GRADE - 1

edufy publications

Semester 2

TEACHERS RESOURCE MANUAL

MATHEMATICS
Grade 1

7 NUMBERS UP TO 20 TWINKLING THE TWENTY WORLDS

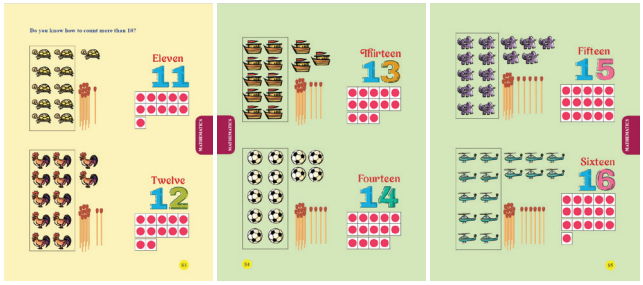
Children already know how to count and write numbers from 1 to 10 and addition and subtraction of single digit numbers. Now, we're going to learn some new numbers and explore how they connect with those we already know!

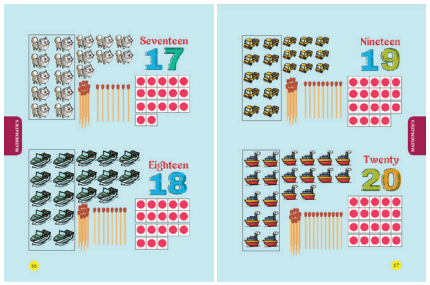
1. Recap with Familiarity: Begin by revisiting numbers 1-10. Ask children to count objects around the room or use items like blocks or beads to help reinforce their knowledge.
2. Building on 10: Explain that after reaching 10, we can keep counting by adding just one more each time. Introduce 11 as "ten plus one more," 12 as "ten plus two more," and so on.
3. Visual Representation: Use visual aids such as a number line from 1 to 20, showing how 11-20 are simply the next steps on the line after 10. Count along together, pointing to each number as you go.
4. Hands-On Activities: Involve them in activities like counting small groups of objects up to 20, matching numbers with objects, and filling in missing numbers on a number line up to 20.

Ideas and Perceptions:	Process and Operations	Learning Achievements
1. Understanding Place Value: ♦ Children begin to grasp the concept of place value, recognizing that numbers between 10 and 20 consists of "10 and some more." For example, 14 is understood as one set of 10 plus 4 more. This introduces them to the base-10 number system. **2. Counting Forward and Backward:** ♦ Learning to count up to 20 helps children refine their ability to count forwards and backwards. This also enhances their fluency with numbers and prepares them for operations like addition and subtraction.	**Concrete Manipulatives:** ♦ Using objects like sticks, beads, or counters help children visualize quantities, especially when crossing the 10- mark. **Interactive Activities:** ♦ Children engage in games, counting exercises, and hands-on tasks that involve numbers ♦ 10 to 20, ensuring active participation in the learning process. **Progressive Challenges:** ♦ Gradually increasing the complexity of counting tasks, such as skip counting or solving simple math problems within 20, helps reinforce the concept.	**Counting Mastery:** ♦ By the end of this unit, children should confidently count from 10 to 20 without assistance. **Recognition and Writing of Numbers:** ♦ They will be able to recognize, read, and write numbers from 10 to 20. **Basic Arithmetic Skills:** ♦ Learners will have a basic understanding of adding and subtracting ♦ within this range, especially recognizing sums and differences involving 10. **Understanding of Place Value:** ♦ Children will start recognizing that 11- 19 are composed of ten plus some more, which is a significant conceptual leap in mathematical thinking.

3. Number Sequences and Patterns: ♦ Children observe patterns in numbers, such as the repetition of units digits in 11-19. This reinforces their understanding of regularity in numbers and helps in recognizing number sequences. **4. Grouping and Bundling:** ♦ The concept of bundling (like grouping 10 sticks together) is used to visually demonstrate how numbers beyond 10 are formed. This aids in the understanding of the "teen" numbers and prepares children for future work with larger numbers and operations. **5. Linking Numbers to Real-World Quantities:** ♦ Activities, such as counting objects in sets or groups, help children associate numbers with actual quantities. This also builds the foundation for understanding measurement and quantity comparison. **6. Introduction to Basic Addition and Subtraction:** ♦ As children move from numbers 10 to 20, they start performing simple arithmetic operations within this range, building their confidence in handling sums and differences in this session		♦ This approach to teaching numbers up to 20 ensures that children build a strong foundation in number sense, setting the stage for more advanced mathematical concepts.

- This is the beginning of understanding groups of 10 as they begin learning numbers up to
- 20. By recognizing that the bundle represents 10 sticks, children can visualize the quantity and build a foundation for counting in larger numbers by grouping, such as counting 10, 11, 12, and so on. This approach can also introduce them to the concept of grouping and basic place value (tens and ones)





These pages represent various styles of learning aid for teaching numbers up to 20. Here's a breakdown of what it likely represents:

Groups of Objects:

- For each number (11to20), there are groups of objects (possibly birds, flowers, sticks, and balls) shown in the top left corner. Children can count these items to understand the quantities associated with each number.

Number Representation:

- On the right side, the numbers 11to 20 are shown in both words and numerals. This helps with number recognition and associating the numeral with its word form.

Ten Frames:

- For each number, a ten-frame (a grid with 10 squares) is used, and the boxes are filled with dots. Eleven to Twenty are represented with filled boxes, allowing children to see the number visually. This approach reinforces place value concepts, showing how numbers are built with "ten" and additional "ones."

- **These are the other activities intended to reinforce children's understanding of numbers**

1. Counting Blocks or Cubes

- Use colourful blocks to build towers up to 20. Group blocks in sets of 10 to reinforce the idea of "10 and some more."

2. Number Line

- Display a large number line from 1 to 20 in the classroom. Children can physically move along it or place markers to represent each number as they count.

3. Flashcards

- Use flashcards with numbers on one side and corresponding images (e.g., 15 apples) on the other. This helps children associate numbers with quantities.

4. Ten Frames

- Provide children with ten frames to show numbers up to 10, then combine two frames to reach numbers up to 20. This visual grouping helps with understanding place value and counting.

5. Beads or Counting Sticks

- Use beads on a string or bundles of counting sticks (like the one in the image) to represent quantities up to 20. Children can count the items by touching them.

6. Number Puzzle Mats

- Create puzzles with numbers and corresponding quantities (e.g., pictures of 18 fish) that children can match, reinforcing number recognition and counting.

7. Songs and Rhymes

- Songs and rhymes about counting to 20, add rhythm and repetition, which help with memory. Use familiar tunes to make it more engaging.

8. Counting Books

- Use picture books that focus on counting up to 20, allowing children to count objects on each page.

9. Interactive Digital Tools

- Use educational apps or digital games that involve counting and number recognition up to 20. Some apps allow children to touch numbers in sequence, enhancing engagement.

10. Real-Life Objects

- Gather small objects like buttons, pebbles, or toys. Group them to represent numbers up to 20, and let children count them during hands-on activities.

11. Magnetic Numbers

- Provide magnetic numbers on a board, allowing children to arrange and count them from 1 to 20. This helps with number sequencing

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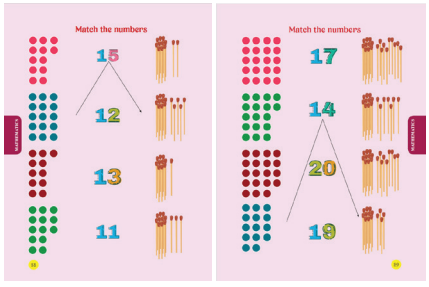

This activity is designed to help children match numbers to their visual representations using counting groups. Here's a breakdown of how it works:

1. Left Side - Dot Groups:

- The left side has groups of coloured dots organized in rows. Each group represents a number from 11 to 20. Children can count the dots in each group to identify the total and match it with the corresponding number on the right.

2. Center- Target Numbers:

- The center of the activity shows the numbers 15, 12, 13, and 11, which are meant to be matched with the corresponding dot group or matchstick bundles.

3. Right Side - Matchstick Bundles

- On the right, there are groups of matchsticks bundled together in quantities matching the target numbers. Each bundle or combination of matchsticks represents a number that the children need to count and match with the numbers shown in the centre.

4. Activity Goal:

- Children are supposed to look at each number, count the dots or matchsticks, and draw lines to connect the numbers with their correct visual representation. This helps reinforce counting skills and number recognition by encouraging children to count and match quantities.

This activity is designed to help children practice counting and comparing numbers. Here's how it works:

- Count how many leaves are there in each plant in the pot. After counting the leaves on each plant, children are supposed to write the number in the white circle on each pot. This helps reinforce counting skills and connects

the quantity (leaves) with its numerical representation. "Which plant has more leaves?" Once children have counted and written down the numbers, they can compare the pots to determine which plant has the highest

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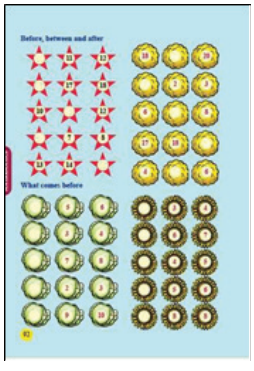
This activity is designed to help children practice addition through story-based problems involving groups of friends.

1. Scenario 1 (Top): Anil has 10 friends. Then asks the question, "Three more friends joined him. Now how many friends does Anil have?" Children are meant to add 3 to 10 and write the answer in the blank.
2. Scenario 2 (Bottom): Sheena has 5 friends. Five more friends joined her. Then asks, "Now how many friends does Sheena have?" Children are expected to add 5 to 5 and write the answer in the blank.



This activity is designed to help children understand number sequences, specifically the concepts of "before," "between," and "after."

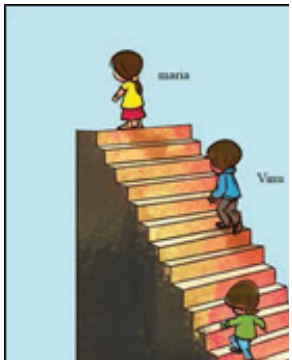
1. Top Section (Stars and Circles):

- In the stars and circles, each shape contains a number. Children are expected to identify the numbers that come before, between, or after the given numbers.
- For example, if the numbers in the stars or circles are 16, 17, and 18, children should identify which numbers come before (15), between (16, 17), and after (19).

2. Bottom Section (Flowers):

- This section may have incomplete sequences where children need to fill in the missing numbers.
- Children can practice finding the next or previous numbers, reinforcing their understanding of counting in sequences.

♦ This activity encourages children to practice counting forward and backward, which builds a foundational understanding of number order and sequencing.



This activity involves a picture of children on different steps of a staircase, and it aims to teach children counting, position identification, and basic subtraction through observation and questioning. Here's a breakdown of the tasks:

♦ **Counting the Steps**: Asks the question, "How many steps are there in this staircase?" Children need to count the visible steps to find the total.

♦ **Identifying Position:** Asks the question, "On which step is Maria standing?" This question encourages children to observe and identify the specific step where each child is located. This helps to reinforce ordinal numbers (1st,

2nd, 3rd, etc.).

Finding the Difference in Position:

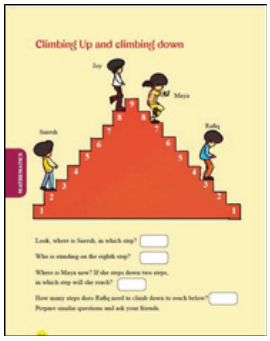
- Another question is, "How many steps does Shyam have to climb to reach the 12th step?" Here, children are encouraged to calculate the difference between Shyam's current position and the target step, practicing basic subtraction.

Counting Backward:

- Ask the next question, "How many steps does Venu have to walk down to reach Shyam?" Children will count or subtract backward to find the answer, further developing their understanding of descending order and subtraction.

Creating Questions:

- The final prompt encourages children to ask their own questions about the image. This task promotes critical thinking and creativity by having children engage with the scene and create their own math-based questions.
- Overall, this activity is interactive and visually engaging, helping children practice counting, ordinal numbers, and simple arithmetic operations in a fun, context-based way.



This activity, titled "Climbing Up and Climbing Down," involves a staircase with children positioned on different steps. It encourages students to practice counting, position identification, and simple arithmetic operations involving steps up and down. Here's a breakdown of the tasks:

Identifying Position:

- Ask the first question, "Look, where is Suresh, in which step?" This requires students to observe and identify the specific step where Suresh is standing, reinforcing the concept of ordinal numbers.

Observation for a Specific Position:

- The second question is, "Who is standing on the eighth step?" Students need to look closely at the image to identify which child is on a specific step, helping them understand positions and observe carefully.

Counting Down:

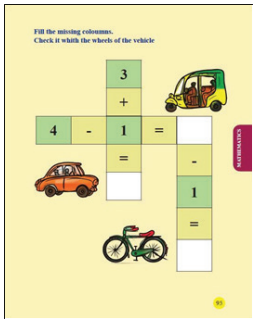
- The next question is, "Where is Maya now? If she steps down two steps, in which step will she reach?" This question involves counting down, helping children practice subtraction by moving Maya down two steps from her current position.

Counting Down Further:

- The final question, "How many steps does Rafiq need to climb down to reach below?" requires students to calculate the number of steps Rafiq needs to descend to reach the bottom, reinforcing subtraction through backward counting.

Creating Questions:

- Similar to the previous activity, this one also encourages students to create their own questions and ask them to their friends. This promotes critical thinking and reinforces their understanding by formulating questions based on the picture.
- Overall, this activity is designed to help children practice counting, position identification, and basic addition and subtraction in a visually engaging way. It also helps them develop spatial awareness by thinking about steps in terms of going up and down.



This activity involves filling in missing numbers in a cross-shaped math puzzle using basic addition and subtraction. The theme includes different types of vehicles, each with a specific number of wheels, which adds a visual and contextual element to help young learners understand and verify their answers. Here's an explanation of the tasks involved:

Completing the Puzzle with Addition and Subtraction:

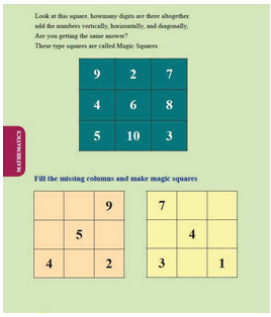
- The puzzle has empty squares where children need to insert the correct numbers based on the given equations. For example, they might need to figure out what number goes in the blank square to satisfy the equation 3+?=43 +? = 43+?=4 or ?-1 =1? - 1 = 1?-1=1.

Vehicle and Wheel Count Association:

- The vehicles shown (auto-rickshaw, car, and bicycle) have different numbers of wheels: an auto-rickshaw typically has 3 wheels, a car has 4 wheels, and a bicycle has 2 wheels.
- Students are encouraged to use the wheel counts of these vehicles as a way to check their answers. For instance, they could associate the number 4 with the car, the number 3 with the auto-rickshaw, and the number 2 with the bicycle to reinforce their understanding of the solution.

Encourages Counting and Verification:

- By connecting math problems with real-life objects (vehicles), children can use the wheel counts as a practical verification method, linking abstract numbers with tangible items they're familiar with.
- This approach encourages students to practice addition and subtraction while associating their answers with something concrete, which can enhance retention and understanding.
- Overall, this activity combines basic arithmetic practice with real-world associations, helping young learners reinforce their math skills in a fun, interactive way.



This activity introduces children to the concept of "Magic Squares," which are special arrangements of numbers in a grid where the sums of each row, column, and diagonal are equal. This activity helps children develop problem-solving skills, understand patterns in numbers, and practice addition.

Here's how the activity works:

Understanding the Magic Square:

- The first part presents a completed 3x3 magic square with numbers arranged so that the sum of each row, column, and diagonal is the same.
- Students are prompted to count how many digits are there altogether and then check if each row, column, and diagonal adds up to the same total.
- This introduces them to the "magic" of the magic square and encourages them to observe patterns in addition.

Filling Missing Numbers:

- Below the completed magic square, two incomplete 3x3 grids are provided. Each has several missing numbers.
- Students are asked to fill inthese missing numbers to make them into magic squares, ensuring that each row, column, and diagonal has the same sum.

Practicing Addition and Logical Thinking:

- To complete these magic squares, children need to use addition to determine which numbers can go in the blanks to achieve equal sums across all directions.
- This activity encourages logical thinking as students must figure out which numbers will balance each row, column, and diagonal to achieve the "magic" property.

- By engaging in this activity, students practice addition and develop an understanding of balanced numerical patterns. Magic squares can be a fun and challenging way for children to work on arithmetic and pattern recognition.

- This board represents a classic "Snakes and Ladders" game adapted to a number sequence from 1 to 19, aimed at helping children practice counting and basic number concepts. Here's how to explain the game to children:

Objective:

- The goal of the game is to move from the starting point (1) to the finish (19). The first player to reach 19 wins the game.

How to Play:

- Starting Point: All players start at square 1. Players can roll a dice or use a spinner to determine the number of steps they move on each turn.

Moving Forward:

- Each player takes turns rolling the dice and moves forward the number of spaces shown on the dice.
- For example, if a player rolls a 3, they move their token forward by three spaces.

Snakes:

- If a player lands on a square with a snake's head (e.g., 18 or 8), they must slide down the snake to the square where its tail ends.
- For instance, landing on square 18 would send the player back to square 6, and landing on square 8 would send them back to square 3.

Ladders:

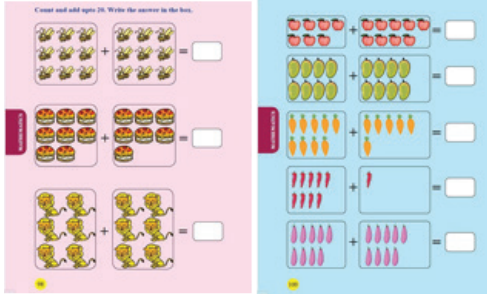
- If a player lands on the bottom of a ladder (e.g., square 3 or 12), they get to climb up the ladder to the square at the top.
- For example, landing on square 3 allows the player to climb up to square 6, and landing on square 12 moves them up to square 17.

Winning the Game:

- The first player to reach or exceed square 19 is the winner.
- If a player's roll would take them past 19, they only move the number of steps required to reach exactly 19.

Learning Benefits:

- **Counting Practice**: As children move along the board, they practice counting forwards and backwards.
- **Following Rules and Turns**: Taking turns and following game rules reinforce social skills and patience.
- **Basic Addition**: Adding the number on the dice to their current position encourages basic addition skills.
- **Observation and Strategy**: Players learn to observe where the snakes and ladders are, which can add a strategic element as they anticipate moves.



These Two worksheets (page No 98& 100) are designed to help children practice counting and addition up to 20. Each row contains groups of items that children need to count and then add together to find the total. Here's how the activity works:

- **Counting Items**: Each row displays two groups of items (such as bananas, cakes, or monkeys). The first step for the children is to count how many items are in each group separately.

Adding the Counts:

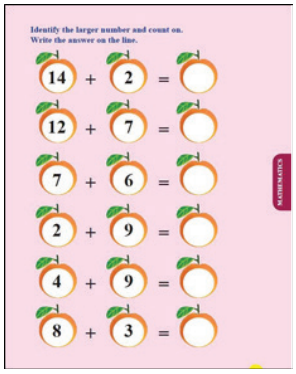
- Once they have counted each group, children add the two numbers together to find the total.
- This encourages them to apply basic addition skills with visual objects, which helps in making the math more concrete and relatable.

Writing the Answer:

- After adding the two groups, children write the total in the box provided on the right side of each row. Count 7 + 7 and write 14 in the answer box. For the third row, if there are groups of monkeys, each containing 8 monkeys, they will count 8 + 8 and write 16 in the answer box.

Learning Objectives:

- **Counting Skills**: Children practice counting items in groups.
- **Addition Practice:** By adding the counts of two groups, children strengthen their addition skills.
- **Visual Learning**: The use of pictures helps to make abstract addition concepts more 12 concrete, especially for young learners.

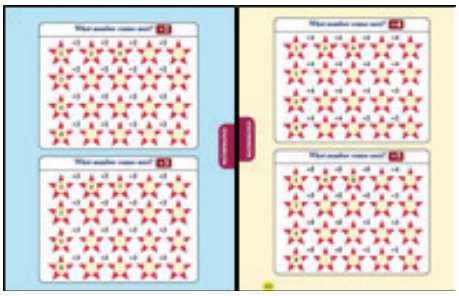


This worksheet helps children practice addition by encouraging them to identify the larger number and then "count on" by adding the smaller number to it.

Instructions:

1. For each problem, children should identify the larger number in the addition problem.
2. They then "count on" by adding the smaller number to the larger number.
3. The final answer is written in the orange circle next to each equation.

- This method reinforces the concept of counting on from a larger number, making addition quicker and easier for young learners.



These activities are designed to help children practice counting and recognizing number patterns by following addition sequences. Each grid presents a series of numbers that increase by a specific amount, indicated by the symbols at the top of each box.

Learning Objectives:

- **Understanding Number Patterns**: These activities help children recognize and continue numerical patterns based on a fixed addition rule.
- **Counting Practice:** By adding consistent increments, children improve their counting and addition skills.
- **Pattern Recognition:** Identifying patterns reinforces logical thinking and prepares children for more advanced arithmetic concepts.

- These activities are great for practicing sequential addition and understanding how numbers increase in fixed increments

Explanation of Each Activity:

1. +2 Pattern:

- The first grid uses a +2 pattern, meaning that each subsequent number is obtained by adding 2 to the previous number.
- Children identify the pattern and figure out what number comes next by adding 2 repeatedly.

2. +3 Pattern:

- The second grid uses a +3 pattern, where

each number increases by 3.

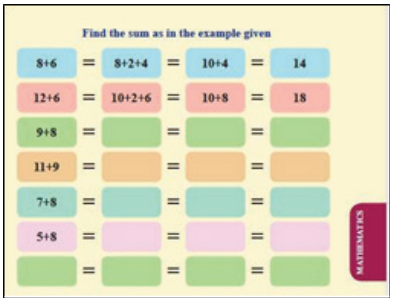
- Students continue the pattern by adding 3 to each previous number to find the next number in the sequence.

3. +4 Pattern:

- The third grid uses a +4 pattern, where each number increases by 4.
- Children add 4 to each number to determine what comes next, reinforcing addition with larger increments.

4. +5 Pattern:

- The fourth grid follows a +5 pattern, where each number is the previous number plus 5.
- Students apply the +5 rule to continue the sequence.



Learning Objectives:

- Mental Math and Decomposition: This activity teaches children to decompose numbers, making it easier to add by creating simpler steps.
- Addition Practice: By practicing addition in parts, children reinforce their basic arithmetic skills.
- Building Confidence with Numbers: This method helps children build confidence in handling numbers by breaking down more challenging sums into manageable pieces.
- This approach to addition helps children develop mental math strategies and provides a structured way to handle larger sums through decomposition.

- This activity is designed to help children practice addition by breaking down sums into smaller parts, as shown in the example at the top of the worksheet. This method encourages mental math skills by decomposing numbers and making the addition process more approachable.

Instructions:

1. Understanding the Example:

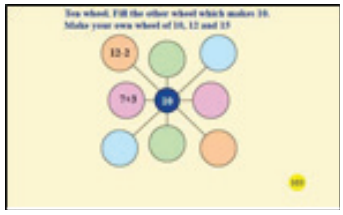
- The first example, 8+6, is broken down into steps:
  - First, it is rewritten as 8+2+4.
  - Then, 8+2 is calculated to make 10, and 10+4 is added to get the final sum of 14.
  - This example demonstrates how to decompose numbers for easier addition by making 10, a common mental math strategy.

2. Applying the Strategy:

- For each of the following sums, children are encouraged to break down the numbers similarly.
- They will separate each problem into parts, aiming to reach 10 or another convenient number, and then complete the addition step by step.

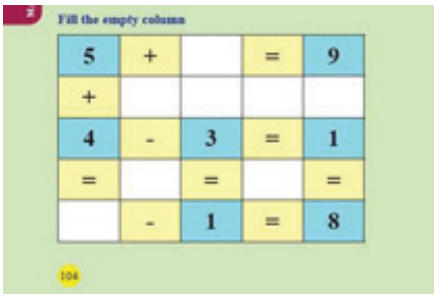
3. Filling in the Boxes:

- Children will write each intermediate step in the blank boxes provided, following the example pattern.
- Finally, they write the total in the last box of each row.

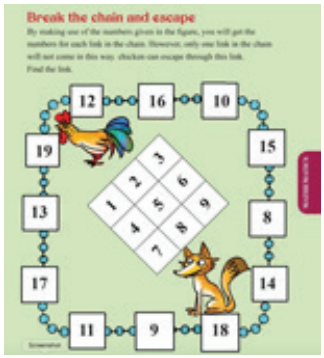


This activity helps children practice addition by finding pairs of numbers that add up to a target sum, which is 10 in this example. The structure encourages mental math and reinforces the concept of pairs that total to a specific number. Let Children make their own number wheels using the numbers 12 and 15

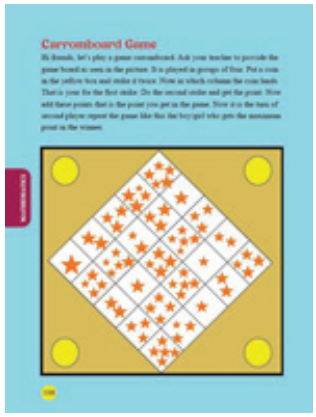
- This activity appears to involve a fun and engaging way for children to practice solving basic arithmetic problems, possibly as part of a scavenger hunt or a "math chase" game. The image shows a rabbit and several math problems written on pieces of paper. Here's how this activity could be structured:
- This activity combines math with movement or storytelling, making arithmetic practice more interactive and enjoyable for young learners.



- This activity is a math puzzle designed to help children practice addition and subtraction by filling in missing numbers in a grid. Each row in the grid contains an incomplete arithmetic equation, and the objective is to determine the correct numbers to complete each equation.



- This activity presents a fun story where a chicken needs to escape from the chain. Here's a story to engage children while solving the puzzle:
- Once upon a time, there was a clever little chicken who found himself trapped in a magical chain. Each link in this chain had a number, carefully set up to prevent his escape. But there was danger! On the other side of the chain sat a sly fox, licking his chops, eagerly waiting for a chance to pounce.
- The chicken was worried but determined to escape. He examined the chain closely and noticed something interesting-a special 3x3 square in the middle, filled with the numbers 1 to 9. He realized that each link around the chain was the result of adding two numbers from this square.
- His eyes lit up with hope as he thought, "If I find the link that doesn't match any of these sums, that must be the missing link theone opening through which I can escape!"
- With a flutter of feathers, the chicken called out, "Dear children, help me check each number in the chain! Let's compare them to the possible sums from the square. When we find the one that doesn't fit, we'll have my way out!"
- Now, it's up to the children to help the brave chicken find the odd link, break the chain, and make him escape from the hungry fox!



- Here's how to play the Carrom board Game as shown in the instructions:
- **Setup**: Gather a group of four players, as this game is designed to be played in a group.
- **Game Board**: The game board, as shown in the image, has a grid filled with squares containing orange stars. Each square represents a score based on the number of stars in it.

Starting the Game:

- Each player takes turns. Place a coin in one of the yellow circles (the starting point).

First Strike:

- Flick or strike the coin so it lands on a square within the grid.Note the column where the coin

lands. This column's score (based on the stars in the square) is your first score.

Second Strike:
Strike the coin again to land on another square within the grid.Note the column and score for this strike as well.

Calculate Points:

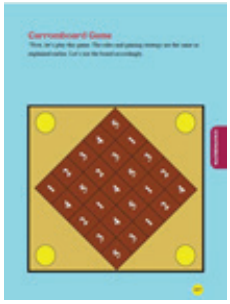
- Add up the stars from the two squares where the coin landed during your two strikes. This total is your score for the turn.

Next Player's Turn:

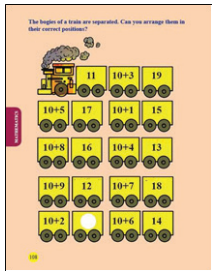
- After you finish, the next player repeats the process, aiming to get a higher score.

Winning the Game:

- Each player completes their turns, and the game continues until everyone has had a chance to play. The player with the highest total score (most stars) is the winner.
- The goal is to strike the coin accurately to land in squares with the most stars to get a high score. It's a fun way to practice counting and aiming skills!



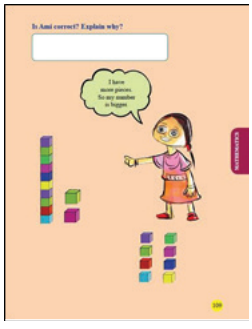
- This game is the same as the game above. In this Carrom board Game, players take turns striking a coin from one of the yellow circles to land on a square within the grid. Each square has a number representing points. After two strikes, players add up the points from the squares where their coin landed. The player with the highest total points wins.



In this activity, children are given a series of train bogies with numbers or addition problems on each. The goal is to arrange the bogies in order from the smallest to the largest, so that they form a connected train.

Here's how it works:

1. Identify Values: Each bogie has either a single number or a simple addition problem (like "10+3" or "10+5").
2. Solve the Addition Problems: For each bogie with an addition problem, calculate the total (for example, "10+3" equals 13).
3. Arrange in Order: After finding all the values, place the bogies in sequence from the smallest number to the largest number to complete the train.
4. Result: When arranged correctly, the train will be in numerical order, showing a smooth sequence of numbers.
    - This activity helps reinforce addition skills and the concept of ordering numbers, making it a fun and an interactive way for children to practice math.



In this activity, a girl named Anu is shown pointing at stacks of coloured blocks, making a comparison to identify which stack represents a larger number. The prompter asks, "Is Anu correct? Explain why."

Here's how the activity works:

1. **Observation**: Children observe the stacks of

coloured blocks shown in the image. Each stack has a different number of blocks.

2. **Counting and Comparison**: They need to count the blocks in each stack and determine which stack has more blocks, thus representing a larger number.
3. **Explanation:** After determining the correct answer, children are encouraged to explain why Anu is correct or incorrect in her comparison, fostering critical thinking and understanding of quantity comparison.
   - This activity helps children practice counting, comparing quantities, and expressing their reasoning in simple terms.

In this activity, children are asked to determine if Anie is correct in her observation as she has balls in two ten frames groups of objects, specifically a set of soccer balls arranged in ten frames. The activity encourages counting and comparing quantities.

Here's how it works:

- **Observing the Groups:** There are two main groups of soccer balls arranged in grids.
- One group, which Anie is pointing to, is fully filled with soccer balls.
- The other group, which another child is pointing to, has some empty spaces without soccer balls.
- **Anie's Statement**: Anie seems to be making a claim or comparison about the number of soccer balls in the two groups.
- Counting and Verification: Children are encouraged to count the soccer balls in each group and determine if Anie's statement is correct.
- **Explaining the Answer**: After counting, children need to explain why Anie is correct or incorrect, helping to develop their reasoning and ability to articulate their thought process.

Patterns

- Teaching patterns to first-grade students help them develop critical thinking and foundational math skills. Recognizing, predicting, and creating patterns improves their understanding of order, sequence, and relationships, which are essential in mathematics and problem-solving. Specifically, learning patterns helps children:

Develop Observational Skills:

- Children learn to observe differences and similarities, an important skill in all areas of learning.

Build Mathematical Thinking:

- Recognizing patterns introduces students to the concept of sequences and structure, foundational for later mathematical concepts like addition, multiplication, and even algebra.

Improve Prediction and Reasoning Skills:

- Patterns help children predict what comes next, developing logical thinking and reasoning.

Enhance Visual and Spatial Awareness:

- Understanding patterns with shapes and colours enhances spatial reasoning, important for geometry.

Explanation of the Patterns in the Examples:

Repeating Patterns of Objects (First Row):

1. In these examples, students are presented with objects like fruits, leaves, and pots arranged in repeating sequences. The goal is to identify the pattern and continue it by filling in the missing items.
2. **Objective:** Recognize and extend patterns based on object repetition, which strengthens their ability to identify regularities.
3. **Repeating Patterns of Shapes (Second Row)**: These exercises use different shapes

(circles, triangles, hearts, etc.) arranged in a specific order. Students are asked to observe and extend the sequences by adding the correct shapes in the blanks.

4. **Objective:** Practice shape recognition and sequencing, helping children learn to identify and predict based on pattern rules.
5. **Direction Patterns (Third Row)**: Here, children see patterns involving arrows pointing in various directions. They must draw the next arrows to complete the sequence.
6. **Objective:** Enhance directional understanding and spatial awareness, as children learn to identify the direction in the sequence.
7. **Complex Shape Patterns (Fourth Row)**: These exercises have more varied sequences involving different shapes and colors, such as alternating geometric shapes and flowers. Children fill in missing shapes and complete the sequence.
8. **Objective**: Recognize more complex patterns, which helps build problem- solving skills by analysing and continuing intricate sequences.
9. **Matching and Sequence Completion (Fifth Row):** This section includes activities where children must match similar shapes and complete sequences in both simple and complex forms.
10. **Objective:** Develop attention to detail and matching skills, which further reinforces understanding of order and similarity in patterns.
    - Overall, these pattern activities are designed to progressively build children's abilities to observe, predict, and complete sequences. They provide a foundation for mathematical concepts and logical thinking that will be useful in higher grades

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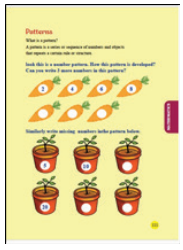
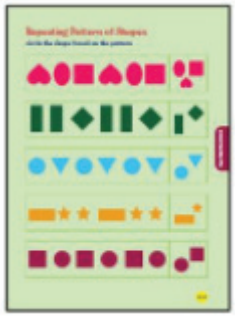
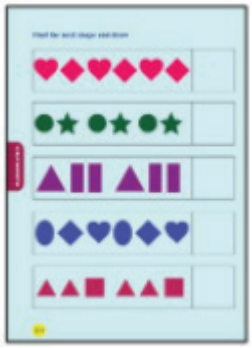


Carrot Pattern:

- The carrots are arranged in a sequence with numbers: 2, 4, 6, 8. The pattern involves adding 2 each time.
- To continue the pattern, children should add 2 to the last number (8), resulting in the next three numbers: 10, 12, and 14.
- The worksheet focuses on identifying and completing patterns of shapes. It consists of rows of shapes arranged in a sequence, with some shapes missing in each pattern. Children are required to:
- **Observe the Pattern**: Look at the sequence of shapes provided.
- **Identify the Rule**: Determine how the shapes are repeating (e.g., by colour, type, or arrangement).
- **Fill in the Missing Shapes**: Complete the sequence by adding the correct shapes in the blanks.
- This activity develops pattern recognition, logical reasoning, and visual-spatial skills in children. It's an excellent way to introduce young learners to the concept of patterns while making learning fun and engaging.



2nd worksheet Instructions



- Observe the sequence of shapes.
- Identify the repeating or logical pattern.

- Determine which shape comes next and draw or select it.
- **Explanation and Answers:**
- Row 1: The sequence alternates between a diamond and a heart:
- Diamond, Heart, Diamond, Heart, Diamond, Heart, ...
  - Answer: Heart.

- Row 2: The sequence alternates between a circle and a star:
- Circle, Star, Circle, Star, Circle,
  - Answer: circle.

- Row 3: The sequence alternates between a tall triangle and a wide triangle:
- Triangle, two rectangles, Triangle, two rectangles...
  - Answer: Triangle.

- Row 4: The sequence alternates between an oval and a diamond:
- Oval, Diamond, Heart Oval, Diamond, Heart,
  - Answer: Oval.

- Row 5: The sequence alternates between a single triangle and a pair of triangles:
- Pair of Triangles, square. Pair of Triangle, square,
  - Answer: Pair of Triangle.

- This worksheet helps children recognize patterns and develop logical reasoning.

8 TIME - A JOURNEY THROUGH PAST, PRESENT AND FUTURE

Introduction to Time for First Standard Students

Before teaching the concept of telling time, it's important to introduce some foundational ideas to ensure that the students are ready. The goal is to help them develop an understanding of sequences, routines, and basic number skills. Here's a structured approach:

1. Understanding Daily Routines

- Begin by discussing the concept of daily activities in sequence. Use relatable examples from their own lives to build awareness of how time is part of their daily routines.

Interactive Discussion:

- "What do you do when you wake up?"
- "What happens after breakfast? When do you go to school?"

2. Learning the Vocabulary of Time

- Introduce basic time-related words to build familiarity.
- **Key Words:**
  - Morning, afternoon, evening, night
  - Today, yesterday, tomorrow
  - Before, after, now, later
- Activity: Use actions or visuals to illustrate these concepts, such as "What comes before lunch? What happens after school?"

3. Sequencing Events

- Help students to understand the order of events, which is an essential precursor to understanding time.
- **Story Sequencing:**
  - Read a short story or describe a series of events.
  - Ask them to arrange the events in the correct order (e.g., brushing teeth, eating breakfast, going to school).
- **Visual Aids:**
  - Provide a simple set of pictures and ask students to place them in the order of occurrence.

4. Connecting Time to Nature and the Day

- Introduce the natural rhythm of the day and how time relates to it.
- **Activity: Discuss the sun and the moon:**
  - "When the sun rises, it's morning."
  - "When the sun sets, it's evening."
  - Use pictures or simple diagrams to reinforce the concept of day and night.

5. Concept of Duration

- Help them understand the idea of short and long durations.
- **Activity:**
  - Clap hands for 10 seconds and ask, "Was that a short or a long time?"
  - Compare durations with phrases like, "A school day is long; recess is short."

Transition to Telling Time

- Once students are familiar with these prerequisites, you can introduce the clock as a tool that helps us to measure and organize time. Use a toy or real clock to build excitement and curiosity for learning how to read time.
- Would you like a detailed activity plan for any of these sections?
- The prerequisites for teaching students how to tell time include foundational skills and concepts that prepare them to understand the clock and the concept of time measurement. These are essential for ensuring that students grasp the topic effectively

1. Number Recognition

- Students should be able to recognize and identify numbers up to 12 (for the clock face).
- They should understand the order of numbers

and be able to arrange them correctly.

2. Counting Skills

- Ability to count up to 60, as they need this for understanding minutes.
- Skip counting by fives, since clock numbers represent intervals of 5 minutes.

3. Sequencing and Order

- Understanding the concept of "before" and "after."
- Ability to sequence events in chronological order (e.g., what happens first, next, and last).

4. Concept of Parts of the Day

- Familiarity with daily routines and how they fit into time periods:
  - Morning, afternoon, evening, and night.
  - Relating activities to these time periods (e.g., "We eat breakfast in the morning").

5. Vocabulary Related to Time

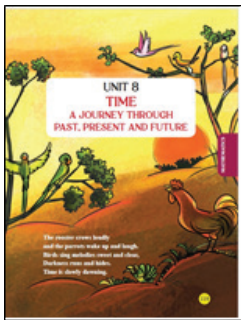
- Basic time-related terms like:
  - Hour, minute, second
  - O'clock, half-past, quarter-past, quarter-to
  - Morning, afternoon, noon, midnight
- Understanding phrases like "now," "later," "earlier," and "soon."

6. Duration and Measurement

- Awareness of short and long durations.
- Basic understanding that time can be measured (e.g., "It takes 1 minute to tie your shoes").

7. Spatial Awareness

- Recognizing positions on a clock face (top, bottom, left, right).
- Understanding the circular layout of a clock.



- This image appears to be an introduction to **Unit 8: Time - A Journey Through Past, Present, and Future**, focusing on the concept of time in an engaging and relatable way for students.

Poetic Text:

- The poetic description emphasizes how time is experienced through nature:

"The rooster crows loudly" signals morning.

"Parrots wake up and laugh" and "Birds sing melodies" illustrate the start of activity.

"Darkness runs and hides" signifies the end of night.

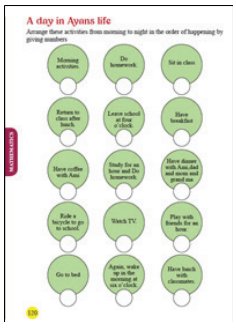
- "Time is slowly dawning" introduces the idea that time is constantly moving and aYects our lives.

Learning Theme:

- The text introduces time as a natural cycle that can be observed and experienced.
- It sets the stage for exploring time in three dimensions: **past, present, and future**, which are central to understanding the flow of events in life

Purpose:

- This introduction is likely designed to:
  - Spark curiosity in students about how time influences life.
  - Build a bridge between the natural observation of time (day and night cycles) and the formal study of measuring and understanding time.
  - Provide a poetic and imaginative way to ease students into the topic of time.



- The Activity titled "A Day in Ayans Life" likely outlines a sequence of daily activities, aiming to teach students the concept of sequencing events in chronological order. This activity helps students connect daily routines with the passage of time and introduces the idea of organizing tasks or activities based on the time of day.

Chronological Order:

- Activities like waking up, brushing teeth, eating breakfast, going to school, doing homework, and bedtime are arranged step-by-step.
- This provides a practical context for introducing terms like morning, afternoon, evening, and night.

- This activity is designed to help students think critically about the concept of time duration by comparing everyday activities. It encourages them to evaluate and categorize activities based on how much time they take to complete each activity.
- Washing hands, Playing football, Cycling, going to school Talking on the phone, Studying
- Students are prompted to consider which activities take more time or less time and make a decision for each.

Objectives:

- To help students develop an understanding of short and long durations and to enhance their ability to relate activities to time taken in real life. Time estimation and logical reasoning by comparing the time required for different tasks.

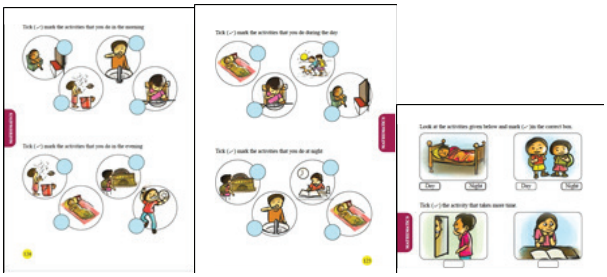
How to Implement:

- Discuss each activity with the students and ask them how long they think it might take (e.g., seconds, minutes, or hours).Let them classify the activities into "short duration" or "long duration. Use examples from their daily lives to reinforce the idea (e.g., "Does studying take more time than washing hands?")

- This activity focuses on teaching students the concept of sequencing events by observing and arranging them in the correct order of occurrence. The top section depicts the life cycle of a hen, including stages like laying an egg, hatching, and the growth of a chick into an adult hen. Students are required to analyse the images and write the stages in the correct sequence. The bottom section illustrates the process of blowing a balloon until it pops, broken into smaller actions. This visual and interactive task helps students practice logical reasoning and understand how events progress step by step. It strengthens their ability to arrange actions or events chronologically, a foundational skill for time-related concepts.

- This activity helps students associate daily activities with specific parts of the day: morning, afternoon, evening, and night. It includes a list of common tasks such as waking up, eating lunch, playing with friends, and

watching TV. Students are required to match each activity to the appropriate time of the day by writing the correct time period in the blanks provided. This task reinforces their understanding of how time divides the day into segments and helps them relate their own routines to these periods. It encourages time awareness, logical thinking, and strengthens their ability to sequence activities in a day.



- This activity is designed to teach students sequencing skills by arranging daily activities in the correct order. The top section displays a series of pictures illustrating a child's morning routine, such as waking up, brushing teeth, eating breakfast, and packing a school bag. Students are tasked with identifying and writing the correct sequence of events. Similarly, the bottom section focuses on evening activities, such as playing, studying, eating dinner, and going to bed. By completing this activity, students develop an understanding of logical order, time management, and the ability to structure events chronologically based on their daily life. It helps build foundational skills for understanding the flow of time and routines.
- The second worksheet activity is designed to help students differentiate between activities performed during the day and those performed at night. Students are required to tick or mark the activities according to the appropriate time of day and night. This exercise enhances their understanding of daily routines, builds time-awareness, and helps them relate their own activities to specific parts of the day. It also reinforces the concept of organizing events in chronological order..
- Children are likely expected to identify whether an activity happens at night or day and mark it correctly based on the labels.
- The child should compare the two activities and decide which one generally takes more time, then mark it with a tick.

The days of a Week

Sunday starts a brand new week,
Monday comes with work to do.
Tuesday comes, a joyful sight.
Wednesday's hump we climb with glee,
Thursday whispers, "nearly there,"
Friday's cheer, the weekend's near,
Saturday arrives, free and clear,
A week of wonders, big and small,
Seven days, a precious gift to hold,

126

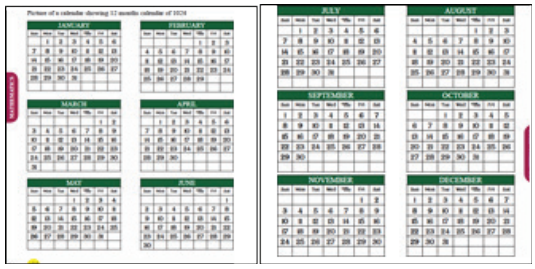
- It is a poem titled "The Days of a Week." It describes each day of the week with a unique characteristic or mood, starting from Sunday as a fresh start, Monday as a workday, Tuesday as joyful, Wednesday as the midpoint of the week, Thursday with anticipation, Friday as the gateway to the weekend, and Saturday as a free and clear day. The poem concludes by highlighting the week as a precious gift with seven days to cherish. It's a light, rhythmic reflection on the progression of the week.

- This activity focuses on teaching children about the sequence of days in a week and understanding the concepts of **yesterday, today, and tomorrow**. Here's a brief explanation:

Second Section:

- Below, there are lines for each day of the week (Monday, Tuesday, Wednesday, Thursday).
- The instruction is likely for students to write down specific activities or tasks they usually do on those days, encouraging them to think about their routines.
- This activity helps children understand the chronological order of the days, introduces

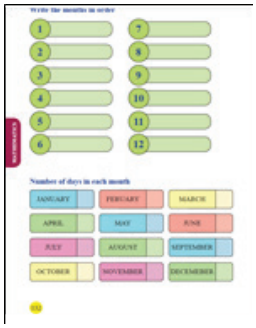
temporal concepts (yesterday, today, tomorrow), and connects the abstract idea of time to their personal experiences. It reinforces sequencing, comprehension, and planning skills in an engaging and practical way.



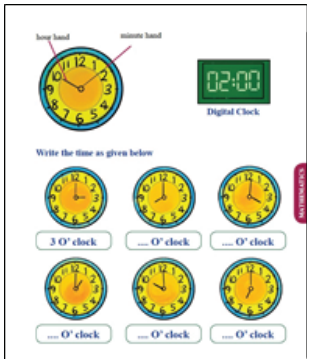
- To teach children how to read and use a calendar like the one shown above. Start by introducing the concept of a year divided into 12 months and each month having weeks and days. Begin by pointing out the names of the months and explaining the sequence of months from January to December. Highlight how weeks are divided into seven days, and show where the weekdays and weekends fall. Use real-life examples, such as finding a child's birthday or counting the days upto a holiday, to make the activity relatable. Encourage students to practice locating specific dates and observing patterns, such as identifying months with 30, 31, or 28 days. You can also introduce exercises like marking important events, calculating the diYerence between dates, or understanding weekdays based on the calendar. This approach ensures both familiarity and interactive learning.

- This activity is designed to help students associate important events with their corresponding months, enhancing their awareness of significant national days and calendar skills. The worksheet displays images representing events such as "Reopening School," "Children's Day," "Teachers' Day," "Republic Day," and "Birthday of Mahatma Gandhi," along with blank spaces where students are prompted to write the month in which each event occurs. This activity combines visual cues and text to reinforce learning through identification and recall, encouraging students to relate these culturally significant occasions to specific times of the year.

- This activity introduces children to various festivals and special occasions through illustrated scenes, helping them identify and connect with cultural events like Ramsan (Eid), Onam, Christmas, Independence Day, and Birthdays. Each image represents key aspects of the celebration, and students are tasked with writing the name of the festival or occasion in the blank space above each illustration. The activity encourages discussions about the significance, traditions, and ways these events are celebrated, fostering cultural awareness and inclusivity. It also allows children to relate these occasions to their personal experiences, enhancing their understanding of community, diversity, and shared celebrations.



- This activity is designed to teach students the sequence of months in a year and familiarize them with the number of days in each month. The first section prompts students to write the months in order from January to December, reinforcing the chronological arrangement of months. The second section provides a color-coded list of months, encouraging students to recognize and recall the duration of each month (e.g., 30 days, 31 days, or February's unique count of 28/29 days). This dual focus on sequence and duration helps students develop a clearer understanding of the calendar and enhances their organizational and memorization skills.



- This activity is designed to help students learn how to tell time using both analog and digital clocks. It combines visual recognition, interpretation, and writing skills to ensure students grasp the concept of time-telling effectively. Here's a detailed breakdown of the activity:

Understanding the Components of an Analog Clock:

- At the top of the worksheet, an analog clock is shown with its hour and minute hands clearly labeled.
- This introduces students to the roles of the two hands: the shorter hand indicates the hour, while the longer hand represents the minutes.

Comparison with a Digital Clock:

- Alongside the analog clock, there is an image of a digital clock displaying "2:00."
- This serves as an example to help students connect the analog representation of time to its digital counterpart.

Practice Writing Time:

- Below the examples, several analog clocks are shown, each with its hands set to a specific time (on the hour, such as 3:00, 5:00, etc.).
- Students are required to read the time on each clock face and write the corresponding time in the blanks provided, using the format "O' clock."

9 DATA HANDLING (DRIVE INTO THE WORLD OF INFORMATION)

Objectives

- Students will learn to collect, organize, and interpret data using simple tools like charts, tables, and visuals.

Teaching Strategy:

Introduction to Data:

- Use everyday examples like the number of different fruits in a basket or favourite colours of classmates.
- Show how data can be organized in charts or tally marks.

Interactive Activity:

- Provide a chart with different types of fruits and ask students to count and record the number of each fruit.

Encourage them to answer questions such as:

- Which fruit appears the most/least?
- How many apples and bananas are there together?

Use of Visual Aids:

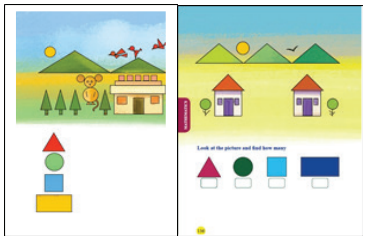
- Introduce bar graphs using examples like students' favourite ice cream flavours.
- Teach students to read and create simple bar graphs.

Group Activity:

- Divide the class into groups and assign a task, like collecting data on types of vehicles seen outside the school.

Assessment:

- Ask students to draw a chart or bar graph based on collected data and interpret the results.



- These activities are designed to help students identify and count shapes, develop their observation and data handling skills.

Explanation of the Activity:

Look at the Picture:

- The image presents a colourful scene containing different shapes arranged as objects (e.g., trees as triangles, a house as rectangles, etc.).

Objective:

- Students need to observe carefully and count the occurrences of different shapes (triangle, circle, square, rectangle).

They must identify:

- The shape that occurs the most. The shape that occurs the least. Steps for the Teacher:
- Guide students to identify individual shapes within the picture. Encourage them to tally the number of each shape they find.
- Use guiding questions like:
  - "How many triangles do you see in the picture?" "Can you count all the rectangles?"
  - "Which shape appears the least?"

1. Expected Outcome:

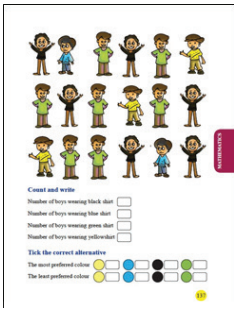
- This activity reinforces counting, categorization, and comparison skills.
- It introduces concepts of data collection and interpretation in a simple, engaging way.

2. Extension Ideas:

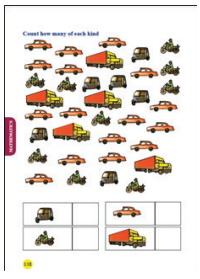
- Ask students to draw a similar picture using their own shapes.
- Create a bar graph to visualize the count of

each shape for further data handling practice.

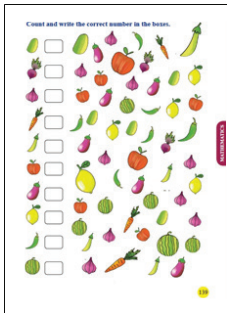
- This activity combines art, observation, and mathematics, making it an effective and fun way for children to learn.



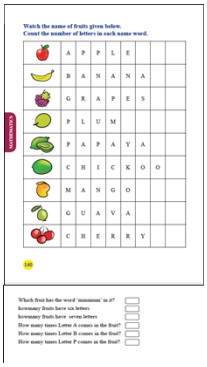
- This activity focuses on visual discrimination, counting, and categorization. The image shows multiple characters wearing different coloured shirts and pants, with students tasked to carefully observe and count how many characters are dressed in specific colours.
- Below the picture, there are blank spaces where students are required to fill in the numbers corresponding to their observations. Additionally, the activity includes a section where students identify the most and least occurring combinations of colours for shirts and pants. This promotes critical thinking, comparison, and basic data handling skills in an engaging way while reinforcing the concepts of sorting and organizing visual information.



- This activity focuses on visual counting and categorization. Children are tasked with identifying and counting the number of vehicles of each type in a given image. The image includes cars, trucks, motorcycles, and vans scattered randomly. Below the main image, there are separate boxes representing each vehicle type, where students write the corresponding counts. This exercise develops observation skills, attention to detail, and the ability to sort and organize data. It's an engaging way to reinforce basic counting and categorization concepts for young learners.



- This activity is designed to help children practice counting and recognizing different types of fruits and vegetables. The image contains a variety of colourful items, such as apples, lemons, carrots, onions, and more, scattered across the page. On the left side, there are blank boxes corresponding to each type of fruit or vegetable. Children are required to carefully count the total number of each item and write the correct number in the corresponding box. This exercise enhances observation, counting skills, and the ability to differentiate between similar shapes and colours, making it a fun and educational way to develop early math and categorization abilities.



- This activity combines letter recognition, spelling, and counting. Children are presented with images of different fruits, and next to each image, the corresponding fruit name is partially filled in, with some letters missing. Students need to identify the fruit, complete its name by filling in the missing letters, and then

count the total number of letters in the word. This number is written in the blank column provided at the end of each row. The task helps children to improve vocabulary, spelling, and counting skills while associating words with visual representations of fruits. This activity encourages children to explore fruit names while engaging in critical thinking, counting, and letter recognition.

- First, it asks which fruit name contains "minimum," number of letter prompting students to carefully analyze the letters within each fruit's name. Then, children identify how many fruits have six letters (e.g., orange) and seven letters (e.g., avocado), building their spelling and categorization skills. They also count specific letters in fruit names: how many times A, B, and P appear, which develops their observation and language abilities. For instance, children may note that A appears multiple times in fruits like "banana" and "papaya." By combining counting, spelling, and letter recognition, this activity integrates literacy and numeracy into a fun and engaging exercise. It promotes critical thinking and reinforces literacy and numerical understanding in a fun and interactive way.

10 NUMBERS MORE THAN 20

- When teaching this, we help children progress from their understanding of numbers 1–20 to explore and work with larger numbers. This unit builds on foundational counting, writing, and understanding numbers to develop further number sense.

Key Objectives:

1. Recognize Numbers Beyond 20:

- Understand the place value system for numbers 21–100.
- Identify the tens and ones in numbers.
- Develop fluency in reading and writing numbers beyond 20.

2. Counting and Sequencing:

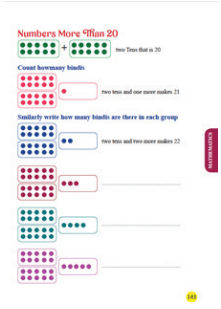
- Count forward and backward starting from any number above 20.
- Learn to skip count by 2s, 5s, and 10s.

3. Comparison and Order:

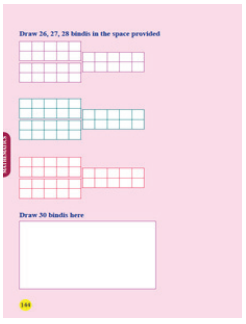
- Compare numbers using concepts like "greater than," "less than," and "equal to."
- Arrange numbers in ascending and descending order.

4. Basic Arithmetic with Larger Numbers:

- Perform addition and subtraction with numbers more than 20.
- Solve simple real-life problems involving these numbers.



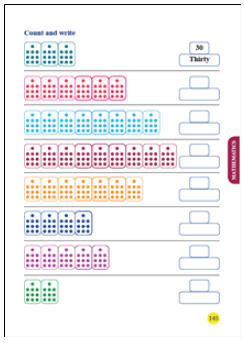
- This activity introduces students to numbers greater than 20 by using bindis (coloured dots) to represent quantities visually. The top section starts by showing two groups of ten green dots, which equals 20, establishing the foundational idea of "two tens." In the next example, students see two groups of ten red dots and one additional dot, which are counted together to make 21. The explanation "two tens and one more makes 21" reinforces the concept of tens and ones.
- The remaining part of the activity asks students to count the dots in different groups and write the corresponding number. For instance, two tens and two extra dots (blue) make 22.
- Students are then encouraged to identify the numbers represented by other groups of dots, such as 23, 24, and 25, by counting the tens and the additional ones. This hands-on activity enhances understanding of place value (tens and ones), develops counting skills, and makes learning interactive through visual representation.



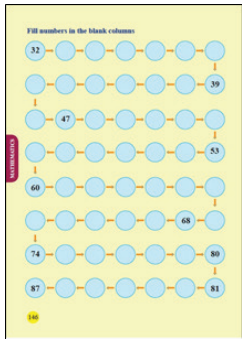
- This activity is designed to teach children how to visually represent and count numbers using a grid format. It focuses on the numbers 26, 27, 28, and 30, helping children understand the concept of place value and grouping. In the first part of the activity, students are provided with three rectangular grids and are instructed to draw a specific number of "bindis" (dots) within each grid to represent the numbers 26, 27, and 28. Each grid consists of rows

and columns, encouraging children to group numbers systematically, reinforcing their understanding of tens and ones. For example, they can draw two complete rows of ten (20) and then add the remaining dots (6, 7, or 8) in the next row.

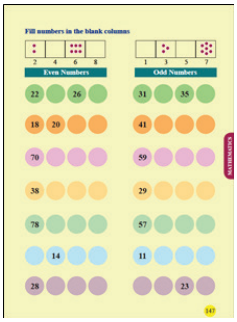
- The second part of the activity asks children to draw 30 bindis in a blank rectangular space. This step allows them to extend the skill learned in the structured grids to a more open-ended task. By requiring students to count and represent numbers accurately, this activity enhances their counting, organization, and visualization skills while making the learning process engaging and interactive. It lays the foundation for understanding larger numbers and the importance of systematic grouping in mathematics.



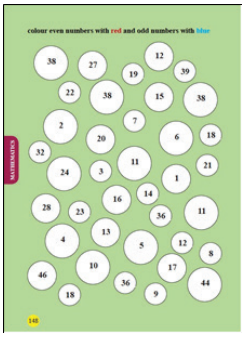
- This activity is designed to help children develop their counting and number recognition skills through a visual representation of numbers using domino-style dot patterns. At the top of the worksheet, the number "30" is given as the example, represented visually by groups of ten dots in three columns, and the number is also written in numeral and word form ("Thirty"). Below, students are presented with several rows containing different groups of dot patterns. The task is to count the total number of dots in each row, write the corresponding number in the provided box, and, in some cases, write the word form of the number.
- This activity strengthens the understanding of grouping and counting systematically by presenting numbers in visually distinct clusters. It also encourages children to practice writing numbers both in numeral and word form, building their numerical literacy. By engaging with this exercise, students gain confidence in counting larger numbers and begin to recognize how grouping facilitates easier calculation and understanding of quantity.



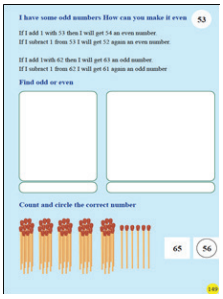
- This activity focuses on practicing sequential counting and number patterns. Students are given rows of blue circles, where the starting and ending numbers in each row are pre-filled, and they are required to fill in the blank circles with the missing numbers. The numbers progress in a linear sequence, either ascending or descending, helps students identify patterns in numbers and reinforce their ability to count forward or backward. For example, in the first row, students would complete the sequence between 32 and 39 by filling in the missing numbers in consecutive order.
- This task promotes critical thinking and strengthens a child's understanding of number sequences and logical progression. By filling in the missing numbers, children enhance their problem-solving abilities and improve their familiarity with number patterns. This activity serves as an excellent tool to build confidence in number counting and recognizing relationships between numbers, laying a foundation for more advanced arithmetic concepts.



- This activity is designed to help children distinguish between even and odd numbers and to practice their ability to identify and categorize numbers accordingly. The left side of the sheet is dedicated to even numbers, while the right side focuses on odd numbers. At the top, visual aids are provided, showing examples of even and odd numbers using dots in boxes to reinforce the concept that even numbers can be divided evenly into two groups, whereas odd numbers cannot. Children are asked to fill in the missing circles below by identifying numbers that belong to either the "Even Numbers" or the "Odd Numbers" columns.
- Each row contains a pair of numbers as examples, and blank spaces are left for the students to complete the sequence. The activity reinforces their understanding of the numerical sequence, while also building skills in pattern recognition and logical reasoning. By physically sorting numbers into even and odd groups, children are encouraged to engage interactively with the concepts of parity and number categorization, making the learning experience both fun and educational.

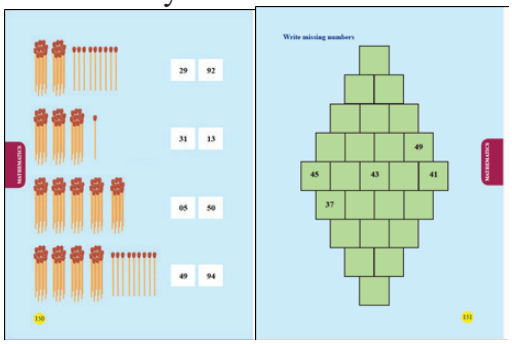


- This activity is aimed at helping children practice distinguishing between even and odd numbers while engaging in a fun colouring task. The worksheet contains a collection of numbers inside circles spread randomly across the page. Students are instructed to colour the even numbers in red and the odd numbers in blue. This visual and hands-on exercise reinforces the concept of even and odd numbers while improving number recognition and fine motor skills.
- The activity is interactive and encourages critical thinking, as students must first identify whether a number is even or odd before applying the correct colour. This dual focus on classification and colouring provides a multi-sensory learning experience, keeping children engaged and making the process enjoyable. By the end of the task, students will have reinforced their understanding of number parity while creating a visually appealing result that highlights the distinction between even and odd numbers.

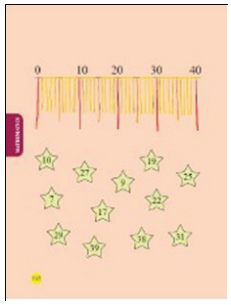


- This activity introduces the concept of converting odd numbers to even numbers through simple addition or subtraction. The worksheet begins with instructions explaining how adding or subtracting 1 from an odd number makes it even. For example, if a child starts with the number 53, adding 1 will result in 54 (even), and subtracting 1 will result in 52 (also even). The activity encourages children to apply this concept by practicing with given numbers in a structured way, writing down their answers in the provided boxes.
- The second part of the activity involves a hands-on counting task with visual aids, such as groups of sticks or objects. Students are asked to count and circle the correct total,

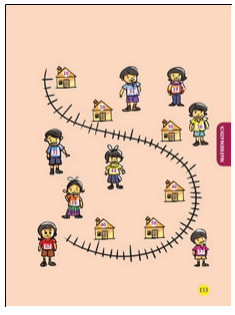
ensuring that they can recognize odd or even groupings visually and numerically. By integrating numerical operations with visual counting, the activity makes the concept of parity tangible and relatable, helping children develop a deeper understanding of even and odd numbers while engaging them in a fun and interactive way.



- This activity involves identifying and completing missing numbers within a structured number sequence arranged in a diamond-shaped grid. A few numbers are already provided in the grid as clues, and children are expected to use logical reasoning and knowledge of numerical patterns to fill in the blank spaces. The provided numbers form part of a recognizable pattern, such as consecutive numbers, even or odd sequences, or another arithmetic progression. Students must analyze the pattern and continue it accurately in the empty spaces.
- The activity is designed to enhance critical thinking and problem-solving skills while reinforcing the understanding of number sequences and patterns. It encourages children to think logically and systematically as they identify relationships between the given numbers. By completing the grid, students also practice their numerical writing skills, which supports their overall mathematical fluency. The diamond-shaped layout adds an element of visual appeal, making the task engaging and fun.



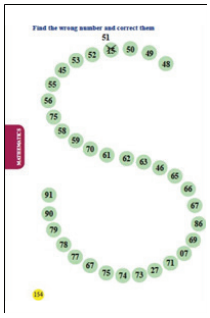
- **Hang the stars on the correct thread**
- This activity focuses on helping children identify and place numbers on a number line. The top of the worksheet features a number line marked in intervals of 10, from 0 to 40, with additional tick marks between the intervals for individual numbers. Below the number line, there are stars containing random numbers within this range. The task is for children to determine where each number fits on the number line and mentally associate the number with its correct position.
- The exercise strengthens children's understanding of number order, intervals, and spacing on a number line, which are foundational skills in mathematics. By analyzing and placing numbers, children develop their ability to estimate and compare values, improving their grasp of numerical relationships. Additionally, the visual element of stars makes the activity engaging and adds a playful touch, motivating children to participate actively while learning.



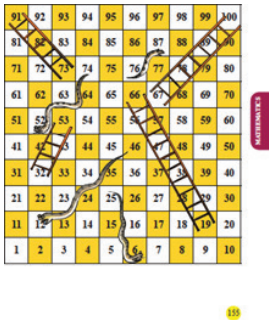
- **Send children to the correct place**
- This activity combines number recognition and matching with a fun, imaginative setting involving a train track and houses. Children are presented with a winding track leading to houses marked with multiples of 10 (e.g.,

10, 20, 30, etc.). Scattered along the track are characters wearing shirts with various numbers. The task for students is to match each child to the appropriate house based on the number they are wearing, by determining the closest multiple of 10. For instance, a child wearing the number 34 would match to the house labeled 30, as it is the nearest multiple of 10.

- This exercise is designed to reinforce rounding concepts by teaching children how to approximate numbers to the nearest tens place. It also strengthens their ability to recognize number patterns and relationships. The playful context of houses and characters makes the activity visually engaging and relatable, motivating students to participate actively while practicing an essential mathematical skill in a fun and interactive way.

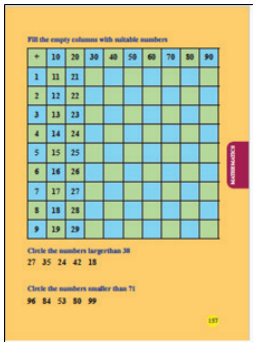


- This activity involves identifying errors in a sequence of numbers arranged in the shape of the letter "S." The sequence is meant to follow a specific numerical pattern or progression, such as counting by ones, twos, or tens. However, certain numbers in the sequence are incorrect and do not fit the intended pattern. The task for students is to carefully examine the sequence, find the wrong numbers, and replace them with the correct ones to restore the proper order.
- This exercise develops critical thinking and pattern recognition skills as children must analyze the number sequence and identify inconsistencies. It also reinforces their understanding of numerical order and arithmetic progressions. The "S" shape of the sequence adds a visual and engaging element, making the activity more enjoyable while encouraging children to focus on accuracy and logical reasoning.

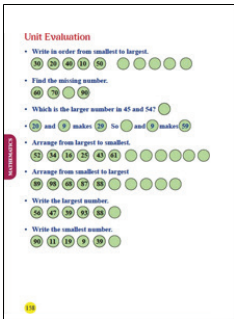


- This game is a classic "Snakes and Ladders" board designed to reinforce number recognition and counting skills in an engaging and interactive way. The board consists of a grid numbered from 1 to 100, with snakes and ladders strategically placed to create challenges and rewards. Players start at square 1 and progress through the board by rolling a die and moving the corresponding number of spaces. If they land at the base of a ladder, they climb up to a higher number, while landing on the head of a snake causes them to slide down to a lower number.
- The game not only helps children practice counting and number sequencing but also introduces concepts of probability and decision-making. As players advance, they must navigate the risks of snakes and the opportunities provided by ladders, encouraging strategic thinking. The combination of fun and learning ensures that children remain engaged while improving their understanding of numerical order and spatial awareness.

- This activity focuses on counting and grouping objects to practice addition and compare quantities. Four children are shown collecting manchadis (Red Seed) in groups of ten, with some extra manchadis added. Each child's collection is depicted visually using bundles of 10 and loose manchadis, and the task requires children to count the total number of manchadis each child has. Students must write down the total for each child in the provided boxes, reinforcing their ability to add grouped and individual numbers.
- The activity also includes a comparative element, where students identify who has the most and the least manchadis and organize the collections in ascending or descending order. This not only strengthens their addition skills but also introduces concepts of comparison and ordering. The playful scenario with manchadis and the interaction between the children makes the task engaging and relatable, encouraging active participation while developing essential math skills.



- This activity is designed to help children practice addition using a structured table format and develop their comparison skills. The top row displays numbers in multiples of 10 (10, 20, 30, etc.), while the leftmost column contains single-digit numbers (1 to 9). The task requires children to add the corresponding numbers from the row and column and fill in the empty spaces in the table with the correct sums. For example, if the number in the row is 10 and the number in the column is 1, the sum (11) is written in the appropriate cell.
- The second part of the activity focuses on number comparison. Students are instructed to circle specific numbers based on criteria, such as identifying those greater than 38 or smaller than 71, from the given lists. This helps improve their ability to analyze and evaluate numerical values quickly. The combination of addition practice and number comparison reinforces both computational and logical reasoning skills in an engaging format, making the activity suitable for building foundational math competencies.



- This activity is a unit evaluation exercise designed to test children's understanding of number concepts such as ordering, comparison, and identifying numerical properties. It consists of several tasks that require students to apply their knowledge of numbers. For example, one task asks students to arrange numbers in ascending (smallest to largest) or descending (largest to smallest) order. Another task involves identifying the missing number in a sequence, which helps reinforce their grasp of numerical patterns.
- Additionally, the activity includes direct comparison questions, such as determining the larger number between two options or identifying the smallest or largest number in a given group. These tasks are complementary

11 Money - A Fun Journey into the World of Money

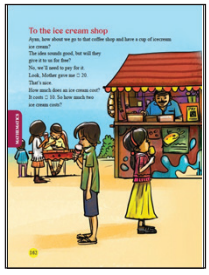
- This unit focuses on introducing students to the daily use of coins and currency notes, with an emphasis on recognizing and understanding the value of ₹1, ₹2, ₹5, and ₹10 coins, as well as ₹5, ₹10, ₹20, ₹50, and ₹100 currency notes. It aims to provide practical experience by solving simple real-life problems involving money. Activities such as matching coins and currency up to ₹20 and handling basic buying and selling scenarios are included. Using real or play coins and notes is encouraged to make the learning process more interactive and engaging. The unit also includes exercises to help distinguish the sizes of currency notes, enhancing recognition and familiarity.
- The learning objectives of this unit are to help students become comfortable with recognizing and using coins and currency notes of diGerent denominations. It encourages interpreting numbers from 1 to 20 and applying this knowledge in fun, practical contexts such as buying and selling games. By engaging in these activities, students develop confidence in handling money, laying the foundation for real-world financial literacy and arithmetic problem-solving.

Objectives

- Be familiar with the denominations of rupees 1, 2, 5, 10, 20, 50, and 100 and the denominations of coins 1, 2, 5, and 10.
- Use coins and currencies to interpret 1 to 20 and engage in buying and selling games and activities
- Engaging children in practical problem-solving and mathematical reasoning using money

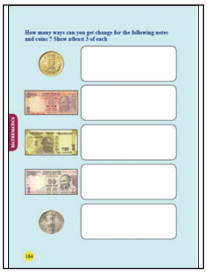
- This activity, titled “To The Market,” is a contextual and interactive exercise aimed at engaging children in practical problem-solving and mathematical reasoning. The scenario begins with a family discussion where they need to buy vegetables and a bag of rice because there are no supplies in the kitchen. The children also express their additional desires, such as wanting chocolates and biscuits. This sets a real-life context where children are prompted to think about purchasing essentials alongside fulfilling their own wishes.
- The adult, likely a parent, involves the children in the process by asking them to check the purse for the available salary in the form of notes and coins. This creates a hands-on opportunity for children to explore money, learn to identify denominations, and think about budgeting. It not only encourages basic arithmetic skills, like adding up the total money, but also promotes critical thinking about prioritization—distinguishing between needs and wants.
- Overall, the activity combines storytelling with a mathematical context to make learning relatable and engaging. It fosters practical skills like communication, decision-making, and financial awareness while reinforcing basic math concepts like counting, addition, and money management. This approach helps children connect classroom knowledge with everyday life, making learning meaningful and enjoyable.

- This activity focuses on familiarizing children with the common denominations of Indian currency, including coins and notes. The visual representation of coins (₹1, ₹2, ₹5) and notes (₹10, ₹20, ₹50,
- ₹100) helps children identify and recognize diGerent currencies. Additionally, it introduces the concept of the "₹" symbol, used to represent rupees, and how it is applied in writing amounts, such as ₹5 for 5 rupees. Children are then tasked with labeling the denominations of the displayed currency notes using the rupee symbol, reinforcing their understanding of money values.
- The activity is designed to build basic financial literacy and numeracy skills in a practical and engaging way. By connecting the learning to real-world contexts, such as the coins and notes they encounter daily, children develop confidence in handling money and understanding its values. This also serves as a foundational step for more complex concepts like addition, subtraction, and budgeting with money in later activities.



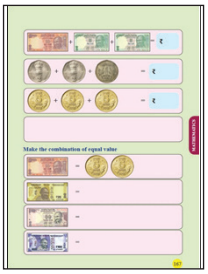
- This page introduces children to a basic arithmetic problem in an engaging and relatable scenario. The conversation between Ayan and the other child takes place at an ice cream shop, providing a real-world context for practicing math. The dialogue highlights key concepts, such as the need to pay for goods and how to calculate costs. Ayan's mother gives him ₹20, and they discuss how much one ice cream costs (₹10) and calculate the total cost for two ice creams (₹20). This creates an opportunity to practice addition or multiplication in a simple, practical way.
- The page uses visuals to enhance understanding and connect it to everyday experiences, making math more approachable. The colourful ice cream shop, where children enjoy their ice cream and interact with the shopkeeper creates a lively atmosphere. By integrating a familiar activity with mathematics, students can see the relevance of arithmetic in daily life, fostering both engagement and learning. This activity reinforces the concept of money, addition, and multiplication while encouraging reasoning and problem-solving.

- This page introduces children to basic arithmetic and decision-making through a shopping scenario at a store named "Smile Shoppy." The illustration displays a shopkeeper and various colourful items for sale, along with their prices listed on the wall. The activity prompts children to calculate the total cost based on their shopping choices. For example, Ayan wants 2 balloons(₹3 each) and one ball (₹10 each), requiring students to compute the total cost of these items.
- Similarly, Ami can choose items and calculate her total cost, promoting addition in a practical context.
- This interactive activity encourages children to engage with math in a fun and relatable way by imagining themselves as shoppers. It also allows them to practice budgeting by selecting items they wish to buy and determining how much money they would need. The page stimulates creativity, critical thinking, and problem- solving while reinforcing the concept of value and cost in a real-world setting. This approach helps students understand the practical application of arithmetic in everyday life.



- This activity introduces children to the concept of making change using coins and currency notes. The page presents various denominations of coins and notes (e.g.,
- ₹1 coin, ₹5 coin, ₹10 note, ₹50 note, ₹100 note) and asks students to determine the diGerent ways these can be broken down into smaller denominations. For instance, a
- ₹10 note can be exchanged for ten ₹1 coins, two ₹5 coins, or a combination of coins like one ₹5 coin and five
- ₹1 coins. This task encourages students to explore multiple solutions and enhances their understanding of equivalence in currency.
- The exercise promotes critical thinking, problem-solving, and a practical understanding of money. It teaches children how to calculate change and visualize the value of money in terms of smaller units, a vital life skill. By exploring various combinations, students develop flexibility in thinking and confidence in handling money, laying the foundation for real-world financial literacy.

- This page focuses on developing students' skills in counting and totalling money using coins and currency notes. The first section presents two amounts, ₹21 and ₹33, and likely prompts students to consider how they might represent or calculate these amounts using combinations of coins and notes. The second section is more structured, asking students to add specific coins and notes, such as ₹1, ₹2, ₹5 coins, and ₹10 or ₹50 notes, to calculate the total value in each row. This exercise enhances their ability to add and organize monetary values effectively.
- The activity emphasizes practical math skills, essential for handling money in everyday scenarios. It not only reinforces arithmetic concepts, such as addition, but also teaches children to recognize the value of diGerent coins and notes. By engaging in this activity, students improve their confidence in managing money, preparing them for real-world situations like shopping or budgeting.

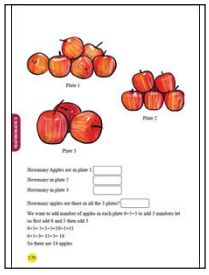


- This activity page focuses on understanding and constructing equivalent monetary values using coins and notes. The first section displays combinations of notes and coins, prompting students to calculate their total value. For instance, students are asked to add up
- ₹10 notes and ₹5 coins, or other combinations of coins, to find the overall amount. This helps them practice addition and become familiar with recognizing and totalling diGerent denominations of currency.
- The second section asks students to "make the combination of equal value." It provides a specific value represented by one set of coins or notes, and students must create an equivalent value using a diGerent combination. For example, a ₹20 note can be matched with two ₹10 notes or four ₹5 coins. This reinforces the concept of equivalence and develops their ability to think flexibly about money. By engaging with this task, children build practical skills in handling money, budgeting, and understanding the interchangeable nature of different denominations.

- This activity introduces children to the concept of estimating prices and performing subtraction in a shopping context. The first part displays images of everyday items such as candy, a pen, a ball, and an apple, with empty spaces to "guess and write the price" of each item. This engages children in critical thinking, helping them develop an understanding of approximate costs for common goods. It also promotes awareness of price variation and encourages them to relate their guesses to real-world experience.
- The second part narrates a scenario where Aasma wants to buy mango juice costing ₹60 but realizes she only has ₹50 in her wallet. The question asks children to calculate how much more money Aasma needs to pay, reinforcing subtraction in a practical context. This activity integrates storytelling with mathematics, making it more engaging for students. It not only strengthens their arithmetic skills but also introduces budgeting and real-life problem-solving in a relatable situation.

12 More Number Activities

- The last chapter, “More Number Activities”, focuses on enhancing students’ understanding and application of mathematical concepts through engaging and practical exercises. This chapter emphasizes arithmetic operations such as addition and subtraction while integrating problem-solving into real-life contexts. It encourages learners to explore math interactively and apply their skills to solve practical problems.
- The activities in this chapter are designed to foster critical thinking and collaborative learning. Students are tasked with counting objects, comparing quantities, and solving problems involving daily life scenarios, such as distributing items among friends or calculating the remaining quantities. These tasks make mathematics more relatable and enjoyable, bridging the gap between abstract concepts and real-world applications.
- The chapter also incorporates structured activities like completing number grids, finding diEerences, and matching sums, which provide opportunities to develop a deeper understanding of arithmetic patterns and operations. Through these exercises, students are encouraged to explore relationships between numbers, promoting logical reasoning and numerical fluency.
- Overall, this chapter is an engaging conclusion to the curriculum, aiming to consolidate foundational math skills while fostering a positive attitude toward learning. It sets the stage for further exploration of mathematical concepts, ensuring that students are equipped with the confidence and skills to tackle more advanced topics in future studies.

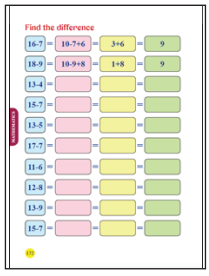


- This activity is designed to teach children basic counting and addition skills using a visual and hands-on approach. The image depicts two plates, each with a number of apples, and prompts children to count how many apples are on each plate. Children are then guided to write down the number of apples on each plate in the respective blank spaces provided.
- After counting the apples on each plate, children are asked to find the total number of apples by adding the two numbers. The activity explicitly shows how to structure an addition equation (e.g., 6+5+3=11+3=14) and guides children through the process step-by-step. This method encourages understanding of addition as combining two groups and introduces the concept of summation.
- The activity is visually appealing and interactive, making it easier for young learners to grasp the concept of addition. It also provides a real-world connection by using apples, which are relatable and familiar to children. This kind of hands-on practice helps solidify foundational math skills and builds confidence in performing arithmetic operations.

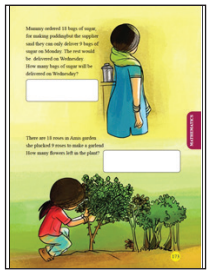
- This activity focuses on counting and

introduces children to the concept of grouping and addition. The image shows three circular tables, each surrounded by chairs, with children seated in some of the chairs. The task for the students is to count the total number of children across all the three tables.

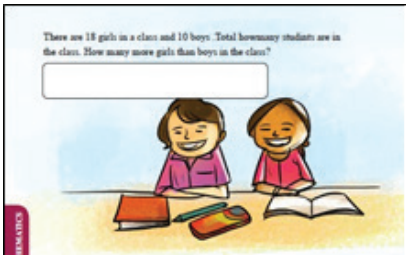
- This encourages observation and counting skills, as the children must carefully assess each table and record the number of children seated.
- Once the total number of children is counted, the students are prompted to write the total in the provided blank space. This step helps them practice not only their counting but also their ability to translate visual information into numerical form. It subtly reinforces addition as they add the numbers from each table to find the total.
- The activity is practical and relatable, as it simulates a real- world scenario of counting people in a group setting. By engaging children with visual representations and contextually meaningful tasks, it makes math more enjoyable and builds a foundation for more complex arithmetic concepts.



- This activity introduces children to the concept of subtraction and reinforces their ability to find diEerences between numbers. Each row presents a subtraction problem on the left side (e.g., 16−7) and requires the child to compute the result . This structured approach allows children to focus on calculating each subtraction problem (e.g., 16-7) by splitting 16 as 10+6 then subtract 7 from 10 (which is easy for children)then add 6
- By including a mix of subtraction problems and pre- calculated sums (e.g., 10-7+6) or single-digit additions, the activity integrates problem-solving and number manipulation skills. This variety ensures that students not only practice subtraction but also enhance their understanding of how addition and subtraction relate. The interactive format makes it engaging, while the clear layout helps children follow the steps systematically, building both confidence and competence in arithmetic.



- his activity focuses on problem-solving and basic subtraction through real-world scenarios. In the first part, the activity describes a situation where a certain number of bags of sugar were ordered, but some were delivered and used for making sweets. The students are asked to calculate how many bags of sugar remains by subtracting the number of bags used from the total ordered. This contextual problem engages students by connecting math with everyday life, making it more relatable and practical.
- In the second part, the child is asked to subtract the number of roses plucked (9) from the total number of roses in the garden (18). It leads to the calculation 18-9=9. The activity helps reinforce the idea of subtraction as a process of determining what is left after something is taken away. This exercise connects math with nature and daily life, making the concept of subtraction relatable and fun.



Girls and Boys in the Class

- To solve the problems in the given activity, the

teacher can ask the following guiding questions

1. How many girls are there in the class?
2. How many boys are there in the class?
3. What does the question require us to find? (Hint: Are we comparing the number of girls to boys?)
4. If there are more girls than boys, what operation do we use to find how many more girls there are than boys?
5. What happens if we subtract the number of boys from the number of girls?
6. Does the result make sense?
7. Can you explain how you found the answer?

♦ This problem involves basic subtraction. Here's how to solve it step by step:

1. Understanding the problem:

- The total number of eggs in the basket is 15.
- Out of these, 6 eggs are not hatched.
- You are tasked with finding how many eggs are hatched.

2. Set up the subtraction:

- To find the number of hatched eggs, subtract the number of broken eggs from the total number of eggs.
- Hatched eggs=Total eggs− eggs not hatched

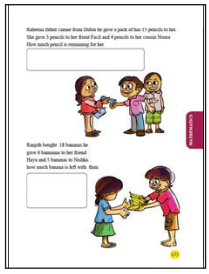
3. Perform the calculation:

- 15−6=9 .

4. Answer:

- The number of hatched eggs is 9.

♦ This is a practical example of subtraction that involves taking away a part from a whole.



♦ A constructivist teacher engages students in solving these problems by encouraging active participation, exploration, and critical thinking. Here's how they can approach this activity:

Engagement Through Real-Life Context

1. Connecting to Experiences:

- Ask students if they've ever shared or given away something they had, like fruits or snacks.
- Relate the problem to their personal experiences, e.g., "Have you ever divided your snacks with friends? How did you decide how much to give?"

2. Role-Playing or Simulating the Situation:

- Provide props such as toy fruits, packets, or objects representing the quantities in the problem.
- Let students act out the situation of giving away packets or bananas and calculating how many are left.

♦ For example, one student can "give" 7 packets to another and 4 to someone else, while the others count how many remain

Encouraging Inquiry and Problem Solving

1. Facilitating Exploration:

- Ask open-ended questions such as:
- "What do you think we need to do first to solve this?"
- "How can we figure out how many pencils or bananas are left after giving some away?"
- Encourage students to work in small groups to discuss and try different methods.

2. Guiding Through the Process:

- Instead of giving the solution, guide students with prompts:
- "How many packets did he have to start with?"
- "How many packets were given away in total?"
- "What happens when you take away the packets given from the total?"

3. Encouraging Collaboration:

- Let students compare their approaches and answers in groups.
- Discuss any differences in their methods and outcomes to foster peer learning.

Reflective Discussion

1. Discuss Results:

- After solving, ask students to explain how they got their answers.
- Encourage them to verify the solution by adding the given-away quantities back to the remaining amount.

2. Relating to Other Situations:

- Encourage students to think of other real-life examples where subtraction is useful, such as budgeting pocket money or distributing toys.
- By engaging students in hands-on activities, encouraging exploration, and fostering collaboration, a constructivist teacher ensures students actively build their understanding of subtraction through meaningful, real-world connections.

Engagement Through Real-Life Connection

1. Connecting to Students' Experiences:

- Start by asking, "Have you ever run a race or seen one? How do you know who is ahead and by how much?"
- Relate the problem to something tangible, like sports day or games they've played where distances or differences mattered.

2. Visualization and Simulation:

- Draw a simple track on the board or ground and use markers (e.g., coins, blocks) to represent the runners' distances.
- Let students place the markers to visualize one runner at 15 km and another at 9 km.

Encouraging Inquiry and Exploration

1. Facilitating Critical Thinking:

- Ask, "How can we figure out how much farther ahead the first runner is than the second?"
- Pose guiding questions like:
- "What information do we already know?"
- "What do we need to find out?"

2. Encouraging Collaboration:

- Divide the students into small groups and let them discuss and solve the problem together.
- Allow them to use manipulatives like number lines or counters to represent distances.

3. Hands-On Problem-Solving:

- Provide tools such as a ruler or measuring tape to create a real-world scenario where they measure and subtract distances practically.

Reflective Discussion and Real-World Application

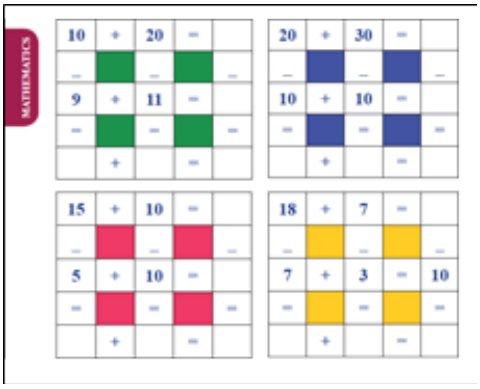
1. Discussing Results:

- Ask students to explain their method of finding the difference in distances.
- Encourage them to check their answer by adding the difference back to the shorter distance to see if it equals the longer distance.

2. Relating to Other Contexts:

- Discuss situations where they might need to find differences in real life, such as comparing scores in games, distances in races, or heights of objects.
- By involving students in hands-on activities, group discussions, and reflective questioning, a constructivist teacher helps students not only solve the problem but also understand and internalize the concept of subtraction as finding the difference.

Engagement Through Exploration and Interaction



1. Introducing the Activity:

- Start by asking, "What do you notice about the numbers in the grid?"
- Let students explore the grids independently or in pairs and share their observations about the patterns and operations.

2. Using Real-Life Examples:

- Relate the activity to real-life scenarios, like counting objects, grouping numbers, or solving puzzles, to show the purpose behind the addition and subtraction operations.

3. Hands-On Learning:

- Provide manipulatives such as counters, blocks, or a number line for students to physically represent the operations in the grid.
- Encourage students to fill in the blanks by moving and counting the objects, making the operations tangible.

Encouraging Inquiry and Collaboration

1. Guiding with Open-Ended Questions:

- "How do you think we can find the missing number in this box?"
- "What happens when you add the numbers in the rows or columns?"
- "What relationship do you see between the numbers in the grid?"

2. Promoting Peer Collaboration:

- Divide the class into small groups and assign one grid to each group.
- Encourage them to discuss their ideas and strategies for completing the grid together.

3. Exploring Patterns:

- Ask students to explain any patterns they notice, such as symmetry in addition and subtraction, or repeated numbers in rows and columns.

Reflective Discussion and Extension

1. Reflecting on Solutions:

- Once grids are completed, have students explain their reasoning and the strategies they used to solve the problems.
- Discuss diEerent approaches and verify answers as a class.

2. Encouraging Creativity:

- Challenge students to create their own grids with missing numbers and exchange them with classmates to solve.
- Ask, "How would you teach someone else to solve this grid?"

♦ By encouraging exploration, collaboration, and discussion, a constructivist teacher helps students actively build their understanding of arithmetic while fostering problem- solving and critical-thinking skills. This approach also makes the activity more engaging and meaningful for students.

edufy publications

GRADE - 2

Semester 2

TEACHERS RESOURCE MANUAL

MATHEMATICS
Grade 2

8 MEASURE THE WEIGHT

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Compare the weight of two objects using balance. ♦ Find the weight of objects using balance. ♦ Guess and check the weight of an object. ♦ Explain the units of measuring weight and their relations. ♦ Solve mathematical problems including operations of weight.	♦ Weight can be compared using a common balance. ♦ Standard weights are used to find weight using acommon balance. ♦ Electronic balances are used more now ♦ Units of measuring weight are gram and kilogram. ♦ 1000 grams= 1Kg ♦ Weights can be added and subtracted in different ways.	♦ Compare weights as part of play and games ♦ Find the weights of different objects and compare. ♦ Guess the weights as part of plays. ♦ Discussion of life related problems. ♦ Find suitable units for finding weight. ♦ Discussion of life related problems. ♦ Classify the objects according to their weight. ♦ Analyzing and solving problems that pupils experience in their daily life situations.

What is in this unit?

♦ This unit deals with measurement of weight. Children can recognize and distinguish between heavier and lighter objects. They have seen various types of balances in their daily life. In this unit children learn how to measure weight using balance and what are the units of measuring weight. In this unit children study the operations using the units of measurement and solving problems using it.

CLASS ROOM PROCESS.

♦ **Ensuring current ability level.**
  - Show two objects and ask which is heavier.
  - Compare the weight by guessing.

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

BALANCE THE SEA SAW (PAGE 108)

♦ Observe the picture. Then ask questions. Lead a discussion.
  - What do you see in the picture?
  - What are the things they hold?
  - What are the things on the floor?
  - Which of them is the heaviest?
  - Can you guess how many mangoes are needed to balance the weight of coconut.

♦ This is only a discussion. No need of correct answer.

WHICH ONE IS THE HEAVIEST (PAGE 109)

♦ Observe the picture.
  - Which one of these is the heaviest?
  - Remove the heaviest from the group. Then which one is the heaviest among the remaining things.
  - Take some objects from the class and outside and ask which is heavier.

GUESS AND FIND (PAGE 110)

- Write the objects given in the TB Page 110, from the heaviest to the lightest. (guess)
- Check with others and discuss in the class.
- Then discussion. How can we check whether your guess is correct or not.
- Conclude the discussion that a balance is needed for the same.

COMMON BALANCE (PAGE 110)

- Show a balance. let them say how it works.
- Observe the pictures in the TB and say which is heavier.
- Then introduce commonly used weights and how it is used to measure the weight.
- Then let pupils check the 1 kilogram weight .
- Then ask them which of the objects given in page 112 is more than one Kilogram and which is less than 1 kilogram. Tick in columns and
- Check with each other.

WHICH ONE IS HEAVIER (PAGE 113)

- Then ask them to collect materials and say which is heavier and which is lighter.

Evaluation.

- Teacher evaluates

The ability to guess weight .

The ability to compare weight using balance.

PUMPKIN MATH (PAGE 113)

- This is to introduce how the weight of an object is measured using balance. Show it using a balance and standard weights, in the class.

LESS THAN ONE KILOGRAM ; KILOGRAM AND GRAM (PAGE 114)

- These activities are to introduce gram, as the smaller unit of weight. Let them understand 1000 gram is 1 Kilogram.

WEIGHT OF MANGOES (PAGE 115)

- It is to find weight using digital Balance. Bring it to the class and let pupils find weight of different objects. Then write it in the table. Check with each other. Then introduce various types of balances.
- After that find the weight of the objects given in the TB , and write in the table.

WEIGHT OF CUCUMBER (PAGE 116)

- This should be discussed in the class. 1700 grams is one Kilogram and 700 grams.

AT THE MARKET (PAGE 117)

- This is to add two or more weights. It is described there in the TB,

HOW MUCH MORE WEIGHT (PAGE 118)

- This is to introduce finding weight using weighing machine. Discuss it and let them find the weight themselves. Then make a weight chart in the class.

PACKING MATH (PAGE 118)

- This is to find the combination of weights to make 1 kilogram. Fill the table and check with each other. Discuss in the class.

HOUSE HOLD GROCERY (PAGE 120)

- It should be given as home work. Let the students discuss with parents and fill the table.
- Present it in the class.

MATCH THE FOLLOWING (PAGE 120)

- Do these works individually. Check in groups. Present it in the class.

Evaluation. Teacher evaluates

- *The ability to find weight using balance.*
- *the ability to find relation of units.*
- *The ability to compare weights.*
- *The ability to analyze problems*
- *The ability to solve problems.*

- Let pupils do the "re visit problems" and give necessary feed back.

9 MEASURE THE CAPACITY

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Guess and compare the capacity. ♦ Measure capacity using measuring jar. ♦ Measure the capacity using litre jar. ♦ Explain litre and estimate one litre. ♦ Solve mathematical problems including capacity	♦ Capacity is the ability to hold ♦ Capacity is said in ltre. ♦ Litre jar is used to measure capacity.	♦ Discussion of life related problems. ♦ Find unit for finding capacity (litre) ♦ Measure the water and estimate the capacity. ♦ Discussion of life related problems. ♦ Classify the objects according to their capacity . ♦ Analyzing and solving problems pupils experience in their daily life situations.

What is in this unit?

♦ This unit deals with measurement of capacity. Children can say which one will contain more and less among two vessels. In this unit they learn the concept of ‘’litre’’ and to measure liquids using litre. They get chance to guess the capacity of a vessel also.

CLASS ROOM PROCESS.

♦ **Ensuring current ability level.**
♦ Show two vessels and ask them to say which will contain more water.
♦ Compare the capacity by guessing.
♦ Give additional support to those who are still below the current ability level.

MORE WATER (PAGE 122)

♦ Raise the issue in the class. Discuss how can we find out which glass is the biggest.
♦ Show the activity in the class using glasses .

WHICH IS BIGGER (PAGE 123)

♦ Show four or five bottles of different types and size. Then ask them to put the bottles in the order from the least capacity to more capacity. If there is any doubt teacher can help them.

MAKING PAYASAM, A LITRE POT (PAGE 123)

♦ This is to introduce ‘’litre’’ Read the conversation.
♦ Ask pupils , whether they have heard of litre. Say some instances.
  - One litre milk
  - One litre petrol.
  - 100 litre water.
  - I litre bottle.
  - 5 litre can.
♦ Then show a measuring jar of one litre . Then measure I litre water and pour in a bottle. Then pour in other bottles of different size.

MORE THAN OR LESS THAN ONE LITRE. (PAGE 124)

♦ Bring different size bottles and other vessels. Guess which will contain less than one litre and more than one litre. Then check. Let all students participate in this activity. Then do “guess and match the following”.

DRINKING WATER., HOW MANY MUGS. (PAGE 125)

- These are to solve problems using measurement of water. Ask them to read and explain the situation. Then explain how to solve. Then let them solve.
- Show a bucket and ask them to find out to how much litre of water will it hold it Then check using a measuring jar. Repeat this with different buckets.

Evaluation. Teacher evaluates,

- *The ability to guess capacity*
- *The ability to compare capacity*
- *The ability to measure capacity using measuring jar.*
- *The ability to solve problems.*

10 MEASURE THE TIME

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Explain the calendar and collect information from the calendar. ♦ Write date in standard form. ♦ Explain why one day is more in February once in every 4years ♦ Say time on a clock. ♦ Find the relation of minutes and hour.	♦ There are 12 months in a year ♦ There are 7 days in a week. ♦ 4 months has 30 days and seven months has 31 days. ♦ February has 28 days in common years and 29 days in leap years. ♦ Date is written as DDMMYYYY format. ♦ A clock has minutes hand and hour hand ♦ 60 minutes is 1 hour ♦ Time can be read in different ways on a clock	♦ Analyze calendar and explain the findings. ♦ Write date of births in standard format and analyze them. ♦ Discuss the days of months. ♦ Say and show time on the clock related with daily routine works. ♦ Read time in different ways.

What is in this unit?

♦ This unit is for time. Children can say the time for their daily routine works in daily life. They know the words indicating time as morning, evening, noon night etc. They have heard about day, week and month which indicates time duration. They have seen the calendar and they can say date and day from the calendar. In this unit they are going to understand more about calendar and the methods of indicating date. They also conduct knowledge about time on a clock and minutes hour relation.

CLASS ROOM PROCESS.

♦ **Ensuring current ability level.**
- Ask them to explain their daily activities with time.(morning, evening, noon night etc)
- Show calendar and say the month, day and date.

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

HOLIDAYS (PAGE 127)

♦ Talk about Annu. Then ask questions.
- What is Annu doing?
- Can you say which place does she belongs to?
- Can you tell me the date Annu wrote the letter?
- About which vacation does Annu say in the letter?
- When does Annu go to her grand mother's place?.
- How can you explain 20-12-24?

♦ After discussion ask them their birth dates and write it in the TB. Then make a table of their birth dates in a format.
- Discuss about what should be there in the list. Sl.No, Name, Date of birth.
- Then make the format.
- Then write in the format.

Sl.No	Name	Date of birth

♦ Then arrange the names in order of birth dates from January.

CALENDAR (PAGE 129)

♦ Give the calendar in groups and find answers for the questions in the TB.

MAKING CALENDAR (PAGE 130)

♦ Discussion about making calendar for the month of January next year.
- What day is the first of January next year?
- We have no calendar for next year. Then how can we find it?
- What is the last day of this year?
- Then what will be the first day of next year?
- How many columns are needed?
- How many rows are needed?
- In which colour will Sundays be marked?
- Is there any other holiday? Which is that?

♦ Then let them make the calendar. Then check it in groups. Ask them to evaluate themselves.

Evaluation.

♦ Teacher evaluates,
- *The ability to find day and date from a calendar.*
- *The ability to interpret date and write date in standard form.*
- *The ability to analyze calendar.*
- *The prepared calendar. (portfolio)*

REOPENING DAY (PAGE 131)

♦ Read the conversation .Then a discussion
- When do you leave your home to go to school?
- When do you reach school?
- When do you go home in the evening?
- When do you reach home?
- When do you go to sleep?
- Can you show me the time on the clock when you wake up in the morning?

♦ Show 9.00 and 9.10 in the picture. Then show other times on a play clock.

MAKING CLOCK (PAGE 132)

♦ Discussion about making a clock.
- What are the materials needed?
- What can be used to make needles?

♦ Then make a clock face in groups. Evaluate themselves.

THE CLOCK (PAGE 132)

♦ Show the clock. Introduce minutes hand hour hand and dial. Ask children to say the time on the clock. Then do the works in Page 132 and 133.

DISTANCE TO SCHOOL (PAGE 134)

♦ It is to make them say time like half past, quarter past etc. Introduce the time and how they are read.

♦ Then introduce the relation of minutes and hour. Then familiarize the words half an hour and quarter of an hour and how much minutes they are. Then introduce digital clock.

♦ Do the problems in the TB . Evaluate each other.

Evaluation.

♦ Teacher evaluates,
- *The ability to say time on the clock.*
- *The participation in making clock.*
- *The ability to say time in different ways.*

♦ 'Let's revisit' problems should be done individually. Then discuss in the class. Give feed back.

11 MAKING PATTERNS

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Colour the geometrical patterns. ♦ Observe the number patterns and find the continuation of a given number pattern. ♦ Observe the geometrical patterns and find the continuation of geometrical patterns. ♦ Find simple number relations ♦ Explain the findings and communicate one's own arguments with correct reason	♦ We can make many patterns by colouring. ♦ There is a fixed relation with numbers in a pattern. The continuation of a number pattern can be found by identifying this relation. ♦ There is a fixed relation with figure in a figure pattern. The continuation of a figures pattern can be found by identifying this relation. ♦ When adding two numbers if one number is decreased by one and the other is increased by 1 , the answer will not change.	♦ Analyze tiling patterns and find new pattern by colouring. . ♦ Analyze pictures, lines, etc and find out the number patterns involved in them. Then find the unknown numbers by making tables and making conclusions from it. ♦ Analyze the tables and find the number relations. Explain them in one's own words.

What is in this unit?

♦ This unit deals with Patterns. Pupils have experienced different patterns in their life. They have learned patterns in the previous class. In this unit we discuss both geometrical patterns and number patterns. They can colour patterns, find continuation of number patterns and draw patterns while going through this unit

CLASS ROOM PROCESS.
TILING TIME (PAGE 138)

♦ Let pupils observe tiles and find the patterns in them. Let them explain it. Then observe the tiling pattern in the TB. Then discussion.
- In each tile, there are 9 small squares.
- There are two colours in each tile.
- Then give a grid of 9x9 and ask them to colour it differently.

MATCH STICK PATTERNS (PAGE 138)

♦ Observe the pattern. Ask questions.
- How many sticks are there in figure 1?
- How many are there in figure 2?
- How many are there in figure 3?
- Then write these numbers. 6,11,16
- What is the relation between these numbers.
- Difference with the nearest number is 5.
- Then how many sticks will be needed for the next figure?

MORE MATCH STICK PATTERNS (PAGE 139)

♦ Through questions as given above elicit from children the relation between the triangles and match sticks.
- Then let them make a table in groups.
- Analyze the table and find the relation.
- Share the findings of groups in the class
- When one triangle increases two match sticks increases.
- Number of triangles is 1,2,3,4,5,6……..
- Number of match stick is 1, 3, 5, 7, 9, 11, 13, 15…….

PATTERNS WITH CIRCLES (PAGE 140)

- Let pupils count the number of lines and number of parts. Then write it in a table. Then find the relation. Let them find, the number of parts is double of the number of lines. Then ask.
  - How many parts will be there if 10 lines are drawn?
  - Let them explain with reasons,

Evaluation.

- Teacher evaluates,
  - *The ability to find relations*
  - *The ability to interpret patterns*
  - *The ability to analyze patterns*
  - *The ability to present one's own arguments.*

BEST PATTERN (PAGE 141)

- Ask questions to analyze.
- Which pattern is there in the figures. (small squares)
- How many small squares are there in the 1st figure?
  - How many are there in second figure?
  - How many are there in third and so on.
  - Then let them make a table in groups.
- Analyze the table and find the relation.
- Share the findings of groups in the class.
- Then find some more numbers in the pattern.

Then explain the Fibonacci series. How the pattern is formed, is explained in the TB. First observe the pattern and ask them to find the next number, then the next number and so on. Let them explain how it is got. Find individually and share in groups. Then present it in the class and discuss. Then teacher introduces Fibonacci numbers.

NUMBER TOWER (PAGE 143)

- Let children complete the number tower by adding the nearest numbers. Then check the top number with friends. Then present it in the class and discuss.
- Let them find the answers of the works in page 144. Check with each other and correct if necessary.

EQUAL SUM (PAGE 145)

- It is to arrange 1,2,3,4 and 5 in the circles so as to get the sum in each line 9. Try individually. Share in groups and present it in the class. How many different ways did they get?
- The method is given here.

  1,2,3,4,5
- Write 3 in the centre. Then write 1+5 and 2+4 in straight lines.

THE SAME RULE (PAGE 145)

- It is to find a number relation.
- First ask children to observe. They make the following conclusions.
  - Sum of all sets are 46.
  - The numbers added in all sets are different.
  - The first number decreases by 1, while going down.
  - Second number increases by 1 while going down.
  - The next lines will be 16+30=46, 15+31=46…….. and so on
- When adding two numbers if one number is decreased by one and the other is increased by 1, the answer will not change.

WHAT IS NEXT (PAGE 146)

- Let pupils find the next figure and explain why it is so. Then share it in groups. Each one should present his/her arguments and the reasons with clarity. Each work should be discussed in the class.

Evaluation.

- Teacher evaluates,
  - *The ability to find relations*
  - *The ability to interpret patterns*
  - *The ability to make tables.*
  - *The ability to analyze tables.*
  - *The ability to present ones own arguments.*
  - *The ability to communicate well.*

'Let's re visit' problems are the repetition of previous works. Let them do and give feed backs if necessary.

12 PART OF A WHOLE

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Explain the half of a whole and quarter of a whole. ♦ Read and write half. ♦ Solve simple problems using the concept of half and quarter.	♦ One piece of an object, equally divided by two is half. ♦ One piece of an object , equally divided by four is quarter. ♦ Half is written as 1/(2) ♦ Quarter is written as 1/4 ♦ Two halves make one.	♦ Analyze stories , life related situations and identify half and quarter. ♦ Making half and quarter of a whole using circles, rectangles and squares made by papers. ♦ Solve problems related with sharing of objects.

What is in this unit?

♦ This is an introductory unit for fractions. Pupils have already seen cutting and sharing objects. They have heard the words half, quarter etc. In this unit halves and quarters are explained and also the writing of half and quarter. Pupils will learn to make halves and quarters in different types. The teacher will discuss some problems related with these fractions.

CLASS ROOM PROCESS.

THE MONKEY WHO SHARED THE DOSAI (PAGE 148)

♦ A discussion about cutting and sharing objects.
- Only one dosai is there. Mother wants to give it to two children. What will she do?
- There is a papaya. Mother wants to use it for two days . What will she do?
- A cake was baked. 2 boys shared it equally. What portion did each one get?
- A ribbon was cut and shared by two girls. How would have they cut it?

♦ Ask such questions that children can explain. Then say the story of the monkey. It is to make the children understand that the parts received by animals are not the same. Monkey got more. If it was shared equally among the three cats would have got more.

PAPER DOSAI (PAGE 149)

♦ This is to introduce half and its symbol, 1/2 Give circular pieces in groups and ask them to make two halves. Then introduce each piece as half and its writing as 1/2.

♦ Then take one half and make it half again. Introduce it as quarter . 1/4.

EATING DOSAI (PAGE 150)

♦ This is to show that two halves will make one. Let pupils explain it.
- Cut a circle in to half.
- Then put together and show it as one.
- Understanding the concept 2 halves make 1

HALF THE SQUARE (PAGE 150)

♦ Divide the children into groups.

♦ Give same size of square paper. (3 pieces each)

♦ Ask them to make it into half in different ways.

♦ Then check the halves by matching one against the other.

♦ Then colour each half with different colours.

♦ Repeat the same activity with rectangle shaped paper of same size.

♦ Display the product on display board.

DO IT YOURSELF (PAGE 151)

♦ Colour half of the figures. Check with each other and evaluate yourself.

Evaluation.

- Teacher evaluates,
  - *Understanding the concept of half*
  - *The ability to find half.*
  - *The ability to interpret half.*
  - *The ability to write and read 1/(2)*

STORY OF MINKU (PAGE 151)

- This is to introduce in detail 1/(4). After discussing it colour the figures in page 152. And check with each other.
- Then do the works in Page 153 and evaluate yourself and each other.

DIVIDING THE CAKE (PAGE 154)

- Read the situation and write how much part each one will get.
- Discuss it in the class.
- Then do the "let's revisit " problems.

Evaluation.

- Teacher evaluates,
  - *Understanding the concept of quarter.*
  - *The ability to find quarter.*
  - *The ability to interpret quarter.*
  - *The ability to write and read 1/4*

13 Multiplication is Fun

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Explain multiplication as finding times and repeated addition. ♦ Find multiplication facts and make tables. ♦ Find the relation of a multiplication fact to another and explain. ♦ Solve problems using multiplication.	♦ Multiplication is repeated addition ♦ To find times of a number multiply the number by the number showing times. ♦ When multiplying two numbers, if one number is doubled the other should be halved. 4x3= 2x6 ♦ Multiplying a number by 2 numbers and adding it is the same as multiplying the number by the sum of the numbers. 2x4 + 3x4 = 5x4	♦ Analyze life related situations and form multiplicati0n tables. ♦ Find relations of multiplication facts by describing the practical situations. ♦ Make tables and find the relations of multiplication facts. ♦ Solve problems including multiplication.

What is in this unit?

♦ This unit is for multiplication facts. Students have studied different methods for finding sum(addition) and difference (subtraction). They can solve problems using addition and subtraction. This unit introduces multiplication. It is presented as finding times and repeated addition. All these multiplication facts are introduced through practical situations which are familiar to students. Problem solving using multiplication facts are also done in this unit. When going through the activities, children will understand and remember the facts and they will be able to use them in a new situation. Teacher should provide experiences with materials and pictures to introduce each facts.

CLASS ROOM PROCESS.

♦ **Ensuring current ability level.**
♦ Give addition problems.
♦ Ex. A pen costs 5 rupees. How much should a person pay to buy 4 such pens. 5+5+5+5 = 20.
♦ There are 8 students in a group. There are 6 groups. How many students are there in total? 8+8+8+8+8+8=48
♦ Give more works as given above by changing numbers.
♦ Ensure that children can add numbers below 10 repeatedly.
♦ Give additional support to those who are still below the current ability level.

OPENING THE SAVING BOXES (PAGE 156)

♦ Let children read the passage in Page 156.
♦ Then ask questions and elicit answers.
  - Who are the children in the picture?
  - What are they doing?
  - Why do they open the savings box?
  - What coins did they get from the box?
  - How many rupees did each get?
  - Where are they going?
  - Which coins did Navas give as bus fare?
♦ After discussion ask
  - How many rupees did he give in the bus?
♦ Make groups of 3 or 4.
♦ Give play coins in groups.
♦ Find the total amount they got.
♦ Then ask to explain how they found the answer. 2+2+2+2+2 =10.

5+5= 10. Total 10+10=20.

- Then a discussion should be held.
  - How many times was 2 added? (5 times.)
  - What is five times 2? (10)
- Then explain 5 times 2 is 10. It is written as 5x2 =10

  2+2+2+2+2= 5x2=10
  - How many times was 5 added? (2 times.)
  - What is two times 5? (10)
- Then explain 2 times 5 is 10. It is written as 2x5 =10

  5+5=2x5=10
- Then explain 5x2 and 2x5 are equal.
- Ask the questions
  - Which coins did Ansila give in the restaurant?
  - What is the total amount given?
- Make groups of 3 or 4.
- Give play coins in groups.
- Find the total amount they got.
- Then ask to explain how they have found it.

  10+10 =20.

  5+5= 10. Total 20+10=30.
- Then a discussion should be held.
- How many times was 10 added. (2 times.)
- What is two times 10. (20)

  2 times 10 is 20. 2x10 =20

  10+10= 2x10=20

- How many times was 5 added. (2 times.)

  What is two times 5. (10)

  2 times 5 is 10. 2x5 =10

  5+5= 2x5=10
- Then explain 2x10 + 2x5 = 20+10= 30 (it is equal to 3 tens)
- Then explain 1x2= 2 . 10x2=20

  1x5 = 5. 10x5=50 .
- Let them find the relation.
- After that let them fill the table individually and check with in groups.
- Then find and write the multiplication facts in a table.

1 time 2	2 times 2								
1x2	2x2								
2	4								

1 time 5	2 times 5								
1x5	2x5								
5	10								

- Then explain the cost of pencil . 6x5 + 4x5 30+20=50

  6x5 + 4x5 = 10x5 =50
- Then join the boxes. Check with each other.

Evaluation.

- Teacher evaluates,

Understanding the concept of multiplication

The ability to find relations.

The ability to find multiplication facts of 2 and 5

SEATS IN THE BUS (PAGE 158)

- How many rows of 2 seats are there?
- How many rows of 3 seats are there?
- How many seats are there in the back row?
- How many seats are there in total?

  9x2 =18

  9x3= 27

  18+27+5= 50
- Then find the number of cups and pens.
  - Five times 3= 5x3= 15.
  - 6 times 3= 6x3= 8
- Then give manjadi or other objects and put 3 manjadis each in a group.
- Then count the number of groups and say how many manjadis are there in total.
- Eg. Take 3 groups and say 3x3= 9. Then count and show 9.
- Repeat this by changing the number of groups.

Then fill the table (PAGE 159)

Match the boxes (PAGE 159)

- Then do "write as in the example"
- Show these using objects.
  - Ex. 5 times 3 + 2 times 3= 7 times 3 . g5x3 + 2x3= (5+2)3 = 7x3 =21

    5x3= 15 7x3= 21

    2x3 =6

Evaluation.

- Teacher evaluates,

- *The ability to find relations.*
- *The ability to find multiplication facts of 3.*
- *The ability to explain using objects.*

ARRANGING THE MANJADI (PAGE 160)

- This is to find the multiplication facts of 4. It is explained in the TB. Group the pupils. Do this activity in the class. Write the multiplication facts in the note book. Then fill the table showing the total amount paid by each child. It is to apply the facts of 2,3 and 5.
- Then ask
  - How many erasers did they buy in total? 10
  - What is the total cost of it?
    10x2= 20 (2x2 + 1x2+ 4x2 +3x2= 10x2)

Evaluation.

- Teacher evaluates,

The ability to find relations.
The ability to find multiplication facts of 4.
The ability to explain using objects.
The ability to apply multiplication facts in problem solving.

IN THE SUPER MARKET (PAGE 162)

- This is to explain the multiplication facts of 6. After finding the answers for the problems fill up the table. Then do the work ''draw a line to the answer'' and fill up the columns.
- From these columns children can find the multiplication facts up to 6x6.
- After filling the columns lead children to see the patterns in rows and columns.
  - First row. 1,2,3,4,5,6
  - Second row . 2,4,6,8,10,12
  - Third row. 3,6,9,12,15,18 and so on
  - Just like .
  - 1st column 1,2,3,4,5,6
  - Second column . 2,4,6,8,10,12 and so on.

Evaluation. Teacher evaluates,

The ability to find relations.
The ability to find multiplication facts of 6
The ability to explain using objects.
The ability to find patterns and explain them.

STUDENTS ON THE GROUND (PAGE 164)

- This is to introduce the multiplication facts of 7. Let children find answers for the questions individually and check with in groups. Present each question in the class and discuss how it was found. Then discuss the different ways.
  - Eg. What is the total number of boys and girls?
    4x7 + 3x7 = 28+21=49
  - It can be done as 7x7=49 also. Like that
  - Remaining boys in the ground 4x7 -2x7 = 28-14=14
  - It can be done as 2x7= 14
  - Remaining girls in the ground 3x7 -1x7 = 21-7=14
  - It can be done as 2x7= 14
- Then fill the table.
- Then do "match the following"

Evaluation. Teacher evaluates,

The ability to find relations.
The ability to find multiplication facts of 7
The ability to explain the problems
The ability to solve problems.
The ability to find suitable methods.

COLOURING THE COLUMNS (PAGE 166)

- Let children work in groups.
  - How many green coloured columns are there?
  - How many red coloured columns are there?
  - How many blue coloured columns are there?
  - How many total coloured columns are there?
- Let them explain how they have found it.
- Write the multiplication facts received from this activity in the note books.
- Repeat the work with the columns in next next

page.

- Write the multiplication facts received from this activity in the note books.Then fill up the tables. By filling the second table, find the relation of multiplication by 2.4 and 8.
- 1x2=2, 1x2=4 ,1x8=8 . Answers are 2, 4, 8
- 2x2=4, 2x4= 8, 2x8=16. Answers are 4,8, 16
- Analyzing the table, find the relation between the answers.
- Do "join with a line". Check all the works yourself and compare it with each other.

Evaluation. Teacher evaluates,

The ability to find relations.
The ability to find multiplication facts of 7
The ability to explain the problems
The ability to solve problems.
The ability to find suitable methods.

SPORTS CLUB (PAGE 168)

- This is to introduce the multiplication facts of 9. Read the problem and find answers individually. Then discussion in groups. Present in the class the different ways they have found. The relation of multiplication of 10 with 9 is given there. Discuss this also. Then fill the table. Check with each other. Fill the table of 3,6,9 and find the relation of the products. Then find the suitable facts in the TB. Discuss in the class. Now they have gone through all the multiplication facts and hence so many facts are in their note books and in the TB. By filling in the grid, the facts will fit into place. Pupils can look at this grid for further problem solving, if necessary. By applying these in different contexts in this class and next class they will be familiar with all these facts and they can answer to any fact when asked. Memorizing the table won't necessarily help to find a specific fact. Teacher can exhibit the above grid written on a chart paper allowing the pupils to visualize and apply it in new contexts.

Evaluation. Teacher evaluates,

The ability to find relations.
The ability to find multiplication facts of 7
The ability to explain the problems
The ability to solve problems.
The ability to find suitable methods.

- Then, 're-visit problems' are given in the next 3 pages. All these are to apply what they have studied in this unit. Each problem should be done individually and shared in groups. Self and peer evaluation should be done. Discuss all problems in the class. Identify the difficulties children face and give feed back. They can refer the table of multiplication facts while doing the problems, if necessary.

14 EQUAL SHARING

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Solve problems involving equal sharing.	♦ A number can be equally shared in different ways. ♦ Ex. 10= ● 10 times 1 ● 5 times 2 ● 2 times 5	♦ Analyze life related situations and find how a number can be shared in different ways. ♦ Share objects among the children in the class and find the shares each one gets. ♦ Make number webs to show the different types of sharing a number.

What is in this unit?

♦ This unit deals with sharing. This is an introductory unit for division. But the word division or the symbol for division are not introduced here. In this unit equal sharing is discussed. How a number can be divided equally is shown here in different ways. This is done as repeated subtraction or using multiplication facts.

CLASS ROOM PROCESS. SHARING SWEETS (PAGE 174)

♦ Discuss the context with children.
- How many sweets are there with Amina?
- How many equal shares does she want to make?
- How will you share it.

♦ Let them explain the different ways.
♦ Take one each and repeat the process till the sweets are over.
♦ Then each one will get 3 sweets each.
- 6= 3+3.

♦ Then ask them ,"Can you share 6 sweets equally to 3 persons?"
♦ Then how many will each one get?
♦ Let them explain.
- 6=2+2+2.

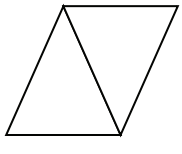
♦ Then ask, if it is shared among 6 persons how many will get each one?
- 6=1+1+1+1+1+1

♦ Conclude that there are three ways to share 6 equally.
- 1+1+1+1+1+1
- 2+2+2
- 3+3
- Can you find any other way to share 6 among more than one person?

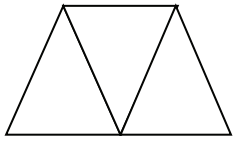
HOW MANY FIGURES (PAGE 175)

♦ Give 12 triangles in groups.
♦ Ask them to make big triangles using 4 triangles.
- How many triangles can you make?
- 3 triangles.
- 4+4+4=12

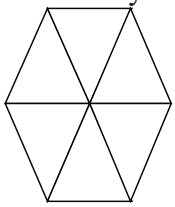
♦ Then how many shapes can you make like this using 2 triangles?



♦ Pupils make 6 shapes.
♦ Then conclude 2+2+2+2+2+2=12
♦ Then how many shapes can you make like this using 3 triangles?



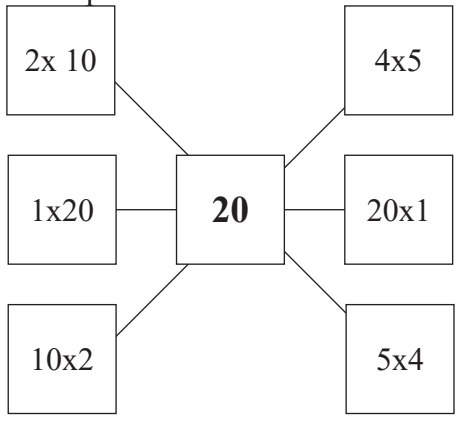
- Pupils make 4 shapes
- Then conclude 3+3+3+3=12
- How many triangles are used in this figure?



- Then how many such shape can you make using 12 triangles?
- 6+6=12
- Then conclude the discussion as 12 can be shared equally in different ways.
  - 1+1+1+1+1+1+1+1+1+1+1+1=12
  - 2+2+2+2+2+2=12
  - 3+3+3+3=12
  - 4+4+4=12
  - 6+6=12

SHARING LADOOS (PAGE 176)

- Give 20 objects in groups and ask them to share in different ways.
- Then complete the web.



- Then fill the web in the TB.

BIRTHDAY (PAGE 177)

- Explain the activity. Do it individually. Share in groups. Discuss in the class. Then complete the web.
- Ask them to find out how many equal groups 24 can be shared into?

GROUPING GAME (PAGE 179)

- Let them do it individually. Discuss in the class. Make a web of 18. Then say how many equal groups 18 can be shared into.

Evaluation. Teacher evaluate,

The ability to find relations.
The ability to share a number equally.
The ability to explain using objects.
The ability to solve problems.
The ability to apply multiplication facts.

15 LET'S READ PICTURES

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Read and interpret tables. ♦ Make tables from a row data ♦ Collect data and interpret them. ♦ Read and interpret data represented in the form of pictures. ♦ Make pictographs using the given data.	♦ Data presented in tables using pictures are easy to understand and interpret. ♦ Data can be presented in the form of pictures.	♦ Write the data given in tables. ♦ Interpret data given in a table. ♦ Interpret data given in the form of pictures. ♦ Collect simple data from surroundings. ♦ Represent data in the form of pictures

What is in this unit?

♦ This unit deals with data handling. Collecting data from a table, writing the received data in a table, interpreting a pictograph and making simple pictographs are discussed in this unit.

CLASS ROOM PROCESS.

FAVOURITE COLOUR (PAGE 180)

♦ Ask children about their favourite colour and get responses.
♦ Then ask children to find out how many of them like each colour.
♦ Then a discussion about writing these data in a table.
♦ What are the items to be wriiten.
♦ Serial number.
♦ Colour.
♦ Number of pupils.
♦ Number of rows.
♦ Number of rows are as per the number of colours. Then make table and write the number in it.
♦ Check the table each with other .
♦ Then show the table in the TB.
♦ Then answer the questions below the table.
♦ Make a new question based on the table.

HOW MANY STUDENTS (PAGE 181)

♦ Observe the table and ask them to answer the questions below.
♦ Then a discussion on making a table showing the number of students in the school in each class.
  - How can the data be collected?
  - How can it be recorded?
  - How many columns should be there?
  - How many rows should be there?
♦ Prepare the table individually and write data in it.
♦ Check the table with each other and make necessary changes if any. Then present the table in the class and discuss.

FAVOURITE PETS (PAGE 182)

♦ Pupils read the passage. Then ask questions and get responses.
  - How many students are there in Lena's class?
  - What is her survey about?
  - What are the pets mentioned in the report?
  - How many of them like puppies?
  - How many of them like cats?
  - How many of them like fish?
  - How many of them like rabbits.?
♦ Then write these numbers in the columns, below the picture of pets.
♦ Then check with each other.
♦ Is it more convenient to extract the data from these tables rather than from the report above.

Discussion.

- Conclude that, the data given in the form of tables and pictures are easy to understand.
- Then do the problems in page 183. The activities are to write row data in the table. Let them write individually and check in groups. Then present it in the class and discuss.

Evaluation. Teacher evaluates,

The ability to read and comprehend.
The ability to collect data.
The ability to explain the data.
The ability to make tables
The ability to write in tables
The ability to interpret tables.

ANNUAL DAY CELEBRATIONS (PAGE 184)

- Observe the table and explain the number of vehicles. Then let them see the data in the form of a pictograph. Let pupil understand how pictograph is constructed.
  - What are the pictures used for?
  - How many pictures are used for each?
  - What are the titles given to columns?
- Then write answers to the questions.
- Write some questions based on the pictograph.

BOTTLED WATER (PAGE 185)

- Observe the pictograph. Answer the questions and make more questions.

PET HOUSE (PAGE 186)

- It is to make table from pictograph.
- First discuss
  - What should be the columns?
  - How many rows are needed?
  - How will you make the table?
  - Then make the table and write data in it..
  - Check with each other.

MAKE A PICTOGRAPH (PAGE 186)

- Now make a pictograph using the data given in the TB.
  - What should be discussed before doing it?
  - How many columns should be there?
  - How many rows should be there?
  - What picture will you draw to indicate one parent?
- Draw and check with each other. Make modifications, if necessary.

Evaluation. Teacher evaluates,

- The ability to interpret pictographs.
- The ability to make tables
- The ability to write in tables
- The ability to interpret tables.
- The ability to make pictographs.
- Participation in discussion.

- Do ‘let’s re visit’ problems and give feed back if necessary.

edufy publications

Semester 2

TEACHERS RESOURCE MANUAL

MATHEMATICS
Grade 3

GRADE - 3

7 HOW MUCH HEAVIER

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Explain the units of measuring weight and their relations. ♦ Convert the units of weight. ♦ Guess the weight of an object ♦ Solve mathematical problems including operations of weight. ♦ Interpreting data and making conclusions	♦ Units of measuring weight are gram and kilogram. ● 1000 grams= 1Kg ● 100 kilograms is one quintal. ♦ Weight in Kg can be changed to gram by multiplying by 1000. ♦ Weights can be added and subtracted in different ways.	♦ Discussion of life related problems. ♦ Find suitable units for finding weight. ♦ Discussion of life related problems. ♦ Classify the objects according to their weight. ♦ Analyzing and solving the problems pupils experience in their daily life situations. ♦ Find relation by analyzing the tables and explain the findings.

GRADE - 3

What is in this unit?

♦ This unit deals with the measurement of weight. Children know how to measure weight using balance and what are the units of measuring weight. They can convert smaller units to bigger and vice versa. When going through this unit children study the operations using the units of measurement and solving problems using them. Children will get chances to guess the weight and collect data from tables and interpret them. At the end of this unit they will be able to handle the daily life situations related with weight.

CLASS ROOM PROCESS.

Ensuring the current ability level.

♦ Find the weight of things using balance.
♦ Compare the weight by guess.
♦ Recognize the units of weight, Kg and gram.
♦ Change the units – gram to Kg and Kg to gram.
♦ Find the weight of children using weighing machine.
♦ Give additional support to those who are still below the current ability level.

FARMER IN THE MARKET

♦ Observe the picture. Read the passage. Page 86,87. Then ask questions. Lead a discussion.
  ● What do you see in the picture?
  ● What are there in the bags?
  ● For what purpose is it brought?
  ● Where are the bags put?
  ● What are the numbers shown on the machine?
  ● What do the numbers indicate?
  ● What is 54.900 and 19.800?
  ● How much is needed to make these to 55 KG and 20 Kg?
  ● What is the price of coconut and arecanut?
  ● What is a quintal?
  ● Why was 300 grams deducted?
  ● How is it done? If necessary read the passage again and discuss in groups. Then groups present the answers. Conclude the discussion.
♦ Kumar and his son has come to sell coconut and arecanut.
♦ Coconut is in white bag and arecanut is in blue bag.
♦ The bags are put on the weighing machine.

- The numbers shown on machine are 54.900 and 19.800.
- The numbers shown on the machine are the weights of coconut and arecanut.
- 54.900 is 54 Kg and 900 grams and 19.800 is 19 Kg and 800 grams.
- 100 grams is needed to make coconut 55 Kg and 200 grams is needed to make arecanut 20 Kg.
- The price of coconut for 100Kg is 2900 rupees and the price of arecanut for 100 Kg is 4000 rupees.
- 100 Kg is 1 quintal.
- 300 grams is the weight of the bag.
- 54.900 -300 gram is 54.600 Kg and 19.800-300 gram is 19. 500 Kg.
- Then do the work in page 88 Bring an electronic balance. Put it on the table. Pupils are divided into groups of 5 each. Ask them to collect five objects from the class, kitchen and out side the class. Each group find the weight using balance. Write in the table in TB. Check with each other.

Evaluation. Teacher evaluates,

- *The ability to find weight using balance.*
- *Understanding of units of weight*
- *the ability to find relations with units..*
- *The ability to make conclusions.*
- *The ability to solve problems.*
- *The ability to communicate.*

- Water melon activity is to convert units and find the difference. . It is explained that 4670 grams is 4 Kilograms and 670 grams, then it is found that, it is 330 grams less than 5 kilograms.
- Group these objects to guess the weight. Let them write in the boxes and check with each other.
- The activities on page 90 and 91, are to find the sum and the difference of weights. It is explained in detail. Let children do as they like and explain on the class. Then discuss each method in the class, so that the whole class benefits.
- The grocery shop activity on page 92 is to find the total weight of each item and total weight of the things purchased.
- Let them do it and check self and with each other.
- Then do the works on page 93 and 94.

Evaluation. Teacher evaluates,

- *The ability to find total weight and difference of the weight.*
- *the ability to find relation.*
- *The ability to compare weights.*
- *The ability to analyze problems*
- *The ability to solve problems.*

Project

- First discuss the project.
- Then make arrangements to measure height and weight.
- Discuss about making the table to record the data.
- Make table.

Sl. No	Name	Height	Weight	Difference

- Then write the findings.

Evaluation. Teacher evaluates,

- *the participation in the project work.*
- *The ability to analyze tables.*
- *The ability to make conclusions.*
- *Accuracy of the data collection.*
- *The ability to communicate.*
- *Project report. (portfolio)*

- Let pupils do the “re visit problems” and give necessary feed back.

8 WHAT IS THE TIME

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Find the time on common clocks and digital clocks. ♦ Find the time duration between two times. ♦ Solve problems using time and conversion of units of time ♦ Collects information from a calendar and find relations with numbers on a calendar.	♦ Time is said in hours and minutes. ♦ The small hand is hour and large one is minutes hand. ♦ 60 minues =1 hour ♦ Half an hour is 30 minutes. ♦ Quarter of an hour is 15 minutes. ♦ Calendar shows the dates and day. ♦ The 30 th day a month is next day of the first of that month. ♦ A leap year has 366 days. ♦ 24 hour is one day . ♦ There are 52 weeks in a year.	♦ Find time from given clocks. ♦ Draw needles on clocks to show the given time. ♦ Analyse the daily works and find the time duration. ♦ Discussion of life related problems to find time duration. ♦ Find suitable units for mentioning time for a particular activity. . ♦ Discussion of life related problems ♦ Analyzing and solving problems pupils experiencing in their daily life situations. ♦ Find relation by analyzing the calendar and explain the findings.

GRADE - 3

What is in this unit?

♦ Time and calendar is the content of this unit. Children know how to tell time on the clock and watch. They have studied the relation between hour and minutes. They have studied about calendar. In this unit all these are repeated and some more concepts are introduced. Minutes and hours, their relation and conversion are discussed here. We discuss telling time using am and pm. Also discuss about the 24 hour clock and more information on calendar. Leap year and more problems related to calendar and time are discussed here.

CLASS ROOM PROCESS.

Ensuring current ability level.

♦ Show clock and ask to tell time on it.
♦ Ask the children to convert minutes into hour and vice versa.
♦ Recognize the units of weight, Kg and gram.
♦ Change the units – gram to Kg and Kg to gram.
♦ Find the weight of children using weigh machine.
♦ Give additional support to those who are still below the current ability level.

TIMING PLAY (PAGE 97)

♦ This activity is to get a sense of time duration.
- Observe the clock in the picture.
- Ask to tell the time on the clock.
- Then let them read the passage.
- Can you say what is the play?
- Allow one or two to say the play rules.
- Then play the game in the class.
- Identify who has kept almost the correct time and the exact time.
- Change the time duration and play again.
- Is there any progress? Teacher should note it.
- Tell them to play the game in leisure times.

JOURNEY TIME (PAGE 98)

- This is to write the time duration between two times. Let them fill the table and check with each other.
  - Who takes more time to reach the school or in the class?
  - Is it more than one hour or less than one hour? Discuss.
- The next activity is to mark time on the clock.
- Then write answers to the questions on page 99.
- Check each other's work.

Evaluation. Teacher evaluate,

- *The ability to guess time.*
- *the ability to find time on the clock.*
- *The ability to find time duration.*
- *The ability to analyze data.*

CLASS TIME (PAGE 100)

- This is to introduce the words like half past, quarter to , etc and to find the time needed to complete the hour. Read the passage. Then ask questions.
  - When does class start/
  - When did Ravi reach school?
  - How much time is remaining to start class?
  - How many minutes is one hour?
  - What is the time 60 minutes after 9 hours?
  - What is the time quarter to 10?
  - How much time is left to 10 from 9.45?
  - How much time is half an hour?
  - How much time is quarter of an hour?
  - How many hours are there for a day?
- Then complete the table. Check each other.

DRAW THE HANDS (PAGE 101)

- Find the time 55 minutes after 1.15 and draw the hands on the clock. A discussion should be held on how the time is found.
  - 1.15+ 45= 2.. and then add 10 more. 2.10
  - 60 minutes after 1.15 is 2.15 and less 5 minutes from it. ie 2.10
  - 1.15+55 = 1.70 . it is 2.10
- Then write answers to the questions below it.

DIGITAL CLOCK (PAGE 101)

- This is to identify the time on digital clock. Do the works and check each other's work.

STARTING AND ENDING TIME (PAGE 102)

- This activity is to find the time duration. Read the passage individually and fill the white space in the passage and then fill the table given. Then make groups and share the work in groups and make corrections if necessary. Then do the 'tell the time ' on page 103.

BUS JOURNEY (PAGE 103)

This is to solve problems using time. Let them read and find answers. Then discuss in the class. Then do the works on page 104 and 105.

Evaluation. Teacher evaluate,

- *the ability to tell time in different ways.*
- *The ability to find time duration*
- *The ability to add time.*
- *The ability to convert units of time.*
- *The ability to solve problems.*

CALENDAR DETAILS (PAGE 105)

- Explain the situation. Then show a calendar and ask students to comment on it. Write the points on a chart when they say.
  - It is the calendar for …….
  - There are .. .. days in the month.
  - First day of the month is on ……
  - Last day is ……..
  - There are ……..Sundays.
  - The date of the second Saturday is ……
  - There are …….. holidays other than Sundays and second Saturday.
- Then discuss the questions in TB.
- Let them explain the first and last day of the next month. Conclude that the 30th day of a month will be on the next day of the 1st day of that mon th.
- Then write the months in the box.
- Discuss the ''leap year'' given on page 107

and the relation of year to weeks , days and months is given there.

Evaluation. Teacher evaluate,

- *the ability to collect information from a calendar*
- *The ability to find relation of numbers in a calendar*
- *The ability to explain one year in different ways.*
- *Understanding about leap year.*

♦ 'Let's revisit' should be done individually and give feed backs if necessary.

9 LET'S MULTIPLY

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Solve problems using multiplication. ♦ Find the relations with numbers and operations	♦ Multiplication is used to find times of a number. ♦ To multiply a two digit number by one digit number, multiply tens and ones separately. ♦ To multiply a three digit number by one digit number, multiply hundreds, tens and ones separately. ♦ To multiply a number by 10, one zero should be put on the right side of the number. ♦ To multiply a number by 100 , two zeroes should be put on the right side of the number. ♦ When multiplying two numbers , if one number is doubled the other will be halved.	♦ Analyze the daily life related problems. ♦ Make questions for a given answer. ♦ Relating the practical situations to multiplication.. ♦ Find relations by analyzing life related problems. ♦ Observe and make conclusions about the relations.

GRADE - 3

What is in this unit?

♦ Multiplication of numbers by a single digit number is described in this unit. Pupils have studied multiplication facts in previous classes. It is recalled here first. Then different methods for multiplying by a single digit number is done through practical situations. Besides, pupils get chance to find the relation of a multiplication fact to another one and explain it. When going through the unit the child gets opportunity to solve problems, analyze and make tables and to communicate the findings. Pupils also go through the unit making questions.

CLASS ROOM PROCESS.

Ensuring current ability level.

♦ All the works given on page 108 are to test the previous knowledge of the child. Give more items to re-enforce multiplication facts. It is better to conduct a play in the class using red tokens and green tokens, as in the TB.

♦ While doing the second work ,it should be said that 4 times 3 and 5 times 3 is 9 times 3. Pupils have to say accordingly and write the remaining task.

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

PLAY NOTES (PAGE 110)

♦ This activity is to multiply a two digit number by 10 . In the previous class they have studied 1x2= 2.

♦ 10x2= 20 ; 3x5=15 . 30x5= 150 etc.

♦ Observe the table. Then ask to find how many rupees each has.

♦ Then check in groups and modify if necessary.

- Then present it in the class and discuss.
- Ask what is the relation of notes to the total amount.
- Total amount is 10 times of the number of the notes.
- Then describe as it is given in the table given below.
- Then fill the blanks in the boxes given on the right side.

Evaluation. Teacher evaluates,

- *The ability to multiply by 10.*
- *the ability to find relations.*

HOW MANY IN THE BOX (PAGE 111)

- This is to multiply 12, by 4. Let pupils find the total number in their own ways. Discuss in the class. Then explain the different ways.
- 12x4 =(10x4)+(2x4) =40+ 8= 48.

  12x
  4
  48 ---(4x12)
  40 -- (4x10)
  88
- 10 2

4	40	8

- Then find the price of 15 cups. All the methods are explained in the TB. Let them do the problem in their own ways and discuss.

SCOOTER JOURNEY (PAGE 113)

- Read the question and analyze it. Then let them do it and discuss the different ways in the class. Then discuss this.
  6x32= 3x 64 = 12x16 = 24x8 =192
- Then do the works in page 113 , 114 ,115and 116. Let the children do the problems individually and discuss in groups and evaluate themselves.

Evaluation. Teacher evaluates,

- *the ability to multiply a two digit number by a one digit number.*
- *The ability to find different ways.*
- *The ability to solve problems.*

BONUS DISTRIBUTION (PAGE 117)

- Explain the situation. Then discuss how it will be solved. Then let them fill the table as shown in the example.
  - To multiply by 100 , add two zeros on the right side
  - To multiply by 200 , multiply by 2 and add two zeros on the right side
- Then find the bonus amount of Hasna. Do it and discuss in the class. Then write it as given on Page 118

WHOLESALE MERCHANT (PAGE 119)

- This is to understand the multiplication of a three digit number by a single digit number. They have already understood the way to multiply by 100.
  - Read the problem
  - Let pupils read in the question.
  - How it is solved?
  - What is the cost of one box?
  - What is the cost of 100 boxes?
  - What is the cost of 30 boxes?
  - What is the cost of 2 boxes?
  - What is the cost of 132 boxes?
  - Discuss in the class, discuss different methods.
  - Find the number of candles. The process is same as in previous work.

CONSTRUCTION WORK (PAGE 120)

- It can be solved in two ways.
  - Find the wage for 4 carpenters.
  - Find the wage for 4 masons.
  - Then add the wages of carpenters and masons.
  - In another way ,
  - Add the wage of one carpenter and one mason.
  - Then multiply the total by 4.
- It has been discussed in TB.
- Fill in the blanks on page 121
- It is to be made clear to the learners that as 3x6= 18 ; 30x6= 18x10 and 300x6= 18x100.

They should do it with clear understanding. Don't allow them to do mechanically.

- Find the relation and write the answer on page 122
- This work is not to multiply and find. It should be found by identifying the relation between the given operations.
- First ask what relation do they see between the two operations.
- 24x9 and 24x10 are related. 24x10 is 1x24 more than 24x9. Then the answer is 24 more than 24x9= then 24x10= 216+24= 240.
- 49 x8 is one less than 50x8. That is 400-8=392
- 35x9 is 35 less than 35x10. So 350-35=315.
- 4x124 is 4 less than 4x125. That is 496.
- 4x12 is the double of 2x12. So it is 48.

Find the pair. (PAGE 111)

- Find the equal sums by matching. It is not by multiplying, but by finding the relations.
  - 120x6= 60x12. 120 became half and 6 became 12. So the product will be the same.
  - 100x5= 50X10
  - 50x8= 100x4
  - 200x7= 100x14
  - 80x8= 40x16
  - 40x2=20x4

NASEEMA'S SAVINGS (PAGE 123)

- It is to be discussed in detail.
  - Discuss how we can find the total.
  - 152x1= 152
  - 199x2= 398
  - 160x5= 800
  - 120x10= 1200
  - Total =2550
- Then discuss the hints given.
- What is the total of 1 rupee coin and 2 rupee coins. It is 152 +398 = 550. (200x2 =400. So 199x2= 398) 152 one rupee is equal to 76 two rupee coins. So the total of 1 rupee coins and 2 rupee coins. = 199+76= 275. 275x2= 550.
- 80 ten rupee coins will be there for 160 five rupee coins.
- Total of 5 rupee coins and 10 rupee coins is 120+80 =200. 200x10= 2000.
- Let them discuss all these points.
- **Write as in the example** is to be done by students. Then discuss it in the class.

Do it mentally (PAGE 124)

- First find the strategy for calculating mentally.
  - 4x12 + 6x12. Both are multiplied by 12. So 4 times 12 and 6 times 12 is 10 times 12. 10x12= 120
  - 5x50 +5x50= 10x50= 500
  - 80x3+20x3= 100x3=300
  - 70x10+10x10= 80x10=800
  - 97x5+ 103x5 = 200x5 =1000
- Find the product and find the answers are to be done and discussed in groups. Then discuss them in the class.
- Make your own questions is very important.
- Let them write questions so as to get the answer as 147x7. Discuss the questions in the class and make modifications. It should be noted that the questions should be meaningful.

Evaluation. Teacher evaluates,

- *the ability to multiply a three digit number by a one digit number.*
- *The ability to find relation of numbers and operations.*
- *The ability to explain different ways.*
- *The ability to think logically*
- *The ability to solve problems.*
- *The ability to make questions.*

- Think and do should be done individually and discussed in the class.

10 WHICH CONTAINS MORE

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Guess the capacity of a vessel in terms of non standard units. ♦ Measure the capacity and compare using non standard units. ♦ Convert the units of measurements from litre to millilitre and from millilitre to litre. ♦ Guess the capacity of a vessel in terms of standard units. ♦ Measure the capacity and compare using standard units. ♦ Solve problems using addition and subtraction related to measurement of capacity.	♦ Large vessel contains more liquid. ♦ 1000 ml= 1litre	♦ Measure water in a bucket . ♦ Guess the water in a bucket. ♦ Find relations by analyzing life related problems. ♦ Observe and make conclusions about the relations. ♦ Solve daily life problems.

GRADE - 3

What is in this unit?

♦ This unit deals with measuring capacity. Children have experienced measuring capacity using non standard units in 2nd standard. They can say which vessel contains more and which contains less with out measuring, if there is visible difference. They will measure liquid using mugs, cups etc. In this unit we discuss the standard units of capacity and their relations. We also address the problems using the addition and subtraction of capacity measurements. Pupils will get opportunity to guess and check capacity while going through this lesson.

CLASS ROOM PROCESS

Ensuring current ability level.

- Show two vessels and ask them to find which contains more?
- Show one large vessel and a small vessel. Ask them to say how much times the small vessel should be filled to fill the large vessel.

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

♦ Observe the picture and lead a discussion.

♦ Ask questions.

- Why does mother say big bucket can't be carried by the daughter?
- How much water does the big bucket hold?
- How much water does the small bucket hold?
- What do you understand by ''litre''?

GUESS AND CHECK

♦ This activity is to guess the capacity and to find different ways to compare capacity.

♦ Take full water in one bucket and pour it in the second one. If the water remains in the first

bucket, then the first one is big. If the space in the second bucket remains the second bucket is big.

- Take a small vessel and fill the buckets using it. Then we can not only show which is bigger but also how much big it is.
- Then take two buckets and one mug.
- Ask the students to guess how many mugs of water will each bucket hold
- Write it in the format given in the TB page 127.
- Then measure it using the mug.
- Write the correct measurement in third column.
- Then find the difference and write it in the 4th column.
- Then check the format with each other.
- Evaluate self and find the difference in the guess work.
- Repeat the activity using different vessels.

Evaluation. Teacher evaluates,

- *The ability to measure .*
- *the ability to guess.*

UNITS OF MEASUREMENT.

- This is to introduce litre and millilitre and their relation.
- 1000 ml= 1 litre
- Do the activities on page 128 and 129.

MILK SOCIETY, PETROL PUMP

- These tasks are meant to develop the skill, to add and subtract litre and millilitre.
  - Read the question.
  - Explain what is to be found.
  - What is to be done to find it.
  - Do individually.
  - Discuss in groups.
  - Present it in the class.
- Discuss the additional information given in the TB.
- Do " let's revisit" activities individually and discuss.

Evaluation. Teacher evaluates,

- *The ability to convert units.*
- *the ability to analyze problems.*
- *The ability to solve problems.*

- "Think and do" should be done individually and discussed in the class.

11 SHARE EQUALLY

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Solve Mathematical problems using division ♦ Find relations of quotient , divisor and remainder to the dividend. ♦ Find number properties related with division.	♦ To divide equally division is used. ♦ quotient x divisor+ remainder. = dividend. ♦ a number divided by 1 is the same number. ♦ a number divided by the same number is 1.	♦ Solve daily life problems and find different ways for division. ♦ Observe and make conclusions about the relations. ♦ Find number properties by analyzing life related problems.

What is in this unit?

♦ This unit is to introduce division. Although pupils have done equal sharing in 1 and 2 classes, it is not described as division. They can share a fixed amount of things equally in various types. Now they have studied multiplication facts and it is easy to divide using this multiplication facts. In this unit equal division is introduced as repeated subtraction and as opposite of multiplication facts. Dividng a two digit number by a single digit number is also introduced here in this unit, where there is no remainder.

CLASS ROOM PROCESS.

Ensuring current ability level.

- Ask questions. Ex. There are 20 sweets. If you give 2 each to your friends how many friends will get it?
- What will be the number of friends if you give 4 each? 5 each and 10 each?
- Change the situation and number and ask more questions.

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

MINNU'S BIRTHDAY

♦ Do the first activity in the class.

♦ Start with minnu and her birhday. She has brought ladoos. She is going to divide them among her family members.

♦ Bring 12 objects and some plates.

♦ Give in groups and ask them to put equally in 4 plates.

♦ Then ask them how they divided the ladoos.

♦ Discuss in the class. Explain 12- 3 , 9-3…….

- How many are in one plate?
- How many plates?
- What is the total? 4x3=12

♦ Continue with Minnu. Father said he doesn't want.

- Then avert one plate. And tell them to put equally in 3 plates.
- Then ask them how they divided the ladoos.
- Discuss in the class. Explain 12- 4 , 8-4……
- How many are in one plate?
- How many plates?
- What is the total? 3x4=12

♦ Continue with Minnu. Mother said she wanted only two.

♦ Then divide the remaining 10 in 2 plates.

♦ Then ask them how they divided.

♦ Discuss in the class. Explain 10- 5 , 5-5

- How many are in one plate?
- How many plates?
- What is the total? 2x5=10.

♦ Then introduce division and the symbol as

given in the TB page 135.

- This order should be kept before introducing symbol.

1. 3+3+3+3+= 12
2. 4x3=12
3. There are 4 times 3 in 12
4. 12 divided by 4 is equal to 3
5. 12÷ 4=3 then again say 4x3=12 12÷4=3

PACKING THE PENCILS.

- Do the activity in the class in groups.
- The process is detailed there in TB.
- 4+4+4+4+4+4+4+4+4 =36
- 9x4=36
- There are 9 times 4 in 36
- 36 divided by 4 is equal to 9
- 36÷ 4=9 then again say 9x4=36 36÷ 4=9
- Then read the questions and fill the boxes. This is to say 36÷ 9=4

- How many times can we take 4 from 36.
- There are 4 times 9 in 36.
  4x9=36
  36÷9=4
- Then see how many are in one box if it is put 6 each.
  6x6=36 36÷6=6
- How 4x9 is changed to 6x6 is illustrated there.
- Then introduce dividend, divisor and quotient.
- Then do the activities on pages 138 to 140.

Evaluation. Teacher evaluate,

- *The ability to share equally.*
- *Understanding of division and its symbol.*
- *Ability to find different ways to find different ways to divide.*

APPLE SELLER

- This is to introduce the division in which the quotient is more
- than 10. Pupils know the multiplication fact and so they can divide
- a number by another number, using the reverse process of multiplication.
- 16÷2 can be found from 8x2=16. But to see 33÷11 or 88÷4 other methods have to be found. In this activity 33÷3 is done as 30÷3 + 3÷3.
- That is 33 is split as 30+3. It is explained with pictures in TB. In other way 3 can be subtracted from 33 , 11 times.
- The process of dividing 69 by 3 is explained in detail. This should be done by using ten rupee notes and one rupee coins.(play notes and coins)
- First show the process in the class. Then only introduce the method of writing.
- This can also be done as splitting 72 as 60+12. 60÷6 = 10. 12÷6= 2 . So 72÷6= 10+2=12.
- The next problem for dividing 72 by 6 also should be shown using play notes or coins.
- Then explain the method of writing.

REMAINING AS REMAINDER.

- This is to divide the number in which remainder comes. The process is same as the previous activities. Pupils should understand why remainder occurs.
- Then do the activity dividing 96 by 7. It should be done using play notes and coins.
- Then discuss the previous relation of quotient, dividend and divisor and revise as Quotient x divisor + remainder = dividend.
- Then do the activities ‘’divide the following’ ‘solve these problems” individually.
- Check in groups and discuss.

Evaluation. Teacher evaluate,

- *The ability to do division.*
- *the ability to analyze problem.*
- *The ability to solve problems.*
- *The ability to find relations.*

PROJECT

1) Le them find that a number divided by 1 is the same number.

- Take some examples and write it in the note book.
- Then make conclusions.

2) Ask questions

- There are 8 sweets. How much will each one get if it is divided equally to 8 persons.
- It is 8÷8 =1
- Change the context and numbers ,and repeat the same types of questions.
- Write the division facts got from these contexts in note books and let them check the answer.
- Then present their findings.
- If a number is divided by the same number the answer is 1

Evaluation. Teacher evaluate,

- *Participation in project work*
- *The ability to collect data.*
- *the ability to analyze data.*
- *The ability to make conclusions*

- "Think and do should be done individually" and discussed in the class.

12 FINDING THE PARTS

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Explain a fraction as apart of a whole. ♦ Identify the given fractions and write fractions .	♦ Fraction is used to say the prescribed part of a whole. ♦ Fraction shows how many total parts and how many of these parts are considered. ♦ 1/2 is one part of a thing equally divided by 2.it is half of the whole ♦ 1/4 is one part of a thing equally divided by 4.it is quarter of the whole ♦ 3/4 is three part of a thing equally divided by 4.it is three fourth of the whole ♦ In a fraction the number above the line shows how many parts are considered and it is the numerator. ♦ In a fraction the number below the line shows how many parts in total and it is the denominator.	♦ Discuss the need for dividing one thing to two or more pieces and how it is said in daily life. ♦ Dividing objects and pictures and find the fractions indicating the parts. ♦ Explain the fractions for the shaded and un shaded part of rectangles, squares etc. ♦ Colour the divided parts of pictures with respect to the given fractions. ♦ Observe and make conclusions about the numerator and denominator of the fractions.

GRADE - 3

What is in this unit?

♦ This unit deals with fractions. Children have seen cutting and dividing objects in their daily life situations. They are acquainted with the word half, quarter etc. they use these words , like half dosai, quarter apple etc in daily life. In this unit the fraction is introduced. Child understands, what is a fraction, how it is interpreted and how it is written. They get opportunity to colour the given part and to find the fraction of the coloured area. They also get chance to discuss the use of fraction in daily life.

CLASS ROOM PROCESS.

CUT EQUALLY

♦ Do the first activity in the class.Lead a discussion in the class based on the matters given in the TB.

♦ Ask questions to lead the discussion.
- What are there in the picture?
- How will you take half of it?
- How will you cut papaya to make two halves?
- How will you cut jack fruit to make two halves?
- Can you cut the pineapple into 4 parts
- Is the watermelon cut in to equal pieces?

♦ The conclusion is that although we say the parts are half , quarter etc. .. they are not parts of the same size.

♦ Then explain half and quarter as given in the TB.

♦ Then discuss about the words we use in our daily life.

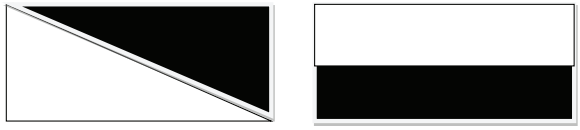
CUTTING THE CAKE.

♦ Bring 12 objects and some plates. This activity is to introduce half and writing fractions.
♦ One part of a thing equally divided into two parts is half.
♦ Two halves will make one.
♦ Half is written as 1/2
♦ One part of a thing equally divided into 4 parts is quarter. (One fourth)
♦ Four one fourths will make one.
♦ One fourth is written as 1/4

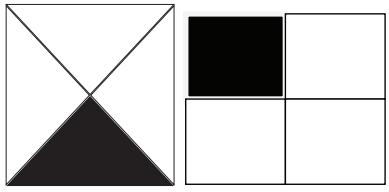
RECTANGLES AND SQUARES

Observe the rectangle.

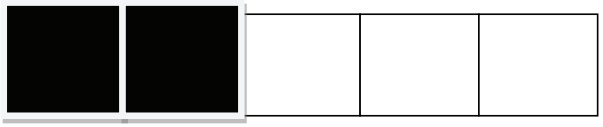
♦ Rectangle is divided into two equal parts.
♦ One part is 1/2
♦ Two rectangles are there. Divide it equally in a different way and colour 1/2 part.



♦ Then explain 1/4 of the square.
♦ Two squares are there. Divide it equally in a different way and colour 1/4 part.



♦ Then introduce the three fourth of the square . 3/4 . (3 part of a thing equally divided by 4)
♦ Then introduce one third (1/(3)) of the rectangle (one part of a thing equally divided by 3)
♦ Then explain two third (2/3) (two part of a thing equally divided by 3)
♦ Write the shaded part and unshaded part and explain the fraction.
  - Example



  - Shaded part is 2/5 and un shaded part is 3/5
  - 2/5 = two part of a thing equally divided by 5
  - 3/5 = three part of a thing equally divided by 5

♦ Explain all the fractions like this.
♦ Then write all the fractions discussed in the note books. Ask to explain what does fraction show and what is indicated by the number under the line and above the line in a fraction. After discussion conclude the points given in the box.
♦ Then explain 3/5 with the help of the circle given. Then ask to explain 1/8 and show by colouring the rectangle given. Then do the colouring work on page 153. Check with each other.Explain the fraction

Evaluation. Teacher evaluate,

- *The conceptual understanding of fractions.*
- *The ability to find the fraction for the given part.*
- *Ability to explain a fraction as part of a whole.*
- *The ability to colour the given part.*

13 MONEY TRANSACTIONS

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Solve Mathematical problems using money trasaction. ♦ Explain the items included in a bill and understand about various money transactions including banking.	♦ There are different types of coins and notes. ♦ MRP is the maximum retail price of a thing. ♦ Rate shown in a bill is the price for one unit. ♦ Net amount is the amount payable after reduction. ♦ Taxes should be paid to government. ♦ Pay in slip is used to remit cash in the bank. ♦ Cheque is used to withdraw cash from bank.	♦ Solve daily life problems and find the combinations of notes and coins for an amount. ♦ Analyze bills and tables and find the items included in a bill. ♦ Analyze Pay-in slips and discuss about Banking and denomination of notes and coins.

GRADE - 3

What is in this unit?

♦ This unit is about money. In second standard pupils have learned about currencies and coins and their transactions. They can identify the existing currencies and coins. They can do problems using money. The same concepts are repeated in this unit with some more depth. More problems, cash bills, tax and banking are discussed in this unit. pupils get opportunity to analyze supermarket bills, bank pay slips etc, while going through this unit.

CLASS ROOM PROCESS.

Ensuring current ability level.

♦ Show play notes and ask to identify them.
♦ Ask the children to take an amount from the given notes and coins.
♦ Ask how many and which notes and coins are needed to make a prescribed amount.
♦ Conduct mock transactions in the class.
♦ Give additional support to those who are still below the current ability level.

SAVINGS OF LEENA

♦ Do the first activity in the class.
♦ After describing the situation in the TB teacher says these are the notes and coins Leena brought. Put play notes and coins on the table. Ask one pupil to to take the notes and coins for Rs. 1000 in the same way as Leena took. Show it in the class and dicuss about taking 1000 rupees in another way. Then make pupils group and give these notes and coins in each group. Ask them to take 1000 rupees in two different combinations. All group members write their combinations in the columns in TB. Discuss various combinations in the class.
♦ Then give only 200 rupee notes and 50 rupee notes in the groups and ask to take 1000 rupees. It can be taken in three ways.
  - Only 200 rupee notes.
  - Only fifty rupee notes.
  - 200 rupeee notes and 50 rupee notes.
  - Explain the denominations of notes taken by each group, in the class.
  - Then ask groups to take 200 rupee notes and 50 rupee notes equally and make 1000

rupees.

- Explain in the class.
- Write the number of notes in columns of TB.
- Discuss the dialogues.
- Then count and write in the table.
- Then find the total .
- Then find the minimum number of notes and coins for 2477 rupees.
- (4x500 2x200 1x50 1x20 1x5 1x2)
- Give another amount and find the minimum number of notes and coins for it.
- Let them check with each other. .

Evaluation. Teacher evaluate,

- *The ability to identify notes and coins.*
- *Understanding of combinations of notes and coins.*

- The next activity is to analyze a bill. Show the bill in th TB
- What do you see in the bill?
  - Item name.
  - MRP
  - Quantity
  - Rate
  - Net amount
  - CGST and GST.
- Discuss about all, and then answer the questions below.
- Total MRP= 206. It is the price of one unit. The quantity of third item is 3. So the rate of that item is 3x10 = 30. MRP is 10. Rate is the amount after reduction. For some items it is less than MRP. Net price is 219. She had to pay 2 rupees before. So total 221. Now paid 220. Balance to pay is 1 rupee.
- Total amount of CGST is 1.71 and total amount of SGST is 7.63
- Then write answers on next page. Write three possibilities for the amount.
- Then show the bill on page 158 and discuss. Ask to say the findings from the bill and then write.
- Ask pupils to collect such bills and discuss in the class.
- Then discuss the price of rice.

BANKING

- This explains the process of banking and write denominations of the notes and coins.
- Read the passage and discuss. Then fill up the form. Write the total amount in figures and words on the first page. Then write the denominations of the notes and coins as they like. Total amount is 6875. Discuss in the group and compare with others.
- Then discuss the medical shop bill and cashless transaction and related matters.

Evaluation. Teacher evaluate,

- *The ability to analyze tables and bills.*
- *Participation in discussion.*
- *Communication skill*

- Do 'let's revisit' activities and give feed back "Think and do" should be done individually and discussed in the class.

14 LOOK AT THE TABLE

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Analyze tables and collect data. ♦ Arrange the data received from a description by making suitable tables. ♦ Interpret and collect data from pictographs. ♦ Make questions based on a given data in tables or pictographs	♦ Data given in a table are easy to understand than given as row data ♦ Data can be shown by using pictographs.	♦ Analyze news reports and arrange the data in tables. ♦ Interpret the given data and make questions based on it. ♦ Interpret pictographs and answer the questions based on it. ♦ Interpret pictographs and make questions using it.

What is in this unit?

♦ This unit deals with data handling. Children have studied to interpret a simple table and to make such tables. They have also studied how to collect data from pictures in the form of a pictograph. In this unit they are going to interpret tables with more data and make such tables. Also introduces pictographs, in which one picture represents a fixed number. They will get opportunity to make questions based on a table.

CLASS ROOM PROCESS.

Ensuring current ability level.

- Shows simple table and asks to describe the data.
- Asks to make simple tables by giving simple data.

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

RAIN FALL

♦ Discuss the dialogue in the starting of the unit. Then discuss why rain fall is said in centimetres. It is the height of water collected over a period of time..

♦ Then read the news in the box. Discuss about writing the data in the table.

- Which district will come first?
- Then what's the relation mentioned to next district.
- Which district will come next.
- Then write in the table individually.
- Fill the self evaluation format.
- Then discuss in groups and check each other.
- Present it in the class .
- Also make some questions based on the table.

NUMBER OF STUDENTS

♦ Read the table and fill it. Then make questions. Check questions and evaluate each other. Discuss in the class. After refining write on a sheet of paper and make a book containing all the sheets of papers.

PRICES OF VEGETABLES AND FRUITS

♦ Ask the price and weight of vegetables and fruits purchased by Suma.

♦ Then discuss it writing the above in table.

♦ How many columns? How many rows? What should be there in the columns? Decide the format. Make the table.

♦ Check self and fill the self evaluation format. Check in groups. Check each other. .

GRADE - 3

Evaluation. Teacher evaluates,

- *The ability to interpret tables.*
- *The ability to make questions.*
- *To make tables.*

CLUB MEMBERS

- Ask questions based on the table. Then explain about making a
- Pictograph.
- Then answer the questions by analyzing the pictograph.
- What do you see in the bill?

LIBRARY

- Observe the pictograph and answer the questions. Then write questions based on the pictograph. Make a booklet of questions. Then analyse the pictograph showing the number of scooters and make questions.

edufy publications

Semester 2

TEACHERS RESOURCE MANUAL

MATHEMATICS
Grade 4

GRADE - 4

7 MULTIPLY

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Solve mathematical problems including multiplication of two digit numbers and three digit numbers. ♦ Find different ways for multiplication and explain the methods. ♦ Find relation of numbers and operations, and explain in one's own words.	♦ To find the times of a number, the number should be multiplied by the number showing the times. ♦ There are different ways to multiply two numbers. ♦ A multiplication fact or operation can be stated in other ways by relating the number properties ♦ Among the three consecutive natural numbers, one more than the product of first and last numbers will be equal to the number got by multiplying the middle number by itself.	♦ Find the product through solving life related problems. ♦ Find different ways for multiplication and discuss in the class. ♦ Find relation by analyzing the tables and discussion

What is in this unit?

♦ This unit deals with multiplication. Children have already studied multiplication facts in std 2 and it has been revised in std 3. They can multiply two digit numbers and three digit numbers by a single digit. They have experience solving many problems using multiplication. They can split a multiplication fact conveniently so as to do it mentally. In this unit we revise this and discuss the multiplication involving more digits and life related problems. Activities to develop logical thinking and reasoning power are included in this unit. Pupils will get chance to find different ways for multiplication and make connections with numbers to make multiplication easier. Pupils will get chance to find and explain the methods of problem solving and develop skill in mathematical communication.

CLASS ROOM PROCESS.

Ensuring current ability level.

♦ Activities given from page 102 to 105 is to ensure current ability level. All these are discussed in previous classes and teacher should make sure that all children are competent to do these activities. If necessary, additional work sheets or activities should be given to ensure current ability level.

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

Let's recall

♦ Write the multiplication fact in red token in the note book and find the answer from the blue token and write against the fact. Then cross check with each other. After that ask them to write some more facts which are not in tokens. Teacher checks and gives feed back.

Before pairing the group let them split and write 12x9. 10x9 + 2x9 = 90+18= 108. Then how to do it using another method. 12x9 is 12 less than 12x10. 120- 12=108.

- Then ask them to pair it. As far as possible mental calculation should be encouraged. In the first box, it is two digit x one digit and in the second box it is three digit x one digit.
- In the third box there is another type of combination. Pupils know that when multiplying two numbers, if one number is doubled, the other one will be halved. So 4x8 = 2x16 = 1x32. This type of multiplication should be done before doing the TB activity. 24x8= 48x4, 35x8= 70x4, 10x30= 5x60 and 18x8=9x16.
- "Find the missing numbers in page 104" is to find which numbers are to be multiplied to get the larger number. Ask them which number is to be multiplied by 2 to get 10. That is 10÷2. Answer is 5. Then fill the missing numbers. Each one should be discussed in class.
- "Find the relation and write the answer" in page 104, is to make multiplication by 10 and 100 easy. Pupils have experienced it earlier.
- "Find the answer and how did you find it" in page 104, is to find the relation between the numbers. 25x10= 250. 25x9 is one 25 less than 25x10. That is 250-25=225. Same way 24x10 is one 10 less than 25x10. That is 250-10=240. 12x9 = 108 . 12x10 = 108+12 =120 12x90= 108x10= 1080
- "Find the product" should be done individually and cross check with each other.
- "Find the product as in the example" is to be done and explained by the children All the above activities should be evaluated by the teacher giving necessary feed back,

School assembly

- This is to introduce the multiplication of a two digit number by a two digit number.
- Show the picture and ask, how many pupils are there in the assembly? Let children find it in any way and say the answer. Let them explain how they have found the answer.
- Discuss all the ways in the class. Pupils may have found it by,
  - counting all the heads.
  - by adding 15+15+15……..(12 times)
  - by adding 12+12+12+……(15 times)
  - by doing 12x10 and 12x5 and adding it. (12x10)+(12x5)
  - by doing 10x10 , 10x2 , 5x10 , and 5x2 and adding it.

Number of cups

- The class room process is the same as described above.
- All the methods should be discussed in the class.
- Children can accept whatever method they like.
- In all the methods it is seen that the process is
- 14x13= 10x10 + 4x10+ 10x3+ 4x3 = 100+ 40+30+ 12= 172.
- The same is done here.

	10	4
10	100	40
3	30	12

- The same is done here also. But there is change in order.

```
  14   x
  13
  42
 140
 182
```

In the rice shop.

- Let pupils do the multiplication in the activity as they like. Then discuss in the class.
- Let them find the relation between 10x48 and 5x48. 5x48 is half of 10x48. Once 10x48 is found it is easy to get 5x48. It is half of 480 ie, 240.
- Whenever such relation is found, it should be highlighted and discussed in the class.
- To find the price of 2 and 3, find 42x11 and 55x12

42x 11= 40x11 + 2x11 = 440 + 22 =462
42x11= 42x10 + 42x1= 420+ 42= 462

	40	2
10	400	20
1	40	2

40x10 + 2x10+ 40x1+ 2x1
400+20+40+2
42x
11
42= 1x42
420= 10x42
462.
55x 12= 50x12 + 5x12 = 600 + 60 =660
55x12= 55x10 + 55x2= 550+ 110= 660.

	50	5
10	500	50
2	100	10

50x10 + 5x10+ 50x2+ 5x2
500+50+100+10
660

55x
12
110 = 2x55
550 = 10x55
660.

At the stationery shop

- First let pupils read the question and then ask to explain it in their own words. Through discussion following conclusions are made.
  - To find the price of 200 page note books 15x32 is to be done
  - To find the price of 100 page note books 16x15 is to be done
  - To find the total price of 100 and 200 page note books 15x32+16x15 is to be done.
- Let them find it in their own method. Then discuss the different methods in the class .
- Another relation is also given. 48x15 is 2x15 less than 50x15. 50x15=750 , so 48x15= 750-30=720 . 100x15=1500. So 50x15=75
- Discuss Shafi's method. (15x32)+ (16x15) 15x32= 30x16 - 15 is doubled. (30) and 32 is halved (16)

- To see 45x16 , find 50x16 =800 and less 5x16= 80 from it . 800-80=720

Help to the poor

- First let pupils read the question and then ask to explain it in their own words. Through discussion following conclusions are made.
  - The amount given by 4A students = 36x40
  - The amount given by 4B students = 32x25
  - To find the total, add the above two amounts.
- Let them find it in their own method. Then discuss the different methods in the class .
  (36x40) + (32x25) is to be done.
  36x40= 72x20= 144x10= 1440
  32x25 =16x50=8x100 =800
  Total = 2240
- Don't insist a particular method. Discuss the different ways. Give freedom to accept any way. The method one pupil accepted may not be acceptable to another.
- Do the works in page 111and 112.
- Let them check the answers themselves and with each other.

Evaluation. Teacher evaluates

- *The ability to multiply two x two digit numbers*
- *The ability to find relation.*

- *The ability to make conclusions.*
- *The ability to solve problems.*
- *The ability to communicate.*
- *The ability to explain the reasons for their findings.*

Independence day celebrations.

- This activity is to introduce multiplication of a three digit number by a two digit number.
- Explain the context in the TB. Ask them ,
  - How many packets of balloons have been bought?
  - What is the price of one packet?
  - How can we find the total price?
- Then let them find it and explain in the class.
- Different methods are given in the TB. Discuss all.
- Price of 100 + Price of 20 +price of 4 is price of 124.
- It is written as 124x25 = 100x25 +20x25 + 4x25
- All these are known to students and they can do it in mind. 100x25=2500, 2x25=50 so 20x25=500, 4x25=100 Total= 2500+500+100=3100
- Then discuss the expense for making flags. It is explained there in TB.
- Then discuss the price of ribbon.
  143 x13= 100x13+ 40x13+ 3x13 = 1300+520+39= 1859
  143x13= 100x10+ 40x10+ 3x10+ 100x3+ 40x3+ 3x3 = 1000+ 400+30+300+120+9 = 1859 (this should be shown by drawing rectangles)

Selling coconuts.

- 206 x29 = 200x29 + 6x29
  If it is shown in a rectangle it will be 200x20 + 6x20 + 200x9 + 6x9
- It can also be found as 206x30 – 206

Construction work .

- It can be found in two different ways. First find the wages of 12 carpenters and then the wages of 12 masons. 12x 1050 + 12x 950 = 12600 + 11400 = 24000. In another way 1carpenter and 1 mason together get 1050+950 ==2000. 12 carpenter and 12 mason together get 12x2000= 24000. It is noted that 12x1050 = 12x1000 +12x 50 and 12x 950 is 12x1000 - 12x50.
- Then let them do the works in page 115
- Let them check answers themselves and with each other.

Evaluation. Teacher evaluates,

- *The ability to multiply three x two digit numbers*
- *the ability to find relation.*
- *The ability to analyze problems*
- *The ability to solve problems.*
- *The ability to communicate.*
- *The ability to explain the reasons for their findings.*

Grouping the beads.

- Teacher says: I have 24 sweets with me. I want to give the sweets to two students equally. In how many ways can I give it?
  - 3 each to 8 students
  - 8each to 3 students
  - 2 each to 12 students
  - 12 each to 2 students
  - 6 each to 4 students
  - 4 each to 6 students
  - 1 each to 24 students
  - All the 24 to 1 student
- Then write the above as in text books. The same fact may not be repeated. Eg . 3x8 and 8x3 are written once.
- Then take one item from these and again write as product of two numbers if possible.
- In 8x3 , 8 can be written as 4x2. Then 24= 4x2x3. Again 4 can be written as 2x2. Then 24= 2x2x2x3. No number in this can be written as product of two numbers except 1x2 or 1x3.
  Again, 24=4x6 = 2x2x2x3
  12x2= 2x2x3x2
  24x1= 2x3x2x2
  Every time , we get three times 2 and one time 3.
  So 24= 2x2x2x3

Just like that we get 30 as 2x3x5 and 48 as 2x2x2x2x3

Then let them split and write the numbers in TB.

36= 4x9 = 2x2x3x3.

45= 9x5= 3x3x5

60= 12x5 = 2x6x5 = 2x2x3x5

80= 20x4 = 2x10x4 = 2x2x5x2x2 =2x2x2x2x5

100= 10x10 =2x5x2x5= 2x2x5x5

90=10x9= 2x5x3x3

72=9x8= 3x3x4x2= 3x3x2x2x2

- Note. This time don't introduce factors or primes. Just writing as given above is only introduced.
- Evaluate the process and give feed back.

Project

- First discuss the project.
- Is there any relation for the middle number among three consecutive natural numbers, to the number one more than the product of first and last numbers.
- Let them take 5 set of numbers and check this. Then check in groups and make a table of their findings.

Numbers	Product of first and last	One added to the product	Middle number	Relation with middle number
1, 2, 3	1x3= 3	3+1=4	2	2x2=4

- Then explain their findings and discuss in the class. Write the findings below the table.
- Findings. Among the three consecutive natural numbers, one more than the product of first and last numbers will be equal to the number got by multiplying the middle number by itself.

Evaluation. Teacher evaluates,

- *the ability to find relation.*
- *The ability to analyze tables.*
- *The ability to make conclusions.*
- *Accuracy of the data collection.*
- *The ability to communicate.*
- *The ability to explain the reasons for their findings.*
- *Project report. (portfolio)*

- Let pupils do the "revisit problems" and give necessary feed back. "Think and do" problems should be done individually and discussed in the class.

8 LET'S CHECK THE WEIGHT

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Find the weight of an object correctly using balance ♦ Guess the weight of objects and check it using instruments. ♦ Solve mathematical problems including measurements of weight and conversion of units. .	♦ There are various types of balances to find weight . ♦ 1000 grams =1 kg ♦ 1000 milligrams=1 gram ♦ 1000 kilograms= 1 tonne ♦ 100 kilograms = 1 quintal.	♦ Find the weight of objects using different types of balances. ♦ Guess the weight of objects and students as a part of plays and daily life situations. ♦ Change the smaller units of weight by solving problems related with daily life.

What is in this unit?

♦ This unit deals with measurement of weight. Children have studied about measuring weight, its units and instruments. They know the conversion of Kilogram into gram and vice versa. They can recognize which unit is suitable to measure the weight of a particular object. They can solve problems related with measurements of weight. In this unit we revise these and enable the children measures more accurately and guess the weight more precisely. Milligram, quintal and tonne also are introduced in this unit. Conversion of units is discussed in this unit. Problems related with addition and subtraction of weights are also given in this unit.

CLASS ROOM PROCESS.

Ensuring current ability level.

- Show some objects/ picture and ask which unit- gram or kilogram will they use to measure it.
- Ask to find the weight of some objects using balance.
- Give some problems of addition and subtraction of weight.

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

Guess your weight.

♦ Teacher describes the situation happened in a class. Teacher brought a weigh- machine and called one student, Fayas. His weight was 36 kilog- rams. Then teacher called another 5 students and asked others to guess their weight and then measure. They wrote in the table and found the difference between the real weight and their guest.

♦ Then teacher says we are going to do this in our class also. What they are planning.

♦ Discuss with students. Bring the weight machine, make table and decide who are going to check the weight.

♦ Call one student. Find the weight and write it on the board. Then call another one and ask others to guess and write the weight in the table. Then measure and announce the weight. Everyone write in the related column. Find the difference and write in the column. Repeat this with other four students also. Complete the table. Check with each other. Each one compares the difference in guess with others.

♦ Teacher evaluates the ability to guess.

♦ Remember that 1000 grams = 1 kilogram. Then say large weights are said in quintal. It is 100 kilograms.

♦ Then make groups and let them find the weights of some objects in the classroom and

out side. Write it in the table and find how much is needed to make it next kilogram. For example if the weight of the book is 655 grams, the additional grams needed to make it next kilogram is 345 grams. Then fill the table on page 120.

Supermarket bill.

- Describe the situation and introduce the bill. Ask them,
  - How much more is the weight of onion than one kilogram shown in the price list?
  - What are there in the bill?
  - How is it recorded?
  - What is GST?
  - How is the total amount rounded?
- After responses explain all. Then ask them to convert the weight of cucumber into grams and How much less is the weight of cashew nut than one kilogram. Cucumber = 2750 gram. Cashew nut is 940 kilograms less than one kilogram. The self evaluation tools are given in the table. Let children fill it after finding total weight. Do the works on page 122

Evaluation. Teacher evaluate,

- *The ability to guess weight.*
- *the ability to find relation with gram and Kilograms.*
- *the ability to convert units.*

To gold shop

- This is to introduce milligram. Process is detailed in TB
- Then convert the units given on page 123 and 124

Wholsale business

- This activity is to convert Kilograms and grams into tonne, quintal and kilograms.
- 4728 kg and 500 grams is 4 tones+ 7 quintals+ 28 kilograms+500grams. .
- Then convert the given weights.

Farmer's society

- This is to solve problems using weights. Read each question and let them solve. Discuss in the class.
- Tomato sold = 202x16 = 200x16 + 2x16 = 3200+ 32=3232.
- Recall that 2x16=32. 20x16=320 and 200x16=3200
- Weight of cucumber= 42x35= 40x35 +2x35 =1400+70= 1470 kg.
- 1470 Kg= 1 tonne+ 4 quintal+ 70 kgs.
- Pineapple = 2556 kilograms . Watermelon 1465 kilograms
- Difference. = 1091 kilograms.
- Total= 4021 kilograms.

Evaluation. Teacher evaluate,

- *the ability to find relation with units weight.*
- *the ability to convert units.*
- *the ability to solve problems.*

- 'Weight of some animals' is given only for an information. Let them read and compare.
- Do the 'let's revisit' questions. Give necessary feed backs.

9 DIVIDE EQUALLY

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Solve mathematical problems including division of two/ three/four digit numbers . ♦ Find different ways for division and explain the methods . ♦ Find relation of numbers and operations , and explain in one's own words.	♦ To divide equally , the total number should be divided by the number of shares ♦ There are different ways to divide a number equally. . ♦ Division can be stated in other ways by relating the number properties ♦ The remainder will be the digit in one's place of the dividend when divided by 10. ♦ The remainder will be the number got by digit in ones place and tens place of the dividend when divided by 100. ♦ The remainder will be the number formed by digit in ones place ,tens place and hundreds place of the dividend when divided by 1000.	♦ Find the quotient and remainder through solving life related problems. ♦ Find different ways for division and discuss in the class. ♦ Find relation by analyzing the tables and discussion

What is in this unit?

♦ In this unit we discuss the division. It is the continuation of the unit studied in previous class. Children have understood division as repeated addition , as reverse of multiplication and as equal sharing. They can do division of two digit numbers by a single digit. They know the symbol and the process of division. In this unit it is extended to the division of a three digit number by a two digit number. It is explained in detail with the logic of the process. Division process is not explained mechanically, but why it is happening so is discussed in detail. Children will get enough opportunity to go through problems related with division and this will help them develop the problem solving ability. Finding relation with numbers so as to make division easy has also been discussed in this unit.

CLASS ROOM PROCESS.

Ensuring current ability level.

- Works given under ''let's recall'' is to repeat the concepts studied in the previous class. Make sure that all children are able to do it. .

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

Let's recall

♦ Match the following. It is to find the division facts. Pupils have to find which number is to be multiplied by the second number to get

GRADE - 4

the first number. They have to understand as 8x2= 16 , 16÷2= 8 and 16÷8= 2 . This should be discussed in the class at the time of each presentation. Find the answers and draw a line to match.

- **Fill the blanks.** It is to find the relation of a multiplication fact to a connected division fact. Let them find and fill.
- **Match the apple and orange**. In the previous class pupils have seen that when dividing , if a number is doubled the other also will be doubled and if a number is halved the other also will be halved. This concept is used here. Eg. 12÷2 = 24÷4
- Make sure that children are competent to do multiplication. Then go to the next activity.

Help to divide.

- Ask the children what the boy was saying and what he wanted.
  - How many rupees does the boy have?
  - How many friends he wants to share with?
  - What are the denominations of notes he has? See the picture.
  - Then ask them how will they help him to divide.
  - Let children say their own ways.
  - Then discuss the process in TB , as detailed.
  - Finally check the answer as given in he box.
  - Before writing, the process of dividing is to be discussed and when writing the algorithm child should understand that the process found here is written logically. It should not be written mechanically.
- This is an entry activity to go to the next one.

Helping poor

- This is to divide 363 by 3. Subtracting 3 repeatedly is not practical . So we have to divide it in another way. As described in the last problem the process is given in the TB.
- Then divide 386 by 4 and explain the process how the remainder comes about. Discuss about the maximum remainder when dividing by 4.

Work and waget.

- This is to divide 1250 by 6. Process is there in the TB. Remainder is 2. Then show 208 x6 +2= 1250.

Price of Bag

- It is to divide 2781 by 9. The quotient is 309 and there is no remainder. Explain the process clearly and then make them write the algorithm.

Making Bundles , Coconut bags

- Let pupils do these two works and check the answer, then discuss in groups. using the check tool given in TB. It should be noted that after doing the problem children should be allowed to explain how they solved it. Before going to divide, a discussion on the problem and how it is solved should be done . As it is a problem of sharing, division is to be done.
- Then do the problems given on page 133. Get them check the answers with each other and correct.
- The problems should be discussed well. The relation of 20÷5 to 200÷5 is to be identified and find the answer. As 200 is 10 times of 20 , answer is 10 times of 5, ie 50.

Evaluation. Teacher evaluate,

- *The ability to divide a three/four digit number by a single digit number.*
- *the ability to solve problems*
- *the ability to find relations*

Discount sale

- Show the picture and get their responses.
  - What is the price of one pen?
  - What is the price of one packet of pen?
  - How can we find the cost of one pen?
- After discussion start the process of division. This is to divide a three digit number by a 2 digit number. The process is as we did earlier, when dividing by a one digit number. The process is there in TB. Discuss it in the class.

Rice shop.

- To find how many kilograms is there in a bag ,

the total should be divided by 48. The process is given in TB in detail.

Electricity bill.

- To find the charge paid in a month 4848 is to be divided by 12. There is a possibility to write the answer as 44. This should be cleared. The need of putting 0 in tens place should be addressed.
- Then discuss 48÷12= 4 480÷12=40 4800÷12 = 400 and 4848÷48=404
- (4848=4800+ 48 , 4800÷12= 400. 48÷12= 4. 400+4=404)

Zoological gardens.

- Ask pupils to collect the given data from the picture. Ticket rate. Adults 35, children 20. Collection, Adults 7175 children 5800 Number visited. Adults 7175÷ 35 and children 5800÷25 Let them explain and verify each other's work.
- Then do the problems on Page 137

Evaluation. Teacher evaluate,

- *The ability to divide a three digit or four digit number by a two digit number.*
- *The ability to solve problems.*
- *The ability to explain the different ways.*

Price of one and total price.

- This can be found in two ways. As price of 5 pens is 75, price of one pen is 15. Then price of 15 pen is 15x15=225
- Number of pens bought by Sam is 3 times more than that of Subair. The price also will be three times more. 3x75=225
- Do the 'price of books' and 'water supply' individually and discuss in groups. Present it in the class and discuss the process. Let them find that the water distributed in the morning is double of the quantity of water distributed in the evening.

Evaluation. Teacher evaluate,

- *The ability to solve problems.*
- *The ability to think logically.*
- *The ability to explain the different ways*

Project

- The project is to find the remainder when divided by 10,100 and 1000. Lead a discssion in the class about the project. Decide to collect data and write it in the table. Decide the format of the table.

Dividend	Divisor	Quotient	Remainder
45	**10**	**4**	**5**
325	**100**	**3**	**25**
1548	**1000**	**1**	**548**

- Then discuss the findings in the group and present them in the class. Explain the relation.

Findings.

1. The remainder will be the digit in ones place of the dividend when divided by 10.
2. The remainder will be the number got by digit in ones place and tens place of the dividend when divided by 100.
3. The remainder will be the number got by digit in ones place, tens place and hundreds place of the dividend when divided by 1000.

Project evaluation

- the process of the project and the report as portfolio should be evaluated.

Evaluation. Teacher evaluate,

- *The ability to collect data.*
- *The ability to make tables.*
- *The ability to interpret data*
- *The ability to analyze.*
- *The ability to think logically.*
- *The ability to explain the reason.*

- 'Do Think and do problems' individually and discuss in the class.

10 LET'S MEASURE THE CAPACITY

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Solve mathematical problems including measurement of capacity and conversion of its units.	♦ 100 ml= 1 litre ♦ There are different ways to solve problems	♦ Solving life related problems. ♦ Find different ways for solving a problem. ♦ Find relation by analyzing the tables and discussion ♦ Collects data from pictures and tables .

What is in this unit?

♦ This unit deals with measuring the capacity. Children have studied earlier about measuring the liquids and its units. They can change the litre in to milliliter and vice versa. They know the relation between them. They have seen the instruments for measuring liquids. They have solved problems related with capacity measurement. In this unit we revisit all these and do some more problems related with measurement of capacity. Children will get opportunity to do operations using the unit of measurements to interpret and analyze tables and develop problem solving ability.

CLASS ROOM PROCESS.

Ensuring current ability level.

- Fill water in a bucket and ask them to guess how much litres it holds.
- Then let them measure using measuring jar.
- Remember the relation with litre and milliliter.
- Give measurements and ask to change the unit.

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

Precious water

♦ It is to understand the value of water. Lead a discussion in the class about the use of water. Show the picture.

- What are they doing?
- List more activities that we do with water.
- How much water we do need for these activities?

♦ Then ask the question in the TB and lead discussion.

♦ At the end of this activity pupils should be aware of the value of water we use and not to waste water.

♦ Then everyone take a pledge that they will not waste water and they will use it carefully.

Milk society

♦ This is a problem solving activity. Fill the column of price received. Find data from the table and give answer to the question given. Price for 1 litre milk is 50 rupees. Price of 14 litre milk is 14x50= 700 rupees. Price of 12 litre 500 millilitre milk is 12x50= 600 rupees.+ 25 rupees. 625 rupees. Price of 14litre 250 millilitre milk is 14x50= 700 rupees.+ 12 rupees 50 paise. 712 rupees and 50 paise.

♦ Check with others and dicuss in the class. The questions given in page 143 and 144 are problem solving questions. Importance should be given to solve problems. Analyze it and solve. Let them do it individually and discuss in groups. Then discuss each question in the class. Find different ways.

Purchasing the coconut oil.

- Read the problem. Collect data from the picture. Do it individually. Share in groups. Discuss in the class. Abdu paid 180x40 = 720 Suhara paid 4x48x4 = 768. Suhara paid than Abdu =48. This can be found in another way. Suhara paid 12 rupees more than Abdu for one litre. So for 4 litre she paid 4x12=48 rupees than Abdu. Then discuss the questions in the next page.
- Let pupils do the **Medicine** math and **Bike journey**. Do individally. Discuss in groups. Present in the class.

Evaluation. Teacher evaluate,

- *the ability to solve problems*
- *the ability to find relations*
- *the ability to do operations of units of capacity.*

- Do let's revisit. Give feed back . Do think and do problems individually and discuss in the class.

11 EQUAL PARTS

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Explain the meaning of fractions as part of one. ♦ Shade the part of one ♦ according to the given fraction. ♦ Compare like fractions. ♦ Solve problems involving addition, and subtraction of like fractions. ♦ Find equivalent fractions for a given fraction.	♦ A fraction denotes the part of a whole. ♦ The total part is shown under the line and it is the denominator. ♦ The parts considered is shown above the line and it is the numerator. ♦ If numerator and denominator of the fraction is same, it is 1. ♦ The fraction with same denominator is called like fractions ♦ Fraction with different denominator is called unlike fractions. ♦ Fractions with 1 as numerator is called unit fractions. ♦ The fraction with larger numerator is the larger fraction, if the denominator is the same ♦ When adding and subtracting like fractions, add or subtract numerators and the denominators will be as in fractions. ♦ When multiplying and dividing the numerator and denominator by the same number we get equivalent fractions.	♦ Explain fractions by solving life related problems. ♦ Discussing life related problems and comparing Like Fractions. ♦ Discussing life related problems and finding the way to add and subtract fractions. ♦ Analyze tables and find how equivalent fractions are formed.

GRADE - 4

What is in this unit?

♦ This unit is for Fractions. Children have studied the meaning of fraction and the method of writing and reading fractions earlier. They can identify and name the fractions for the coloured part of circles ,rectangles and squares that are equally divided. They can give colour to the parts as directed using fractions. They know the numerator and denominator of a fraction. In this unit we deal with some more concepts related to fractions. Comparing Like Fractions, and addition and subtraction of Like

Fractions are discussed. Equivalent fractions and unit fractions are also discussedin this unit.

CLASS ROOM PROCESS.

Ensuring current ability level.

- Let's recall to check the previous knowledge about fractions.
- Write the fraction for the shaded part.
- By looking into each figure ask,
  - How many parts are there in total?
  - How many parts are shaded?
  - What is the fraction for the shaded part?
  - What is the meaning of this fraction?
  - Eg. 1/2 (half. One part of a thing equally divided by 2)
- Divide and color the rectangles to show the fraction.
- Pupils should recognize the total parts should be as in the denominator and the shaded part should be as in the numerator.
  - Eg. 2/5

Write the fractions

- Children should understand that the parts considered is numerator and the total parts is denominator. Numerator is above the line and denominator is below the line. Eg. 4 parts of a thing equally divided by 5 is 4/5. Write the numerator and denominator. Let them write and check.
- Give additional support to those who are still below the current ability level.

Sharing by cutting.

- This is to compare, add and subtract Like fractions. Read the situation and ask to write the fraction of ribbon each one has got. Then ask them to compare it. Let them explain why one piece is larger and one is smaller. Then write them using symbols. After that introduce the addition and subtraction of like fractions by doing the problems given in the TB. Give opportunity to analyze and solve problems.

Coloured columns.

- Let them observe the rectangle and write the fractions in the table. Then find the largest and smallest. Then write it by using symbols.
- Find the answers for the questions in page 151

Evaluation. Teacher evaluate,.

- *the ability to explain fractions.*
- *the ability to compare fractions.*
- *the ability to add and subtract fractions.*

- Give activities to find the concepts in the page 152 .
- If numerator and denominator of the fraction is same , it is 1.
- The fraction with same denominator is called Like fractions and fraction with different denominator is called Unlike fractions.
- When we add and subtract Like fractions, the denominators will be as in the fractions.
- Fractions with 1 as numerator is called Unit fractions.

Chocolate cutting.

- This activity is to introduce equivalent fractions. First ask them to find the part each one got. Then color the rectangle. After coloring the rectangles according to the fractions, children will see 1/2, 2/4, 3/6 and 4/8 are equal to 1/2. The part of chocolate each one got is half of one chocolate.
- Then do the activity of dosai. Ask questions and get responses.
  - What part of one dosai is in the picture?
  - How many parts are needed to make 3/4 dosai if it is cut in to 8 pieces?
  - How many parts are needed to make 3/4 dosai if it is cut in to 12 pieces?
  - How many parts are needed to make 3/4 dosai if it is cut in to 16 pieces?
- Then make them understand that 3/4 = 6/8 = 9/12 = 12/16
- After that find some more equivalent fractions and write it in note book.
- Then ask children , how do we get equivalent fractions.

- Discuss in the class and make conclusion.
  - When multiplying and dividing the numerator and denominator by the same number we get equivalent fractions.
- Then do the works in page 155 and 156. Check with each other. Discuss in the class.

Evaluation. Teacher evaluates

- the ability to find and explain equivalent fractions.
- the ability to make conclusions.
- the ability to find relations.

- Do 'let's revisit' Give feed back .

12 WHAT IS IN THE TABLE

LEARNING OUTCOMES	CONCEPTS	PROCESS
♦ Read and analyze tables. ♦ Solve problems by collecting data from tables ♦ Make tables by combining more than one table. ♦ Make reports based on data collected from tables. ♦ Interpret pictographs ♦ Draw pictographs ♦ Collect data and represent it in the form of pictographs.	♦ It is easy to find and interpret data from a table than stated otherwise ♦ Pictographs show information in the form of pictures or symbols	♦ Observe tables and find data from tables. ♦ Say answer to the questions asked based on the data given in a table. ♦ Make questions based on tables. ♦ Make tables using raw data. ♦ Combine and make complex tables from more than one tables. ♦ Interpret pictographs and say answer to the questions asked based on it. ♦ Draw pictographs related with the surroundings of the learner. ♦ Collect data, make tables, interpret it and make pictographs related with daily life situations.

What is in this unit?

♦ In this unit we deal with 'Data analysis'. It is the extension of the unit studied in the previous year. In previous class children have studied to collect data from a single table and make simple tables using the given data. They have also become acquainted with pictograms. In this unit, students learn to collect data from a complex table to solve problems and make complex tables using the data given in more than one table. They will also do activities to collect data from a pictograph and make a pictograph using the data given.

CLASS ROOM PROCESS.

Ensuring current ability level.

- Give a table showing the number of students in the school. (class, boys, girls, total) and ask them some questions related to the table and ask to make some questions based on the table.
- Ask pupils to make a table showing their family members. (Sl.no., Name and Age)
- Give a simple pictogram and ask to analyze it.

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

Factory labourers

♦ This activity is to fill the table and collect data from the table to solve problems. Showing the table ask

- What data is given in the table?
- Which columns need to be filled?
- How can the total be found?

GRADE - 4

- Then find the total and write in the columns.
  - How many types of employees are there at the factory?
  - What is the total number in each category? (fill the blank columns)
  - What are the wages for each category of employees?
  - How many male employees are there in total?
  - How many female employees are there in total?
- Then ask the questions given in the TB.
- After that ask to prepare some questions individually, based on the table. Present the questions in the class. Then make a booklet of the questions by adding all the questions.

School bus

- Two sets of information are given there. The first is a raw data. Read and identify the following.
  - Which are the classes mentioned? (1,2,3,4)
  - How many boys and girls are there in first standard? (64 and 73)
  - How many boys and girls are there in 2nd standard? (68 and 67)
  - How many boys and girls are there in 3rd standard? (64 and 73)
  - How many boys and girls are there in 4th standard? (68-6=62 and 67+4=71)
  - How many boys and girls are there in 5th standard? (62 and 71)
- Then write it in a table.

CLASS	BOYS	GIRLS	TOTAL

- Then ask some questions based on the table. Then pupils understand that it is easy to find data from a table than stated otherwise. Ask them to see the next table. Ask them some questions based on the table. After that record the information collected from two tables in a single table given in the TB. Then answer the questions and make some questions. Cross check with each other. Present it in the class. Modify and write on smallsheets of paper. Then make a booklet of the questions.

School leader election.

- Read the table and make a report of the election result. What information needs to be included in the report. Lead a discussion in the class.
  - How many voters are there in total?
  - How many votes did each one get?
  - How many votes are left asadhu?
  - What is the margin of the winner?
  - Write the report. Cross check with each other.

Evaluation. Teacher evaluates the learners.

- *ability to read tables*
- *ability to make tables*
- *ability to analyze data.*
- *ability to make questions.*
- *ability to solve problems.*

Chair company

- Let students observe the pictograph and make questions.
- Present the questions in the class.
- Make booklet.

Number of students.

- This is to draw a pictograph. Discuss about drawing it.
  - What data is in the table?
  - What picture will you draw to represent the students?
  - Which is the largest number?
  - How many pictures can you draw at most?
  - Then what should one picture represent?
  - How many columns do you have draw?
  - Which column should be larger ?
- After discussion decide to draw one head for 100 students. Then let them check in groups and evaluate.

Evaluation. Teacher evaluates the learners,.

- *ability to interpret pictographs.*
- *ability to draw pictographs.*
- *ability to find relations.*
- *ability to participate in discussions.*

Project

- Discuss about the project.
  - How can the data be collected?.
  - How can you make table?
  - How many columns and rows are needed for the table?
  - How many classes are there?
  - What can be used symbol?
  - How many numbers should one symbol represent?
- After discussion collect data from classes and write it in the table. Then draw pictograph. Evaluate self and each other. Draw it on an A4 sheet. Display it on Display board.

Evaluation. Teacher evaluates the learners.

- *Participation in collection of data.*
- *ability to make tables.*
- *ability to draw pictographs.*
- *ability to find relations.*
- *ability to participate in discussions.*

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Semester 2

TEACHERS RESOURCE MANUAL

MATHEMATICS
Grade 5

GRADE - 5

8 The Secret within the Numbers

Concepts	Activities	Outcomes
♦ Multiplying a natural number by consecutive natural numbers gives its multiples. ♦ If a number is divisible by another number, then the second number is a factor of the first number. ♦ Any number greater than 1 has at least two factors: one and the number itself. ♦ Prime numbers are numbers whose only factors are one and the same number. ♦ Write any composite number as prime factors. ♦ It is possible to check whether the expression is divisible by the numbers 2,3, 4,5, 6,7,8,9,10 and 11 without dividing any composite number. ♦ Any composite number can ♦ be written as prime factors in only one way. ♦ The product of two numbers ♦ and the product of their LCM and HCF will be equal.	♦ Practical situations where multiples and factors are to be found. ♦ Practical situations where LCM and HCF should be found. ♦ Functions using properties of numbers to classify them into prime numbers and composite numbers. ♦ Logical practical activities to know if a number is divisible by another number. ♦ Solving practical problems using HCF and LCM. ♦ Mathematical problems in which numerical properties can be found. ♦ Projects and assignments that involve numerical techniques that enable data collection and the formation of conclusions.	♦ Recognizing and explaining the idea of common multiples of numbers. ♦ Recognizing and explaining the idea of common factors of numbers. ♦ Explaining the relationship between highest common factor and least common multiple. ♦ HCF and LCM are found using numerical relationships. ♦ Solving practical problems using the idea of LCM and HCF. ♦ Explaining the method of expressing a number as the product of its prime factors. ♦ lassifying numbers as prime numbers and composite numbers based on their factors. ♦ Checking whether a number is a multiple of 2,3,4,5,6,7,8,9,10 and 11 without actual division.

Introduction

♦ Children can read and write any number. They are already used to arithmetic operations involving large numbers. Children are also able to solve practical problems at this stage. In some cases, they experience practical problems that cannot be solved using quadratics. The unit should be seen as a stepping stone to solving such practical problems. At this stage the child should be able to solve some practical problems using number properties. Similarly, through this unit, the child is able to find numerical properties and form conclusions related to them through some mathematical games and sequential activities. By classifying numbers as prime numbers, composite numbers the child develops basic concepts related to number theory. Such activities acquire the development of the most important process skills associated with mathematics learning, which are logically analyzing numerical relationships and forming conclusions

♦ For example, to check whether a number is divisible by 4, it is enough to check only the

numbers in the tens and ones positions of that number. If the resulting number after omitting the digits in the tens and ones positions of the number is a multiple of four then the original number is also divisible by 4. This realization is achieved through individual repetition, discussion of such ideas in groups and effective intervention by the teacher. Children get this opportunity in every activity. Categorizing numbers into prime numbers, composite numbers ,highly composite numbers, perfect numbers and discovering their properties enables the child to approach number theory with interest.

Colouring

- A colouring activity should be introduced as an initial activity to introduce the concept of multiples. Let the children complete the table individually after doing the colouring activity. At this stage, try to increase the children's inference and reasoning skills by asking the necessary questions. By this activity, the children should realize that every multiplication result obtained by multiplying consecutive counting numbers by a fixed number is a multiple of this fixed number. Then there is an activity of finding some multiples of numbers up to 10.By the end of this activity each child will have a few multiples of numbers up to ten. Answers to the following questions are to be found through the analysis of this table. Answers found individually should be improved in the group and subjected to class level discussion. The following conclusions are formed through these discussions, or if such conclusions are not formed, questions leading to these should be asked by the teacher.
  - The smallest multiple of a number is the same number.
  - Multiples of one are counting numbers.
  - Some numbers are multiples of more than one number.
  - Numbers with zero in unit place are multiples of ten.

How many biscuits

- Better to do this activity live in class in groups of six. As a practical case, the activity of placing biscuits is used. This activity can be easily implemented in the classroom by using objects like tokens instead of biscuits. If there are 10 biscuits in a packet, the difference between the minimum number of biscuits required and the number of biscuits required to provide equal supply to six persons is to be discussed. It would be good for the children to form a table and check the information collected here.

	1 each	2 each	3 each	4 each	5 each
Number of biscuits	6	12	18	24	**30**

- By checking this table it can be concluded that if there are at least three packets of biscuits i.e. 30, then six people can be fed equally.
- This activity should be concluded by writing the multiples of 6 and 10 consecutively and finding the common multiples among them.

Multiples of 6	6	12	18	24	30	36	42	48	54	60	
Multiples of 10	10	20	30	40	50	60	70	80	90	100	

- Common multiples 30, 60 …
- Let the children find a few more common multiples of six and ten.

Multiples of multiples

- This is an activity to develop a very important concept of multiples. If 12 is a multiple of six and 6 is a multiple of three, then 12 is a multiple of three. It is this concept that needs to be formed. For this, let the children do the activity given in the textbook. At the end of this activity this concept can be easily formulated through group level discussions.8 is a multiple of four, so we need to discuss whether all multiples of four are multiples of eight. Conversely, we should also discuss whether multiples of eight are all multiples of four.

Common multiples.

- This is an activity that leads to the concept of common multiples. It would be a good idea to discuss this activity at group level and write a list of the days each plant should be watered. Then check this list to find the days when both plants are watered together.

First plant watered	3	6	9	12	15	18	21	24	27
Second plant watered	4	8	12	16	20	24	28	32	36

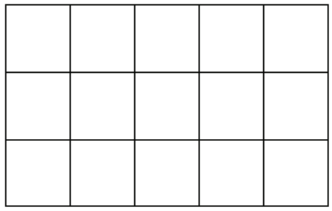
- From this the children will find out the answer. Those ones are 12, 24….etc. Then the children will do the given ‘’do it by yourself’’ activities themselves.

Project

- This is an activity to find the LCM of two consecutive natural numbers. Let the children form their own conclusions by taking many examples, examining and tabulating them.
- The LCM of two consecutive counting numbers is to form the conclusion that the product of these numbers is the same. This should be discussed in some future work. Discuss why the LCM of two consecutive counting numbers is the product of these numbers

Different rectangles

- This activity introduces the concept of factors. This activity can be done in class by constructing rectangles in different ways using 12 unit squares. By this activity 12 is written in different ways like 1 x 12 ,2x6 and 3 x4 and it is concluded that 12 is a multiple of the numbers 1 ,2 ,3 ,4 ,6 12 .If we put the same point in reverse, we can say that the factors of 12 are the numbers one, two, three, four, six and twelve. The activity of finding the factors of more numbers using unit squares can be done in the class by forming rectangles in different ways. For example, if we make different rectangles using all 15 unit squares, each group will get as given below.



15 = 1x 15
15 = 3x 5
Factors of 15 are 1,3,5,and 15

Factors

- This is an activity to learn how to find the factors of a number. It is a method of finding factors by writing a number as the product of two numbers in the maximum possible way. Children who find it difficult to find factors by writing in this way can be given the activity of constructing rectangles using unit squares as in the previous activity. Each child will have developed his own way of finding the factors of a number by completing this activity. After completing this activity the teacher can ask some questions related to the factors of number.
  - Which number is a factor of any number?
  - What is the largest factor of a number?
  - Find some number that has only two factors.

Let’s measure

- This is a practical context for introducing the concept of HCF. The activity should proceed by discussing which are the different jars that can measure 12 litre milk and 16 liter milk. It can be concluded that one litre two litre 4 litre containers will be enough. It should be noted that the largest jar that can accurately measure both of these measurements is four litres. Find the factors of 12 and 16 and from this find their common factors. Their common factors are identified as the numbers one, two, and four. Here the greatest common factor must be found to be four and thus the problem should be solved. Then we can do the highest common factor activity. Write all the factors of the numbers 36 and 45 and find the common ones from them. Then the greatest of the common factors is found here to be nine. Thus the HCF

of numbers 36 and 45 is identified as nine.

- After this, let each child do the ''do it by yourself'' activity by themselves. The questions attached to this activity are subject to group discussion. The teacher must ensure that each child reaches the relevant conclusions. There is potential for peer assessment and teacher assessment.

Without division

- This activity discusses a way to check whether a given number is divisible by ten and two without looking at the division. First find and write the numbers that are divisible by ten from the given numbers. Then write and add numbers that are divisible by 10. Examine the characteristics of these numbers and have the children present the characteristics of numbers that are divisible by 10. Group discussion can also help children who are unable to come to a clear conclusion.

It should be concluded that the unit place of numbers that are divisible by ten is zero

- A Concept attended model activity can be done in the classroom as an activity to discover the properties of two-factor numbers.

- First a set of numbers is written on the board. From these, the teacher says Yes or No in response to the numbers the children say. The teacher always says yes for the numbers that are multiple of two. Then the children are asked to say only the numbers that can be answered by 'yes'. At this stage the children can also say the numbers that are not written on the board. This way the children can find out for themselves what are the common characteristics of the numbers that can be said yes.

The conclusion to be made is that the digits two, four, six, eight and zero will be in the units place of a number divisible by two.

Kareem's trick

- This is an activity to check if 5 is a factor of a given number. If we write some numbers that are multiples of five and check their properties, we can come to some conclusions. It is concluded that the digit in the unit place of numbers which are multiples of five will be 5 or zero. There is potential for much more in-depth discussion regarding this concept here. At this stage, you can ask to find out the remainder of a number divided by 5 without making the actual division. If necessary, you may be ask to list the remainder obtained by dividing some numbers by 5.

Number	13	49	137	456	788	577
Remainder	3	4	2	1	3	?

Multiple of three

- Children know that all multiples of three are divisible by 3.This activity presents a way to find out whether a given number is divisible by three without dividing it. Children will discover this feature for themselves by finding the sum of digits that are multiples of three. The conclusion is formed that the sum of the digits of the numbers which are multiples of three will be the numbers 3,6 and 9.
- When we conclude that we can find out whether the number is divisible by 3 by looking only at the sum of the digits of a given number, one naturally wonders why this is so. The logical answer to this is the activity given in the box in the lesson.
- Children know how to interpret the number 423 by place value. 423 = 4 x 100 + 2 x 10 + 3
- What has been written in this way is interpreted here again in a suitable way.
- 4 x 100 is 100 times four. This is equal to 99 times four plus one four (4 x 100 = 4 x 99 + 4)
- Here the number 99 is a multiple of three, so 4 x 99 is also a multiple of 3.The place value of ten is also interpreted in the same way. So instead of checking whether the number 423 is divisible by 3, it turns out that we only need to check 4+2+3.This type of discussion and codification should take place at this stage.

Multiple of 9

- The first step is to find the digital root of multiples of nine. The conclusion can be quickly formed that the sum of the digits of numbers that are multiples of nine will be nine. Therefore, to know whether a given number is a multiple of nine, we should be able to reach the conclusion that it is enough to look at the digital root of this number. A discussion and codification of why a given number is said to be a multiple of nine by looking at the digital root of the number is possible at this point. A few problems to find the remainder of a number divided by 9 without dividing can also be given in this context.
  - For example, how to find out how much the remainder will be if the number is divided by nine. 123456789 → 1 +2 + 3 + 4 + 5 +6 + 7 + 8 +9 = 45 → 4 + 5 = 9
- Here it would be good to have a discussion in such a way that some conclusions can be formed without looking at the sum of the numbers.
- 1 + 8,2 +7, 3 + 6, 4 + 5 , 9 It can be arrived at very quickly that the digital root will be 9 and there will be no remainder.

Digital Root

The digital root of a number is obtained by repeatedly adding the sum of the digits of a number until it becomes a single digit.

Multiple of 4

- The textbook presents a logical approach to check whether a given number is divisible by four. This operation explains the reason why it is enough to check only the number which is the combination of the digits in the unit and tens place of the given number. In this activity also we have to learn to interpret the given number in a way that suits our problem.
- First the number 512 is seen as 500 + 12.
- Here it is asserted that the number 500 is divisible by four. The first step is to see that 500 = 5 x 100.
- Here, since the number 100 is a multiple of four, we can say that 5 x100 is also a multiple of four. So let's decide that we don't need to check 500 to see if 512 is a multiple of 4 and have to check 12.
- At this stage, an activity can be given to find the remainder by giving some numbers and dividing them by four.

Prime and Composite

- This can be presented to the class as a game using unit squares. One team takes a few unit squares without counting. The second team guesses if they can make the rectangles in more than one way. This is checked to see if the guess is correct and points are awarded to that team if correct. If the game continues in this way, any child will be able to guess whether rectangles can be made in more than one way using a given number of unit squares. It is easy to distinguish from the examined numbers those that can be made into rectangles in only one way. It can be concluded that such numbers can be written in only one way as the product of two numbers. Here it should be recognized that two numbers are one and the same number. That means such numbers have only two factors, one and the same number. Thus, if a number is divisible only by one and the same number, such numbers are called prime numbers. That is, prime numbers have only two factors, one and the same number.

Prime numbers below 500

- 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199, 211, 223, 227, 229, 233, 239, 241, 251, 257, 263, 269, 271, 277, 281, 283, 293, 307, 311, 313, 317, 331, 337, 347, 349, 353, 359, 367, 373, 379, 383, 389, 397, 401, 409, 419, 421, 431, 433, 439, 443, 449, 457, 461, 463, 467, 479, 487, 491, 499.

Do it by yourself

- Why is 1 not considered a composite number

or a prime number?

- When discussing this with children, it is sufficient to mention that 1 has only one factor.

In mathematics, the fundamental theorem of arithmetic, also called the unique factorization theorem and prime factorization theorem, states that every integer greater than 1 can be represented uniquely as a product of prime numbers, up to the order of the factors. Actually 1 was considered a prime number until the beginning of 20th century. Unique factorization was a driving force beneath its changing of status.20 = 2 x 2 x 5 This is the only way to express 20 .If we consider 1 as prime number it will change.

- The third activity given in 'Do it by yourself' deserves a detailed discussion.

- 2,5,7,11,13,17,19,23,29,31 These are the first 10 prime numbers. The digit in the units place of their product is to be found. Do we have to multiply all these numbers? Multiplying the first two prime numbers, two and five, yields 10.If we multiply the remaining numbers with 10, we will have 0 in the unit place, so we need to conclude that there is no need to multiply further.

Sieve of Eratosthenes

- *In mathematics, the sieve of Eratosthenes is an ancient algorithm for finding all prime numbers up to any given limit.*
- *It does so by interactively marking as composite (i.e., not prime) the multiples of each prime, starting with the first prime number, 2. The multiples of a given prime are generated as a sequence of numbers starting from that prime, with constant difference between them that is equal to that prime.[1] This is the sieve's key distinction from using trial division to sequentially test each candidate number for divisibility by each prime.[2] Once all the multiples of each discovered prime have been marked as composites, the remaining unmarked numbers are primes*.

- The third question should be discussed in class.
- How far must the numbers be expanded to find prime numbers less than 100?
- To find this you need find only multiples of 2, 3, 5 and 7, because the next possible number (11) will have all of its multiples crossed out already (99, 88, 77, 66… as you work back you will become more and more convinced).

Prime factors and all factors

- This activity presents the method of finding all the factors of a given number by writing it as the product of 2 numbers as possible. Thus, once all the factors of a number are obtained, it is easy to extract the integral factors from it. It must be recognized that this number will be the product of the prime factors thus obtained. Discussions leading to this are necessary at this stage. The method of rewriting any composite number as prime factors is formed by this activity. The ability to interpret a number as needed in a particular context comes in handy in this context. For example, when factoring 70, it is easy to first see 7 times 10 and then 10 as 2 times 5.So 70 can be rewritten as prime factors equal to 7 x 5 x 2.Then each child will do the task of finding the given prime factors by himself. By presenting it in class, peer assessment is possible.

Amina's trick.

- The method of finding all the prime factors of a number using these given prime factors is introduced by the activity Amina's trick. Here the prime factors of a number are two three and five. Any number can have zero and the same number of factors, so let's start by writing these two factors first.
  - 1, 2x 3 x5 = 30
  - All the given prime factors are also factors of this number. 2,3,5
  - Then each prime factor can be multiplied by the other factors to find the subsequent

factors.

2 x 3 =6,2 x5 = 10,3 x 5 = 15

- So 1, 2, 3, 5,6,10 ,15 and30 gives all factors of 30
- The question can be raised at this stage whether all the numbers that have three different prime numbers as factors will have eight factors if all their factors are considered. Then let the children complete the given activity by themselves to find all the elements.

Basic factors

- A method of directly factoring a number into prime factors is presented here. Here we use the method of checking whether a number can be divisible without dividing it by a number. During problem solving, the teacher should try to form new conclusions through the necessary questions at each stage. For example, to check whether a number is divisible by two, it is only necessary to examine a common property of that number, and it should be possible to form the conclusion that all even numbers are divisible by two.
- A number of conclusions can be drawn from the discussions conducted in connection with this activity.
  - Any composite number can be written as the product of prime numbers in only one way.
  - Every number greater than 1 can be divided by at least one prime number.

Divisibility by 7

- The textbook presents a method for finding whether a given number is divisible by 7.Those who find this method difficult, can continue the factorization by dividing by 7.
- Let's look at another way to check if a given number is divisible by 7.
  - Multiply the digit in the units place of the number by five and add the remaining digits to the resulting number.
  - If the number obtained by continuing this method is a multiple of seven, the first number considered is also a multiple of seven.

322 → 2 x 5 + 32 = 10 + 32 = 42

- Here 42 is a multiple so 322 is also a multiple of seven.

10836 → 6 x 5 + 1083 = 30 + 1083 = 1113
→ 3 x 5 + 111 = 15 + 111 = 126
→ 6 x 5 + 12 = 30 + 12 = 42

- Here 42 is a multiple so 10836 is also a multiple of seven.

Highest common factor and least common multiple

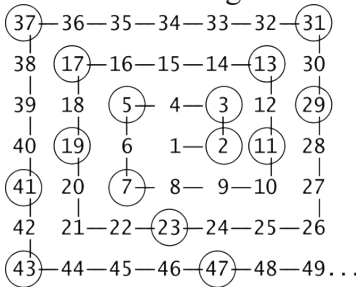
- Children learn to find the greatest common factor by writing all the factors of two numbers and finding their common factors. In this work a method of finding the greatest common factor is presented without writing down all the factors and finding only the prime factors. In the first step, the method of finding the prime factors of each number separately and then the method of finding the prime factors of both numbers together is presented. Children will find this method easier to find the common factors of two numbers. A continuation of this method means that LCM is the result of multiplying common factors and non-common factors. After this, let the children do the 'Do it by yourself' activity on their own. For children who find it difficult to answer these problems individually, grouping them into groups of 4 or 5 members and providing problem solving through discussion is appropriate.
- Children can reach the task of finding the HCF of two consecutive counting numbers by themselves through many examples. It is important to realize here that two consecutive counting numbers have only one as common factor. Another question may be asked in this context related to this idea.
  - When is the HCF of two numbers equal to one?
  - What is the HCF of two prime numbers?

Project

- Consider two numbers and find their LCM and HCF. Consider some examples and list them. The information thus obtained can be examined and conclusions can be drawn.
- In the case of the provided natural numbers, the LCM and HCF of the given numbers are equivalent to the product of the given numbers.
- According to the stated property, LCM × HCF of the numbers = Product of the Numbers
- Let the students prepare a project report and present it to the class and it should be evaluated. Practical problems related to the concept may also be presented for solution.
  - The LCM and HCF of the two numbers are 750 and 125 respectively. If one of the numbers is 250, what is the other?
  - The product of the two numbers is 765 and their HCF is 3. Find the LCM of the two numbers.

Think and do

- The first activity is to find prime numbers by arranging the numbers in a particular way. By writing the numbers in six columns, a peculiarity can be found in the arrangement of the odd numbers. The peculiarity is that columns two, three, four, six do not include any prime numbers.
- Dr. Ulam's arrangement of prime numbers is also very well known and may be introduced for further reading etc.



- The Ulam spiral or prime spiral is a graphical depiction of the set of prime numbers, devised by mathematician Stanisław Ulam in 1963 and popularized in Martin Gardner's Mathematical Games column in Scientific American a short time later.[1] It is constructed by writing the positive integers in a square spiral and specially marking the prime numbers.
- Further problems given here will also be subject to class level discussion which will be helpful for children who cannot find it individually.
  - In the second problem the product of two prime numbers is 166. This is an even number. So we can understand that one of the two prime numbers is even. The only prime number in even numbers is two, so 166 is the product of two prime numbers. From this the second prime can be found.
  - In the third problem, the product of 3 prime numbers is 4010. Since the one's place of this product is zero, we know that the two prime numbers are both two and five. Divide 4010 by ten to find the third prime number from this. This is the kind of discussion that should take place.
  - In the fourth problem 2005 is given as the product of two prime numbers and the digit in the one's place of this product is therefore clearly a prime number five.
  - The fifth problem given are numbers that have only three factors when all factors are considered. Let the children find and write more such numbers. Let's discuss their general properties and draw conclusions that they are obtained by multiplying a prime number by the same number.
  - The problem given at the end should lead to further thought and discussion.
- Let us find two numbers a and b, and their HCF is 3 while their LCM is 30.
- Now we know that a x b = 3x30 = 90
- Let us factorize the product 90. Factors of 90 are 1 x 90, 2 x 45, 3 x 30 5 x 18, 6 x 15,and 9 x 10
- We know that the HCF of the two numbers is 3. So we can eliminate (1, 90) (2,45) (5,18) (9,10) since their HCF is not 3. we are left with (3,30) and (6,15) and these are the two possible answers to this question.
- Let the children do the activities given in 'Let's Revisit' and present them to the class. Performance should also be evaluated.

9 VOLUME

Concepts	Activities	Outcomes
♦ The volume of a rectangular block is the product of its length, width, and height. ♦ The unit of volume is the cubic metre. Its smallest unit is cubic centimetre. ♦ A cube that is one centimetre long, one centimetre wide, and one centimetre high has a volume of one cubic centimetre. ♦ A cube that is one metre long, one metre wide, and one metre tall has a volume of one cubic metre. ♦ 1000 cubic centimetre = one litre ♦ 1000000 cubic centimetre = 1 cubic metre ♦ The volume of a square is the product of its interior length, width, and height.	♦ Activities that collect and classify three-dimensional shapes from the environment. Activities to make rectangles and cubes using matchboxes, rubber and unit cube of the same size. ♦ Activities to find the total number of smaller unit cubes in a rectangular box and cubes made with unit cubes. ♦ The activity of finding the volume of a rectangular box is the product of its length, width, and height. ♦ Activities that solve practical problems involving volume. ♦ The act of recognizing that the interior volume of a rectangular box is the product of its interior dimensions, length, width, and height. ♦ The activity of interchanging units of volume.	♦ Forms a way to calculate the volume of a rectangular block. ♦ Given any three measurements of length, width, height, and perimeter of a rectangular block, the method of finding the fourth dimension is logically justified. ♦ Forms a method of calculating the volume of a rectangular container. ♦ Solving practical problems involving volume. ♦ The relationship between litres and millilitres can be explained logically. ♦ Explains the relationship between cubic metres and cubic centimetres. ♦ Find the relationship between cubic centimetres and litres.

Introduction

♦ Children have learned many things related to length, weight, area and width. This unit discusses the volume of a rectangular block and the volume of a rectangular container. Children will know how to use the unit metre to measure length and find area if they know length and width. Recognizes that length, width, and height must be known to calculate volume in three dimensions. Given the length, width and height of a rectangular block, the method of finding the volume can be formulated at this stage. Similarly, if children get any three of these dimensions, they will acquire the ability to find the fourth dimension. By discovering the fourth dimension, the ability to explain and rationalize causal relationships is formed. This improves the ability to deal with practical problems related to the scope of daily life and to use these concepts for problem solving through reasonin. This unit helps in conceptualization and further study related to subjects other than mathematics.

Toy house

♦ It is an experimental task to compare two objects that have no regular shape but are almost identical in appearance and to find out which one has the larger volume. Such activities may have been done in science

classes. Let the children do this activity in class in groups by collecting the necessary materials. Such a model can also be constructed using materials collected from the surroundings if such overflows are not available. A container is enough to collect the overflowing water if it is full. This activity should be implemented in the classroom in such a way that every child can go through this activity. Through this, the ability to act accurately, the ability to observe, and the ability to analyze and form conclusions will improve.This activity will be useful in leading to the concept of scope in subsequent activities.

Which is larger

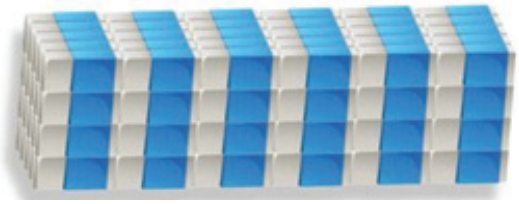
- Various materials collected by two children to make a playhouse are given in the textbook. Children can be asked to collect these types of objects. From these, roughly box-shaped objects can be sorted and ask to arrange them according to size. Thus, it can be seen that the way children find out the bigger one by checking some measurements of objects that cannot be recognized as bigger at first glance, comes out on its own. These types of three-dimensional objects have three dimensions, namely length, width, and height. It should be formed through discussion that when examining such three-dimensional objects, we consider their length, width and height.

Stacks

- This is an activity that leads to finding the volume of a rectangular block. This activity can be done in class using matchboxes of the same size. It can be discussed how to find the total number of matchboxes when arranged in five rows and three columns. Then, when arranging one more stack in this way, how to find out how many are there in total should be discussed. Without counting all the matchboxes, the total number of matchboxes can be found, if the length, width and height are found. The activity can be continued in class by changing the setting. Similarly, various groups can be organized and listed.

Another stack

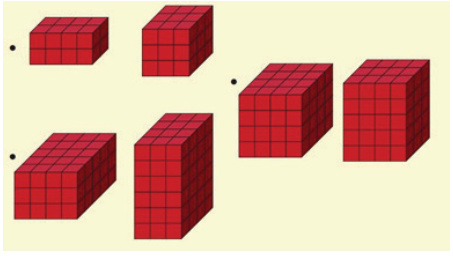
What is needed here is to find out how many numbers are there in this shape which is arranged in the shape of a rectangular box. How many such stacks are there? The total number is determined by multiplying the total number in a stack by the number of stacks. This is the same as the number of length x the number of width x the number of height. Each group should do this activity with a different number and present the information found.



- Total number of erasers = 6 x 5 x 4 = 120

Which is larger

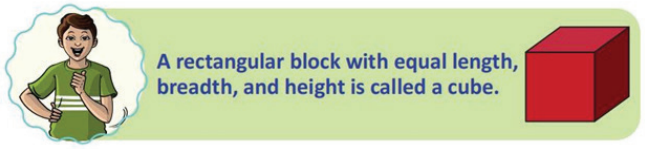
- This is an activity that indicates the need to find the volume of the rectangular block. If you look at the two blocks given in the textbook, you won't be able to tell which one is bigger at first glance. There should be a discussion about what to do to find out which one is bigger. It is necessary to find out how many smaller blocks each block is made of. For that, let's find out how many small blocks are there in each block without counting just as we have done in the previous activity. This activity can also be done in groups using pictures or objects. The first picture given in the textbook is three in length, two in width and five in height. Thus the total is found to be 3x2x5 = 30.
- 3 x 4 x 3 = 36 is also found in the second figure.



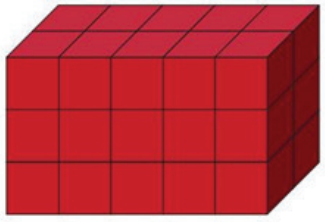
*A related practice problem is the '**Do it by yourself**' provided below. Let the children discover this for themselves by examining the square blocks in each group. Children should also act out how they found the small blocks in each block without counting them.*

What is the volume

- The concept presented here is that unit cubes are used to find volume. It should be recognized that a unit cube is a cube of 1 unit length, 1 unit width and 1 unit height.



- A good way to do this activity in the classroom with unit cubes is to find 5 x 2= 10 unit cubes per layer and a total of 30 unit groups in three such layers. Here the volume of this rectangular cube is 30 unit cube. Length is 5 units, width is 2 units and height is 3 units. Such conclusions should be formed through discussions.



Find the volume

- It is through this activity that the concept that the volume of a rectangular box is length x width x height is formed. In this activity also unit cubes are used. A layer has three unit cubes on the length side and two unit cubes on the width side, so 6 unit cubes. Adding four such layers gives us the idea of 3x 2 x 4 = 24 unit cubes. The following 'Do it by yourself' activity should be listed on a group basis. Through the analysis of this table, the idea is formed that the volume of a rectangle is length x width x height.
- Here it would be appropriate to formulate through discussion that the volume of a rectangular block is obtained by multiplying the area of the base by the height.

Let's compute

- The problem presented here is how to find the height of a rectangle if its perimeter, length and width are given. From the relationship between length, width, height and breadth
  - Height = Volume ÷ Length x Width
  - Length = Volume ÷ Width x Height
  - Width = Volume ÷ Length x Height
- Concepts should be formed.
- Then let the children do the ''do it by yourself'' activity.
- These activities should be presented in class and subject to assessment. The assessment areas are:
  - problem solving.
  - reasoning and proving.
  - reflecting.
  - connecting.
  - communicating.
  - representing.
  - selecting tools and strategies.

How much does it contain?

- This activity can be done in the classroom using a 5 x 3 x 2 rectangular container made of card board with unit cubes. It is found that the container contains a total of 30 unit cubes. Thus the conclusion should be formed that its volume is equal to 30 unit cubes.

Capacity

- This activity can be implemented in the classroom with the help of unit cubes by collecting a 10 x 10 x 10 container from the lab or making it out of cardboard as was done in the previous activity. It should be agreed through discussion that there is no need to keep all the cubes in this container and count them. 10 x 10 = 100 unit cubes are required to make one layer. There should be a discussion in the class about how many layers are needed to fill this entire container. From this we arrive at the answer of 10 x 10 x 10 = 1000 unit

cubes. This vessel can also be filled with water and measured. It will be convinced that it is a litre of water. Here we can introduce the idea that one litre is one thousand cubic centimetre. A container 1 cm long, 1 cm wide and 1 cm high will hold 1 cubic cm of water. Such ideas should be formed through this activity.

- Then the children will do the 'Let's find out' activity in the textbook by themselves. This can also be evaluated.

Millilitres and cubic centimetres

- This activity begins with the problem of how many litres of water can be held in a container shaped like a cube of 20 cm. A cube is a rectangular block whose length, width and height are equal. So we have to arrive at the concept of volume of a cube as side x side x side.. Using this we find the volume of a cube of 20 cm is 20 x 20 x 20 = 8000 cubic centimetre.
  - 1000 cubic centimetres = 1 litre
  - 8000 cubic centimetres = 8000 ÷ 1000 = 8 litres
- The teacher should try to formulate such conclusions through group level discussions.
- The following problem is to find how many litres are in 125 cubic centimetres. It should be formed by discussion that it is ⅛ litre. Along with this the understanding should be formed that one cubic centimetre is one millilitre and it is 1/1000 of a litre.

Let's find out

- It includes an activity to find out how many litres are in a cubic metre followed by some problem solving activities. There should be group discussion and codification throughout this activity. This will improve the ability to present ideas individually, improve in groups and form conclusions. The teacher should become a facilitator by asking the necessary questions.

Think and do

- If all the sides of a cube are doubled, how much will its volume be? To find this, first find the volume of a cube with sides of one centimetre. Then find the volume of the cube with sides of two centimetres. A conclusion can be reached by considering some of these examples. The conclusion to be drawn is that if all the sides of the cube are doubled, the volume will be eight times.
- The second activity is best tested by using a rectangular piece of paper 16 cm long and 12 cm wide, folded both ways.
- At first glance it may seem that there is no difference between the volumes, but in both cases it becomes clear if the volumes are found by finding the length, width and height.
- Volume of first figure = 4 x 4 x 12 = 192 cubic centimetres Volume of second figure = 3 x 3 x 16 = 144 cubic centimetres Discuss how the length, width and height were found.

Let's revisit

- In the first activity, examine the pictures and find the extent of each one individually. This can be checked in groups to ensure that the answer is correct. The teacher can also intervene in other ways. The necessary groups can improve their conclusions by providing unit cubes.
- Following are the four activities for problem solving. Have each student find these individually and present their findingsn to the class. Each activity will require the teacher's intervention to find the appropriate strategy to aid in problem solving. For example, drawing a picture in the second activity can be helpful for problem solving.

10 JOINING PARTS

Concepts	Activities	Outcomes
♦ To determine the larger and smaller fractions by comparing them. ♦ A fraction can have many equivalent fractions. ♦ Fractions can be compared using the concept of equal fractions. ♦ Sum and difference can be found using the concept of equivalent fractions. ♦ Add two fractions by finding the LCM of the denominators. ♦ Solve practical problems involving additions of fractions. ♦ Subtract a mixed fraction from another. ♦ Solve practical problems involving subtraction of fractions. ♦ Perform operations involving addition and subtraction of fractions.	♦ Activity of finding similar fractions with the help of pictures. ♦ Operations to find an equivalent fraction by multiplying or dividing the denominator and numerator of a fraction by the same number. ♦ Activities to find simple fractions with the help of pictures. ♦ Operations to find equal fractions with the help of patterns. ♦ Simplest form of fraction found using common factor and by using HCF. ♦ Activities to compare fractions with the help of pictures and by converting them to the same denominator. ♦ Activities to find the sum and difference of fractions with the help of pictures and practical contexts. ♦ Activities for logical problem solving.	♦ Formulating a method to find different forms of fractions and explaining it. ♦ Reducing a fraction to the lowest term by using HCF. ♦ Compare two fractions using the notion of equivalent fractions. ♦ Explaining the sum of fractions using pictures and practical situations. ♦ Explaining the method of adding fraction of different denominators by making the denominators equal and solving practical problems by using LCM. ♦ Explaining the sum of mixed fraction using practical situations. ♦ Explaining the method of subtracting fractions by making denominators equal and solving practical problems by using LCM.

Introduction

♦ The students are already familiar with the notions of fractions. They also know addition and subtraction of fractions of same denominators. There are some more concepts to be learned about fractions which are used in daily life and essential for further studies in mathematics. In order to achieve these abilities further study of fractions is necessary. This lesson contains certain activities the students can do by themselves that will help them gain competency in addition and subtraction of fractions. To prepare them for this a number of preliminary activities, assignments and discussions are to be held inside as well as outside the classroom. Various activities are included in this lesson to enhance problem solving skills. It includes activities for children to do individually, group-based discussion and improvement activities. The following

guidelines will help the teacher organise them. Of course the necessary modification can always be made.

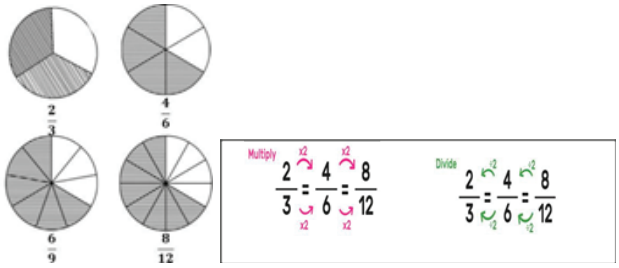
Learning activities.

Several forms

- This can be done as a live activity to divide the children into different groups in the class. Draw and colour the pictures representing the fractions given in the textbook on pieces of paper and distribute them to the children. Try to prepare required fraction strips according to the number of children in the class. Let the children who get the same fractions be the same group. Discussion and investigations to find members of their own group will lead each child to the ability to find equivalents of fractions. Here the teacher should try to intervene only when discussion is necessary. Let the children find similar fractions for themselves. Then write the fractions represented by each picture and do the grouping activity in the textbook.

One fraction several forms

- This is the activity of finding fractions equal to two-thirds. This can be presented to the class by finding and writing fractions using fraction strips equal to 2/3 and finding the relationship of each numerator and denominator.



- The idea to be formed here is that multiplying or dividing the numerator and denominator of a fraction by the same number gives an equivalent fraction.

Do it by yourself

- Children can do this activity to find equal fractions on their own. If necessary, the conclusions formed earlier through discussions can be recalled. The second activity is to find an equivalent fraction that has a given number as a numerator or denominator.

$$\frac{3}{5} = \frac{27}{?}$$

- Here the discussion should take place as to what has happened to the numerator or denominator. If it cannot be found individually then it should be discussed on a group basis and conclusions should be formed.

$$\frac{3}{5} = \frac{3X9}{5X9} = \frac{27}{45}$$

- The problem given at the end of this activity probably requires further discussion.

$\frac{4}{6}$ Find an equivalent fraction of $\frac{4}{6}$ that has 21 as the denominator.

$$\frac{4}{6} = \frac{?}{21}$$

- Here it is difficult to find out by which number 6 is multiplied to get 21.

- First convert 4/6 to the simplest form and then discuss.

$$\frac{4}{6} = \frac{2}{3}$$

$$\frac{2}{3} = \frac{?}{21}$$

$$\frac{2}{3} = \frac{2X7}{3X7} = \frac{14}{21}$$

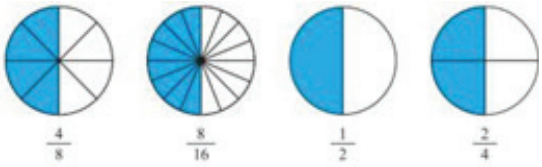
$$\frac{4}{6} = \frac{2}{3} = \frac{14}{21}$$

Lowest term

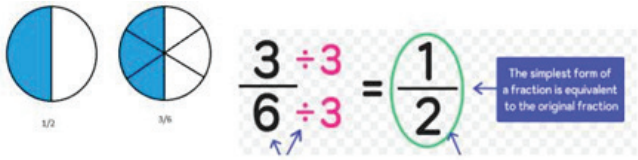
- 'Lowest terms, pizza math, patterns in fractions and find the lowest terms' are all to be discussed together. It is at the end of these activities that the ability to find the lowest term of a given equivalent fraction is achieved.
- The first phase of this is the activity called lowest terms. At the beginning of this activity, use the fraction strips to find your equivalent

GRADE - 5

fraction in both and then form this relationship. Multiplying or dividing the numerator and denominator of a fraction by the same number results in the conclusion that equivalence is obtained.



- The pizza math is the activity of forming the conclusion that 1/2 is the lowest form of 3/6



- This activity must also be seen to establish the relationship between the numerator and the denominator in all fractions equal to 1/2
- In fractions equivalent to the fraction 1/2, the conclusion must be formed that the denominator is 2 times the numerator.
- Similarly, to find the lowest term of a fraction, it is enough to divide its numerator and denominator by a common factor.
- It should also be concluded that to find the simplest form of the fraction 50/100, instead of repeatedly dividing by the common factor, it is sufficient to divide by HCF.

$$\frac{50}{100} \div \frac{50}{50} = \frac{1}{2}$$

Relay game

- Before doing the next activity, a Relay game can be held in the class. Form two groups of 5 students each. Then the teacher writes the following pattern on the blackboard and allots one pattern to each group.

→

$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{2}{5}$
$\frac{2}{4}$	$\frac{4}{6}$	$\frac{6}{8}$	$\frac{4}{10}$
$\frac{3}{6}$	$\frac{6}{9}$	$\frac{9}{12}$	$\frac{6}{15}$
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

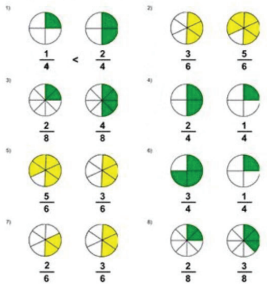
- When the teacher says 'start' one student from each group comes forward and writes the next number in the pattern. Next number means multiplying the fraction by continuous natural numbers and writing the equivalent fraction. When they return to their seats another pair steps forward. The first group to complete the pattern correctly wins. if a student from a group commits an error, the next student from the same group can correct it. At the end of the game the students are to write down the patterns in their notebooks. The students should also tell the peculiarity of the patterns. The other students should also be given a chance with the different patterns. Afterwards they can move on to the work in the text.

Do it by yourself

- The children will now do the 'Do it by yourself' activity by themselves. Each step can be divided by the common factor of the numerator and denominator or done directly with HCF. The conclusion should be drawn that to find the lowest term of a fraction, the method is to divide by the HCF of numerator and denominator.

Which is larger

- Children have developed the ability to compare like fractions and find which is larger. This activity is to reinforce this concept. Here if needed more examples can be given through pictures to improve the functionality.

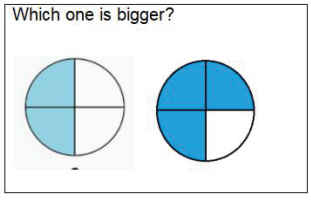


- It would be appropriate at this stage for children to draw pictures representing these types of fractions, find out which is bigger and discuss with each other.
- Ability to represent fractional numbers pictorially and the ability to compare can be assessed at this stage.

Change and write

- This activity compares fractions with different denominators. The fractions to be compared are rewritten as having the same denominator and thus compared. In the first step, the method of representing the fractional numbers in pictorial form and comparing them to find the larger one can be adopted.

- For example, let's look at the method of comparing $\frac{1}{2}$ and $\frac{3}{4}$.



- A method is presented to convert 1/2 into 3/4 and compare them.

$$\frac{1}{2} < \frac{3}{4}$$

- The following example also shows how to compare fractions by rewriting them as fractions with the same denominator.

$\frac{2}{3}$, $\frac{3}{5}$ which one is bigger?

- Both fractions are rewritten with 15 as the denominator.

$$\frac{2}{3} = \frac{10}{15} \quad , \frac{3}{5} = \frac{9}{15} \Rightarrow \frac{2}{3} > \frac{3}{5}$$

Comparison of fractions

- The concept of comparing fractions with different denominators is to rewrite them as fractions with the same denominator. This activity recognizes that it is convenient to take the least common multiple of the two fractions when rewritten as like fractions.

- When comparing the fractions like 3/5, 5/7 we must rewrite them into common denominators. It is debatable as to what general approach should be adopted here. The smallest number common to the numbers 5 and 7 is their LCM. Such an idea should be formed through discussions.

- Here the LCM of the numbers 5 and 7 is 35.

$$\frac{3}{5} = \frac{?}{35}$$

$$\frac{5}{7} = \frac{?}{35}$$

$$\frac{3}{5} = \frac{21}{35} \text{ and } \frac{5}{7} = \frac{25}{35}$$

$$\frac{21}{35} < \frac{25}{35}$$

$\frac{3}{5}$ $\frac{5}{7}$ $\Rightarrow$ $\frac{21}{35}$, $\frac{25}{35}$

- This method of checking can also be introduced through discussions
- Then let each pair given in the table be rewritten as like fractions and find the larger one.

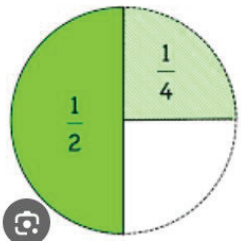
GRADE - 5

Easy addition

- Children have the ability to see the sum of fractions with the same denominator. Keeping this in mind, further work is devoted to formulating the concept of addition of unlike fractions. Let the children do the simple and problem-solving activities given here first individually. Group discussion and help of pictures can be provided only if difficulty is felt.

Another pizza math

- This activity introduces the addition of fractional numbers with different denominators. As a starting point, fractions from the same family of ½ and ¼ are used here.(In other words, the term "Same family" refers to fractions in which the denominator of both fractions is the same, if only one of the fractions is changed)
- With the help of pictures and verbal explanations, the idea that if half and quarter are added, we get three quarters is first established here.



$$\frac{1}{2}+\frac{1}{4}=\frac{3}{4}$$

To find this, we can add $\frac{1}{2}+\frac{1}{4}$

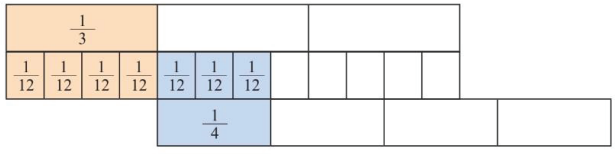
The denominators are not equal.

So, we can write these two fractions into the same denominators.

Suppose we write $\frac{1}{2}=\frac{2}{4}$

$$\frac{1}{2}+\frac{1}{4}=\frac{2}{4}+\frac{1}{4}=\frac{2+1}{4}=\frac{3}{4}$$

Then the given activity is 1/3 + 1/4



- This figure is given in such a way that the 1/3 can be seen as four twelfths or 4/12. Similarly, one fourth can be seen as three twelfths or 12 .It is advisable to have each child try this activity using strips of paper.
- Then the operational form of this should be presented to the class through discussion.

Add $\frac{1}{3}$ and $\frac{1}{4}$

How do we do it?

Do you remember writing $\frac{1}{3}$ and $\frac{1}{4}$ as fractions with the same denominator?

$$\frac{1}{3}=\frac{1\times4}{3\times4}=\frac{4}{12}$$

$$\frac{1}{4}=\frac{1\times3}{4\times3}=\frac{3}{12}$$

So $\frac{1}{3}+\frac{1}{4}=\frac{4}{12}+\frac{3}{12}=\frac{4+3}{12}=\frac{7}{12}$

Then discuss the need to convert fractions to a common denominator by using the given 2/3 + 1/5 operation. Moving to a common denominator means adopting the least common multiple, or LCM, of these numbers.

$$\frac{2}{3}=\frac{\quad}{15} \text{ and } \frac{1}{5}=\frac{\quad}{15} \rightarrow \frac{2}{3}=\frac{10}{15} \text{ and } \frac{1}{5}=\frac{3}{15}$$

$$\frac{10}{15}+\frac{3}{15}=\frac{10+3}{15}=\frac{13}{15}$$

- Hence, a discussion should be conducted to lead the students to the conclusion that in order to add two fractions of different denominators it is enough to add equivalent fractions of the same denominator.

Project

- The particularity of the unit fraction sum is presented in problem form as a project. There is a special feature of unit fractions given to see the sum. Each pair of fractions has only one common factor that is one. At this stage it is enough to consider only such fractions. Let's take lots of examples and see sums individually first. Then improve and record all available information.
- Such conclusions can be reached very quickly by looking at the available information.
  - If the denominators of the unit fraction whose sum is to be found have only one common factor, or if the denominators are

GRADE - 5

relatively prime, then their product is the denominator of the sum.

- If the denominators of unit fractions whose sum is to be found have only one common factor, the numerator of their sum is the sum of the denominators.

$$\frac{1}{3}+\frac{1}{5}=\frac{3+5}{3X5}=\frac{8}{15}$$

♦ The findings and conclusions should be written in the form of a project and presented to the class and this should be evaluated.

♦ Here are some follow-up questions.

- Can a fraction be written as a unit fraction sum?

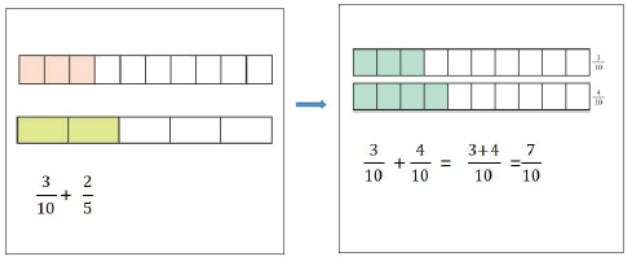
$$\frac{1}{2}=\frac{1}{3}+\frac{1}{6}$$

- Can you find some examples and present them to the class?

Ribbon math

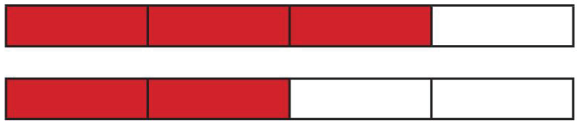
♦ 'Ribbon math ,Some more sums, Find this and Morning walk', these activities should be consider together. All these activities lead to the concept of addition of fractions with different denominators.Included in these activities are cases where the sum of two fractions is greater than one and addition of mixed fractions.

♦ In the ribbon math problem, the problem is, if two ribbons of length 3/10 metre and length of 2/5 metre are joined end to end, how long will the total length be? After finding that for the first addition to be done here, it is enough to add 3/10 and 2/5, what we need to discuss is how to rewrite these two fractions as like fractions. Since 5 and 10 are denominators, it is easy to rewrite both fractions with a fraction denominator of 10. So here it is sufficient to write only the fraction of 2/5 . When we rewrite the number 3/10 as a fraction, we get 4/10 . Then it is enough to see the sum of 3/10 and 4/10 . The pictures given in the textbook are also here to help. Individual examination, group discussion and formulation of conclusions can help in this problem solving. Individual findings may also be subject to assessment.



Some more sums

♦ The following activity is when the sum of two fractions is greater than one. Let's discuss the sum by writing the numbers as equivalent fractions. A discussion on how to write a mixed fraction should also take place here. The pictures given in the textbook will help each group to make paper strips and present the activity for further learning.



$$\frac{3}{4}+\frac{1}{2}\rightarrow\frac{3}{4}+\frac{2}{4}=\frac{3+2}{4}=\frac{5}{4}$$

$$\frac{5}{4}=\frac{4}{4}+\frac{1}{4}=1\frac{1}{4}$$

♦ Then the given 'Find this' activity should be rewritten as same denominator fractions to find the sum. The debate over which proper fraction to rewrite should take place here. The discussion here is that finding the LCM of these numbers is convenient when converting both fractions to have the same denominator. The method of writing the answer then should be formulated through discussion.

$$\frac{3}{4}+\frac{2}{3}$$

LCM of 4 and 3 is 12

$\frac{3}{4} = \frac{9}{12}$

$\frac{2}{3} = \frac{8}{12}$

$\frac{3}{4} + \frac{2}{3} = \frac{9}{12} + \frac{8}{12} = \frac{9+8}{12} = \frac{17}{12} = \frac{12}{12} + \frac{5}{12} = 1\frac{5}{12}$

Morning walk

- Presented here is a practical case of finding the sum of two mixed fractions. A method of adding whole numbers differently and fractional parts differently is presented. This is the same in a relatively easy way. Here we can also introduce the method of writing mixed fractions in division form from the beginning. (Children have mastered the ability to write and rewrite mixed fractions in fractional form)

$2\frac{3}{4} + 3\frac{1}{2} = \frac{4 \times 2 + 3}{4} + \frac{2 \times 3 + 1}{2} = \frac{11}{4} + \frac{7}{2} = \frac{11}{4} + \frac{14}{4} = \frac{25}{4} = 6\frac{1}{2}$

Do it by yourself

- All the activities given in this section can be done by the children themselves. Problems involving simple operations and practical problems are given here. In practical problems, the first step is to determine the operation. Necessary discussion for this can be done in the classroom and then the work done individually should be evaluated by each other and if necessary improved in the group. Here the teacher should assess the children's problem-solving ability, analytical ability and ability to form conclusions. Further problem forming activity can be provided at this stage if required. It should also be recognized that problem formulation is the most necessary context for problem solving.

Problem forming activity.

- Find and write two practical situations involving 1/5 + 2/3
- Annu has 3/4 metre ribbon and Senna has 4/5 metre ribbon.Frame an additional question

- Related to this context.
  - Standard VA maintain 2/3 part of the garden and VB maintain 1/6 part of the garden.
- Frame an additional question to this context.

How to subtract

- Subtraction of fractions with the same denominators has been studied in previous classes, but here it is recalled and then the concept of subtraction of fractions with different denominators is developed. Rewriting fractions with different denominators to fractions with the same denominator is similar to subtraction of fractions with the same denominator. Equivalent fractions are also used to rewrite fractions. A method of completing the subtraction by rewriting the fraction to the desired denominator, first with the help of pictures and then without the help of pictures, is presented here. Discussions and strips of paper are required for this and the class should use them as part of the activity.
- Here too, at the last stage, the method of rewriting the denominators of the fractions that need to be differentiated without the help of pictures in a certain way and converting them into such fractions and doing the divisor should be formed. There should also be a discussion of whether the Least Common multiple or LCM of the numbers considered is more convenient when rewriting the fractions to our desired denominators.

Milk math

- A method of finding the difference of two mixed fractions is presented through this activity. Mixed fractions are first introduced in the division form and then rewritten with the same denominator as the fractional numbers. This method requires a lot of practice to master. Additional activities can be provided at this stage. In some of these cases, it is good to use mental math to check whether the answer is correct. There is such a possibility in this question. The problem here is that if you subtract two and three quarters from six and a quarter first add one quarter to two and three quarters, it becomes three. Adding three

to three makes six. Add one more quarter to this to make six and a quarter. That's three and two quarters. Thus, a total of three and a half added to two and three quarters makes six and a quarter. This will help you to come to the answer in your mind.

$6\frac{1}{4} - 2\frac{3}{4} = 2\frac{3}{4} + ? = 3$ (It is $\frac{1}{4}$)

Then 3 + 3 = 6, If you add any number to six, you get six and a quarter? $6 + \frac{1}{4} = 6\frac{1}{4}$

(So if we add $3 + \frac{1}{4} + \frac{1}{4}$ ($3\frac{1}{2}$) to $2\frac{3}{4}$ gets $6\frac{1}{4}$

Do it by yourself

- Given here are practical problems involving addition and subtraction of fractions and absolute operations, all of which the children will do on their own. Children should be given an opportunity to present these in class and discuss areas for improvement. It is equally important to approach the problem in a different way. Through such presentations, each child's unique ways are discussed. It may also be suggested to formulate a practical context for the problems involving absolute operations presented here. This can also be evaluated as a problem solving method. Similarly, mental math can also be utilized here.

Think and do

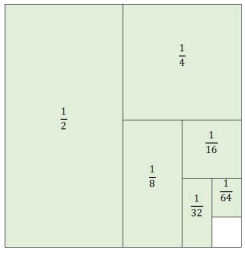
1. Tricky sum

- The textbook gives the first five rows of a pattern using fractions. First let each child find and write the sum individually. Then they can find and write the sum of a few more lines in this sequence. The real issue here is whether it is possible to predict the sum of the next row from the analysis of the information thus obtained without actual operation.

$\frac{1}{2} + \frac{1}{4}$	$\frac{3}{4}$
$\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$	$\frac{7}{8}$
$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}$	$\frac{15}{16}$
$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32}$	$\frac{31}{32}$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \frac{1}{64} = ?$$

- The denominator of the resulting fractions is the same as the denominator of the last fraction.
  - What is the numerator of the resulting fraction?
  - Is the number one less than the denominator?
- The answer is 63/64
- The same problem can also be presented as a geometric problem.



- Which fraction represents the shaded part of the square?
- To find this, simply subtract the non-sided part, 1/4, from one 1-1/64 = 63/64

Fractions between two fractions

- Have the children find the fraction between the two fractions. The other groups should check and evaluate whether each group's presentation is correct. The idea that finding fractions between two fractions can be found very quickly using their equivalent fractions should be developed through discussion. Here we have to find the fractions between 1/3 and 1/2

$\frac{1}{3} = \frac{20}{60}$ and $\frac{1}{2} = \frac{30}{60}$

- Now it is enough to find the fractions between 20/60 and 30/60

That are $\frac{21}{60}, \frac{22}{60}, \frac{23}{60}, \frac{24}{60}, \frac{25}{60}, \frac{26}{60}, \frac{27}{60}, \frac{28}{60}, \frac{29}{60}$

- Now we get 9 fractions between these two fractions.
- If we want to get more fractions between these two fractions?
- What if the denominator is 600 instead of 60?

$\frac{1}{3} = \frac{200}{600}$ and $\frac{1}{2} = \frac{300}{600}$

2. Magic square

- In a magic square, the sum of the diagonal numbers in the row and column is equal.

	$\frac{1}{15}$	
$\frac{4}{15}$	$\frac{9}{15}$	

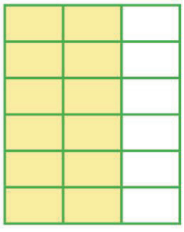
- The magic sum in this magic square is one. Have the children identify the numbers in each field and present how they found them. Evaluate the process and conclusions used to find them.
  - Find the number in the middle first. $1 - \frac{1}{15} + \frac{9}{15} = \frac{15}{15} - \frac{10}{15} = \frac{5}{15}$
  - Now find the number above the corner. $1 - \frac{4}{15} + \frac{5}{15} = \frac{15}{15} - \frac{9}{15} = \frac{6}{15}$
  - Now find the number in the upper left corner. $1 - \frac{6}{15} + \frac{1}{15} = \frac{15}{15} - \frac{7}{15} = \frac{8}{15}$
  - Now find the number on the left side. $1 - \frac{4}{15} + \frac{8}{15} = \frac{15}{15} - \frac{12}{15} = \frac{3}{15}$
  - Now let's find the middle number on the right side. $1 - \frac{3}{15} + \frac{5}{15} = \frac{15}{15} - \frac{8}{15} = \frac{7}{15}$
  - Now find the number in the right corner. $1 - \frac{6}{15} + \frac{7}{15} = \frac{15}{15} - \frac{13}{15} = \frac{2}{15}$

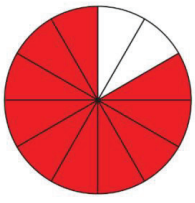
$\frac{8}{15}$	$\frac{1}{15}$	$\frac{6}{15}$
$\frac{3}{15}$	$\frac{5}{15}$	$\frac{7}{15}$
$\frac{4}{15}$	$\frac{9}{15}$	$\frac{2}{15}$

There will be children who arrive at the answer in different ways.An attempt should be made to present the way in which the answer was arrived at and to evaluate these.

Let's revisit

1)





- Find and write the fractions that represent the shaded part.Then write the simplest form of each.This should be evaluated by giving the children the opportunity to present the method of how they arrived at the answer.

First picture $\frac{12}{18}$, Lowest form $= \frac{12 \div 6}{18 \div 6} = \frac{2}{3}$ (HCF of 12 and 18 is 6)

Second picture $\frac{10}{12}$, Lowest form $= \frac{10 \div 2}{12 \div 2} = \frac{5}{6}$ (HCF of 10 and 12 is 2)

- 2) Let the children find these two activities for finding equal fractions themselves and present them to the class. Each must explain the method found and present the findings which can be subject to peer evaluation and teacher evaluation.

$\frac{1}{6} = \frac{2}{12} = \frac{4}{24} = \frac{8}{48}$ ....

$\frac{1}{6} = \frac{2}{12} = \frac{3}{18}$ .....

- 3) The third activity is comparing fractions to find the larger and smaller. Children can do this themselves by finding equivalent fractions or rewriting them to fractions with fixed denominators. The way the answer was arrived at and the answer should be evaluated. Activities four and five are practical problems involving fractions. Children will understand these and arrive at the answer by themselves. These activities can also be evaluated.
- Activities six and seven are perhaps more likely to involve discussion and interactions that lead to compromise.

- 4) A problem solving strategy needs to be developed through analytical questions.
- How much time will it take to fill the tank if only the first tap is left open? 20 minutes. What does it mean?
- You should be able to clearly analyse the problem through such questions.
- If the tank is filled in 20 minutes, how much part of the tank will be filled in one minute?
  - 1/20 Isn't it?
- If only the second pipe is open, how much water will fill the tank in one minute?
  - 1/30 Isn't it?

- If both the pipes are left open, how much water will fill the tank in one minute?

It is the sum of $\frac{1}{20}$ and $\frac{1}{30}$, that is $\frac{1}{20}+\frac{1}{30}=\frac{3+2}{60}=\frac{5}{60}$

- That is, if both the pipes are left open, the tank will be filled to 5/60 parts in one minute.
- If 5/60 parts are filled in one minute, then in how much time will the tank be filled? (That is how long it takes for 60/60)
- That is 5/60 x12 = 60/60 (5/60 in a minute is 1/12 of a minute. If 1/12 are filled in a minute, in how many minutes will the tank be full? 12 minutes isn't it?

- 5)This activity requires interactions and discussions at each step.
- Write all fractions less than 1 with denominators not more than 5.
- Fractions with denominator 1 nil
- Fractions with denominator 2 - 1/2
- Fractions with denominator 3 - 1/3 ,2/3
- Fractions with denominator 4 - 1/4 ,2/4 ,3/4
- Fractions with denominator 5 - 1/5 ,2/5 ,3/5 ,45
- Reduce them to the lowest terms

$\frac{1}{2}, \frac{1}{3}, \frac{2}{3}, \frac{1}{4}, \frac{3}{4}, \frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}$

- Write them in ascending order.

$\frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{2}{5}, \frac{1}{2}, \frac{3}{5}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}$

- If we consider any three consecutive terms, for example 1 /5, 1/4 , 1/3

$$\frac{1}{5}+\frac{1}{3}=\frac{1+1}{5+3}=\frac{2}{8}=\frac{1}{4}$$

(Remember this is not the way to add fractions. This is just an observation. This number sequence is named after the world famous mathematician John Farey)

- The Farey series (really a sequence) is defined as follows. For a fixed number n, consider all rationals between 0 and 1 which, when expressed in their lowest terms, have denominator not exceeding n. Write the sequence in ascending order of magnitude beginning with the smallest. Then the "curious property" is that each member of the sequence is equal to the rational whose numerator is the sum of the numerators of the fractions on either side, and whose denominator is the sum of the denominators of the fractions on either side.

11 ANOTHER FORM OF FRACTION

Concepts	Activities	Outcomes
♦ Measurements recorded in smaller units can be converted to larger units and vice versa. ♦ There are several methods of writing in decimal form. ♦ When writing decimal numbers, a point is used to separate the integer part and the fraction part. ♦ Quantities recorded in decimal form can be rewritten to whole number form. ♦ A decimal can be written in many forms. ♦ Fractions with a denominator of 10, 100, and 1000 can be written in decimal form. ♦ In a decimal fraction, the digits to the left of the dot indicate places such as 1 , 10 , 100 , and the digits to the right indicate places such as tenths , hundredths , and thousandths . ♦ The place value of a number decreases by tenths as it goes to the right. To see the sum and difference of decimal numbers, it is convenient to write them in order of place value.	♦ Activities where metric units need to be converted to each other. ♦ Practical situations where quantities are expressed as fractions and decimals. ♦ Practical examples of converting quantities from fractional form to decimal number form and vice versa. ♦ Situations where place value involves decimal numbers. ♦ Cases where decimal quantities need to be compared. ♦ Practical cases for rewriting decimal numbers by place value and determining the size. ♦ Practical cases for doing addition and subtraction operations involving decimal numbers.	♦ Represent /Convert the money, length and weight into smaller units and represent it into decimal form. ♦ Metric measurements are written in decimal form. ♦ Decimal numbers are interpreted in place values. ♦ Determine the place value of decimal numbers up to tenth, Hundredths and thousandths and write the number in expanded form. ♦ Comparing decimal quantities. ♦ Solves practical problems involving the sum and difference of quantities in decimal form.

Introduction

♦ Children know different quantities like length and weight and the relationship between them. This lesson introduces decimal numbers related to quantities. They are first introduced to writing in decimal form and writing decimal quantities in whole number form. Then they discuss decimal and place value of numbers. They know how to interpret numbers according to place value. As a continuation of this, the ability to interpret and rewrite decimal numbers in place value should be acquired at this stage. Through this there is

an opportunity to do addition and subtraction operations of decimal numbers and to solve practical problems involving them. The ideas gained through this unit will be helpful for solving problems related to decimal numbers in everyday life.

School reopened

- Decimal numbers are introduced through some practical contexts involving rupees and paisa, which children are very familiar with. As a new method, the combination of rupees and paisas, commonly used in daily life as fractions such as 15 and a half rupees, 30 and a quarter rupees. has been presented in decimal form.15 and a half rupees is the same as 15.5 rupees is presented using the concept of rupee and paisa.
  - Rupees 15 1/2 = Rupees 15.5
  - Half rupees means 50 paisa.It is 50/100 rupees, (1/2 rupees.) It is written as 0.50 rupees.
- At this stage let us present the problem of how to express 75 paisa, 25 paisa and 70 paisa all in rupees.
- Each of these can be stated and written as a fraction and then presented as a decimal.
- For example 25 paisa is quarter rupee and it can be written as 25/100 as fraction and 0.25 as decimal.

A new form

- In this activity, measurements are presented as fractions and decimals using length units such as metres and centimetres.
- Here special emphasis should be placed on the reading of decimal numbers i.e. children should be able to recognize that 12.75 is read not twelve point seventy five but 12 point seven five.

Complete the table

- The activity to fill the table is given not in relation to measurements. This is an activity to rewrite fractions to decimals and to convert decimals to fractions. Children who are not able to do it individually based on the activities done so far can be given different kinds of help at this stage. For example, group discussion and teacher's effective questioning interventions can be beneficial. For example, if the decimal fraction of 10.4 is represented as 10 cm and 4 mm, it will not be difficult to find the fraction form 10 4/10. In this way, the process of converting fractions to decimals and decimals to fractions can be continued at the necessary steps in relation to practical situations as required.

How many kilo grams

- Two decimal places were introduced in the previous exercises. The kilogram measurement is used to introduce three decimal places. One and aquarter kilogram is equal to one kilogram and 250 grams.
- Children have already studied that 250 grams is equivalent to 0.25 kilograms and have used the fractional from 250/1000 Thus, one and a quarter kilogram is represented as 1.250kg.
- There should be a discussion about whether 0.5 is 5/10 and this is 5 out of 10. Similarly, there should be a discussion about 0.25 recognising that 25, hundredths, is equivalent to 250 one thousandths or 250/1000. It can easily be connected later as place value.

Convert the fractions to decimal forms

- It is the activity of converting numbers given as fractions into decimal form without the help of measurements. This activity can be facilitated through appropriate questions and classroom activities.
- For example, what are the discussion questions that can be raised while finding the decimal form of the fraction 7 25/100 ?
  - 25/100 means how many decimal places?
  - Does 25/100 mean tenths or hundredths?
  - How many hundredths are there in 25/100?
  - Can you say 7 25/100 in relation to quantity?
  - How to express 7 quarter metre as a fraction?

Do it by yourself

- This activity is a preparation for understanding and interpreting decimal numbers in place value.
- Children know how to rewrite counting numbers as ones, tens and hundreds. As a continuation of the previous activity, we should be able to find out how many tenths, how many hundredths, how many thousandths of a given decimal number. Here the interpretation using fractions will also be useful.
- For example, 45.725 is four tens, five ones, seven tenths, two hundredths and 5 thousandths.
- This can be interpreted in the form of

$$4 \times 10 + 5 \times 1 + \frac{7}{10} + \frac{2}{100} + \frac{5}{1000}$$

Place value

- It is useful here to interpret numbers according to their position in counting numbers.
- This is an attempt to interpret the number in thousandths according to place value.
- In 8/1000 there are no tenths and hundredths. There are only thousandths, there are eight thousandths so 8 in the thousandths place.

tenths	hundredths	thousandths
0	0	8

$\frac{8}{1000} = .008$

- Then let the children write the numbers given in the place value chart in decimal form.
- Please make a place value pocket in class using a cloth and card board or anything else. It will be helpful to do this activity live. This activity can be done live in the classroom in a variety of ways by preparing a number of number cards to use in place value pockets.

Expanded form

- It is the activity of interpreting and writing a number according to place value. It is more appropriate to organize a place value pocket in the classroom and write the numbers in it and find and write the expanded form of each number.

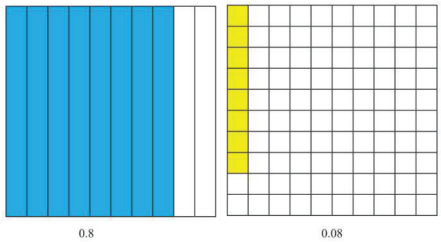
Number	hundreds	tens	ones	tenths	hundredths	thousandths
24.35		2	4	3	5	

24.35 = 2 tens + 4 ones + 3 tenths + 5 hundredths ($20 + 4 + \frac{3}{10} + \frac{5}{100}$)

- Then there are two types of activities in the given 'Do it by yourself' activity. Given a decimal form and finding the expanded form from it, write it and vice versa to find the decimal form from the given expanded form. Using place value pockets in this activity also provides context for better performance and effective brainstorming through discussions.

Who is bigger

- This is an activity to compare decimal numbers. As a starting point, decimal numbers are presented in pictures to help you understand their size, followed by the decimal numbers in the given common balance so that the size can be understood at a glance.
- Comparing decimal numbers as a start, it can be very effective to use graph paper and colour as in the example given in the textbook. Each child should be able to accurately understand the concept of decimal numbers and be able to represent them on graph paper.
- Without proper anticipation, children often give the wrong answer to the question which is"larger"0.8 or 0.08.A child who draws such decimal numbers using graph paper and compares their sizes will never make the same mistake again.



Comparison of decimals

- Presented here is a method to compare decimal numbers and find out which one is larger

GRADE - 5

without any help of pictures.This requires first converting the given decimal numbers into like decimals.This requires equalizing the number of decimal places after the decimal point.

- To find out which of the numbers 9.5, 9.05 is larger, first convert these numbers to like decimals.
- 9.50 = Now let's find out which one is bigger
- 9.50 > 9.05

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- By writing the numbers to check on the place value chart, it is not difficult to figure out which one is bigger.
- Compare the the decimals 12.45, 12.457
- Transfer the decimals from your math problem into the table. Working from left to right, copy each decimal digit by digit into the table (don't forget the decimal point column!). Fill in any empty portions of the table with 0 so all your decimals have the same number of digits.

tens	ones	decimal	tenths	hundredths	thousandths
1	2	·	4	5	0
1	2	·	4	5	7

- Compare the digits in the tens position. All of the numbers have a 1 in ten's place.
- Compare the digits in the ones position. All of the numbers have a 2 in one's place.
- Compare the digits in the tenths position. All of the numbers have 4 in tenths place.
- Compare the digits of the remaining numbers in the hundredths place. 7 is larger than 0, so 12.457 is greater than 12.45

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- Decimal numbers can be compared without writing them on a place value chart.

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- Write the decimals in ascending order 14.36, 13.458, and 14.369
- Write them like:
    - 14.36
    - 13.458
    - 14.369
- Compare the whole numbers.In our example, the number 13 is smaller than 14, so you'd automatically mark 13.458 as the smallest number.
- Take 14.36 and 14.369, for instance—both decimals have a 3 in the tenths place and a 6 in the hundredths place. In the thousandths place, however, 14.36 has a 0 while 14.369 has a 9.So 14.369 is greater than 14.36.
- Then arrange the numbers ,13.458< 14.36< 14.369

***

- Let the children do the following three activities in 'Do it by yourself'. These activities can then be improved in groups and given an opportunity to present to the class, and all these activities can be assessed.

At the tailoring shop

- Addition of decimal numbers is introduced through the activity 'At the tailoring shop' and 'Perimeter of the triangle'. When such problems are presented through practical problems, they become more child-friendly and children have a sense of need. When the sum is found in the first operation, there is no remainder, so the operation can be completed very quickly. But finding the sum in the second operation results in having a remainder, which requires further discussion and some conclusions about the place value.
- Children have done a lot of organizing operations in counting numbers so far. Hence the only difference here is that the numbers to be added are decimal numbers. If the place value is recorded correctly in the chart, the child will not feel any difference from adding normal numbers.

First converting the given decimal numbers into like decimals.This requires equalizing the number of decimal places after the decimal point.After that remove the decimal point and view the sum as integers and adjust the decimals according to the number of places after the decimal point.

Noon feeding

- This activity introduces the subtraction of decimal numbers so that the difference of numbers can be found in the same way as normal integers. In the given problem here, the number of decimal places of both the numbers are equal. On the other hand, in cases where the decimal places are not equal, it will be easier to convert them in such a way that their decimal places are equal.
  - For example, let's do the operation 4.26 - 2.008 First we convert the numbers into like decimals.
  - 4.260 - 2.008

Ones	Tenths	Hundredths	Thousandths
4	2	6	0
2	0	0	8
2	2	5	2

  - 4.260 - 2.008 = 2.252

- After this activity, let the children do the activity to do the given operations by themselves, improve it in groups and present it to the class. There should be peer assessment and teacher assessment.

Let's revisit

- All the activities given here can be done individually by the children. If necessary, improve the completed activities in the group and present them to the class. The teacher must do the assessment and record it.
- The last one is a magic square. In the magic square, the sum of the row and the sum of the column and the sum of the diagonal numbers are equal. The sum of this magic square is given as 0.15.

0.08	0.01	0.06
0.03	0.05	0.07
0.04	0.09	0.02

12 Let's read pictures

Concepts	Activities	Outcomes
♦ A pictograph is a method of recording numerical information by adding appropriate images. ♦ A bar diagram is a way of representing numerical data using rectangles. ♦ Bar graphs and pictographs also help to easily compare and collate numerical data in different contexts. ♦ Numerical data can be converted into suitable quantities and drawn as bar graphs and pictographs.	♦ Statistics, tables, pictograph, bar graphs, etc., presented through classroom, school, and other practical contexts. ♦ Tables, bar graphs, etc., based on the grades obtained in various examinations, the grades obtained by the children in the class in various examinations, population figures, information related to sales in commercial establishments, information related to household income and expenditure figures, etc. ♦ Presentation of Bar Graph, Pictograph Tables etc related to school Children's Travel mode, number of Children in different Classes etc.	♦ Able to collect, classify and interpret data presented in pictographs. ♦ Able to collect, classify and interpret data presented in bar graphs. ♦ Draws a pictograph showing the available information. ♦ Bar graphs are drawn based on available data.

Introduction

♦ Children are familiar with situations where they have to make numerical interpretations of pictures. Children have seen a lot in newspapers and visual media how statistics in different fields are presented through pictures and graphs. In small classes, basic science, social science subjects also require them to read pictures. This lesson aims to introduce the use of pictures and bar graphs that make information easy to understand at a glance. Activities such as pictograph bar graphs containing numerical information in contexts familiar to children, providing different examples of 'organ' interpretation, constructing questions to accompany these, and collecting such graphs from the press are arranged in this lesson. Pictographs and bar graphs specially prepared in the chart can be presented attractively without relying only on textbook pictures in each activity. Special editions containing such images can also be provided.

Class data

♦ The number of boys and girls in different classes of class 5 of Hari's school is given first in tabular form and then in pictograph form. When raising questions related to this data, it should be discussed that the image of a boy represents five children and the image of a girl represents five children. Children can be given the opportunity to construct additional questions related to this data. Children can answer the questions themselves and pass them around in the group. The information of

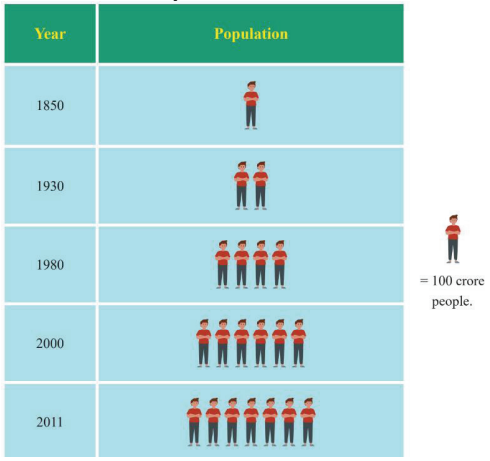
the 5th class students of the school is presented here in two ways, the first is in tabular form and the second is in pictograph form. Which of these methods is better for analyzing the data can also be discussed.

Mode of transport

- In this second activity, Mode of Transport, the information related to the mode of transport of the children arriving at Hari's school is presented in the pictograph. Please note that here only graph is used instead of table. Questions should be raised by discussing how one child in the graph actually represents 10 children. Let the questions presented in this activity be answered individually first, then improvised in groups and presented to the class. This process is also a means of continuous assessment by the teacher. What are the areas that can be subjected to continuous assessment?
  - Collect information from the given graph.
  - Collect and analyse data carefully.
  - Ability to collect, analyse and interpret data accurately.

World population

- Using the graph given in this activity 'World Population', questions are to be constructed and answered.Questions can only be formulated if these data are analysed more deeply than the answers to the questions.



- *A picture of a person on this graph indicates how much of the population?*
- *Which year has the largest population?*
- *How many years did it take for the population to double from 1850?*
- *How many years did it take for*

- The ability to analyse the available data and the ability to accurately formulate analytical questions should be assessed at this stage.

Class library details

- Here, the most important issue when graphing is determining how many books a book image should actually represent. During such a discussion, the teacher should guide the discussion by asking the most suitable questions.
- Is it easier to draw a picture of a book if it actually represents a book itself? Then 50 pictures will be required while recording the books of class 5C. This is difficult, if the image of one book actually represents two books?
- Then it will be difficult to visualize the number of books in class 5B.

- If you look at the number of books in each class, it is most appropriate to see how many books a picture of a book represents?
- Through such discussions, it is necessary to find out that if the picture of a book refers to five books, it will be easier to draw this picture.
- If a picture of a book represents five books, how many pictures should be there in the first class?
- Let the children figure out for themselves how many book pictures they need to represent the number of books in each class.
- If such a discussion takes place in the class, the children will have no difficulty in drawing a graph based on this information. Now let them find the questions and answers on their own based on this information.

Math grades

- In a division of fifth grade, Hari prepared a table using the grades the children received on a math test in a class of 40 students and a pictograph using the same information. Here

the discussion should proceed in the manner that gathering information from the pictograph is relatively easier than gathering information from the table. A quick look at the ETO graph shows that the highest grade for math in this class is a B grade. Similarly, we can quickly see that the number of children who got grades A,D and E is the same. Additional questions related to this information should be prepared and answered.

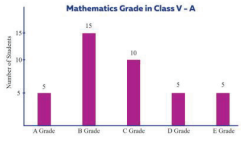
Another method

- This activity presents a bar graph prepared using the same information as in the previous activity. At this stage, the discussion should be about displaying the table, pictograph and bargraph, which is relatively easy to construct and more convenient to analyse the data.

Grade	Number of students
A	5
B	15
C	10
D	5
E	5

Grade	Number of student
A	
B	
C	
D	
E	

= 5 students



- It would be more effective to discuss at this stage by including some questions that lead to drawing the bar graph.

Area math

- This activity is also an example of the extent to which the study of mathematics is related to other subjects. The area of some countries is given in square kilometres in this bar graph. It should be presented as an activity of gathering information from a bar graph and analysing the available information.

Sales of popcorn

- As a starting point for drawing bar graphs, it is advisable to draw them on graph paper. This context has two important data. The number of packets of popcorns sold each day and the total number of days. It should be decided through discussion that this information should be included on the x-axis and y-axis of the graph. Then the numerical values should be plotted as rectangles on the graph. (Here the number of packets of popcorns sold each day should be arranged in rectangles).The height of the rectangles should be proportional to the number of packets of popcorns sold each day. For this, the number of packets of popcorns sold each day should be examined in detail, preferably on a group basis.

Days	Number of popcorn sold
Monday	30
Tuesday	10
Wednesday	16
Thursday	20
Friday	30
Saturday	12

  - 30 is the most sold of these, so it is difficult to draw it to be 30 cm tall.
  - Then we have to think if it is possible to take half of its height.
  - If we set the height to be half of the half.

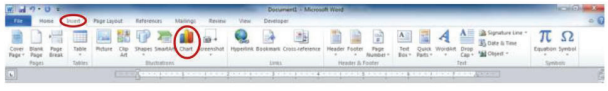
- Through such discussions, the most suitable unit should be decided and the method of drawing rectangle pictures should be adopted.
- It would be helpful at this point to discuss how Microsoft Word prepares bar graphs and prepare them in this manner.
- Below is a step-by-step guide on how to set up a bar graph in Microsoft Word. This discussion should be done by preparing this graph with the help of IT.

Guide to Creating a Bar Chart in Microsoft Word

The following guide provides step by step instructions for how to create a bar chart in Microsoft Word.

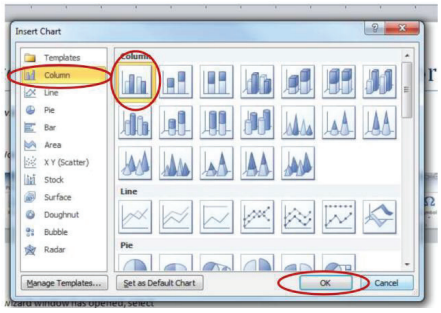
Step1

Open Microsoft Word, go to the "insert" tab on the ribbon, and select the "chart" icon.



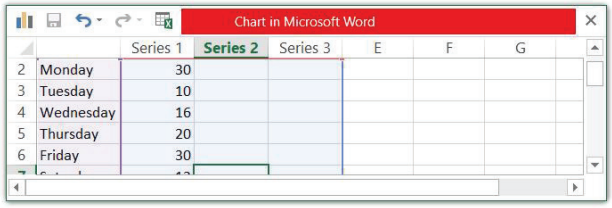
Step 2

Once the "chart" wizard window has opened, select "column" and then select "clustered bar type." Then select "OK."



Step 3

Enter your data (labels and numbers/percent's) in the Excel window that opens and then close out of the window by selecting the "red X" in the upper right corner of the window. Note: You have the ability to resize the data chart range by adjusting the blue range line (drag the right corner to desired size).



Step 4

Edit your chart as needed. Here are some items you may want to consider:

- Add a title
- Add labels to your x and y axis'
- Add data labels to your bars
- Move or remove the key, if needed

Monthly expenditure

♦ Let the children find the answers to the questions individually by looking at this graph. Can be discussed and improved in group if needed. Let each child prepare and present their household expenses for a few months, first in tabular form and then in bar graph form. Using this information it would be good to prepare graphs in word format or excel format with the help of computer and compare these with self-drawn graphs.

Let's revisit

♦ Collect and tabulate information on the mode of transportation of children in your own class. Draw a pictograph and a bar graph based on this information and display it to the class individually. Such activities can also be assessed. With the help of a computer, bar graphs can be drawn using this information and compared with bar graphs prepared by yourself.

♦ Then check the information of marks obtained by the student named Hari who checked the given bar graph. Find and present the answers to the questions given in this connection. Then let the children prepare and present these types of bar graphs using the mark information they have received. Computer aided bar graphs can be prepared using the marks obtained for each subject and these can be compared with the manually prepared bar graphs.

Collection and display of bar graphs

Collect bar graphs published in various newspapers and magazines and use them to make

charts and display them in class.To provide computer aided construction of bar graphs using

the information provided in these cases.

GRADE - 5

13 Scales and Directions

Concepts	Activities	Outcomes
♦ A scale tells a ratio between the actual distance on the map to the actual distance on the ground. ♦ The cardinal points are the four major directions of North, South, East, and West. ♦ A map is a two dimensional representation of the earth or a part of it. ♦ Symbols are used to analyse maps.	♦ Map reading activities using World, India and Kerala maps. ♦ The act of reproducing images by means of grid paper, graph paper etc., to two or four times the size. ♦ Activities to scale the given pictures to half size with the help of grid paper. ♦ Images drawn at different scales of the same object are used for observation. ♦ Various types of maps are used for data analysis. ♦ Activities analysing Google Maps.	♦ Ability to draw the reduced and magnified images of actual objects. ♦ Ability to identify the directions North South East and West. ♦ Read and interpret different kinds of maps. ♦ Understanding different types of scales is crucial for accurately interpreting and using maps. ♦ Ability to draw simple maps of their local areas.

Introduction

♦ Mapping skills need to be developed to study the environment more accurately and to analyse data. Scales and Direction is a lesson included with the aim of developing mapping skills. In many cases we need to gather information from available state, country and globe maps. By developing the necessary skills, information can be gathered effectively from maps. Similarly, techniques like Google Maps have to be used very effectively in modern times. The necessary skills also need to be developed at this stage. The ability to draw pictures of an object at different scales, as well as the ability to zoom in and out of a picture, should be developed. This lesson is aimed at developing such skills and enhancing some of the competencies required for higher studies.

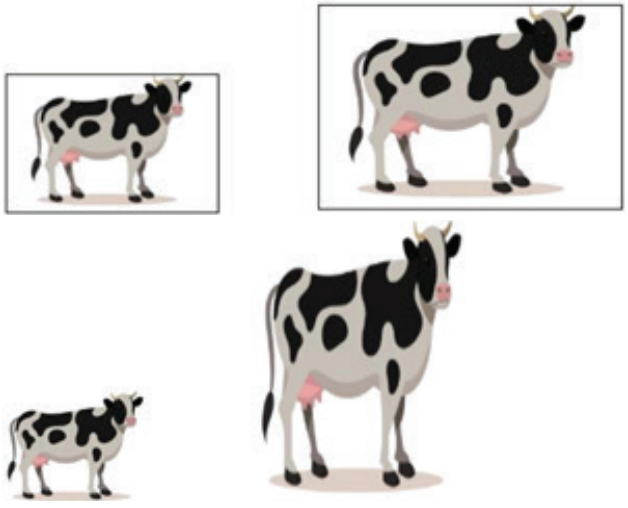
Mapping skills

♦ Mapping skills is an activity to find the most suitable map to find details of Thiruvananthapuram town. This activity will help to identify that the most suitable map for collecting information of Thiruvananthapuram town is not that of India, Kerala or Thiruvananthapuram district. Google map has been introduced to make information about Thiruvananthapuram town the easiest. Let's explore the Google map in detail and collect the important information of the town. What information can be collected? There are four uses for google maps, that are maps, routes, places and environment.

- Places to visit
- Distance from bus stand.
- Names of roads that pass along the given place.
- Important Railway Stations
- Important hotels.
- Important Pilgrimage Centers
- Important beaches.

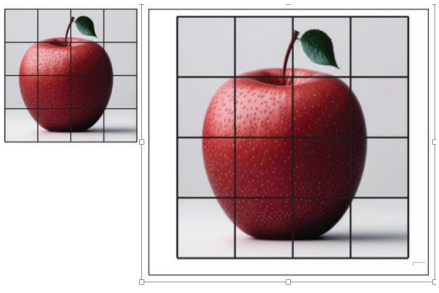
Magnification

- The same image is drawn in two different sizes. When the width is increased by half, the length should also be increased by half. Then the size of the image will increase but the beauty will remain the same.
- But if the length and width are not proportionately increased, the image will be distorted. Look at the two sets of pictures below, one with the length and width proportionally increased like in the textbook and the other without.



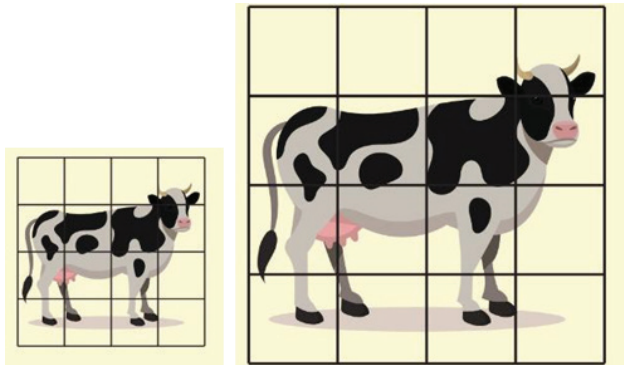
Twice the photo size

- In this activity, two different photos of the child Annu are given, the first photo is smaller and the second photo is twice the size. Here's how to draw an apple twice the size. For this it will be more convenient to draw with graph paper or grid paper. First draw the picture on a grid of size 4 x 4 cm and then draw the picture on a grid of size 8 x 8 cm. Only the picture parts in each small square should be drawn very carefully.



Same picture

- It is the same image drawn on three different grids. Let's observe how the area of the three images differ? Children will find that the area of the second picture is twice the area of the first picture. They find out the area of the third picture is twice the area of the second picture through observation. Such conclusions can be evaluated by observing that everything is square and that the second grid is twice the first grid, the third grid is twice the second grid.
- In the activity 'Do it by yourself', children will find the area of the picture on their own by comparing the sizes of the grids.



Reduction of images to lower scale

- This activity specifies how to scale a picture when it is resized from its actual size to a smaller size. A discussion on how the width should change when the length is reduced to one-tenth should also take place at this stage.A conclusion should be formed through discussion that the width should also be reduced to one-tenth.

It should also be discussed or else the beauty of the picture will be lost. It would be good to discuss with computer help about what happens if the length and width changes are not proportional.

Do it by yourself

- This activity is to convert a picture of a table 1 metre high into a picture of a table 10 cm high. It should then be decided through discussion that all measurements of the table should be reduced to one-tenths. Then it is to find out which scale was adopted in the two given pictures when the picture was reduced.
- The first image is a square shape. A side of the original image is 66 cm. A side of the reduced image is 16.5 cm. How did the length change when it was converted to a smaller image? 66 cm becomes 16.5 cm. That is, the image was drawn at a scale of one centimetre by four centimetres. This type of discussion and conclusion formation should take place through this activity. In the next picture too, each measurement has become half of half that is 4 cm has become one centimetre.

Annu's home

- It is an activity of accurately analysing a map and gathering information and making a map based on the information gathered. Let the children find, analyse and present the answers to the questions given as part of the activity, first individually and then as a group. Then let groups make more questions based on the information given in this activity. It would be appropriate at this stage for children to prepare a similar map of their own school, home and other institutions. The actual distance and the style of the map should be decided through discussion. Participation in discussions, ability to form conclusions, ability to gather and analyse information can be assessed at this stage.

At Thiruvananthapuram

- Google maps are more used than paper maps in modern times. This is an activity that shows how to analyse Google Maps and gather information from it. First let the children find the answers to the questions given in this activity using the pictures in the textbook. The sign indicating the direction on the map given in the picture is subject to discussion. Additional questions related to this activity can be found, improvised in groups, and presented to the class. Finding the location of the house with the help of Google Maps and gathering more information from that map can be given as an assignment.

Let's revisit

- Make questions in such a way as to gather maximum information from the map of Kerala and find the answers to the questions given in the textbook. It is formed by discussion that the direction shown on a map from top to bottom indicates south and up indicates north. Pointing out the places marked on the map and asking questions such as in which direction should we travel to another place?

School map

- It is more appropriate to do the school map work on a group basis. All group discussions will be more beneficial to find suitable scale and location of each building through necessary discussions. It would be nice to present some samples of school maps if needed.

Map study

- Google map of Ernakulam town is given in the textbook. The task is to analyse this map by asking suitable questions. Some questions may be posed by the teacher and the children may then continue the activity of constructing questions.
  - In which part of Ernakulam General Hospital is the sea located?
  - Nearer to Ernakulam Railway Station is Ernakulam Shiva Temple or Caltex Junction?
  - Which way does it cross the main road from Blitz Academy to Kadavantra?
- The task of checking more Google Maps and gathering information can be given as an assignment.