices and sides are equal in a polygon. 	<ul style="list-style-type: none"> ◆ Classify polygons from a complex picture or given polygons according to their sides. ◆ Find the relation between vertices and sides of a polygon by examining various polygons. ◆ Make complex shapes using the polygons cut from colour papers.
<ul style="list-style-type: none"> ◆ Draws triangles , rectangles and squares with out measurement and find ways to check the preciseness of the figure. 	<ul style="list-style-type: none"> ◆ Triangle has 3 sides and 3 vertices. ◆ Rectangle has 4 sides and 4 vertices. ◆ Vertices of a rectangle are same. ◆ Opposite sides of a rectangle are same. ◆ A set square or the corner of a scale can be used to check the corner of a rectangle. ◆ The sides of rectangle are called length and breadth. 	<ul style="list-style-type: none"> ◆ Drawing triangles , rectangle and squares ◆ Finding the length and breadth of rectangles , by dividing various shapes in to rectangles and shapes.
<ul style="list-style-type: none"> ◆ Explain perimeter and finding the way to calculate perimeter of a shape. 	<ul style="list-style-type: none"> ◆ The total length of the sides of polygon is its perimeter. ◆ Perimeter can be calculated by adding length of all the sides. 	<ul style="list-style-type: none"> ◆ Finding the perimeter of shapes as a part of problem solving and life related problems. ◆ Making triangles, rectangles and squares using given straws or irkles with given length. ◆ Finding perimeter of given shapes. ◆ Finding a set of measurements that can be used to make rectangles, from given set of measurements.

<ul style="list-style-type: none"> ◆ Form the formula for finding perimeter of rectangles and squares. 	<ul style="list-style-type: none"> ◆ Perimeter of a rectangle is its 2 lengths + 2 breadths. ◆ Perimeter of a square is 4 x side. 	<ul style="list-style-type: none"> ◆ Examining the perimeter of various rectangles and squares, and find the way to calculate the perimeter. ◆ Find the perimeter of shapes got by joining 2 rectangles. ◆ Join the rectangles so as to get the given perimeter. ◆ Solve practical problems including perimeter.
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What is in this unit?

In this unit polygons and its features are discussed. Children have gone through various shapes. They can recognize rectangles, squares, triangles and circles. All these are spiraled in this unit. Also introduce polygons and their features. Finding perimeter of a polygon is discussed with special reference to rectangles and squares. Pupils get chance to construct formula to find perimeter of rectangles and squares. Some life related problems and higher order thinking problems solved with the concept of perimeter also is discussed in this unit. At the end of this unit child should be able to analyze any problems related with perimeter of rectangles and squares .

CLASS ROOM PROCESS.

Ensuring current ability level.

Make sure that children are able to read, write and interpret 4 digit numbers.

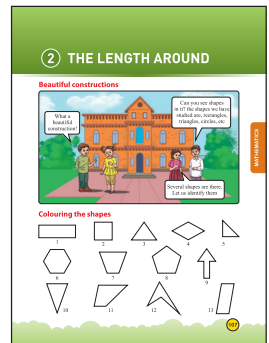
- Teacher gives various shapes and asks students to classify according to features of their sides.
- Ask them to choose closed figures and open figures.
- Ask them to name the figures in a complex picture.
- Ask them to draw rectangles without measurements.
- Discuss why some figures drawn are not rectangles.

Give additional support to those who are still below current ability level

Beautiful constructions

Ask children to observe the picture and write a note about it. What would be the comments written by them?

- ◆ It is a beautiful construction.
- ◆ It is very big.
- ◆ It's colour is red.
- ◆ There are other colours also.
- ◆ There are many shapes in it.
- ◆



Give importance to mathematical elements while discussing.

Colouring the shapes

Let them observe the figures and say comments.

- ◆ All are closed figures
- ◆ In any of the figure there is no curved lines.
- ◆ There are standing lines, sleeping lines and slanting lines.
- ◆ There are shapes with 3 lines, 4 lines ,5 lines , 6 lines and 7 lines.
- ◆ There are shapes with same sides and with different sides.
- ◆

Then ask some questions.

Can you draw a closed figure using two lines?
Draw a figure with 8 sides.

Then introduce the name polygons and ask them to draw some polygons in their note book. Then let them colour the figures in the TB and draw them in their note books. Let them check their work each other.

Give some indicators to check it. Have you coloured all the figures? Is the colour is exactly inside the figure? Have you kept accuracy and precision while colouring? Are your figures beautiful? Is it better than your friends'?

Sides and vertices

This is to find the relation between sides and vertices of a polygon.



Ask to observe this figure and comment on it. It has 4 sides and 4 vertices. But it is not a rectangle. Let them explain why it is not a rectangle.

Then classify and write the numbers of figures in page 107 in the table. Also write the number of vertices in the column. Then let them find the

relation with sides and vertices of a closed figure. Let them Say it in their own words and write it Then do the activity of making attractive shapes. Cut polygons from colour papers and paste it on a chart paper. Do it in groups and display in the class. Then observe the triangles in page 109 and explain. Then draw triangles and evaluate themselves with indicators given in the TB. Note. When we ask children to observe and comment something, they have to write it in note book first and then read it. Don't allow them to explain without clarity.

Evaluation. Teacher evaluate,

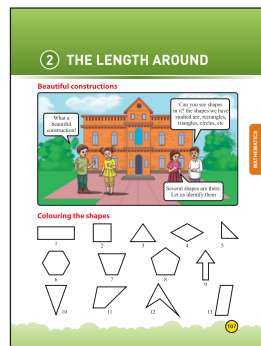
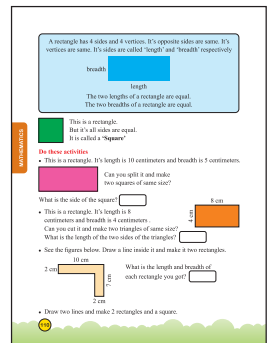
- ◆ the concept of sides , vertices and their relation.
- ◆ Participation in group activities.
- ◆ the ability to communicate.
- ◆ the ability to find relations.
- ◆ accuracy and precision in drawing and colouring.

Polygon with four Sides

This is to explain the features of squares and rectangles. It is illustrated in TB.

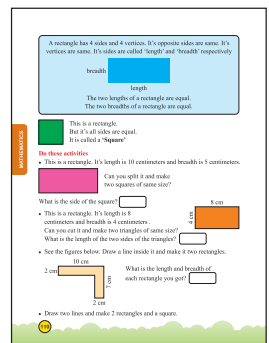
Discuss with pupils. Length and breadth is introduced here. Now introduce length as the longest side and breadth as shortest.

The activities in page 110 should be done individually and then discuss it in groups and in the class. This will help them to understand rectangles and squares well.



Drawing rectangles

This is the first stage of drawing rectangles. Corners are already there. complete it and understand corners can be checked with the set square or corners of scale. From this activity they will understand what should be



done to draw a rectangle.

Then lead a discussion on drawing a rectangle. Hints and indicators are there in TB.

Write a message on the card and display on the board.

Evaluation. Teacher evaluate,

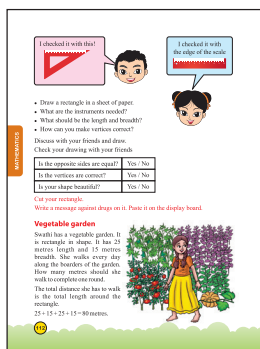
- ◆ the features of rectangle, square, length and breadth.
- ◆ ability to draw geometrical figures with accuracy..
- ◆ the ability to communicate.
- ◆ the ability to find relations
- ◆ the social awareness and participation in anti drug activities.

Vegetable garden. Strawmade rectangles.

These are to introduce the concept of perimeter. Let pupils to read the situation and find the answer. Then discuss in the class. Different ways should be discussed. It is given there.

At the end of these activities pupils themselves should find the way to calculate perimeter of a shape.

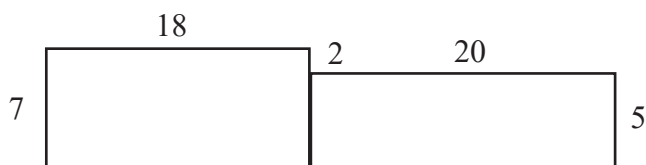
Let them do the works in page 114 and check each other.



Perimeter of rectangles and squares.

From the activities already done they have understood , how to find perimeter. Now it is focused on rectangles and squares. Create situation to find the formula to find it. They should construct the formula from the activity. Discuss different ways. Don't stick on a single method. Do all the problems in Page 115,116 and 117. Discuss each in the class

Joining more than one rectangle..

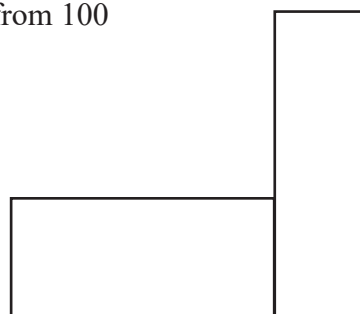


Perimeter of this shape is $18+2+20+5+20+18+7=90$

We can see this another way.

Perimeter of each rectangle is 50. Total $50+50=100$. Side with 5 cm is joined. So 10 cm will be reduced from 100. So perimeter is 90.

When join like these same will happen. 10 will be reduced from 100

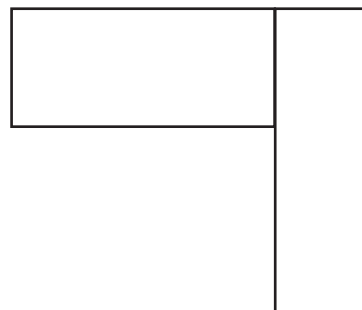


To get 64 cm . perimeter it should be joined like this. 36 cm should be reduced from 100. To reduce 36 cm 18 cm side should be joined.



Other questions like this can also be given from this figure or by giving other rectangles.

Ex. How should it be joined to get 86 cm perimeter. 14 cm is reduced. Then it will be like this. (7 cm side is joined)



Cutting the corner

In first figure perimeter will not change, but in second it will increase by 2cm.

The remaining problems should be analyzed by pupils and done. Discuss in groups and in the class.

Evaluation. Teacher evaluate,

- ◆ ability to analyze problems
- ◆ the ability to think logically and critically.
- ◆ the ability to find relations
- ◆ the ability to communicate with rigour and integrity.

3

JOINING AND TAKING AWAY

UNIT GRID

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Find and explain different ways for addition and subtraction of five digit numbers. 	<ul style="list-style-type: none"> ◆ Addition and subtraction can be done in different ways. ◆ Numbers should be regrouped to make the subtraction convenient. 	<ul style="list-style-type: none"> ◆ Solve life related problems including addition and subtraction of 5 digit numbers. ◆ Make questions including the addition and subtraction of 5 digit numbers.
<ul style="list-style-type: none"> ◆ Estimate the sum and difference of 5 digit numbers. 	<ul style="list-style-type: none"> ◆ To estimate the sum and difference rounding off the numbers can be applied. 	<ul style="list-style-type: none"> ◆ Estimate and check the answer as a part of problem solving.
<ul style="list-style-type: none"> ◆ Collect data from various sources. 	<ul style="list-style-type: none"> ◆ Collection of data and analyzing the data are important in problem solving. 	<ul style="list-style-type: none"> ◆ Collect necessary data to solve problems from advertisements, tables and other sources.(dialogues etc.)
<ul style="list-style-type: none"> ◆ Find number relation and number properties. 	<ul style="list-style-type: none"> ◆ There are some relations with the numbers in a number tower arranged in a particular type. 	<ul style="list-style-type: none"> ◆ Solving puzzles and find relations of numbers.

What is in this unit?

In this unit children go through addition and subtraction of 5 digit numbers. Pupils can read and write numbers up to 1 lakh and they can interpret 5 digit numbers according to place value. They have already done some additions and subtractions mentally as a part of interpretation of numbers in previous unit. They have done addition and subtraction of 4 digit numbers in previous class. Children will go through problem solving using addition and subtraction of 5 digit numbers. Some puzzles and works to guess the sum and difference are also included. .

CLASS ROOM PROCESS.

Ensuring current ability level.

Make sure that children are able to read, write and interpret 5 digit numbers.

- ◆ Teacher says a number- students write it in their note books
- ◆ Teacher says digit in each position and child writes the number.
- ◆ Gives number and asks them to split it according to place value.
- ◆ Asks them to say the sum mentally. $1000+2000$, $1500+1250$, $1000+6542$, $3000+1999$ etc.

Give additional support to those who are still below current ability level.

Grand discount sale

First, let students to observe the picture. A discussion is started about reduction sales in shops.

- ◆ Have you seen such advertisements in news papers and in other medias?
- ◆ What is the objective of such advertisements?
- ◆ What are the items displayed there ?
- ◆ What is MRP?
- ◆ Which item has the highest MRP?
- ◆ Which has the highest selling price?
- ◆ Can you guess which item has the highest reduction?

3 JOINING AND TAKING AWAY

Grand discount sale

Subhash goes to the shop. He has ₹10000 with him. He purchases a TV and a fridge. How much would he remain with him after the purchase?

The money he has =	₹ 10000
Cost of TV =	₹ 32999
Cost of fridge =	₹ 36468
Total cost =	₹ 32999 + ₹ 36468

10000 + 36468 = 46468
 32999 + 36468 = 69467
 46468 + 32999 = 79467

Read the problem in TB.

Now calculate the balance amount with Subhash.

Discuss

how can we calculate the balance amount? Different ways should be discussed.

47001-
36468
10533

- ◆ Subtract cost of TV from 80000.
 $80000-32999 = 47001$. Try to do it mentally. $(80000-33000 + 1)$. 32999 is one less than

33000. Then subtract cost of fridge from 47001.
 $47001-36468$.

- ◆ Add cost of TV and fridge and subtract it from 80000. It is explained in TB.
- ◆ It is very easy to subtract 69466 from 79999 instead of $80000-69467$

Then find the amount needed to buy an electric oven. Find the selling price of electric oven. Then deduct 10533 from it. $12859-10533=2326$. Discuss in the class various ways they used.

The next question is what is the amount needed to buy all the three items.

- ◆ Add three items
- ◆ Add cost of Electric oven to 69467
- ◆ Add 2326 to 80000. (This is very easiest way. Let them think differently). Earlier they have found the amount needed for buying electric oven also. It is 2326 . So total amount needed is 82326.

The next one is a different task. (Abhijith problem) This will help them think logically. Instead of adding all the three items , first make an estimation and then check. First write the selling price in a table and then make the guess and then check)

Is there more than one combination? If 4 items are purchased 6000 will be deducted from the total amount.

Fill the table and find total amount. Explain how they found it.

Do the problems in page 120 and 121.

Evaluation. Teacher evaluate

- ◆ the ability to add 5 digit numbers
- ◆ the ability to find data from various sources.
- ◆ the ability to analyze and solve problems..
- ◆ the ability to find different ways.
- ◆ the ability to explain the methods of operations logically.
- ◆ Rigour and integrity in communication.

Zoological gardens

This is to explain subtraction. All the ways are explained there.

In the first one there is no carry over or “borrowing” except in thousands place. 6 thousand can not be subtracted from 2 thousands. So it should be changed as 32 thousands – 26 thousands.

Find the sum

5432 + 2542	7594 + 2145	2207 + 2216	6437 + 2106	1240 + 2879	2689 + 1758
4821 + 2421	2109 + 2247	7387 + 2085	5884 + 2889	6342 + 2329	2254 + 2891

Zoological Gardens

In the first week of April the number of visitors to Zoo was 26542. Second week it was 22548 and third week it was 24577. How many more people visited the zoo in the second week than the people did in the first week?

Find it

$$\begin{array}{r} 32546 - 26542 \\ 6 - 2 = 4, 40 - 40 = 0, 500 - 500 = 0 \\ 2000 - 2000 = 0000 \\ 6000 - 4 = 4996 \end{array}$$

Find it

$$\begin{array}{r} 22548 - 26542 \\ 8 - 2 = 6, 40 - 40 = 0, 500 - 500 = 0 \\ 2000 - 2000 = 0000 \\ 6000 - 4 = 4996 \end{array}$$

It should be noted that the borrowing should not be mechanical. Pupils should get the idea behind it. It is explained in next problem. What happens when borrowing is re arranging. It has been experienced in previous classes. Here it is explained in detail. (32546-24577 and 26542-24577). Other ways also are described. Discuss all the ways in class and allow them to choose their own ways. Whatever be the ways, they should be able to explain it.

The next activity is to guess the sum and check. Then ask them to find how many is needed to make it 1 lack.

Coconut merchant.

This activity is to,

- ◆ estimate sum and difference.
- ◆ find sum and difference.
- ◆ analyze problem and to make problems.
- ◆ The activity should be done in the class room so as to get the above abilities. Every child should be considered.

How many visitors were there in these 3 weeks together?

Can you guess it?

It is between and and

How did you guess it?

What is the correct answer?

How many more people should come to make the number one lakh?

Coconut merchant

Ashu is a coconut merchant. The number of coconuts he received over the last 3 days are given in the table.

Day	No. of Coconuts
Monday	24019
Tuesday	24518
Wednesday	18297

Guess and check. Give a 'NA' mark to your guesses

Total number of coconuts received

- Between 70000 and 75000
- Between 75000 and 80000
- Between 80000 and 85000

The correct answer is

To estimate the sum first round the numbers to nearest thousand and add or subtract thousands only. Then find the correct answer and check. The rounding process is used in such situations. This will help them to find the correct answer in head without writing the numbers according to place value.

Let them make questions and evaluate themselves and each other.

Let them say what are the merits of their questions. What are the merits / demerits of my question compared with my friends?

It should be noted that the questions are readable and clear.

Do the works in page 124 and 125.

Evaluation. Teacher evaluate,

- ◆ the ability to subtract 5 digit numbers
- ◆ the ability to analyze and solve problems..
- ◆ the ability to explain the methods of operations logically.
- ◆ The ability to make questions.
- ◆ the ability to estimate or guess and to explain the strategy used for estimation.

Cash bill

This is to solve problems. First let them make a synopsis. Then find relations with data and analyze the problem. Then fill the bill and check each other. Then find the balance. Then do the problems in page 128 and 129. In the tower problem pupils should find the relation with numbers.

Panchayath population

There are 22148 men and 19834 ladies in Panchayath. 954 girls and 908 babies are being abroad. What is the total population over living in the Panchayath? Jewels transfer in this way

Total population	22148 + 19834 = 41982
Total abroad	954 + 908 = 1862
New living	41982 - 1862 = 40120

Find it

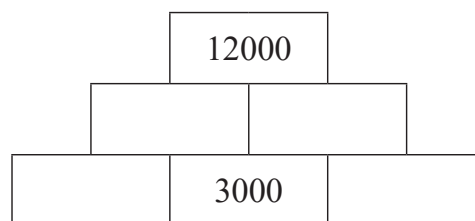
I did it $22148 + 19834 = 41982$
 $19834 - 908 = 18926$
 $41982 - 18926 = 23056$

I got it $954 + 908 = 1862$
 $19834 - 1862 = 17972$
 $17972 + 22148 = 40120$

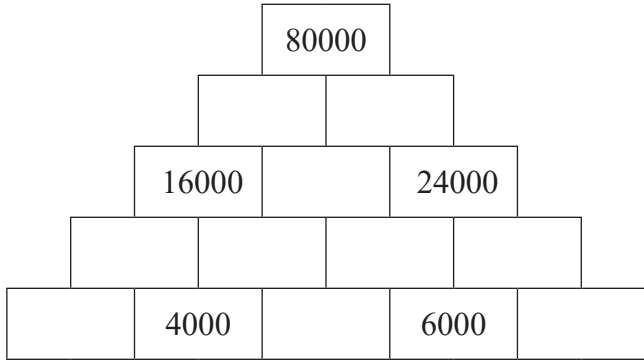
Out of the total population 12254 are children below 15 years of age and 3746 are between 15 and 20. How many of them are above 20 years of age?

41982	19834
12254	3746
29728	23988

$41982 - (12254 + 3746) = 41982 - 16000 = 25982$



The top number is 3 times the middle number in the bottom line. $3000 \times 4 = 12000$ Same way we can find the numbers in blue columns.



In the last problem the total amount paid by them =71470
 Amount to be paid if purchased together= 71470-6000= 65470.

4

LINE AROUND A POINT

UNIT GRID

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Draw circles using compass. ◆ Draw geometrical patterns using circles. 	<ul style="list-style-type: none"> ◆ The instrument to draw circle is compass. ◆ The place where the tip of the compass put is the centre of the circle. ◆ There is only one centre for a circle. ◆ The distance between the compass tip and the pencil determines the size of the circle. ◆ The distance between the centre and any point on the circle is radius of the circle. ◆ Many circles can be drawn with same centre. 	<ul style="list-style-type: none"> ◆ Draw circles using objects and compass ◆ Draw geometrical patterns. ◆ Draw many circles with same centre.
<ul style="list-style-type: none"> ◆ Solve problems by applying the concepts of circles and radius. 	<ul style="list-style-type: none"> ◆ All the radii of a circle are same in length. ◆ All lines in a circle passing through centre are same in length. 	

What is in this unit?

This unit discusses about circles and some of its properties. Pupil can recognize circles and they will draw it using objects. In this unit again revisit what they had studied in previous classes and introduces more information about circles. Drawing circles using compass is given there. Radius and centre are introduced. Some problems are given to think logically and to explain the cause and effect relations. Experience in drawing geometrical patterns are also given.

CLASS ROOM PROCESS.

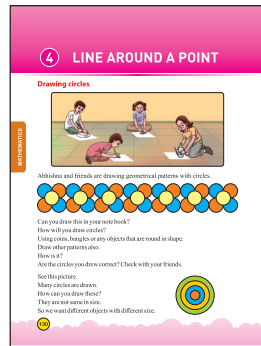
Ensuring current ability level.

- ◆ Make sure that children are able to identify circles from a group of shapes.
- ◆ Draw circles using coin, bangles etc.

Give additional support to those who are still below current ability level.

Drawing circles.

First, let students observe the pattern and explain how they are arranged. Then a discussion about drawing it. Then draw this. Then ask them to draw other patterns also. Evaluate themselves and groups.



- ◆ My circles are correct. Yes/No
- ◆ My pattern is attractive Yes/No
- ◆ My colours are good. Yes/No
- ◆ It is better than my friend. Yes/No
- ◆ It should be drawn again. Yes/No

Such indicators can be used for evaluation. These indicators should be developed in the class through discussion.

Drawing next figure (4 circles with same centre) using objects is a difficult task. Objects with different size are needed, centre will not be identical etc are the problems. So need of an instrument to draw circles is to be discussed. Introduces compass to draw circles. Practice drawing circles with compass. Ask them to evaluate individually and in pairs. Let them say what difficulties they faced and how they solved them.

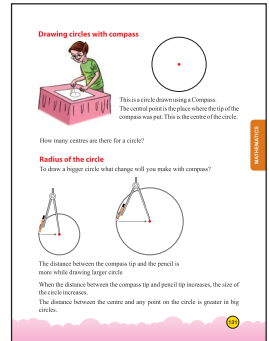
Evaluation. Teacher evaluate,

- ◆ the ability to draw circles.
- ◆ the ability to handle instruments.
- ◆ the ability to explain the methods of drawing.
- ◆ The ability to make patterns.

Radius of the circle.

Discuss this activity in the class. Let them understand

- ◆ Radius is the distance between the centre and a point on the circle.
- ◆ Many radii can be drawn for a circle.
- ◆ All radii of a circle is same in length.
- ◆ To draw a circle same as a given circle radius can be measured from the given circle itself.
- ◆ How radius can be taken from a scale.



Circles with same radius

Observe the figure and draw it. Again draw with other radii. Guess the radius of the circle that can be drawn in one page of the note book. Then measure and draw.

Joined circles.

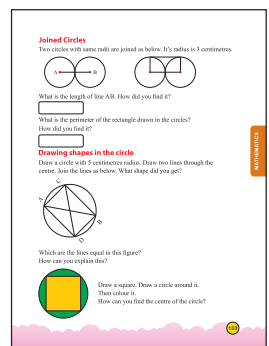
Ask them to find and explain the length of AB and perimeter of the rectangle.

Ensure that children are able to explain the cause and effect relation clearly. Let them say the arguments for their findings.

Drawing shapes in the circle.

Draw the figure as directed. Let them find,

- ◆ AB and CD are equal as they passes through the centre of the same circle.
- ◆ The shape recived is a rectangle.
- ◆ AC and BD are equal as they are opposite sides of a rectangle.
- ◆ AD and BC are equal as they are also opposite sides of a rectangle.



Let them understand centre can be found by drawing lines from corners to corners.

In the last figure radius of the circle is half of the side of the square. The side of the square is double of the radius. This should be found and explained by the students themselves.

Evaluation. Teacher evaluates

- ◆ concept of radius and centre .
- ◆ the ability to think logically.
- ◆ the ability to make conclusions.
- ◆ the ability to communicate.
- ◆ the ability to explain the cause and effect relations.

UNIT GRID

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Find time on the clock. (including digital clocks) 	<ul style="list-style-type: none"> ◆ Different hands of a clock shows different units of time. 	<ul style="list-style-type: none"> ◆ Indicates time on a clock mentioned in a situation. ◆ Prepare time table for a day .
<ul style="list-style-type: none"> ◆ Calculate time duration from the given time for an activity. 	<ul style="list-style-type: none"> ◆ Time duration can be said either in hours or minutes or seconds, according to the length of the time. 	<ul style="list-style-type: none"> ◆ Examine the starting time and ending time of an activity and calculate the time taken for that activity.
<ul style="list-style-type: none"> ◆ Manage time effectively in ones own life. 	<ul style="list-style-type: none"> ◆ Time is precious and the time lost can not be recovered. 	<ul style="list-style-type: none"> ◆ Arrange ones own time on a working day and on a holiday without loss of time.
<ul style="list-style-type: none"> ◆ Find the relation between the units of time and solve problems including time. 	<ul style="list-style-type: none"> ◆ 60 seconds =1 minute ◆ 60 minutes =1 hour. ◆ 24 hours= 1 day 	<ul style="list-style-type: none"> ◆ Find time after or before a particular time. ◆ Solve daily life problems by converting the units of time from one unit to other.
<ul style="list-style-type: none"> ◆ Change the time in to am and pm, which is said using fore noon, after noon, night etc. 	<ul style="list-style-type: none"> ◆ The time after 12 midnight is represented using am and after 12 noon is represented using pm. 	<ul style="list-style-type: none"> ◆ Write the timings of school working and other activities using am and pm.
<ul style="list-style-type: none"> ◆ Find the time in 24 hour clock and change the time said in am and pm to 14 hour clock time. 	<ul style="list-style-type: none"> ◆ Time is said in 24 hour clock in railways, airports sand some other places. ◆ 24 hours clock time starts at 12 midnight. ◆ 12 midnight is 00.00 hours. 	<ul style="list-style-type: none"> ◆ Check time recorded in 24 hours clock and convert it in to am, pm time in day to day life situations. ◆ Solve problems including 24 hours time. ◆ Find the time duration when it is said in 24 hours time.
<ul style="list-style-type: none"> ◆ Find the calendar for a particular month with the understanding of the days, starting date and other specification of the month. 	<ul style="list-style-type: none"> ◆ The last day of a month will be the next of the first day. ◆ The days in month may be 28/29/30/31 ◆ A leap year will have 29 days in February. 	<ul style="list-style-type: none"> ◆ Analyzing the calendar and find relations.

<ul style="list-style-type: none"> ◆ Write date in standard format. ◆ Find the number of days between two dates and explain the methods to find it. 	<ul style="list-style-type: none"> ◆ The format generally used to write date is DDMMYYYY format ◆ When the number of days between two dates are said, whether it is including starting date and ending date should be mentioned. 	<ul style="list-style-type: none"> ◆ Find various situations in which dates are written in DDMMYYYY format. ◆ Analyzing the situations to find the duration of days. ◆ Solve problems including duration of days.
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What is in this unit?

This unit deals with time and calendar. The most of the concepts related with time has already been discussed in previous classes. They know how time is said using a clock, minutes-hour- second relation and time duration. They can solve problems including the concept of time. They have studied calendar and other concepts related with months and date. Most of the concepts attained earlier are spiraled in this unit. Some additional concept like am, pm and 24 hours clock are discussed in this unit. Besides writing date in standard form and the days between two dates also are mentioned.

CLASS ROOM PROCESS.

Ensuring current ability level.

- ◆ Make sure that children are able to say time on a clock.
- ◆ Give minutes time and ask to change it in to hours and vice versa.
- ◆ Ask to find a day with particular date.
- ◆ Ensure that they are able to say days ,months and days in months etc.


Give additional support to those who are still below current ability level.

Sona's timings.

This activity is to ensure that learners are able to show time on a clock. Read the passage and draw the hand on the clock. It should be made sure that the position of minutes hand and hour hand are correct. For example when time is 10.30 hour hand should be in the


5 MANAGING THE TIME

Sona's timings



This is Sona's school. She is studying in fourth standard. Her house is two kilometers away from the school. She gets up at 6:00 in the morning. School bus arrives at 6:30. She reaches school at 6:45. First bell is at 7:30. Class starts at 8:00 and lunch break is at 12:45. Afternoon class starts at 1:45. School leaves at 3:45 in the afternoon. She reaches home at 4:15. She goes to bed at 10:00 at night. You track below in 12:00-11:30 in the morning.

Write the above times in the column and show the time on the clock.

Activity	Time	Time on the clock
Sona gets up	6:00 morning	

middle of 10 and 11.

Check each other and re draw if necessary. Teacher should check and find, who are not aware of finding time on a clock. Then write the duration of each activity in page 137. Discuss it in the class and give chance to each and every child to explain the way they found it.

Then ask them to write a time table of a working day. Let them find the school timings also to fill the table. Get them Check each other. Then prepare a time table for a holiday. Discuss the samples in class and find the activities that can be avoided to save time. See how many of them are wasting the time. In short a discussion on time managing should be done.

Seconds hand

This activity is to introduce seconds. (60 seconds = 1 minute. Let them say the time on the clocks and draw the hands on the clock. (page 139)

Write your working day timing in the table.

Activity	Time from	Time to	Duration
Wakeup to school			
Get prepared			
Learn's work			
Play time			
Watching TV			
Sleeping time			

Let's prepare a time table for your activities on the holiday.

Check with your friend/friendship.

Are there any wastes of time in your life? Can you manage it effectively? Discuss with your friends.


Time is precious. Don't waste it. The time gone for good, it will not come back.

Seconds hand

What is the time on the clock?
2 hours, 40 minutes and 50 seconds.
The third hand indicates the seconds.

60 seconds = 1 minute 60 minutes = 1 hour

After 60 seconds, the time will be 2:41:00 seconds
2:41



Digital clock.

This is to familiarize digital clocks. In most of the places child now see the digital clock. Children can say time on digital clock, but they will make mistake when finding how much time is needed to next hour. Some times they will say 50 minutes are needed to 11 o'clock when time is 10:50. Ask them how much minutes are needed to 11 with 10:45. Then let them write the time needed with the given digital clocks.

Evaluation. Teacher evaluate,

- ◆ the ability to find time on the normal clock and digital clock.
- ◆ Second –minute and minute- second relation.
- ◆ the ability to manage time effectively.
- ◆ awareness of the importance of the time.

Starting and ending time.

This is to find time duration. Discuss the situations in the class and find how time duration is calculated in different ways. Give chance to students to present their own ways. Then do the activities on page 141.

Digital clock
Muthu is waiting to see doctor.
She has an appointment at 11 o'clock.
See the clock. What is the time on now?
How much time is there to 11 o'clock?

See the time on digital clock.
Write how much time is there to next whole hour.

9:10 11:20 12:05 5:32 6:48

Starting and ending time
Muthu is a girl student.
He started walking at 6:00 in the morning.
He walked for 100 minutes.
When did he stop walking?
60 minutes = 1 hour.
100 minutes = hour and minutes.
The time when he stopped walking was

He started to read at 8:00 in the morning.
He read for 40 minutes.
Can you say when was the time when he stopped reading?
40 minutes = hour and minutes.
Somebody stopped reading at in the morning.

He started office at 9:50 and reached office at 10:00.
How many minutes did it take to reach the office?
Duration from 9:50 to 10:00 = minutes.
Find the duration hour and minutes.

Evaluation. Teacher evaluate,

- ◆ the ability to calculate time duration.
- ◆ presentation skills

Sports meet.

This activity is to convert seconds to minutes and viceversa.

Sona's alarm.

This activity is to introduce am. and pm. Ask children to find the written timings in various places in their surroundings using am and pm.

Convert the seconds into minutes and seconds

123 seconds	300 seconds	375 seconds	105 seconds
-------------	-------------	-------------	-------------

Convert the minutes and seconds into seconds

2 minutes and 10 seconds seconds
1 minute and 5 seconds seconds
4 minutes seconds
4 minutes and 1 second seconds

Sona's Alarm

"I had set alarm for 6:00 in the morning on my digital clock but it did not go off on time." Sona complained.
Can you say why did not alarm's alarm go off on time?
"Sona had set alarm for 6:00 in the evening. It was not set pm."
"Then what can I do to set it on in the morning." Sona asked.
"You have to set it to am."

- Ex. Consultation time. 10 am to 3 pm.
- Working time. 10.15 am to 5.15 pm
- No entry from 10 pm to 6 am.

At the railway station.

This is to explain 24 hours clock. Explain the situations and discuss. Convert the time in page 145.

Ensure that each and every child has got the idea about am, pm and 24 hours clock. More activities can be given for this.

- ◆ Make two teams. One team show am, pm time on toy clock and the other say the 24 hours time.
- ◆ Display time schedules of train and convert it to am, pm time.
- ◆ Collect time schedules from various places including news papers.
- ◆ Such collections can be assessed as a part of portfolios.

Study tour.

This activity is to say time duration when it is said using am and pm. Let pupils read and answer the questions given. Let them make more questions and present in the class.

Air journey.

This is to say time duration when it is said using 24 hours clock. Read the passage and answer the questions given. Above two works can be made easy by writing the time details in a table. This will help pupils to experience in making tables and analyzing data from a table.

Siddique asked: "The 24-hour clock time starts at midnight 11.59 at midnight is 23 hours 59 minutes and 12 at midnight is 00.00 hours."

"OK, then 12 am means 12 hours and 5 am evening is 17 hours."

Convert these times into 24 hours clock time

7 pm	8 am	6 pm
2:30 pm	11:30 am	7:30 pm
11:30 am	5:15 pm	12:30 pm

Convert these times into am, pm

17:00 hours	11:30 hours	00:30 hours
2:30 hours	5:30 hours	14:15 hours

Study tour

"Dear students, We will start from here to the botanical garden at 8:10 am. It is expected to reach there at 9:00 am. After breakfast we will enter the garden."

Place	Arriving	Leaving	Duration
School	8.10 am(Starting)	9.00 am(arriving)	50 minutes
Botanical gardens	9.00 am	9.30am	30 minutes

Then do the two works given in page 146 and discuss in the class.

Evaluation. Teacher evaluate,

- ◆ The ability to say time using am and pm.
- ◆ The ability to convert time in to am and pm, and to 24 hours time.
- ◆ The ability to calculate time duration.
- ◆ The ability to interpret tables and find time duration.
- ◆ Participation in group discussion.

Finding the calendar.

Ask children to find the calendars. Then ask them to explain how did they find it. The first day of January is Sunday. The calendar in which first day Sunday is the calendar 1. So the last day of the month is Tuesday. The month starts on Wednesday is the calendar 4 ,5 and 6. But 4 has 30 days and 5 has 31 days. 6 has 28 days, So the calendar 6is the

calendar for February. Thus others also should be identified. Write this in the table on page 148. Explain the notes about the leap year in page 148. Then explain the format for writing dates in standard form.

How many days.

This is to find the days in between two dates. Ask them whether they have included starting date and ending date. It depends on the situation. In the case given Sukanya has stayed from 23-12- 23 to 12-3-2024. So 12 is not included. Let them discuss the case in groups. Then write the number of days in the table. Then fill the starting date and ending date.

Evaluation. Teacher evaluate,

- ◆ Understanding about the calendar
- ◆ The ability to find calendar for a particular month.
- ◆ The ability to calculate the days between two dates.
- ◆ The ability to communicate with proof.
- ◆ The ability to solve problems including concepts of calendar..

UNIT GRID

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Find the relations with the numbers in a calendar. 	<ul style="list-style-type: none"> ◆ The sum of the corner numbers taken from the 2x2 columns in a calendar is equal. 	<ul style="list-style-type: none"> ◆ Analyze the calendar and find the relations with numbers in particular columns.
<ul style="list-style-type: none"> ◆ Find the way to find the top number in a tower if the bottom numbers are written in a particular sequence. 	<ul style="list-style-type: none"> ◆ Some relations exists with the top number in a tower to the bottom numbers if it is written in a sequence. 	<ul style="list-style-type: none"> ◆ Analyzing the number written in a tower and find the relations.
<ul style="list-style-type: none"> ◆ Find the missing number written in a particular relation. 	<ul style="list-style-type: none"> ◆ To find the missing number in a sequence the arrangement of numbers and their relations should be identified. 	<ul style="list-style-type: none"> ◆ Analyzing the numbers arranged in a particular sequence as apart of games or puzzles.
<ul style="list-style-type: none"> ◆ Draw symmetrical figures. 	<ul style="list-style-type: none"> ◆ Symmetrical figures are mirror images of diagrams. 	<ul style="list-style-type: none"> ◆ Draw symmetrical figures in different ways.
<ul style="list-style-type: none"> ◆ Construct geometrical figures. 	<ul style="list-style-type: none"> ◆ Colour combination has an important role in drawing geometrical patterns. 	<ul style="list-style-type: none"> ◆ Observe and colour various geometrical patterns

What is in this unit?

This unit deals with patterns and number relations. Children have experienced so many patterns – number and geometrical- in previous classes. Activities to develop logical thinking and reasoning power are given in this unit. Pupils will get chance to make connections, find relations and to find the unknown numbers if it is continued. This will help them to develop reasoning power and to explain the relations with cause and effect relation. They can say why it is so and what will happen if it continues like this. They get experiences in finding new relations and communicate it with others by giving suitable proof.

CLASS ROOM PROCESS

Ensuring current ability level.

- ◆ Give simple patterns and ask them to complete.
 - 2,4,6,8,.....
 - 2,4,8,14,.....
 - 2,4,8,16,.....
 - 3,6,9,12.....
 -
 -

- ◆ Give a magic square and find the missing numbers.

1		6
	5	3
4	2	

- ◆ Ask them to make number patterns.

Give additional support to those who are still standing below current ability level.

Relations in the calendar

Ask children to take any 4 adjacent columns as shown in the TB and find the relation with the numbers. Let's discuss the findings in the class.

- ◆ The first number in the second row is 7 more than the first number in the first row.
- ◆ The second number in the second row is 7 more than the second number in the second row.
- ◆ The first number in the second row is 6 more than the second number in the first row.

- ◆ The second number in the second row is 8 more than the first number in the first row.
- ◆ The sum of the numbers in first columns are 2 less than the sum of numbers in second column.
- ◆ The sum of the numbers in second row are 14 more than the sum of numbers in first row.
- ◆ The sum of the corner numbers are equal. Then ask why all these come so and lead a discussion.

First number is one less than the second number in two rows. We add first and second number from both rows. Then it will come equal in all cases.

Let the children know the said relations above is correct in all cases, where we take such 4 columns.

Make sure that they are finding the relations and writing in their note books.

Finding relations is a very important skill in Mathematics and this type of activities will help them to develop such capacities.

The take 9 columns and repeat the above process. Here they can find the relations with the numbers in columns and rows.

Also find

- ◆ The sum of two corner numbers are same
- ◆ The sum of 3 diagonal numbers are same.
- ◆ The sum of all numbers are 9 times of the middle number. then take 4x4 columns and try to find relations.

Ask them to find any relations from the calendar. Let them check individually and in pairs.

Evaluation. Teacher evaluate,

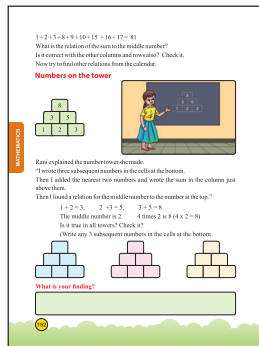
- ◆ the ability to find relation.
- ◆ The ability to make conclusions.
- ◆ The ability to communicate.
- ◆ The ability to explain the reasons for his findings.

Numbers on the tower.

Here pupils get chance to find relations with numbers on a tower.

It is explained in TB in detail. Let them find the relation and explain.

It is noted that not only in subsequent even or odd numbers, but in case of any numbers with same interval give the same relation. For example if the numbers written on the first line is 5,10, and 15, the top number will be $4 \times 10 = 40$



Let the students make their own towers and find the relation is correct.

The tower newly made by them should be evaluated as portfolio.

finding the missing number

Observe the figure. Find the relation with numbers. Then they can see two relations. $1+2+3=6$ and $1 \times 2 \times 3 = 6$. But when observing the next figure the first relation did not exist. $3 \times 4 \times 5 = 60$. This is the applicable relation. This is the method to find the relation in such type of problems. Then ask them to find the relations to the problems on page 154 and explain in the class.

- $1 \times 2 + 3 \times 4 = 14$ $2 \times 3 + 4 \times 5 = 26$. $3 \times 4 + 5 \times 6 = 42$ so $4 \times 5 + 6 \times 7 = 62$
- $1 \times 2 + 3 = 5$ $2 \times 3 + 4 = 10$ $3 \times 4 + 5 = 17$ $4 \times 5 + 6 = 26$
- $(1+2+3+4+5) \times 1 = 15$ $(2+3+4+5+6) \times 2 = 40$
 $(3+4+5+6+7) \times 3 = 75$ so $(4+5+6+7+8) \times 4 = 120$
 in this all the numbers are given. Only the

relation should be found and discussed.

- $1+4=5$ $2+3=5$ $3+6=9$. $4+5=9$ $5+8=13$.
 $6+7=13$ $7+10=17$ $8+9=17$ another relation is
 add all the four numbers and divide it by 2 .
 $1+2+3+4=10$. $10/2=5$

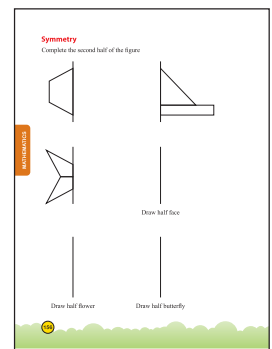
Then let them fill all the worksheet page 155. Get them evaluate individually and in pairs.

Evaluation. Teacher evaluate,

- ◆ the ability to find relations.
- ◆ The ability to think logically.
- ◆ The ability to explain and communicate well.

Symmetry

Pupils have done this type of works in previous classes. Just remember that and do these works. Let them draw symmetrical figures as they like in Page 157.



Geometrical patterns.

Say children to take additional copies of this page to colour various types. Then colour it. Check each other's. Exhibit all the colored patterns on display board. Teacher evaluate this as portfolio.

Evaluation. Teacher evaluate,

- ◆ the ability to make models.
- ◆ The ability to draw symmetrical figures
- ◆ The ability to use instruments.
- ◆ The ability to visualize the figures.



**TEACHERS RESOURCE
MANUAL**

**Mathematics
Grade 5**

GRADE - 5



1

Number world

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Understands the Indian system and international system of numeration. ◆ Writes and reads large numbers like lakh, 10 lakh and crore. ◆ 10 of any units in a place is equal to 1 in the next higher place. ◆ Each digit in the place is 10 times greater than the same digit on its right. ◆ Interpreting numbers in terms of place value. ◆ Interpreting numbers in terms of ones, tens, and hundreds depending on the context. ◆ Solving practical problems involving large numbers using addition and subtraction. ◆ Learn Roman numerals. 	<ul style="list-style-type: none"> ◆ Writing and reading large numbers through practical contexts. ◆ Interpreting numbers with the help of place value chart. ◆ According to the Indian method, each position to the left recognizes a 10-fold increase in position value. ◆ Compare numbers with practical contexts ◆ and compare large and small numbers. ◆ Recognizes and uses Roman numerals. ◆ Identify addition and subtraction verbs through practical contexts. ◆ Engage in number games ◆ involving addition and subtraction. ◆ Logically solves problems involving addition and subtraction. 	<ul style="list-style-type: none"> ◆ Reads and writes large numbers. ◆ Performs addition and subtraction by understanding of place value of numbers. ◆ Estimates sum, difference of numbers using different strategies like standard algorithms or breaking a number and then using operation. ◆ Interpreting numbers in terms of ones, tens, and hundreds depending on context. ◆ Solves problems involving daily life situations involving addition and subtraction. ◆ Analyses and applies an appropriate number operation in the situation or context.

Introduction

The students are already familiar with the notations of numbers. They also know addition and subtraction of small numbers. Some more concepts are yet to be learned about numbers used in daily life and essential for further studies. To achieve these abilities further study of numbers is necessary. This lesson contains certain activities the students can do by themselves, that will help them gain competence in addition and subtraction of numbers. To prepare them for this several activities, games, and projects are to be held inside as well as outside the classroom. The following guidelines will help the teacher to organize them. Of course, the necessary modifications can always be made.

Learning activities

Population of Kerala

- ◆ This is an introductory activity. This should be seen as a context involving large numbers. Here the teacher can also present a chart showing the population of other states of India if required.
- ◆ Here is the list of the largest states of India in

terms of population

No.	State	Population
1.	Uttar Pradesh	19,98,12,341
2.	Maharashtra	11,23,72,333
3.	Bihar	10,40,99,452
4.	West Bengal	9,12,76,115

5.	Andhra Pradesh	8,45,80,777
6.	Madhya Pradesh	7,26,26,809
7.	Tamil Nadu	7,21,47,030
8.	Rajasthan	6,85,48,437
9.	Karnataka	6,10,95,297
10.	Gujarat	6,04,39,692
11.	Odisha	4,19,74,218
12.	Telangana	3,51,98,978
13.	Kerala	3,34,06,061
14.	Jharkhand	3,29,88,134
15.	Assam	3,12,05,576
16.	Punjab	2,77,43,338
17.	Haryana	2,55,45,198
18.	Chhattisgarh	2,53,51,462
19.	Uttarakhand	1,00,86,292
20.	Himachal Pradesh	68,64,602
21.	Tripura	36,73,917
22.	Meghalaya	29,66,889
23.	Manipur	28,55,794
24.	Nagaland	19,78,502
25.	Goa	14,58,502
26.	Arunachal Pradesh	14,58,545
27.	Mizoram	10,97,206
28.	Sikkim	6,10,577

- ◆ Children can also be asked to collect newspaper articles that include large numbers.

Large numbers

- ◆ This is an activity to introduce the number one crore. The new number is presented based on the idea that the children have already formulated. The idea has already been formed that adding 1 to the largest three-digit number will yield the smallest four-digit number. Children arrive at this idea by themselves by filling out this table, the teacher only presents how to read each number.

Complete this table

- ◆ By completing this table the child learns for himself how the numbers are read when each place is larger. Along with this by performing the fill function provided, it is confirmed how one crore is formed. Here the teacher can additionally provide activities indicating how numbers like 10,000, 1, 00,000, and 1, 00, 00,000 are formed.

Crorepati

- ◆ This activity is a practical example of how a crore is formed. More familiar contexts can be presented to children. For example, let us introduce some towns with a population of less than one crore and present the context of how many more people are needed to one crore.

1	Bangalore	Karnataka	84,00,000
2	Hyderabad	Andhra Pradesh	67,00,000
3	Ahmedabad	Gujarat	55,00,000
4	Chennai	Tamil Nadu	46,00,000
5	Kolkata	West Bengal	44,00,000
6	Pune	Maharashtra	31,00,000
7	Jaipur	Rajasthan	130,00,000
8	Lucknow	Uttar Pradesh	28,00,000
9	Kanpur	Uttar Pradesh	27,00,000

- ◆ The population here is rounded to ten thousand.

Place value chart

- ◆ Children are already familiar with place value charts. Let us read and write the numbers given here in the place value chart. Periods are identified by separating them with commas for the purpose of reading. More of these activities can be assigned in the class and for homework. Place value pockets can be used in the class for added convenience.

Preparation of Place value pocket

- ◆ Take a piece of cloth 30 cm wide and 60 cm long. Then sew the required pockets on it. Cut

out a strip of paper longer than the pocket and paste on them. Cut and paste stickers where it indicates on each pocket. If you put the cards in the pocket you can write the number on the visible side and use them.

- ◆ This activity can be performed as a competition between two groups using place value pockets. One group can do the activity of arranging the cards, and the other group can read the numbers. At this stage, the method of writing numbers by looking at the number of digits can also be introduced. The children practice reading numbers using a table like this.

1	One
10	Ten
100	Hundred
1,000	Thousand
10,000	Ten Thousand
1,00,000	Lakh
10,00,000	Ten Lakh
1,00,00,000	Crore
10,00,00,000	Ten Crore

How do we read 3, 82,435?

- ◆ The number has 6 digits. Lakh is a 6 digit number, so we can read the number like this, Three Lakh Eighty two thousand Four hundred and Thirty Five.
- ◆ Such a chart can be displayed in a class and can be used to read numbers.

International system

- ◆ The place value of digits go in the sequence of Ones, Tens, Hundreds, Thousands, Hundred Thousands, Millions, Ten Millions and so on. In this system the places are separated into groups or periods. In the international system we start grouping numbers from right in to group of 3, called a period. We place a comma after each period to read the number easily.
 - One's period - first three digits that is hundreds, tens and ones.
 - Thousand's period - next three digits that is hundred thousands, ten thousands and Thousands. Million's period - next 3 digits

that is hundred millions, ten million and millions.

- Billion's period - next 3 digits that is hundred billion, ten billion, and billions.

Write the numbers in words and do it yourself

- ◆ Both these activities are practical problems. Here we can provide the function to compare both the system and find the corresponding names in the international system for each name in the Indian system. More numbers are given and these numbers can be written by children using Indian and international style.

One number different forms, and fill in the blanks.

- ◆ These are operations for interpreting numbers in terms of place value. When it comes to various operations involving numbers there is a need to interpret the number according to the context. For example when you have to subtract 137 from 3452 you should interpret the number 3452 as three thousands, four hundreds, four tens and twelve ones.

3452	3 thousands
	4 hundreds
	4 tens
	12 ones

- ◆ Here the ability to interpret a number in different ways should be developed.
- ◆ Here we can produce numbers using different digits. For example how many 6 digit numbers can you make using 1, 2, 3, 4, 5 and 6 without repeating?
- ◆ We start with just two digits, say one and two. The only two digit numbers we can make with them without repetition are 12 and 21. Now try with the three digits.

1,2,3	123
	132
	213
	231
	312
	321

- How many four digit numbers are possible with 1 in the thousands place? 1234, 1243, 1324, 1342, 1423, 1432
- How many four digit numbers are possible with 2 in the thousands place? 2134, 2143, 2341, 2314, 2413, 2431
- How many four digit numbers are possible with 3 in the thousands place? 3124, 3142, 3214, 3241, 3412, 3421
- How many four digit numbers are possible with 4 in the thousands place?

- ◆ We can make 6 three digit numbers. Now, can't you do this with four digits?
- ◆ The total number of 4 digit numbers using 1,2,3,4 is $4 \times 6 = 24$ How about five and six digits?
- ◆ Write the following in standard form.
- ◆ It is the activity of rewriting numbers from their positional form into the standard form in various contexts. It should be noted that some possibilities are missing digits. In such cases recording with place value charts will be helpful to avoid errors.
- ◆ For example
 - $4,00,00,000 + 8,000 + 500 + 40 + 1$
- ◆ Students should use place value chart in early stages.

C	TL	L	TT	T	H	T	0
4	0	0	0	8	5	4	1

- ◆ And write the number 4,00,08,541.
- ◆ Likewise in the last two examples the number of once is more than 10. In such cases it is necessary to write one addition to the nearest significant place.

C	TL	L	TT	T	H	T	0
4	2	8	4	3	4	$5 + (1)$	$(1) 7$

- ◆ And write the number 42843467
- ◆ More activities of this type should be provided here.

Successor and predecessor

- ◆ The operation of subtracting one and adding one in the first stage to find the before and after a number is more convenient. Following these activities, children will be able to arrive at the answer without having any written exercise.

	1,00,00,000	
--	-------------	--

- ◆ Like this, write the number in the middle of the three columns and write the number before and after.

Roman numeral

- ◆ Roman numerals are the number system that originated in ancient Rome and remained the usual way of writing numbers throughout Europe well in to the late middle Ages.
- ◆ Numbers are written with combinations of letters from the Latin alphabet, each letter with fixed integer value. Modern style uses only seven.

	V	X	L	C	D	M
1	5	10	50	100	500	1000

- ◆ Roman numerals still persist in some applications to this day. Let the children find and write down where Roman numerals are used in this new age as well.
- ◆ Group based chart making competition can be conducted based on the basic information and collected information on Roman numerals.

Solar system

- ◆ This is the context for reading and writing numbers. More than just reading numerals here we are reading and writing numbers in the specific contexts. Children can be asked to collect information involving large numbers and present it to the class as a chart.
- ◆ Teacher can also evaluate children's portfolios.
- ◆ Children can prepare questions with numbers as the answer in relation to this context.

Study tour

- ◆ This activity should be seen as a practice in recognizing and solving addition and subtraction in daily life. The teacher should know how to help the children analyze the problem, identifying that context is just as important as doing the verb. The last question in this activity is to find out which of the two cases spent more money? To compare two numbers and determine which is larger and by how much, subtraction should be used. If necessary you can provide more such contexts to find the verb. Problem solving skills can also be enhanced by formulating questions. By including such contexts, students can also be made aware of using and place value charts when doing such verbs.

Let's do and find the differences

- ◆ These activities are that practice doing verbs accurately and quickly. Have the children complete the works using place value charts, if necessary. Here the children frame the context for each verb. Problem solving skills are enhanced by framing such questions. Questions constructed by the children can be modified in groups and evaluated by each other.

Palindromic number

- ◆ This activity can be assigned as a home assignment. The teacher can show the method of operation through an example, then let the children do it themselves. It is not known whether this process will eventually reach a palindromic number every time. For example, it is found that starting with 196, this process does not give a Palindromic number even after 70 crore steps. But it can be seen as a good practice problem for finding the sum of numbers.
- ◆ The teacher can also ask some questions that lead to a project work related to palindromic numbers.
 - Look at these examples.

$$327 \rightarrow 327 + 723 = 1050 \rightarrow 1050 + 0501 = 1551$$

$$542 \rightarrow 642 + 246 = 1050 \rightarrow 1050 + 0551 = 1551$$

- ◆ Both the numbers we considered are converted to palindromic numbers in the second step. The sum of the digits of the two numbers we have considered is 12. Can all numbers in the same digit sum become palindromic numbers in two steps?
- ◆ In order to find this out, we have to continue this activity by considering some numbers whose sum of digits is the same and then analyze the information obtained properly to arrive at a conclusion.
- ◆ Let the children take up this problem individually. It would also be good to present the children's findings to the class.

SAARC Countries

- ◆ This is a context that suggest that problem solving involving mathematics is possible in contexts related to other subjects as well. Before doing this an analysis of the problem should carefully be done. Let the children analyze the question themselves and arrive at the answers themselves. Analysis could be helped by asking the students the necessary questions. Problem solving skills are enhanced through formulating questions related to this context.

Calculator game. Let's Play

- ◆ Games can create a context for developing student's mathematical reasoning. Through playing and analyzing games, Students also develop their computational fluency by examining strategies that are more efficient and discussing relationships among numbers. A good way to introduce a game to the class is for the teacher to play the game against the class. After briefly explaining the rules, the teacher should ask students to make the class's next move. The teacher may also want to model their strategy by talking aloud for students to hear his or her thinking. Through this game, teachers can create opportunities for students

to explore mathematical ideas by planning questions that prompt students to reflect on their reasoning and make predictions.

- ◆ While playing games, students should record mathematical equations of the tasks. This data can be revisited by both students and teachers to examine their mathematical understanding. The game does not need to be completed in class. Children can play this game with friends or adults. The child should be able to explain the strategy adopted to score points at each stage.

Project

- ◆ Not only do projects help the development of many mathematics related process skills but they should also be seen as opportunities for self-directed and organized learning for children. It is very helpful for the children in conceptual analysis and conceptualization while making discovery related to each project.
- ◆ Here the children list the differences between a four digit number and the number obtained by reversing it. Analyze the common features of the answers from obtained and made conclusions. Each child should be able to explain the logic of the conclusions they formed.
- ◆ A report should be prepared and presented to the class on completion of the project. Teacher should evaluate each project.

The project report should include the following.

- Name of the project
- Table of contents
- Introduction
- Objectives
- Methodology
- Analysis
- Conclusion

Let us revisit

- ◆ In this section, problems involving all ideas discussed so far are included. It must be

checked whether all the students are able to do these. Necessary help must be given to those who are in need of it. Please remember that certain ideas may have to be reiterated.

- ◆ Let the children do all the activities themselves. Then everyone should be given an opportunity to present the way they found to the class.
- ◆ Make sure that all possibilities of the fifth activity are presented.

$$\begin{array}{r} ABC \\ CBA \\ \hline DDD \end{array}$$

- ◆ There are six solutions for this problem.

1	2	3	1	3	5	2	3	4
3	2	1	5	3	1	4	3	2
4	4	4	6	6	6	6	6	6
1	4	7	2	4	6	3	4	5
7	4	1	6	4	2	5	4	3
8	8	8	8	8	8	8	8	8

- ◆ What is to be done here is to logically find the digits in each position. The teacher should find more such examples and give them to the students.

1) Find A, B and C, all different digits, such that

$$\begin{array}{r} AB+ \quad \quad 2) \quad ABC+ \\ AB \quad \quad \quad ABC \\ AB \quad \quad \quad \hline CCC \quad \quad \quad CCC \end{array}$$

1) $74 + 74 + 74 = 222$

$37 + 37 + 37 = 111$

2) $185 + 185 + 185 = 555$

Think and do

- ◆ Here are relatively higher order problems related to this lesson. Group discussions can be

done after finding answers to all the problems individually. This way children can improve their methods and learn some new methods also. Here are relatively higher order problems related to this lesson. Group discussions can be done after finding answers to all the problems individually. This way children can improve their methods and learn some new methods too.

- ◆ 13 solutions are there in the last problem.

2	3	1	2	1	6	2	7	1
2	3	1	2	1	6	2	7	1
4	6	2	4	3	2	5	4	2
2	8	1	4	3	2	4	8	2
2	8	1	4	3	2	4	8	2
5	6	2	8	6	4	9	6	4
2	9	1	4	5	7	2	3	6
2	9	1	4	5	7	2	3	6
5	9	2	9	1	4	4	7	2
4	1	7	4	6	7	2	8	6
4	1	7	4	6	7	2	8	6
8	3	4	9	3	4	5	7	2
4	2	7						
4	2	7						
8	5	4						

The magic of 1089

- ◆ Let us assume that the initial number is larger and has digits a , b and c . So, when we reverse and subtract, we will have $(100a + 10b + c) - (100c + 10b + a)$
- ◆ This is the same as $100a + 10b + c - 100c - 10b - a = 99a - 99c = 99(a - c)$
- ◆ Because ' a ' and ' c ' are whole numbers, at the end of the first part of the process we will always end up with a multiple of 99.
- ◆ The three digit multiples of 99 are: 198, 297, 396, 495, 594, 693, 792 and 891.
- ◆ Now, note that the first and last digits of each number add up to 9.
- ◆ So, when we reverse any of these numbers and add them together we get 9 lots of 100 from the first digit, 9 lots of 1 from the third and two lots of 90 from the second and so we get $900 + 9 + 180 = 1089$.

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Vertical lines and horizontal lines can be checked with a Set Square and draw them. ◆ Squares and rectangles are drawn by set squares. ◆ When two lines meet at a point an angle is formed. ◆ The common point is called the vertex. ◆ An Angle is divided into equal parts the angle becomes smaller as the number of parts gets larger. ◆ One-degree angle can be used to measure an angle. ◆ Classifies angles into right angle, acute angle and obtuse angle. ◆ To construct an angle of a given measure by using a protractor. 	<ul style="list-style-type: none"> ◆ Recognize vertical lines and horizontal lines through practical experience. ◆ Draw rectangles and Squares using Set Squares. ◆ Using the corners of the sets squares draw meaning full pictures. ◆ Identifying angles from the surroundings. ◆ Find the angles and specify their names through drawing activities. ◆ Classify angles into right angles acute angles and obtuse angles through drawing activities. ◆ Draw angles and mathematical shapes using a protractor. ◆ Make angles and polygons using the tool geogebra. 	<ul style="list-style-type: none"> ◆ Recognizing angles in objects seen around. ◆ Identify the vertical and horizontal line ◆ Squares and rectangles are made precisely with the help of set squares. ◆ Formulate the concept of an angle ◆ Able to recognize angles in terms of rotation. ◆ Students will be able to name an angle. ◆ Classifies angles into right angle acute angle and obtuse angle and represents the same by drawing and tracing. ◆ Estimating the measure of angles using set squares. ◆ To construct an angle of a given measure. ◆ Drawing angles using necessary tools. ◆ Describing angles and rectangles, Squares using geogebra.

Introduction

In this unit, there is a lot of scope for students to formulate ideas through observation. Needless to say, geometric ideas evolve through observation. The activities given in this chapter are to achieve this end. In addition to these, there should be activities in the classroom using concrete objects and drawing examples from the surroundings. In this text, no effort has been made to present the ideas through formal definitions or theorems. Such formulation is not there in our new curriculum approach. Nevertheless, the teachers may help the students reach a conclusion at the end of the activities and formalize them in their own words. Care should be taken to see that your emphasis is not given to our traditional definitions and theorems. On the other hand, it must be ensured that the students reach these conclusions by themselves and use them in a new situation.

Introductory activity

- ◆ The first picture is an introductory activity. Through this activity, children can able to observe their surroundings and identify the straight, slanted and horizontal lines. Children

can also be encouraged to draw the pictures they find.

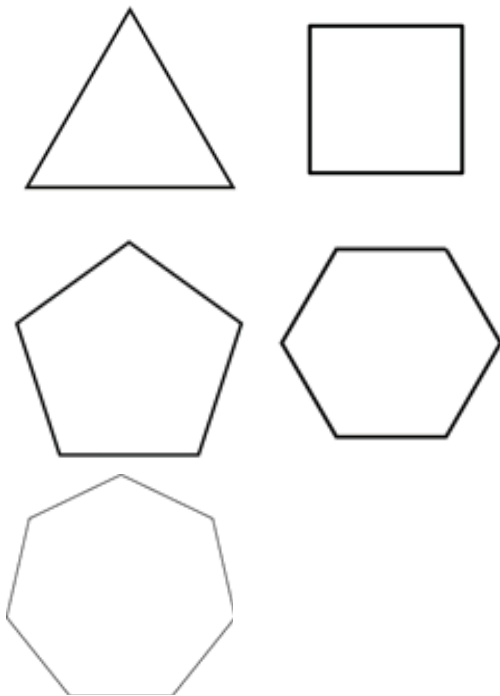
- ◆ It may also be suggested to collect images from newspapers and magazines that contain vertical, horizontal and slanted lines. This

chapter aims at increasing the observation skills of the students and helping them acquire the skill of reaching conclusions through careful observation.



Next figure

- ◆ Let the children examine the given pictures and find out for themselves which picture is next.
- ◆ Have each child present how they found out. In this context, the teacher can use this as an assignment opportunity.

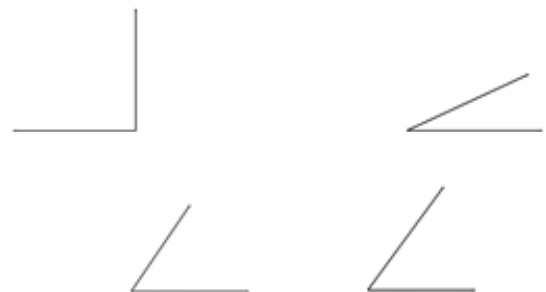


Construction site

- ◆ It is an opportunity to observe the activities going on around the child. Through such activities, the child is able to find out what he wants. The child will observe and understand the use of the carpenter's hanger to get the wall and there by make some discoveries. Along with the increasing children's observation, they are able to grasp the mathematical concept of some objects used in daily life.
- ◆ Questionnaires can also be prepared for interviewing stone masons. By being able to ask such questions the mathematical foundation of everyday life problems is enhanced.

Set Square

- ◆ The intention of this chapter is to enable the children to discover geometrical concepts and also to develop skills in manipulating geometrical instruments. These basic skills will be helpful in acquiring the ability to handle tools with precision in later life. Let the students do some constructions such as drawing squares and rectangles using set squares.
- ◆ There is a need to check the set square by asking whether all the corners of the Set Square are equal. Each child examines it individually and improves the ideas in the group. During the discussion perhaps each child draws a picture using the corners of the Set Square. This will help them form better conclusions.



Text book page 115 third figure(set square)

- ◆ Children discuss the features of the square corner of the Set Square. Recognize that the two sides of the square corner of the set square are perpendicular to each other.

Let's draw a rectangle

- ◆ It is the activity of drawing squares and rectangles using instruments with great precision. Practice drawing each corner of the square with precision using the square corners. They also recognize how to use square corners to check if a figure is a square.
- ◆ At the end of this activity, there is a question like this.
 - Measure the side of this rectangle. What are your findings?
- ◆ This question can be followed by the activity of finding the characteristics of a square and a rectangle.
- ◆ Using a two-column table let the children find and write the characteristics of a square and a rectangle

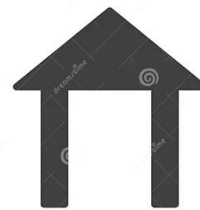
characteristics of a square	characteristics of a rectangle

Count the rectangle

- ◆ This activity can be done very quickly as the features of the rectangles and squares are found.
- ◆ The activity of drawing a square can then be given.
- ◆ This section shows how to construct a square and rectangle of given measures. It teaches you how to draw squares and rectangles with precision using a set square. More activities in drawing squares and rectangles can be provided at this stage. Patterns that are squares and rectangles are best suited for this.

Gopu's Home

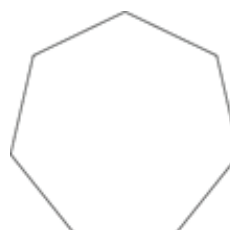
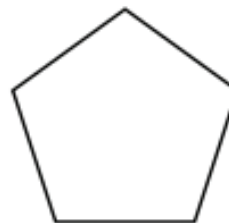
- ◆ This activity can provide relatively small images drawn using the prior.



- ◆ All the constructions in the section are to be done by the students themselves. The teacher must ensure that the students draw these properly in their notebooks doing each step correctly. Another important thing is the way they use the instruments. If some of them find it difficult to use these properly the teacher must give the necessary help. Children can use this context to evaluate each other. The teacher can also evaluate the children

Slanted and Straight up

- ◆ Here we introduced the idea of angles. There are so many things within and outside the classroom related to angles. Several activities relating to the shape of an angle should be done in class.
- ◆ At this stage, the child can be given the task of finding angles from familiar mathematical figures.

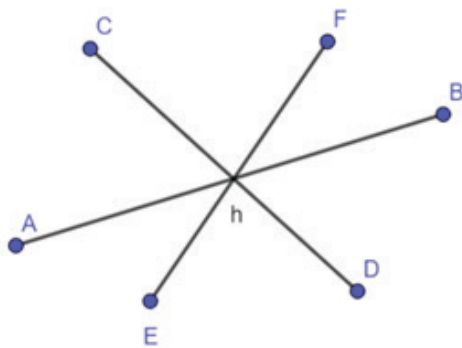


Spread of the angle

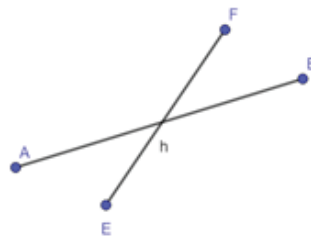
- ◆ The students merely observe the shape of an angle and understand that it is formed from two lines and note that these lines are called the arms of the angle. We do not say that an angle is formed by two rays with a common terminal point. Here we introduce a comparison of two angles. Certain preliminaries are necessary before reading the text. First the students have to find out that the spread of an angle does not change when the length of the arms is increased.
- ◆ Let's do groups of students form two angles using pieces of string. Let the other students observe these angles and find the one with the more spread. This may be repeated with other groups. It may also be done by two groups of students using eerkil. At this stage, it may be pointed out that the angle with the greater spread is called the larger angle.

Joining angles

- ◆ This is an activity that convinces of the need for a name for the angle. They should have a name to tell which angles in this image they are.
- ◆ Here we can put together the activity of finding the number of angles and naming them.



- ◆ Find and write the names of each of the total number of angles in this figure.
- ◆ You should be able to find 12 angles in this picture.
- ◆ Here if necessary the same problem can be solved starting with smaller problems.



Let us find & Name Angles in Set Square

- ◆ Let the children do these activities on their own, including naming the angles and finding the angles. This context can be used for evaluation also. Angles drawn with the set squares are compared with their spread.

Angles in the Clock face

- ◆ This activity examines the spread of clock angles in the face and finds the larger and smaller angles.
- ◆ It can also be conducted as a competition between two groups. The first group displayed an angle on the clock face. The second group should display a larger angle on the clock face than this.

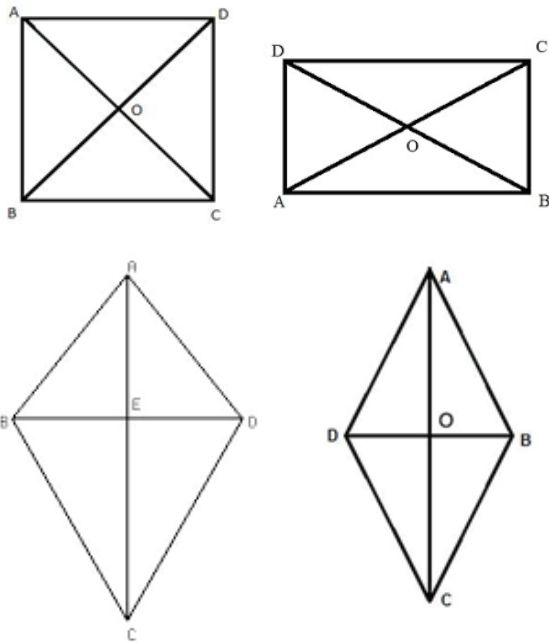
Right angle

- ◆ Children know to draw one line perpendicular to another. Thus they have used the Set Square to draw the perpendicular. Using the knowledge that the corners of the square are drawn here one line by drawing perpendicular to the other. Thus when one line is drawn perpendicular to another line, two angles are formed. These angles are equal and these are called right angles.

A right angle comes into existence when two straight lines intersect each other as perpendicular. Furthermore, at a right angle, two straight lines are perpendicular to each other at the intersection. Euclid states that all right angles are equal.

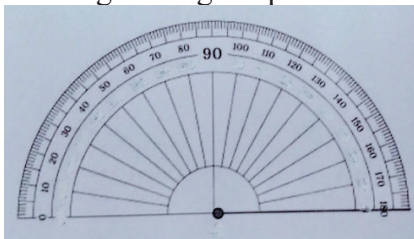
- ◆ Practice in finding right angles can be given

further at the stage.

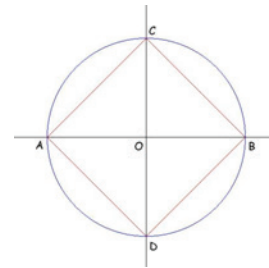


Measurement of Angle

- ◆ In this section, the standard unit used to measure an angle is introduced and the method of finding the measure of an angle using a protractor is described. First, sizes are compared by observation and thereby placing one after the other. The next step is to adopt a small angle of a unit and measure angles using it. A normal protractor can be introduced at this point. If possible, introduce them first to a protractor drawn on a glass paper with units marked in only one direction. Let the students measure an angle using the protractor.



- ◆ Then let the children do the activities of measuring and drawing given in the textbook.
- ◆ At this stage, the activity to find out that the right angle is 90 degrees is also done.
- ◆ **Ask the students to search out several right angles from their surroundings and write them down in their notebooks.**



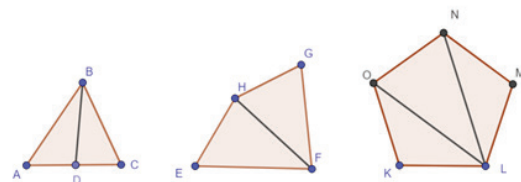
- ◆ This activity shows that two perpendicular diagonals of a circle subtended four right angles and each of these right angles is 90 degrees.

Draw following figures

- ◆ This activity is for drawing angles accurately using a protractor. Let the children do this themselves and assess each other.

More than 90 and less than 90° & Guess and check

- ◆ Each child should be able to tell if an angle is less than 90° or greater than 90 degrees.
- ◆ Name all the angles in the given figure and whether each of them is less than 90 degrees or greater than 90 degrees. Then measure each of these with a protractor. Each child should be able to say that if two angles are formed by joining two lines one angle is less than 90 degrees and the other angle is greater than 90 degrees. The teacher assesses whether each child can form conclusions in this case. The angles found are classified as right angles acute angles and obtuse angles. Instances where more than one angle appears in the same figure should also be given. The following pictures give are examples of this type.



- ◆ Now they can do this part of the text and the problems given under 'let us revisit'
- ◆ Geogebra-related activities are to be carried out in computer labs with the help of IT.

3

Multiplication and division

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Describing various methods for multiplication. ◆ Develop mental strategies for the multiplication of two-digit numbers. ◆ Pattern recognition and correct estimation and ability to mentally compute multiplicands 100 and 1000. ◆ Find your own way to multiply by 101 and 1001. ◆ Finding appropriate methods to multiply by 3-digit numbers. ◆ Multiply and divide large numbers. ◆ Ability to solve and construct problems. ◆ Division of 3-digit numbers by 2-digit numbers. ◆ Explaining division in terms of grouping and equal distribution. ◆ Describe the problems of long division. ◆ Describing different methods of division and finding your own method. ◆ Relating the dividends divisor and remainder. ◆ Solving practical problems using arithmetical operations. 	<ul style="list-style-type: none"> ◆ Practical examples showing different ways of multiplication. ◆ Activities leading to the standard algorithm of multiplication through practical contexts. ◆ Various practical problems for mastering multiplication operations. ◆ Practical operations that lead to the concept of division are repeated subtraction. ◆ Activities leading to standard algorithm of division. ◆ Dividend Divisor Quotient Remainder Activities to establish a correlation between these. 	<ul style="list-style-type: none"> ◆ Find the appropriate way to multiply one number by another number. ◆ Explains different methods of multiplication. ◆ Solving practical problems involving large numbers with the help of quadratics. ◆ It can be explained that the cases of grouping and dividing are division verbs. ◆ A standard algorithm is used for division. ◆ The division is performed mentally. ◆ The relationship between the dividend quotient divisor and the remainder is explained. ◆ Collects information needed for problem-solving and performs problem-solving using appropriate verb forms.

Introduction

We have to solve many mathematical problems in our daily life. Every person should be able to do this. By the end of 5th grade one should be able master performing quadratic operations involving any number. The children have already understood the basic concepts involved in multiplication and division. This unit aims to enable each child to logically analyse these works and find his own way through them. Also the ability to analyse practical problems involving various mathematical operations and interpret numbers in contexts to complete operations in a variety of ways. Teachers should plan the lessons in such a way as to achieve the learning outcomes required for this purpose.

Cost of books

- Children have already acquired the ability to solve multiplicative operations involving two-digit numbers. It should be seen as an activity to remind children of this and to understand different ways of doing operations. It is found that 26 is multiplied by 15. Each child presents it in his way. This will help the child by going through this, to find the right path for him.

$$\begin{aligned} \longrightarrow & 26 \times 15 & 13 \times 2 \times 15 \\ \longrightarrow & & 13 \times 30 \\ \longrightarrow & & 13 \times 3 \times 10 \\ \longrightarrow & & 39 \times 10 \end{aligned}$$

- Through the analysis of such possibilities, it is necessary to learn to interpret the numbers according to the context. A practice problem related to this concept is the find the products section. Now each student must find the answer individually and present it to the class. This context provides an opportunity for peer assessment and teacher assessments.

$$25 \times 20 \longrightarrow 25 \times 2 \times 10 \longrightarrow 50 \times 10$$

$$16 \times 25 \longrightarrow 2 \times 8 \times 2 \longrightarrow 8 \times 50 \longrightarrow 4 \times 100$$

At the sweet house

- This problem should be analysed to determine the operation that multiplies 10 by 25 and this operation should be implemented. The purpose of this activity is to accurately calculate the change in place value when multiplied by the numbers 10, 100 and 1000. Note that when 10 is multiplied by 25 the place value of each digit in the number 25 becomes 10 times greater. The following activity called “Methods for Multiplication by 100 and 1000” is followed by the children to do by themselves.

$$\begin{array}{l} 325 \longrightarrow \begin{array}{|c|c|c|} \hline H & T & O \\ \hline 3 & 2 & 5 \\ \hline \end{array} \\ | \\ 325 \times 1000 \longrightarrow \begin{array}{|c|c|c|c|c|c|} \hline L & TTh & Th & H & T & O \\ \hline 3 & 2 & 5 & 0 & 0 & 0 \\ \hline \end{array} \end{array}$$

- Children should recognize the presence of 0's in places of ones ten and hundred.

- Mental Math is the activity that children can do by themselves.
- Multiplying 99 by 35 means that the number 35 is 99 times.
- Multiplying 99 by 35 and finding the product should be done by multiplying 100 by 35 and subtracting 35 from it. Instead, the number 35 is easily multiplied by 100 times and the number 35 is subtracted from it once. By this we should be able to multiply 99 by 35 and see the multiplication result.

$$99 \times 35 \longrightarrow 100 \times 35 - 35$$

$$\longrightarrow 3500 - 35 = 3465$$

Mental strategies for multiplication.

Commutative law	$24 \times 25 = 25 \times 24$ (50×12 , 100×6)
Associative law	$26 \times 15 = 13 \times 2 \times 15 = 13 \times 30$
Doubling	$13 \times 17 = 1 \times 17 = 17$ $2 \times 17 = 34$ $4 \times 17 = 68$ $8 \times 17 = 136$ $(1 \times 17) + (4 \times 17) + (8 \times 17)$
Adhoc approach of multiplication	$37 \times 6 = 37 \times 3 \times 2$
Distributive law	26×23 $26 \times 1 = 26$, $26 \times 2 = 52$, $26 \times 4 = 104$, $26 \times 8 = 208$, $26 \times 16 = 416$ $26 \times 1 + 26 \times 2 + 26 \times 4 + 26 \times 8 + 26 \times 16$
Adhoc addition and subtraction in multiplication	$26 \times 34 = (10 \times 34) + (10 \times 34)$ $+ (2 \times 34) +$ $(2 \times 34) + (2 \times 34)$

Matchbox merchant

- This activity introduces the multiplication of three-digit numbers. To find the product of 175 and five is analyzed by place value and forms

the standard algorithm.

- ◆ Other ways of performing this operation can also be discussed here. Instead of multiplying 175 by 5, one way is to multiply 175 by 10, look at the product and find half of it.

$175 \times 5 = (5 \times 5) + (70 \times 5) + (100 \times 5)$
 $= 25 + 350 + 500$
 $= 875$

$175 \times 5 = 175 \times 10 \div 2$
 $= 1750 \div 2 = (1000 \div 2) + (700 \div 2) + (50 \div 2)$
 $= 500 + 350 + 25 = 875$

The cost of uniform

- ◆ This is where three-digit numbers are multiplied by two-digit numbers. After determining the action to be taken, multiply 375 by 26. The interpretation of the study is given here as guided by the standard algorithm. This type of column makes sense of the concept of multiplication. Then the activity ‘Let us do it’ given is for the children to do on their own. A different way is indicated here. Children can be motivated, in this context, to find other ways.

Rainfall

- ◆ This is an activity that introduces the practical context of multiplication. The relationship with other subjects and Mathematics is effectively utilized here. It opens up more possibilities for analysis and problem-solving of practical problems. 60 times the amount of rain in the novel on the island is identified as multiplication by 60. It is important to recognize here that there is no need to adopt the standard algorithm. After this, the children will do the last activity by themselves.
- ◆ Introducing groups to the practice of performing multiplication operations opened up opportunities for group discussion and analysis.

Plantation

- ◆ This work indicates how much practical

problems are connected with other subjects in modern times. The class should discuss the various possibilities of multiplying the number 125 by the number 145. What should emerge from the discussion is the idea that 145 can be multiplied first by 100 and then by 25 and finally add them together.

- ◆ Then let the children do the Do This Yourself activity.
- ◆ To guess the product function provided here, open up the possibility to check whether the multiplication result is nearly correct. Multiply 300 by two and 10 to estimate the product of multiplying 313 by 20.

Chain making

- ◆ The division of two-digit numbers is already understood. Another possibility is presented here that divides 29 by 19.
- ◆ This is an activity to recall and reinforce the concept of repeated subtraction. It is more useful in this context.
- ◆ Let’s discuss here an easy way to repeatedly subtract twelve from 132. Instead of repeatedly subtracting 12 from 132, 10 times, subtract 10 of twelve from 132.
- ◆ The important thing here is to find that we can subtract 12 one more time later.
- ◆ This is an operation to arrive at the standard deviation of two-digit numbers. Following this, children have to complete the activity Do yourself by interpreting the number according to the context and try to complete it. Children’s analytical skills, numerical interpretation, and conclusion-making process skills can be assessed here.

Train track

- ◆ This is an activity to arrive at the standard algorithm for multiplication by two-digit numbers. Another possibility for dividing 209 by 19 is presented here. Let’s subtract the number 19 from the number. Thus we arrive at the idea of subtracting 11 times the number 19. After this, the children have to complete the Do This Yourself activity on their own. This

activity aims to enable each child to interpret a number in a context and find their own way of division. Children's process skills such as analytical ability, numerical interpretation, and conclusion formation can be assessed here.

Glass packing

- ◆ This is further work on mastering the standard algorithm for two-digit numbers. Here, again, a different way of division is introduced which enables the child to find his own way.
- ◆ The operation is simplified by interpreting 2520 as $2400 + 120$. Here we can discuss which method each student adopted differently and let the students present the methods found in the class.

$$\begin{array}{r} 105 \\ 24 \overline{) 2520} \\ \underline{24} \\ 12 \\ \underline{12} \\ 0 \end{array}$$

I did it
 $2520 = 2400 + 120$
 $2400 \div 24 = 100$
 $120 \div 24 = 5$
 Total = 105

Packing Mathematics

- ◆ Presenting the context in which the remainder occurs in division. This activity is done by analyzing how the dividend divisor, quotient and the remainder are related to each other.

Stamp distribution & Notebooks

- ◆ The relationship between the dividend divisor, quotient and the remainder was established here. A standard algorithm with three-digit numbers should be established here. More practice activities related to this are given. Children should be given an opportunity to complete these activities and present them in the general class which should be evaluated.

Project

- ◆ When a three-digit number is written and then the same digits are repeated to form a six-digit number, what is the change in the first three-digit number? Such a discussion should be there in the project presentation. The first three-digit number written here is multiplied

by 1000 and the same three-digit number is added to the multiplication result. This way we get the six-digit number. Here we find that the three-digit number is multiplied by 1001. What happens when the resulting six-digit number is divided by 7, 11 and 13? By taking several examples and doing this activity yourself, you can see that everyone forms conclusions. Every child should be given an opportunity to write a project report and present it to the class. Children's process skills such as analytical ability, numerical interpretation, and conclusion formation can be assessed here.

Think and do

- ◆ The problem here is to multiply consecutive counting numbers from one to one hundred and find out how many zeros are at the end of the product. It should be discussed that multiplying consecutive counting numbers from one to one hundred is practically difficult, and whether there are any ways to approach this problem without multiplying the whole number instead. If you adopt the Take Simple Case problem-solving strategy, you will find that finding the product of consecutive numbers from 1 to 10 is not difficult.

$$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 =$$

$$1 \times 2 = 2$$

$$1 \times 2 \times 3 = 6$$

$$1 \times 2 \times 3 \times 4 = 24$$

$$1 \times 2 \times 3 \times 4 \times 5 = 120$$

It can be found that the first zero at the end of the result is multiplied by five.

Now when will the second zero appear at the end of the multiplication result?

$$1 \times 2 \times 3 \times 4 \times 5 \times 6 = 720$$

$$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 = 5040$$

$$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 = 40320$$

$$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 = 362880$$

$$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 = 3628800$$

- ◆ We can find that the second zero comes when multiplying by 10.
- ◆ That is, when multiplying consecutive counting numbers from 1 to 10, there are two zeros at the end of the multiplication result.

Then, when multiplying consecutive counting numbers from 1 to 20, how many zeros are there at the end of the product? Through this kind of discussion, it is concluded that the number of zeros in this case is determined through multiplication by five. Here is the realization that any multiple of two, such as 2 4 6 8 by five, will result in a number ending in zero. In such cases, it can be realized that zero is formed by multiplying by five, the problem turns to finding how many fives are there in the group from 1 to 10. It will not be difficult to find that there are two fives in the number five and ten. Since there are 10 such groups from one to 100, a total of 20 fives can be found.

- ◆ Apart from this, all other numbers have to be found out which includes more fives.

$$25 = 5 \times 5$$

$$50 = 5 \times 5 \times 2$$

$$75 = 5 \times 5 \times 3$$

$$100 = 5 \times 5 \times 2 \times 2 \text{ and so on.}$$

- ◆ We can find out that there are more fives in the numbers 25, 50, 75 and 100. So now there are a total of 24 fives. By taking consecutive counting numbers from 1 to 100, we can find that there are 24 zeros at the end of the product.
- ◆ At this stage, further questions related to this concept can be raised.
 1. When multiplying consecutive counting numbers from 1 to 200, how many zeros are there at the end of the multiplication?
 2. How many zeros are there at the end when multiplying consecutive counting numbers

from 100 to 200?

3. How many zeros are there at the end of the denominator when multiplying from 100 to 150?

Let's revisit

- ◆ The problems given here should be considered as practice problems only. Each one should be taken up by the children themselves and present to the class. These can be assessed by the teacher in the area of problem-solving. More problems of this type should be given and also allowed to create new problems.

$$24 \times 6 = 144$$

- ◆ The product of the numbers 24 and 6 is given as 144. It is the function of finding the product of some other number using it. In each case, each child should be given the opportunity to say how the product was determined without finding the product.
- ◆ Since 24 times six equals 144, the product of 12 times 12 does not change, that is, 12 is half of twenty-four, and 12 is 2 times six, so it must be concluded that the product does not change.
- ◆ The practice of preparing more questions of this type can also be given at this stage which will help in the development of problem-solving skills.
- ◆ Children's presentation style as well as processing skills can be assessed through this activity.

4

PERIMETER AND AREA

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ The perimeter of an object is the distance around the edges. ◆ Perimeter is measured in length with units of length. ◆ The perimeter of a rectangle = $2(l + b)$ ◆ Perimeter of a square = $4s$ ◆ The area of an object is the amount of surface that the object occupies. ◆ The area of the rectangle is length x breadth ◆ The area of the square is side x side ◆ Units of area are square Centimetre and square metre 	<ul style="list-style-type: none"> ◆ Identifies the practical contexts in which the perimeter should be viewed. ◆ Finds the perimeters of squares and rectangles through practical cases. ◆ By observation, it is found that the perimeter of various shapes such as triangles and hexagons is the same as their circumference. ◆ The spread of different shapes is compared through colouring activities. ◆ Identifies the context in which the spread is to be found through various practical contexts and understands the need for a standard unit. ◆ It is found through practical cases that the area of a rectangle is length x width and the area of the a square is side x side ◆ Solves problems using perimeter and area in practical situations. 	<ul style="list-style-type: none"> ◆ Estimating and measuring the perimeter of squares, rectangles, and triangles. ◆ Ability to estimate and solve real-life word problems and diagrams for finding perimeter. ◆ Estimating and measuring area (square and rectangle) ◆ Finding the area of a rectangle and a square using the formula. ◆ Ability to define a square unit and use a grid to measure the area. ◆ Ability to estimate and solve real-life word problems and diagrams for finding area. ◆ Switching between various units while doing practical problems.

Introduction

There is no other branch of mathematics that is as useful as geometric concepts for solving everyday problems. They are relatively easy to analyze and make conclusions about since they are related to everyday life. Children have already acquired basic concepts related to circumference. This unit aims at on-depth study and problem-solving related to the perimeter of shapes such as squares and rectangles. Circumference is a one-dimensional measurement while area is a two-dimensional measurement. That is, if the perimeter is length only, the area has both length and breadth. Everyone has to deal with a lot of life problems related to the area. This lesson discusses the conceptualization and problem-solving strategies required for this. The teacher must realize that such ideas have a decisive impact on the higher learning areas

Minnu's garden

- ◆ This is an introductory activity. The perimeter of the square is the measure around it and this is a function that shows there are life contexts to be found. Most of the children must have faced this situation. The primary idea is that if you find and add the surrounding measurements, you will get the perimeter. The method of finding the perimeter of a rectangle is presented as $2(\text{length} + \text{breadth})$. This is done by explaining that it is sufficient to add two breadths and two lengths to find the perimeter of a rectangle. Children can be given an opportunity to present activities they have done at home related to this concept. This context will be useful for understanding how mathematical concepts relate to everyday life and also for improving presentation skills.

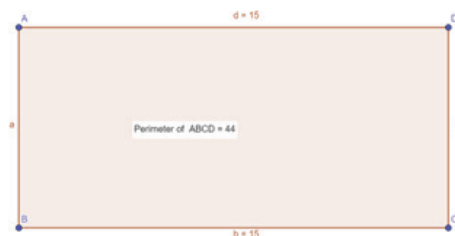
Perimeter of a square.

- ◆ This activity can be given in such a way that the children form a way to find the perimeter of the square. Divide the children into groups of four or five and give each group several squares cut out of paper. Ask the class to present the method of finding the perimeter of all squares. Each child can be seen forming the concept that the perimeter of a square is $4 \times \text{side}$.
- ◆ In this context, the activity Do it yourself is given individually. Some children may be given an opportunity to present the way they arrived at the answer. It can also be discussed here that the diagrammatic method of analysis is helpful for problem analysis. Areas such as problem analysis, problem solving, and conclusion formation can be assessed here.

Traffic signals

- ◆ It is a convincing activity that the perimeter of a triangle or a hexagon is the same measure around it. If all the sides are congruent, then the perimeter can be found by knowing the measure of one side.
- ◆ The perimeter of an equilateral triangle is equal to $3 \times \text{side}$

- ◆ The perimeter of the hexagon is equal to $6 \times \text{side}$
- ◆ Here we need to discuss how to find the perimeter if all the sides are of unequal shape.
- ◆ What follows is an activity that the children can do on their own related to the perimeter of the rectangle. There are two types of activity in this. One is to find the perimeter and the other is given the perimeter, to find the length or breadth. The second activity can be subjected to group discussion if needed.
- ◆ If the perimeter is 44 cm and the length is 15 cm, how shall we solve the problem of width? The method of drawing and analyzing a picture based on the given information is to be discussed here.



- ◆ It should be formed through discussion that the perimeter of a rectangle is the combination of two lengths and two widths. Here the two lengths are $15 + 15 = 30$.
Perimeter is 44
So two widths = $44 - 30 = 14$
So it will be equal to $14 \div 2 = 7$ cm by analyzing the problem.
- ◆ “Make drawing” is a method of problem analysis that should be discussed here.

Colouring time

- ◆ The larger one in each group is asked to colour. Each of these are images that can be determined visually. It should be seen as a function leading to the concept of area. This is the first step in conceptualizing the area.

Compare and Color

- ◆ Two sets of problems are given here. In the first set, you can tell by sight which is the

bigger square. If we do not understand which one is bigger through observation, a discussion should take place here. Here it should be concluded that the rectangles of the same size given in the test book can be found by cutting out the rectangles on the paper and placing them one on top of the other. But in the second set, this is not possible. Even if you cut them and look at them one on top of the other, you cannot find out which one is bigger. How to find out this should be discussed here. It should be concluded that this problem will be solved in the next activity.

Measure the spread

- ◆ By presenting the problem, which rectangle has greater area, it is asserted that the area is to be found here. A method is introduced to arrange stamps of the same size and find out which one has the larger spread. 20 stamps are required to cover the first rectangle and 21 stamps for the second. Hence it is concluded that the second rectangle is larger or has a greater area. Here the term area is introduced.

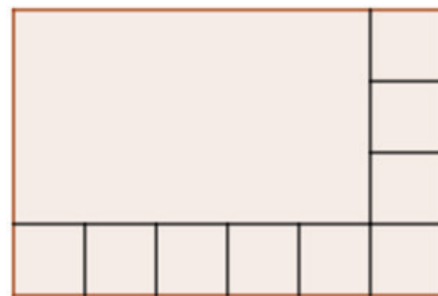
Area of the room

- ◆ This is an activity that demonstrates the need for units of measurement to measure area. The context of the activity is to look at the number of tiles to determine the area of their room. From the fact that the area of the first child's room is 100 tiles and the area of the second child's room is 24 tiles, it is concluded that the second room is smaller. Whether this is true is debatable. A conclusion should be drawn that this would be true if the tiles were of the same size in both cases. This should be done through a convincing discussion on the need for a standard unit. A square with a side of one centimetre is used for area, as is the accepted standard unit for measuring length. Here we recall the earlier activity of comparing the widths of two squares using stamps. Instead, they are compared using the unit square. By finding out how many unit squares are in each square, the children can find out which one has

more width.

Area of the rectangles

- ◆ Given several rectangles arranged in unit squares. Let us ask to find the area of each. It is best to give it as a group activity. Let them complete the table based on the information in this activity. Then the given questions can be answered in the group. Through this discussion,
- ◆ the idea is formed that the area of a rectangle is length x breadth.
- ◆ Here more activities can be given if needed. Groups forming conclusions can be given pictures showing only one row and one column. How many unit squares are there on the length side? How many unit squares are there in the width side? Even if only these are found then the conclusion can be made that the area of the rectangle can be found.



Square Centimetre and Square Metre

- ◆ This is an activity to find out how many square centimetres are in a square metre. Children can be asked to create a table showing the relationship between square metres and square centimetres. Let us find and write the various cases where the area is expressed in square metres.
 - The width of the house.
 - The width of a room.
 -
- ◆ The large measure is a box for additional reading. You may ask them to write the contexts of what the area is in square kilometers

- regarding,
- Spread of Panchayat
 - Population density context
 - Forests, oceans and their spread
 -

Measuring the area of the rectangle

- ◆ This is an activity of finding the area of a square constructed using the GeoGebra tool. This is very helpful for drawing different rectangles and listing the width length and area. Here we take the advantage of the possibility of drawing a rectangle and dragging the sides to create new rectangles. The list thus formed can be evaluated as part of the portfolio.
 - The rectangle was constructed using GeoGebra tools - A,B,C,D
 - Created a new rectangle using the measuring tool. - A,B,C,D
 - The table is correctly formed. - A,B,C,D
 - The table was analyzed and conclusions were made. - A,B,C,D

Tiling time

- ◆ This is an activity that forms the concept that the area of the square as side x side. The figure's potential for problem analysis is exploited here.
- ◆ Mathematician George Polya crafted a legacy that has guided countless individuals through the maze of problem-solving. In his book "How To Solve It," Polya provides four fundamental steps that serve as a compass for handling mathematical challenges.
 - Understand the problem
 - Devise a Plan
 - Carry out the Plan
 - Look Back and Reflect
- ◆ Polya mentions that there are many reasonable ways to solve problems. If we want to learn how to choose the best problem-solving strategy, the most effective way is to solve a variety of problems and observe different steps involved in the thought process and implementation

techniques.

- ◆ During this practice, we can try these strategies:
 - Guess and check
 - Identification of patterns
 - Construction of orderly lists
 - Creation of visual diagrams
 - Elimination of possibilities
 - Solving simplified versions of the problem
 - Using symmetry and models
 - Considering special cases
 - Working backwards
 - Using direct reasoning
 - Using formulas and equations
- ◆ Additional problems with diagrammatic problem-solving can be given at this stage.

Area of the Math Book

- ◆ This is a practical problem related area. Make a diagram strategy of problem analysis and problem solving is utilized here. This should be given as an opportunity to be presented in the class. Various possibilities for solving the problem can be discussed here. Both peer evaluation and teacher evaluation are possible here. The possibility of solving the same problem in different ways can be discussed.
- ◆ If we consider this as a perfect rectangle, the length is 16 cm and the width is 10 cm. Its area is $16 \times 10 = 160$ square centimetres. Subtract $3 \times 8 = 24$ from this to get the area of this figure. If this possibility does not arise in groups, the teacher should guide the children towards this possibility through necessary interventions.

Project Greater Area

- ◆ A square with a side of 4 cm has a perimeter of 16 cm. What is to be discussed is how many different squares can be made without changing the perimeter i.e. the length of all four sides is 16 cm (here only complete cm measurements are enough to be considered). 2 (length + width) is the perimeter. That is, how many squares can be made so that the total length and width is 8 cm?

$$8 = 1 + 7$$

$$8 = 2 + 6$$

$$8 = 3 + 5$$

$$8 = 4 + 4$$

- The last of these is square. The perimeter and area of each of these can be seen. Since there is no change in the perimeter, it is enough to see only the area.

No	Length	width	area
1	1	7	7 square cm
2	6	2	12 square cm
3	5	3	15 square cm
4	4	4	16 square cm

- A project report should be prepared and presented to the class by taking more examples like this and examining it. It should also be evaluated

Area of the square whose side is $a = a \times a$.

Perimeter = $4a$.

Make the side $a + 1$ without changing the perimeter.

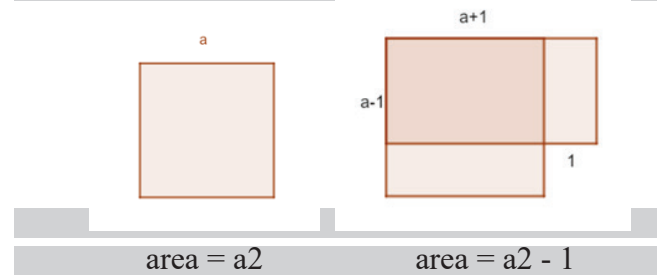
The second side will be $a - 1$.

Its area then will be $(a + 1)(a - 1) = a^2 - 1$.

Then its spread is less than a^2 .

That means if the square is made a rectangle without changing the perimeter then the area

decreases.



Think and do

- Note that the perimeter of the original rectangle is the same as the new shape. It should be found by observation that there is no change in the perimeter. The same parameters can be found to hold for the second problem. You can see that the length that is lost during cutting remains there. Note that width of the footpath is unnecessary data here. The third problem is similar to the conclusion that no matter how many steps are taken, the perimeter does not change. All children can complete the following two problems by drawing rough figure and analyzing the problem. It is best to complete these problems individually and present them to the class. The teacher has options here for assessment also.

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ The size of the circle is measured by the distance from the centre. ◆ The distance from the centre to a point in the circumference of a circle is called the radius of the circle. ◆ A circle can be divided into equal parts in several ways using the corners of the set square. ◆ When a circle is divided into four equal parts by a set square, the lines are perpendicular to each other. ◆ A perpendicular can be drawn from a point outside to a line using a set square 	<ul style="list-style-type: none"> ◆ Gathering information from newspapers, magazines and surroundings to understand the importance of circles in daily life. ◆ A variety of circles are drawn and observed with the same centre to understand that the size of the circle is determined by the distance from the centre to the circumference. ◆ Draw circles of various sizes using a compass. ◆ An activity to find the relationship between the radius and diameter of a circle. ◆ Draw various geometrical pictures using a circle. ◆ The circle is divided into equal parts by the set square in various ways. ◆ Through pictures and discussions, we will realize when two lines are perpendicular to each other ◆ A perpendicular is drawn from a point outside a line using the set square. 	<ul style="list-style-type: none"> ◆ With the help of tools, it is possible to draw a circle of exact size. ◆ Different shapes can be put together to form patterns and new images. ◆ Able to explain the relationship between the dimensions radius and diameter of a circle. ◆ It can be explained that two lines are perpendicular to each other. ◆ Draw a perpendicular to a line with the help of tools.

Introduction

Children have a rough idea of geometric shapes like circles, rectangles, and squares. They have seen many round objects in their daily life. Geometric shapes involving circles have been noticed by them. This chapter focuses on learning more about circles and making constructions. It also focuses on drawing circles using tools and forming relationships between radius and diameter. In the higher classes, there is the construction of equilateral polygons with the help of circles. This lesson includes the activity of dividing a circle and forming equilateral polygons using square corners as its starting point. Square corners and angles are used here to introduce the concept of vertical. GeoGebra activities can further be incorporated to enjoy the dynamics of geometry. Each child can try to plan and implement additional activities if it is necessary to achieve the learning outcomes targeted for this lesson.

Circles are an important part of our everyday life

- ◆ Drawing a circle using circular objects is practised in earlier classes. This initial activity should be structured as an observational activity to extend observation to nature and the environment and to recognize the importance of the circle in everyday life. Here the function of finding and introducing circular devices from the surroundings can be provided which can ease the labor. A collage/chart-making activity can also be done by collecting such pictures.

Two circles

- ◆ The method of drawing a circle using a compass is presented here. Let the children find and present the characteristics of the two circles given in the lesson. It should be concluded that the size of a circle is determined by its distance from the centre of the circle. Here each child has to draw as many circles with the same circle center. This can be seen as a case of using the compass with precision. Children who engage in these activities with precision can also be evaluated here. The ability to draw a circle is improved here.

Radius

- ◆ This is a function to recognize that a circle is determined by the centre and the distance from the centre to the circumference. Circles have been drawn in various sizes in the previous activities. In each of these, we can give the function of finding the radius. Each circle can be named and measured.

Measure the radius

- ◆ This is the function of finding the radius of a previously drawn circle and drawing a fixed radial circle. It is also the function of comparing circles of different sizes and identifying their deep size difference. This is followed by the practice of drawing a certain number of circles through the activity Measure and Draw.

- ◆ In each of the figures drawn, the circle is drawn with a certain dimension and the diameter is established as the relation between the radius and the diameter. The table on page 59 can be used for this. As part of expanding the table, the function of adding the radius and diameter of more circles can be provided, and thereby the diameter also
- ◆ Let the children form the relationship between the radius and diameter themselves. Each group should be given opportunities to present their conclusions and it can be evaluate.
- ◆ The longest line that can be drawn joining two points on the circle is to be identified as the diameter. Similarly, any straight line drawn through the centre of the circle that intersects the circle at two points is the diameter of the circle. The longest line in a circle is identified by the problem of whether a line can be drawn in a circle that is longer than the diameter.

Inside outside and intersects.

- ◆ Through this activity, some special terms related to the concept of circle such as inside circle, outside circle and intersecting circles are introduced. Often such concepts are useful for deep reading and presentation of ideas. After this, let each child draw an activity called Mathematical Flower. Let's demonstrate how to draw it using the GeoGebra tool. This activity will help you to understand the dynamics of geometry.

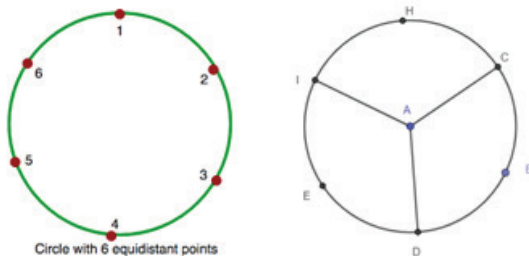
Four equal parts

- ◆ It is an activity to draw equilateral polygons by joining circle segments. Let the children discuss the problem, first individually and then in groups, how to draw a diametre of a circle and then draw another diametre perpendicular to this diametre.
- ◆ This activity shows how to divide a circle into four equal parts using a set square. Let's discuss the properties of the measures of the four angles obtained. The activity to be done is to make equal division of the circle and draw equilateral polygons using the various corners

of the set square. This can be done individually or improvised in a group.

Assignment

- ◆ An independent activity is whether a circle can be made of three equal parts using the set square. Let everyone try to solve this problem individually. Then allow discussion in groups of four or five people. Let the groups conclude that the circle can be divided into three equal parts by assigning six signs and considering the alternating signs of the circle.



Perpendicular

- ◆ The second diameter is drawn upright to the first diameter. These two lines are said to be perpendicular to each other or these two lines are perpendicular to each other.
- ◆ Have all the children draw a line perpendicular to a line using the set square. Thus, when a line is drawn perpendicular to another line, it should be possible to tell without measuring that the angles obtained are all 90 degrees.
- ◆ Next one is the task of finding the shortest distance from a point outside a line to the line.

Let the children measure all the lines drawn in the textbook. Let them find the shortest line in this way. What is special about this shortest line can be discussed. Extending this discussion to the group, we see that the line that gives the shortest distance is the perpendicular from that point to the first line. How is this understood? Have the children measure the angles defined by all lines drawn from a point outside the line to the line. At what point is the right angle obtained? It forms the conclusion that a perpendicular is drawn from a point outside a line to that line.

- ◆ It should then be recognized that a set square can be used to draw a perpendicular from a point to a line. Have all the children draw from a point outside a line to that line using the 90-degree angle corner of the set square.

Let's revisit

- ◆ All the problems given in the Let's Revisit section can be done by the children themselves. Let the children solve these problems individually and present them to the class. It can be helpful for children who have difficulty in solving problems when children present it in different ways. Here peer assessment and teacher assessment are possible. The ability to draw shapes such as squares, rectangles and circles with accurate measurements and to draw perpendiculars using a set square will be developed through this lesson.

6

Fractional Numbers

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> ◆ Fractions can be interpreted as part of a whole. ◆ Fractions can be interpreted in division form. ◆ Interpreting fractions greater than one requires interpretation in division form. ◆ Multiplying or dividing the numerator and denominator of a fraction by the same number gives equivalent fractions. ◆ For the addition of fractions with the same denominator, it is sufficient to maintain the sum of the numerators and remains the denominator. ◆ Ordinary fractions can be converted into mixed fractions using division. 	<ul style="list-style-type: none"> ◆ Activities to interpret fractions as part of one and part of a division through paper folding activities and colouring activities. ◆ Fractions are interpreted as a division method through practical contexts. ◆ Practical examples of finding an equivalent fraction. ◆ Paper folding activities and colouring activities to compare fractional numbers. ◆ Practical examples for practising addition and subtraction of fractions with the same denominator. ◆ Paper folding activities for converting mixed fractions into ordinary fractions and vice versa. 	<ul style="list-style-type: none"> ◆ Fractional numbers are interpreted as parts of one. ◆ Interpreting fractions in rational form. (division method) ◆ Finds that a fraction has many forms. ◆ Equivalent fractions are found by multiplying or dividing the numerator and denominator of a fraction by the same number. ◆ Finds the sum and difference of fractions with the same denominator. ◆ Comparing fractions with the same denominator. ◆ Conclusions are drawn by comparing unit fractions. ◆ Converts a mixed fraction to an ordinary fraction and vice versa. ◆ Solving practical problems involving addition and subtraction of like fractions

Introduction

Children know how to interpret fractional numbers as parts of one. All such fractions are numbers less than one. Local names like Ara, Kaal and Mukkal (Quarter, Half, Three by fourth) are familiar to children. In dividing a whole object into four equal parts a part is interpreted as a quarter. This lesson covers how to find the number of equivalent fractions and arrange fractions by size. In addition, addition and subtraction of fractions with the same denominator and the ability to solve practical problems involving them are also aimed at through this lesson.

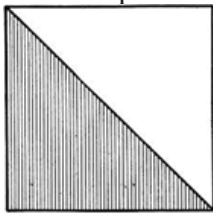
It is at this stage that fractions greater than one are introduced. A new interpretation of the fractional number is also required when fractions greater than one are introduced. So far an object has been divided into four equal parts and taking three parts, it is $\frac{3}{4}$. At this point, it is realized that the same fraction can be interpreted in other ways too. If three objects are divided equally among four persons, each of them will get three-fourths of one, which is interpreted as 3 divided by 4.

So 5 divided by 6 makes sense, that is, when 5 items are divided equally among 6 people, each one gets a $\frac{5}{6}$ share. When four items are divided equally among three people, each one gets $\frac{4}{3}$. We see that $\frac{4}{3}$ is $1\frac{1}{3}$. At this stage, the ability to transform an improper fraction into a mixed fraction and vice versa must be acquired.

The activity of folding paper and colouring is an introductory activity. This activity will serve as a reminder to consolidate previous understanding of fractions. More such activities can be given in groups of four or five children. This activity will help to reinforce the concept of fractions as part of one. It will guide concept formation by introducing numbers through paper folding and further enhancing the concept of fractions through colouring.

Different ways

- ◆ Different ways is a challenging activity. The problem is how to divide a piece of paper into two equal parts. Two different methods are shown in the textbook. The given problem is whether this piece of paper can be cut into two equal parts in any other way. Let the children try to figure it out individually. Those who cannot find it can try to reach the answer through group discussion. Through collective deliberation, different paths may be taken.

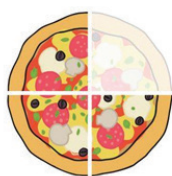


Parts of different forms

- ◆ This is an activity to prove that $\frac{2}{4}$ of one is the same as $\frac{1}{2}$. At this stage, each child draws pictures of themselves and evaluate each other about the part they have coloured. At this point, the challenging problem of colouring one half of an image differently can be posed.

3 out of 4

- ◆ Three-fourths convincing means that three-quarters of an object is affected by dividing it into four equal parts. At this stage, a fractional form is presented as a fraction. That is, this is the stage where the numerator and denominator of the fraction are separated.



3
—
4

Numerator
How many equal parts do you have?

Denominator
How many equal parts is the whole divided into?

Sharing the cakes

- ◆ Three-fourths has so far been interpreted as three-quarters of an object divided into four equal parts. Here is a new interpretation of three out of four. Here, three are made into four equal parts through the problem of how much each person gets when three objects are divided equally among four people. It first divides a cake into four equal parts. Each one gets a quarter of a cake. Then the other two cakes are divided into four equal parts. At each stage, each one gets a quarter share. Thus one gets three-fourths of the total. That is, if three cakes are divided equally among four people, each of them will get three-fourths of a cake. This is a new interpretation of three-fourths, 3 divided by 4. Here each one gets three times the one-fourth of a cake. It also means $\frac{3}{4} =$ three times $\frac{1}{4}$.

Measuring parts.

- ◆ In a new context, two out of three are interpreted. In the first context, the fractional number was interpreted in the area concept. But here this context is made based on length. At this stage too, two-thirds is interpreted in a new way. The problem is how much will each person get if a two-meter-long ribbon is divided equally among three people. For this, first cut a meter of ribbon into three equal parts. Then each person gets one-third of a meter. Again a meter of ribbon is divided into three equal parts and each gets one-third. That is, one meter is divided into three equal parts and each gets 2 parts. It's 2 divided by 3. In other words, $\frac{2}{3}$ is two-thirds.

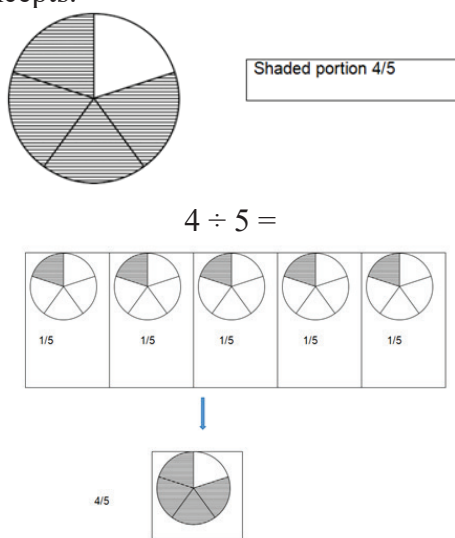
Do this yourself

- ◆ This problem is how much will each person get if a two-meter ribbon is divided equally among five people. Here, if two metres of ribbon are equally distributed to 5 people, then we need to find $2 \div 5$ of each of them. Each meter of ribbon is divided into five equal parts. If you divide it, each person gets $1/5$ a meter. A total of $1/5$ is obtained twice to each. Thus a total of $2/5$ is obtained.

$1/5$				
$1/5$				

Let's do it

- ◆ This is a practice problem on interpreting a fraction in two different ways. For example, $4/5$ should be interpreted in two ways. $4/5$ is four parts out of 5 equal parts. Even if four objects are divided equally among five people, each of them will get $4/5$ part. This is the second method. In this way each fraction should be interpreted in two ways and if necessary draw pictures and consolidate the concepts.



Fraction forms

- ◆ This is the activity of writing the fraction that represents the coloured part. Let the children write themselves the fractions each picture represents. This activity can be used to form questions in the form of division where each colored fraction is the answer. For example,

the first picture indicates two out of three. Here, if two objects are divided equally among three people, the question for the children to form is how much each one of them will get. Similarly, prepare appropriate questions for all the fractions given in the picture individually and improve them in groups. Here there are opportunities for peer assessment and teacher assessment which should be utilized to the maximum.

One fraction several forms

- ◆ Have each child write the fraction form that represents what is coloured in each picture given in the textbook. Then check these in the group to make sure that they are correct. Have the children present the common characteristics of these fractions. As a result of group discussion, all these fractions can be found to be equal. The activity can be presented to the class in a way that convinces them that all the fractions that have been cut and coloured are of the same size. After this, the activity of finding more equal fractions can be given by writing all the fractions found to be equal in order. In this way, each child writes fractions that are equal to $1/2$. They will recognize the characteristics of their numerator and denominator and the teacher can formulate this through a discussion. It be also useful to form the general idea that the denominator of all fractions equal to one-half is twice the numerator?
- ◆ When $1/2$ is written as equal fractions, the operation can be to write the denominator at one stage and write the numerator at another stage. It will be more useful for conceptualization.

$$\frac{1}{2} = \frac{10}{20}, = \frac{12}{24}, = \frac{40}{80}, = \frac{\dots}{100}, = \frac{\dots}{50}, \dots\dots\dots$$

Different ways

- ◆ It can be understood at a glance that the colour is given to half of the total.
- ◆ How can this fraction be expressed as an equivalent fraction, that's the problem here. This will not be difficult for children to do themselves. Asking appropriate questions

to struggling children will lead to problem-solving.

- For example, how many equal parts are there?
- Can it be said any other way?
-

Equivalent fractions for 1/3

- ◆ Children first check whether the numbers are written correctly by looking at the coloured picture. Through discussion, we ensure that all these are fractions equal to one-third. Then the children write fractions equal to one-third for themselves. Everyone asserts why fractions written this way are equal to one-third?
- ◆ Appropriate questions by the teacher will help in deriving the relationship between fractions equal to 1/3.
- ◆ At this stage, it is concluded that the numerator and denominator of a fraction multiplied by the same number will be an equivalent fraction to the first fraction.

Multiply

$$\frac{2}{3} \xrightarrow{\times 2} \frac{4}{6} \xrightarrow{\times 2} \frac{8}{12}$$

Write the equivalent fraction

- ◆ Children can find equivalent fractions by multiplying the numerator and denominator of a fraction by the same number. However, writing the equivalent fraction 500/1000 requires more discussion. Here we must draw the conclusion that just as the numerator and denominator are multiplied by the same number and divided by the same number, the result is an equivalent fraction.

$$500/1000 = 500 \div 10 / 1000 \div 10$$

- ◆ An equivalent fraction becomes much easier if you can find the relationship between the numerator and the denominator of the number to be written. For example, in the fraction 500/1000, the denominator is twice the numerator, so if we write the denominator in such a way

that it is twice the numerator, we can conclude that it will always yield an equivalent fraction.

Same denominators

- ◆ This activity is to find and write equivalent fractions that have the same denominator for two different fractions. Children can find this by writing a few equivalent expressions for a given fraction. At the end of this activity, children should be able to find and write an equivalent fraction for a given fraction that has a fixed denominator.

$$\frac{2}{8} = \frac{\square}{16}$$

- ◆ For example, we want to find a fraction with 16 as the denominator equal to 2/(8). This concept can be easily formulated through a class-level discussions.
- ◆ The problem given at the end of this activity is a bit more challenging.

- Write 4/6 as a fraction with denominator 15

$$4/6 = \quad / 15$$

- ◆ Multiplying the denominator of the first fraction, 6, by a counting number does not yield 15, so we have to consider 2/3, which is an equal fraction 4/6.

$$2/3 = \quad / 15$$

$$3 \times 5 = 15 \quad \text{so} \quad 2 \times 5 = 10$$

$$2/3 = 10/15$$

$$\frac{4}{6} \rightarrow \frac{\square}{15} \quad \rightarrow \quad 4 \times 15 = 6 \times ?$$

It can also be thought of this way

Let's add

- ◆ Here we present the case where fractions with the same denominator need to be added. In this case, the addition will be recognized and found using ribbon, paper strip etc. to see the sum. This can then be done as a colouring activity involving the addition of fractions with the same denominator.
- ◆ Let's formulate the concept, in the context of addition; the idea that when the numerator and

denominator come the same as the answer, it means the whole.

Fraction Board

- ◆ In the activity using the fraction board, the teacher first has to help the children find the answers to the problems displayed on the fraction board. Then each child should prepare their fraction board and use it to add fractional numbers. An accurate understanding of fractions and the concept of their sums helps children become more proficient when making your fraction board.

At the zoo

- ◆ This activity introduces the context of the addition of fractions. This context should be recognized as addition and it should be completed with the help of pictures or paper strips. The following table gives the answers obtained when adding fractions with the same denominator. It is necessary to check this table and find out how to add easily fractions with the same denominator through discussions. By improving through group discussions, it is realized that for the addition of fractions with the same denominator, it is enough to add only the numerators and keep the denominator the same.

Larger and smaller

- ◆ The next few activities are about comparing fractions. Comparing fractions and figuring out which is larger or smaller is more difficult than comparing simple counting numbers. It should be remembered that it goes through several steps. In the first step, fractions with the same denominator are compared. This is to compare the fractions $\frac{3}{5}$ and $\frac{1}{5}$. If you look at the picture given in the textbook, it will not be difficult to see that the bigger one is $\frac{3}{5}$. At the end of this activity, have the children do the other activities Compare the fractional numbers and put appropriate Signs individually. Children who have difficulty in figuring out which one is bigger, will find

it easier if they draw a picture and check. Similarly, if the activities done individually are discussed in groups, it will be more helpful for the disadvantaged children.

Unit fractions

- ◆ Unit Fraction is a very important conceptualization activity regarding the comparison of fractions. The easiest way to compare unit fractions is to use a fraction board. Using the fraction board provided in the textbook, children can tell very quickly that a fraction is larger or smaller. Each child can easily tell which of the unit fractions is larger if each child makes the fraction board himself/herself. Considering a few unit fractions, to determine the larger one, it is enough to check which of these fractions has the smaller denominator. All children come to a conclusion like this, that is, when comparing the unit fractions the fraction with the larger denominator is the smaller one.

Bicycle trip

- ◆ Subtraction of fractions with the same denominator is introduced through this context. Special attention should be paid to this case of subtraction, which compares two numbers and finds which one is greater. The most important of these problems is to recognize that this is a subtraction context. The second step is to do this subtraction operation. Once you recognize that this is a subtraction case, draw a picture representing these fractions and subtract. In the textbook, $\frac{4}{5}$ and $\frac{1}{5}$ are given in pictorial form. If you compare this, you can quickly find out which is one bigger and how much more. Realizing that $\frac{4}{5}$ is $\frac{3}{5}$ more than $\frac{1}{5}$.

Remaining parts

- ◆ This activity introduces another context for the subtraction verb. This context involves removing a specified number from a set. Initially, 8 out of 9 columns were given colour. This subtraction context indicates $\frac{8}{9} - \frac{4}{9}$. Thus if we recognize that this is a subtraction

context and define the verb $8/9 - 4/9$ then things are easy. Just find the difference of two fractions with the same denominator. If necessary, you can also draw a picture at this stage to see the difference. One of the most common situations in practical life for subtraction is taking away a certain number from a group. Formulating the questions that come out of this context also enhances problem-solving skills at this stage.

Complete the table

- ◆ This is an activity to find and write the difference between two identical fractions. In some cases, we are given two numbers and asked to find their difference. In other cases, we are given a number and the difference and the second number is to be found. Group discussion will be more useful to present everyone's arguments and ideas. Let each group examine the table thus found and present how they found the difference between two fractional numbers. If two fractions have the same denominator, then the first conclusion can be formed, that the denominator of the difference is also the same number. Similarly, the numerator of the two numbers will be the difference of the fraction of the given numbers. The concept of subtraction of two distinct fractions is formed by forming such conclusions and presenting them in the class.

One and a bit more

- ◆ This case shows that the interpretation of fractions greater than one is in division form. The fact that one and a half metres of fabric is needed to sew a shirt is represented by the idea that a meter and a half is exactly half of three metres. That is, if one and a half metres and one and a half metres are added together, it will be three metres. Half of three metres is one and a half metres. That is $3 \div 2 = 1\frac{1}{2}$.
- ◆ Subsequent activities should be designed to transform mixed fractions into improper fractions and vice versa. This should be seen as a starting point.

Divided equally

- ◆ This is the operation to convert an improper fraction into a mixed fraction. The fraction is presented in division form and the result is a mixed fraction. Presented here through pictures, groups of children will discuss and present it in the class which will be beneficial for conceptualization. $5 \div 4$ is first $4 \div 4$, then $1 \div 4$, which adds up to $1\frac{1}{4}$. Then the given type of improper fraction can also be converted to a mixed fraction. Here the help of pictures will be useful if needed.

$$10/7 = 7/7 + 3/7 = 13/7$$

Conversion of mixed fraction

- ◆ When converting a mixed fraction to an improper fraction, it is advisable to first write its
- ◆ Numerical part in fraction form and add the remaining fraction to it. Another method can be presented as an easy way through these examples. Let's introduce the method of adding the fractional part by changing the counting number part to ones and writing it in fraction form. Following this, use the method of multiplying the numerical part and denominator then adding the numerator.

$$2\frac{3}{4} = \frac{(4 \times 2) + 3}{4} = \frac{8 + 3}{4} = \frac{11}{4}$$

Mixed Number Improper Fraction

- ◆ Then let the children do the work of converting a mixed fraction to an ordinary fraction and back to an ordinary fraction. Children should be allowed to present the activities they have undertaken on their own to the group and improve on these. Here peer assessment and teacher assessment will be possible.

Let's revisit

- ◆ All these activities can be done by the children themselves. Individual activities can be improved and discussed in groups for peer evaluation and the development of problem-solving skills.

7

Patterns and symmetry

LEARNING OUTCOMES	CONCEPTS	PROCESS
<ul style="list-style-type: none"> Identify odd number sequence, even number sequence, triangular number sequence, Square number sequence, and Fibonacci sequence. Identifying order in number sequences such as odd number sequence, even number sequence, triangular number sequence, square number sequence, and finding next terms by analysis. Identifying the line of symmetry. 	<ul style="list-style-type: none"> The activity of making various patterns using materials collected from the environment. Prepare tangram pictures and solve various puzzles using them. Functions for recognizing symmetry in images. Identifying lines of symmetry in regular polygons, and drawing them. 	<ul style="list-style-type: none"> Recognizing number relationships and finding new words. Patterns are constructed and interpreted using materials collected from the environment. Recognizing symmetry in pictures and able to draw pictures symmetrically.

Introduction

Analyzing numerical relationships and forming conclusions is indispensable in the study of mathematics. Through such opportunities, the development of process skills and problem-solving skills will be developed children will be trained to gather information from different situations that they experience, sort the collected information accurately and analyze it, form conclusions and share their ideas. Effective reasoning is one of the most important promoters of mathematics learning in modern times. The reality is that effective opportunities for this can be found in both individual and group activities. Each child is capable of gathering information from his practical experiences effectively organizing only the information they needed and analyzing it to form conclusions. This unit aims to lay the foundation for future studies related to number theory.

Square pattern

- All children make this type of square patterns using matchsticks. Find out how many matchstick are used in each step in the pattern thus constructed and find the relationship between the number of squares in each picture and the number of matchsticks. Such concepts are enhanced through group discussion and effectively interpret relationships in odd number sequences.

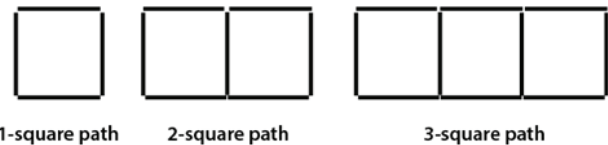


Figure	1	2	3	4	5			
Total matchsticks	4	7	10	13				

- It is recognized that each term is obtained by adding one to three times the fixed position.

Triangular numbers



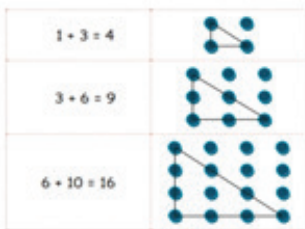
- ◆ Let all the children form this number sequence using beads and small square pieces of paper. Through observation and discussion, they should form the conclusion that triangular numbers are the sum of consecutive counting numbers.

$$\begin{aligned} 1 &= 1 \\ 1 + 2 &= 3 \\ 1 + 2 + 3 &= 6 \\ 1 + 2 + 3 + 4 &= 10 \end{aligned}$$

- ◆ The fourth triangular number to be formed is $4 \times 5 \div 2$
- ◆ By writing this number sequence, the conclusion is formed that the sum of two adjacent triangular numbers is a square number.
- ◆ New conclusions can be formed by asking what is special about the sum of adjacent triangular numbers.

$$\begin{aligned} 1 + 3 &= 4 \\ 3 + 6 &= 9 \\ 6 + 10 &= 16 \end{aligned}$$

By writing this number sequence, the conclusion is formed that the sum of two adjacent triangular numbers is a square number.



Square numbers

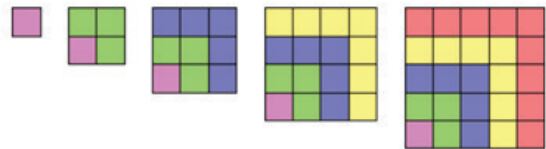


- ◆ Have all the children form a square number pattern using unit squares. A conclusion must be drawn as to how many unit assemblies will there be in each subsequent figure.

$$\begin{aligned} 1 &= 1 \times 1 \\ 4 &= 2 \times 2 \\ 9 &= 3 \times 3 \end{aligned}$$

.....

- ◆ And so on, all children will form the conclusion.
- ◆ Then given in the textbook is the pattern indicating the relationship of square numbers to odd numbers.



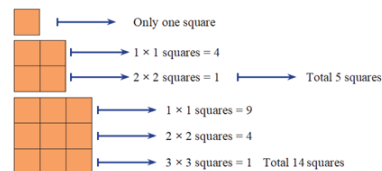
$$\begin{aligned} 1 + 3 &= 4 \\ 1 + 3 + 5 &= 9 \\ 1 + 3 + 5 + 7 &= 16 \end{aligned}$$

.....

- ◆ By completing the table in this way, all children form the conclusion that the sum of consecutive odd numbers is a square number.

Counting the squares

- ◆ The problem here is how many squares there are in total in a grid of 5 x 5. Analyzing this problem utilizes “Taking a Simple Case and Making a Patterning” method, one of the most important strategies in problem-solving.
- ◆ Have all the children complete this table by looking at the pictures given in the textbook and then by analyzing the table they should be able to find out how many squares there are in a 6 x 6 grid.



We can make a table using this data.

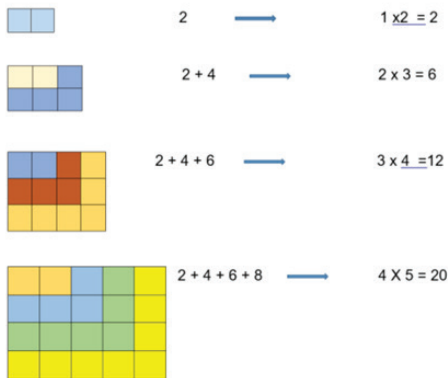
Grid size	1x1 squares	2x2 squares	3x3 squares	4x4 squares	5x5 squares	Total squares
1x1	1					1
2x2	4	1				5
3x3	9	4	1			14
4x4						
5x5						

$$\begin{aligned}
 1 &= 1 \\
 1 + 4 &= 5 \\
 1 + 4 + 9 &= 14 \\
 1 + 4 + 9 + 16 &= 30 \\
 &\dots\dots\dots
 \end{aligned}$$

- ◆ Thus a pattern involving the sum of consecutive square numbers should be formed.

The sum of first even numbers

- ◆ Children know about the even number pattern. They already understand that an even number pattern is twice a consecutive counting number. This activity presents a pattern involving the sum of even numbers. The relationship between the numbers in this pattern is formed with the help of pictures and tables given in the textbook.

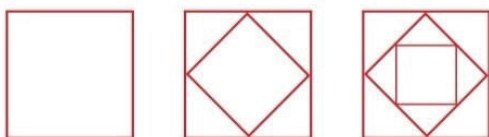


Number of first even numbers	Sum
1 (2)	2 (1 x 2)
2 (2,4)	6 (2x3)
3 (2,4,6)	12 (3x 4)
4(2,4,6,8)	20 (4x 5)
5 (2,4,6,8,10)	30 (5x6)

- ◆ 2,6,12,20,30.....and so on forming a new pattern.
- ◆ Completing this activity develops the ability to find terms in a pattern that includes the sum of even numbers in a given position.

Patterns in area

- ◆ Have all the children do this activity using graph paper.



- ◆ Find and list the area of each figure.
- ◆ The area of the inner square in the second figure is the correct half of the first figure.

Fibonacci sequence

- ◆ The Fibonacci sequence is a numerical sequence that has a lot to do with natural phenomena. It is used to explain the number of petals, the number of cells in a beehive, and the arrangement of thorns on a palm fruit etc.



- ◆ 0,1,1,2,3,5,8,13,21.....
- ◆ Children should recognize that an adjacent term is the sum of two adjacent terms.

Tangram puzzle pieces

- ◆ Children are already familiar with tangram pictures. Children will find answers to problems in the textbook individually. Further questions can be raised in this context that lead to the concept of symmetry.



- ◆ Ask them to prepare more charts by cutting out tangram pieces on coloured paper and displaying them in class.



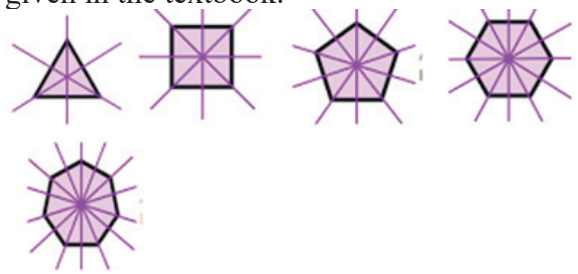
Line of symmetry

- ◆ The activity of finding the line of symmetry can be done on a group basis in the classroom. Give the children a few pictures and a plain mirror to do this activity themselves. Specifics should be identified and presented.

How many lines of symmetry does a circle have?

- ◆ You can find out how many lines of symmetry each regular pole has by looking at the pictures

given in the textbook.



- ◆ The end of this activity can be a discussion of how many line symmetry a circle can have. It can be concluded that each line drawn through the centre of the circle is a line of symmetry.
- ◆ Since a circle can draw many lines through its centre, it must be concluded that a circle has an infinite number of lines of symmetry.

