Based on the Singapore Bar Model Method

WOW! MATHS

Teacher’s Manual

5

OTHER CURRICULUM TITLES

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WOW! Grammar & Composition
WOW! World Within Worlds
WOW! Go Round English
WOW! Go Round Maths
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WORLD BOOK

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REVISED EDITION
WOW MATHS based on the Singapore Model offers complete Maths solutions for grade 1 to 8 in the form of text books, workbooks, lesson plans and more.

The lesson plans follow a learner centric approach and aim at experiential learning. They have been designed to ensure that whereby the learning objectives they aim to achieve are measurable and capable of analysis conductive to the understanding of children.

- The resources needed to carry out the activity in the lesson plan.
- The hands on experience to learn the concept.
- The concepts that have not been explicitly taught in the lesson, but can be associated with the activity or the concept learned through the lesson.
- Indirect questions, aimed at further probing and better understanding of the concepts.
- The things/questions that connect the concept taken up in the lesson plan with the real life.
- The new words related to the concepts which the child is to learn through the activity.
- The implied concepts that if the child is able to gather from the activity, help the teacher quantify that the child has understood the concept clearly.
- Questions to practice the concept taught.
- Higher order thinking questions to enhance the critical thinking skills of the child.
- Page numbers of the content book where the topic is covered.
- Page numbers of the workbook where practice questions related to the topic are given.
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Lesson Plan - 1

Grade - 5

CHAPTER 1

NUMBERS

Learning Objective
- To read and write numbers in crores.
- To write the place and face values of numbers in crores.

Stress Words
Crores, Ten crores, Face value

Activity
- Write the following numbers on the board:
  9    99    999    9999    99,999    99,99,999
- Assign one number to each group.
- Instruct the students to add 1 to the number assigned to them and tell the answer.
- Conclude and share:
  » 9 + 1 = 10; 99+1 = 100; 999+1= 1000; 9999+1 = 10,000;
  » 99,999+1 = 1,00,000; 9,99,999 + 1 = 10,00,000;
  » The last number formed that has eight digits is 1 crore. It is the smallest 8-digit number. The largest 8-digit number is 99,99,999.
- Ask: What will you get if you add 1 to 9,99,99,999?
- Encourage the students to draw a place value chart showing all places till ten crores.
- Demonstrate on the board:

<table>
<thead>
<tr>
<th>TCr</th>
<th>Cr</th>
<th>TL</th>
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<th>Th</th>
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</table>

- Show to the students that a 9-digit number has 2 more places to the left of lakhs period - crores and ten crores which belong to the crores period.
- Write some numbers in the place value chart to show the place values in a 9-digit number. For example 45,12,78,936 and 26,10,97,458

<table>
<thead>
<tr>
<th>TCr</th>
<th>Cr</th>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
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<td>4</td>
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<td>1</td>
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<td>7</td>
<td>8</td>
<td>9</td>
<td>3</td>
<td>6</td>
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<tr>
<td>2</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>9</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>
- Ask the students the face value of each digit in the above numbers.
- Remind them that face value of a number always stays the same as the digit and place value changes depending upon where the digit is placed in the number.
- Write few more 9-digit numbers on the board and instruct the students to tell the place value and face value of each digit.
- Continue as time permits.
Understanding

Expected

• A 9-digit number has 9 places: ten crores, crores, ten lakhs, lakhs, ten thousands, thousands, hundreds, tens and ones.
• Face value of a digit does not depend on its place value.

Application

• How many places are there in the crores period?
• Which of the following numbers have 1 at ten crores place?
  » 1,35,46,892
  » 41,72,83,902
  » 12,74,82,460
  » 43,89,56,901
• Write 87,46,19,847 in words. Write the place value and face value of each digit and write its expanded form.

Analysis

• What is the place value and face value of each digit in 27, 54, 19, 834?
• Write a 9-digit number where place value of one of the digits is 4 crores.
• Write a 9-digit number where face value of one of the digits is 4.

Thinking Skills

Unjumble the digits given below to write the number fifty-six in crores period, eighty-seven in thousands period ,seventy-eight in lakhs period, four hundred fifty-three in ones period.

• Take number cards 1-9 and form 8 or 9-digit numbers from them. Write the number in words, the place value and face value of each digit and its expanded form.
• Make houses on a paper. Set the price of each house using 8 or 9-digit numbers. Decide which house you want to buy and make a cheque to pay for it by writing the amount in figures and words.

Content Book Reference: Page 13-15
Guided Practice: Page 5-7
Lesson Plan - 2

Grade - 5

Learning Objective
- To compare and order numbers upto 9 digits.
- To identify the successor and predecessor of the given numbers.

Material Required
Paper slips, 1 rupee coin

Stress Words
Ascending, Descending

Activity
- Divide the children into groups of four.
- Give 4 paper slips and a coin to each group.
- Instruct each student to write an 8 or 9-digit number on a slip.
- Ask the pairs within groups to compare their numbers and find the smaller or greater of the two.
- Next, ask a member of the group to toss the coin.
- Instruct the students to arrange their numbers in ascending order if heads comes up and in descending order if tails comes up.
- Share with them that large numbers are compared in the same way as smaller numbers.
  » The number with fewer digits is smaller.
  » To compare number with same number of digits, compare the digit at the place on the left. The number with greater digit is greater.
  » If both numbers have same digit at that place, compare the next digit on the right. The number with that greater digit is greater.
  » Continue like this till you have identified the greater or smaller number.
- Instruct the groups to come forward one by one and present their ordered numbers to the class.
- Ask the class to check if the order is correct.
- Repeat the activity if time permits.

Understanding expected
Larger numbers are compared in the same way as smaller numbers.

Application
- Circle the number smaller than 90,28,38,294:
  9,38,59,395; 99,99,99,999; 91,00,00,001
- Arrange the numbers in ascending order :
  8,29,17,385; 91,29,48,495; 19,29,48,375; 19,20,48,375
- Aranya says that 73,18,28,400 = 7,31,82,840. Is she correct? Give reasons for your answer.
- Which is greater- predecessor of 1,00,00,000 or successor of 9,99,99,999?
- Fill in the blanks to make the comparison statement true.
  67,89,19,205 > 67,89,19,_____95

Analysis

Group Activity
Thinking Skills

Dhanush says that the predecessor of 1000 more than 76,38,89,389, successor of 10,000 less than 76,38,20,287 and predecessor of 100 less than 76,38,20,287 are in descending order. Is he correct?

Real Life Connect

- Arrange the countries given below in descending order of their population: Russia 14,62,67,288; Japan 12,69,19,659; Brazil 20,42,59,812
- Mr. Mathur has saved 25,69,38,492 for a house. The following are the prices of the houses that he likes. Which ones can he afford?
  House A: 25,56,38,592  House B: 25,73,82,273
  House C: 26,38,28,384  House D: 24,01,94,184
Lesson Plan - 3

Grade - 5

Learning Objective
To round-off numbers upto 9-digits.

Material Required
White paper slips rounded numbers facts, yellow paper slips with actual numbers facts

Stress Words
About, Approximately

Activity
- Write the following facts on the paper slips and keep them in the bowl.
  » Facts on yellow slips:
    ‣ The most expensive car in the world costs ₹ 9,50,45,930.
    ‣ If a hollow Sun was filled up with Earths, 9,61,895 earths would fit in it.
    ‣ An Olympic size swimming pool uses 24,95,726 L water.
  » Facts on white slips:
    ‣ The most expensive car in the world costs about ₹ 9,50,00,000.
    ‣ If a hollow Sun was filled up with Earths, approximately 9,60,000 earths would fit in it.
    ‣ An Olympic size swimming pool uses nearly 25,00,000 L water.
- Pick a student at random. Instruct him to pick a yellow slip and read it silently.
- Ask him to keep the slip away and tell the students what he read.
- Read out the actual fact from the same slip and ask the students if the same number was called out by the student.
- Repeat the activity for other yellow slips by picking more students.
- Encourage the students to think about why a lot of students were not able to remember the number correctly.
- Repeat the activity with white slips.
- Show to the students that students were able to remember numbers from white slips.
- Ask the students:
  » What is special about these numbers?
  » What do words like about, nearly, approximately indicate?
  » Why do we use rounded off numbers?
- Point out that when we don’t need the actual number and just an idea, we round it off so that it is easy to remember and work with.
- Explain to the class that to round off numbers to a place, we look at the digit on the place at its immediate right. If it is 5 or more, we round up to the next number in the rounding off place. If it is less than 5,
To round off a number, we look at the digit on the right of the place we are rounding off to.

- Round off the numbers to nearest ten thousands.
  » 54,187,394  » 61,75,61,901
- Round off the numbers to nearest lakhs.
  » 8,28,28,395  » 1,99,56,482

- Which number will be rounded off to 5,70,00,000 when rounded off to nearest lakh?
  » 5,75,72,183  » 5,68,00,729  » 5,62,91,38,495
- Vinay rounded off 17,81,62,549 to 17,81,60,000. To which place did he round off?

A number when rounded off to nearest ten, hundred, thousand, ten thousand and lakh remains 18,40,00,000. What could be the number?

- The cost of a farm is ₹ 12,98,29,182. What is the approximate cost of the farm to the nearest crore?
- The population of Nepal is 2,98,00,000 approximately. Which of the following could be the population of Nepal?
  » 2,97,27,676  » 2,98,56,676  » 2,98,27,676
Learning Objective
- To write numbers upto 9 digits using the Indian and the International number system.
- To explore the similarities and differences between the Indian and the International number system.

Stress Words
Hundred thousand, Million, Ten million, Hundred million, International number system

Activity
- Read out the following fact to the students:
  The population of USA in 2014 was about three hundred eighteen million, nine hundred forty-five thousand six hundred thirty-two
- Ask the students:
  » What is this number in numeral form??
  » Where are such numbers used?
  » What is this number system called?
- Draw the place value chart of the Indian and the International Number system on the board.

Indian Number System

<table>
<thead>
<tr>
<th>Crores</th>
<th>Lakhs</th>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCr</td>
<td>Cr</td>
<td>TL</td>
<td>L</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>7</td>
<td>6</td>
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<td>2</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

International Number System

<table>
<thead>
<tr>
<th>Millions</th>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM</td>
<td>TM</td>
<td>M</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
</tbody>
</table>

- Instruct the pairs to note down the similarities and differences between both the number systems.
- Use the exercise to discuss:
  » Both the systems have ones periods at the extreme right position. It has three places, hundreds, tens and ones.
  » Both the systems have thousands period after the ones period. Both have places thousands and ten thousands.
  » The number systems are different after ten thousands.
  » The International number system has hundred thousands instead of lakhs, millions instead of ten lakhs, ten millions instead of crores and hundred million instead of ten crores.
  » Each period in the International number system has 3 places. In Indian number system, only ones period has 3 places. All other periods have 2 places each.
  » In both the number systems, the value of each place on the left is ten times the place on its right.
Understanding Expected

- International number system has millions in place of ten lakhs and crores. A comma is placed after every three digits from the right.

Analysis

- Which period comes after millions in the International number system and what are the places in it?
- Write seventy-five crores sixty-four lakhs eighty thousand one hundred twenty-three in figures according to International number system by placing commas.
- Will the face values in Indian and International number system be different?

Thinking Skills

Meenu wrote a number that has 7 tens, 6 hundred millions, 9 ten thousands, 5 ones, 4 crores 0 thousands, 2 millions, 1 lakh and 8 hundreds. What is the number?

Real Life Connect

- Form different 9-digit numbers using digits 0-9 with or without repetition of digits. Write their number names, place values and expanded form according to the Indian and the International number system.
- Raman bought a house for five hundred thirty-two million two hundred forty-five thousand one hundred one dollars. What is its price according to Indian number system? Write it in words.
Learning Objective
To represent Hindu-Arabic numerals as Roman numerals and vice-versa.

Material Required
A clock with Roman Numbers, straws (or tooth-picks)

Activity
- Display a clock with Roman numbers in class.
- Ask:
  » What kind of numbers are these?
  » How is 1 written as a Roman number?
  » How is 2 written as a Roman number?
- Write the following on the board:

<table>
<thead>
<tr>
<th>Roman Numeral</th>
<th>I</th>
<th>V</th>
<th>X</th>
<th>L</th>
<th>C</th>
<th>D</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindu-Arabic Numeral</td>
<td>1</td>
<td>5</td>
<td>10</td>
<td>50</td>
<td>100</td>
<td>500</td>
<td>1000</td>
</tr>
</tbody>
</table>
- Ask the pairs to look at the numbers from 1 to 12 on the clock to discuss the following:
  » What is the maximum number of times a symbol can be repeated?
  » If a Roman numeral is written before another Roman numeral, which operation will you use to arrive at the number?
  » If a Roman numeral is written after another Roman numeral, which operation will you use to arrive at the number?
  » What is the Roman numeral for 0?
- Discuss the rules to write the Roman numbers with the students.
- Give a match box to each pair.
- Write different Hindu-Arabic numerals on the board and ask the students to represent them in Roman numerals using straws.
- Pick students at random to write the Roman numeral on the board after the students finish.
- Continue the activity as time permits.

Understanding
Expected
Addition and subtraction are used to write a combination of the 7 Roman numerals that represent Hindu-Arabic numbers.

Application
- Write 545 and 1246 using Roman numerals.
- Write CCCXIV, LD as Hindu-Arabic numerals.

Analysis
- Mohan wrote the number 14 as XIIII. Explain why it is wrong.
- Which is smaller- CCLX or CD?
- Will LX be 40 or 60? Why?
Thinking Skills

Write the sum of MDXV and MCXVIII as a Roman numeral.

Real Life Connect

- Write the seven Roman numerals on slips (one numeral on each card). Pick 2 or three at a time and arrange them to form a number. Write the Hindu-Arabic number for this Roman numeral.
- The following are the copyright dates of some movies. In which year was the copyright obtained?
  » MCMLXXXVI  » MMX
- Janet drew a picture on the following page numbers in the book. On which page number will you find the illustration?
  » V  » XXIX  » CXLVII
**Lesson Plan - 1**

**Grade - 5**

**Chapter 2**

**OPERATIONS**

**Learning Objective**
- To add numbers up to 8 digits using column method.
- To subtract numbers up to 8 digits using column method.
- To explore the properties of addition and subtraction.

**Material Required**
Dice

**Activity**
- Assign a number from 1 to 6 to each group.
- Give a dice to each group.
- Instruct the students to roll the dice and form 2 numbers of as many digits as the number assigned to them.
- Ask them to add and subtract the numbers.
- Pick a student from each group to explain the steps that they have used to add and subtract the numbers.
- Point out that the process for addition and subtraction remains the same irrespective of the number of digits.
- Revise the steps for addition and subtraction:
  - To add numbers, write the numbers one below the other according to the places. Add digits at each place from right to left. If the sum of the digits at a place exceeds 10, carry over to the place on the left.
  - To subtract numbers, write the smaller number below the bigger number according to places. Subtract the digits at each place from right to left. If the digit at the top is smaller than the digit at the bottom, borrow 1 from the place on left and regroup as 10.
- Instruct each group to say any digit from 0 to 9.
- Form two 8-digit numbers using it and ask the students to add and subtract the numbers.
- Pick students randomly to solve on the board after everyone has finished.
- Repeat as time permits.

**Understanding Expected**
Larger numbers are added and subtracted in the same way as smaller numbers.

**Application**
- Add the numbers.
  - $8,28,90,283 + 3,45,87,282 + 56,82,23,746$
  - $3,89,28,123 + 2,34,495 + 1,28,90,876$
• Subtract.
  » 9,17,27,283 – 1,27,38,476
  » 7,13,45,273 – 56,58,382
• Solve 7,21,19,234 + 1,00,08,265 – 3,98,37,273
• A factory manufactured 3,78,53,092 bulbs and 1,24,57,725 tube lights.
  » How many units did it manufacture in all?
  » How many more bulbs did it manufacture as compared to the lights?

Analysis

• Which of the statements will give the same answer.
  » 4,15,98,234 + 3,21,82,283
  » 3,21,82,283 + 4,15,98,234
  » 8,54,18,273 + 1,98,26,870 + 4,51,89,273
  » 1,02,83,829 + 0
  » 1,02,83,829 – 0

• What should be added to 2,84,78,293 to get 5,43,27,374?
• Fill in the blanks.
  » ___________ – 8,28,392 = 6,23,98,122
  » 7,12,67,283 – ___________ = 3,46,76,234

• Out of a population of ₹ 1,24,48,900, 68,50,089 are men and 12,98,321 are children. How many women are there?

Thinking Skills

Mona sold a building for ₹ 9,82,37,283. She used the money to buy 2 houses and was left with ₹ 1,23,98,607. If she bought one house for ₹ 4,90,18,237, what is the cost of the other house?

Real Life Connect

• Combine the numbers on the number plates of four cars to form two 8-digit numbers. Add and subtract them.
• Combine the digits of the prices of various items to form the greatest and the smallest 8-digit number possible. Find the sum and difference of these numbers.
Lesson Plan - 2

Grade - 5

Learning Objective
To multiply large numbers by 2 and 3-digit numbers.

Material Required
Base ten blocks (hundreds, tens and ones)

Activity

- Divide the students into groups of four.
- Write $2 \times 346$ on the board. Ask the students what the statement means.
- Conclude that number 346 is to be multiplied two times.
- Encourage the students to think how place value blocks can be used to multiply numbers.
- Explain that since $2 \times 346$ means 2 times 346, they can represent 2 groups of 346 using hundreds, tens and ones and put together all hundreds tens and ones to identify the product.
- Instruct the students to multiply the numbers using blocks. Remind them to regroup if there are more than 10 blocks at a place.
- Demonstrate after the students finish and correlate with the column method on the board.

$$
= \begin{array}{c|c|c|c}
\text{H} & \text{T} & \text{O} \\
\hline
300 & 40 & 6 \\
\hline
2 & & \\
\hline
\end{array}
$$

- Ask the students if it would be easy to solve $23 \times 346$ by putting together equal groups.
- Stress upon the need for column method for multiplying large numbers.
- Demonstrate how to multiply by 2 and 3-digit numbers on the board.
Application

Find the product.

» 73,734 × 65 = 2,34,234
» 23,456 × 167 = 41,215

Madhur’s grandfather bought a house for ₹2,43,743 when he was born. Today, the value of the house is 25 times. What is the value of the house today?

Expected

Understanding

Large numbers are multiplied using the same steps as the small numbers.

Analysis

Which of the following will give 0 as the answer?

» 67,182 × 100
» 67,182 × 0
» 67,182 × 1

Fill in the blanks.

» 81,283 × 762 = _____ × 81,283
» 1,93,239 × 100 = ___________
» 87,29,392 × 10 = ___________
» 56 × 45 × 16 = ___ × 45 × 56

Thinking Skills

The number of red pencils made by a factory is 23,235 more than the number of blue pencils. The number of black pencils is 16 times the number of red and blue pencils combined. If there are 1,92,153 red pencils, how many pencils are manufactured by the factory in all?

Real life Connect

Choose any model of car you like and find out its price. Go out for a walk and count the number of cars of that model. Multiply the price by the number of cars to find total price of all cars you counted.
Activity

- Share with the students: Mona bought a TV for ₹ 30,096 and had to pay the amount in 24 equal installments. How much does she have to pay in each installment?

- Ask:
  » How will you solve the question?
  » How can you divide large numbers?
  
  Seek answers. Conclude that the students will have to divide to find the amount to be paid in each installment.

- Share with the students that just like addition, subtraction and multiplication of large numbers is done in the same way as of small numbers, the steps for division also remain the same.

- Divide the number on the board with the students to demonstrate.

- Explain each step side by side. With each step, bring to the notice of the children that they are not multiplying the digit but the number with respect to its place value.

  » We cannot divide 3 by 24 so we divide 30 by 24. Multiply 24 by 1 and write 1 above the line and 24 below 30 and subtract.

  » With remainder 6, bring down 0 and divide 60 by 24.

  » Multiply 24 by 2. Write 2 above the line on the right of 1. Write 48 below 60 and subtract.

  » Bring down 9 and follow the same procedure unless you divide till last digit, getting remainder 0.

  » So, the numbers on the line above are said to be quotient and gives the required answer. Hence Mona has to pay ₹ 1254 each month.

- Write the following sentences (with the alphabet) at random places on the board.

  » Divide 25 by 2.

  » Bring down 2.

  » Write 2 in the quotient. Write 42 below 42. Subtract 42 from 42 and write the difference.

  » Divide 52 by 21 and so on.

- Instruct the pairs to divide 25252 + 21 in their notebooks and write the steps from the board in their respective order.

- Instruct the students to call out the first step after everyone finishes.
• Solve the question on the board by performing the first step. Continue in the similar way to complete the division. While following the steps, revise each calculation with relevance to the numbers being multiplied with reference to their place values.
• Give more division questions to pairs for practice.

Division of large numbers is done in the same way as small numbers.

• Divide the numbers. Check your answer using division algorithm.
  » 7,12,273 ÷ 46  
  » 3,56,271 ÷ 627
• Radhika earns ₹ 590205 in a year. How much does she earn in a day?

• Mohan divided 6,18,283 by a number and got the quotient 1. What was the number?
  » 0  
  » 1  
  » 6,18,283
• Kirat divided 92,00,000 by a number and got 92000 as the answer. What was the number?
  » 10  
  » 100  
  » 1000
• Kisna divided a number by 67 and got quotient 32 and remainder 45. What was the number?

Ramesh bought 36 boxes of erasers with 48 erasers in each. He wanted to pack them in boxes of 12 each and bought the boxes accordingly. When he opened the boxes, he found that each box had 3 erasers less than the number mentioned on them. How many boxes will be left with him?

Find the price of your car, sofa, A.C, fridge, television etc. Split the price of each item into equal monthly payments for 2 and 3 years.
(Hint: 2 years = 24 months, 3 years = 36 months)
Lesson Plan - 4

Grade - 5

Learning Objective
To estimate the sum, difference, product and quotient of the given numbers.

Stress Words
Estimated, Actual, Approximate

Activity

- Share with the students: Meenal has gone for shopping with ₹4000 in her pocket. She bought trousers costing ₹1938 and a dress costing rupees ₹1127. How can she quickly find if she has enough money?
- Ask: How can Meenal quickly add numbers to get an idea if she has enough money without using a pen and paper?
- Share with the students that many times we don’t need to know the actual answer and just an estimation is enough. In such cases we round off numbers and perform operation on them.
- Ask the students to round off ₹1938 and ₹1127 to nearest ₹1000 and add.
- Recall with them that to round off a number, the digit at its immediate right is observed. If the digit is equal to or more than 5, the digit at the thousands place is rounded off to the next number else the digit remains same. The digits at other place values become zero.
- Show them how quickly they could add the numbers and get an idea if she had enough money.
- Extend the situation further for giving more sums for practice.
  » Meenal paid the sum of ₹3065 using ₹4000. Approximately how much will she get back as change?
  » Meenal bought 12 T-shirts costing ₹1235 each. Approximately how much does she have to pay?
  » After shopping Meenal and her friends went for lunch. If 18 friends split the bill of ₹3890 equally, approximately how much did each of them have to pay?
- Help the students determine which place they need to round off each time.
- Have them compared the estimated answer with the actual answer after solving each question to show how close the estimated and the actual answer are.
- Continue by giving more situations as time permits.

Understanding Expected

To estimate the answer we round off numbers and perform operations on them.

Application

- Estimate the answers.
  » 7364 + 3784  » 3745 – 2672  » 3475 x 36  » 8756 ÷ 32
- 23 students of a class are going on a school trip. If the total cost of the trip is ₹9820, what is the approximate amount that each student will have to pay?
Analysis

- The estimated sum of 2 numbers is 8000. Which numbers could they be?
  » 6736 and 1245
  » 1575 and 7503
  » 4550 and 3550
- Fill in the blank using words in the brackets.
  The estimated _________ of 5628 and 12 is 500.

Thinking Skills

The estimated product of 2450 and a number is 60,000. If the second number is an odd prime number, what is the number?

Real life Connect

- Go for shopping with your parents. Estimate the price of all items you have to pay and the amount you will get back as change. Compare them with actual total and change to see how close your estimation was.
- Estimate the multiple cost of items when you buy many items of the same price. Compare them with actual cost to see how close your estimate was.
- Estimate the cost per unit of items when you buy items in multiple packs. Compare them with actual per unit cost to see how close your estimate was.
Lesson Plan - 1

Grade - 5

FACTORs AND MULTIpLES

Learning Objective
• To write factors of a given number.
• To find common factors of given numbers.

Stress Words
Factor, Common factor

Activity
• Write 36 on the board.
• Ask the students to write down all multiplication sentences which lead to the product 36.
• Instruct the pairs to write them in a rainbow. Demonstrate as shown

1 2 18 36

• Complete the rainbow on the board using students’ responses after they finish.
• Ask the students to divide 36 by these numbers and find the remainder.
• Share with the students that the numbers which divide the given number completely, leaving a remainder 0 are called factors of the number.
• Associate the concept with factors of 36.
• Instruct the students to make factor rainbows of 48 and 78.
• Give more numbers to make factor rainbows if time permits.

Understanding Expected
• A factor of a number divides it completely, leaving no remainder.
• The factor of the number cannot be greater than the number.
• 1 is the smallest factor of a number.
• The number whose factor is to be found out is the greatest factor of itself.

Application
• Write the factors of 100.
• Write the common factors of 35 and 42.

Analysis
• How many factors does 1 have?
• What are the common factors of 36 and 48?
• Which of the following does not belong in the factor set of 27?
  1, 3, 6, 9, 27
• Which number is a factor of every number?
• Can 72 have a factor which is greater than it?
• Is 72 a factor of 72?
Thinking Skills

- Write 2 numbers which have only 1 has their common factor.
- Which numbers will be common factors in all even numbers?
- Which numbers will never have 2 as a factor?
- True or False: 3 is a factor of all odd numbers.

Real Life Connect

- Jyoti wants to divide 40 apples equally into baskets. What are the possible number of apples in each basket if no apple is to be left over?
- Find the pairs of objects in your house like pencil and erasers, plates and bowls etc. Count each of them, find the common factors of counts by listing the factors.
Lesson Plan - 2

Learning Objective
- To write multiples of a given number.
- To write common multiples of given numbers.

Material Required
Red and green colour pencils

Stress Words
Multiples, Common multiples

Activity
- Instruct each pair to write numbers from 1 to 50.
- Tell them to start from number 1 and multiply all the numbers by 2.
- Instruct them to circle all the resultant products using red pencils.
- Ask them to do the same for number 5 by making a circle around the resultant products by green colour.

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- Discuss the numbers circled in red and write them on the board. Explain to the students that when we multiply a number by different numbers, the resulting products are multiples of that number. Thus all numbers in red are multiples of 2 because we multiplied 2 by different numbers and got these numbers as the product.

- Discuss the numbers circled in green and write them on the board. Associate them with multiples of 5.

- Bring their attention to the common numbers in multiples of 2 and 5, marked in both green and red. Associate them with common multiples of 2 and 5. Also, make them understand that the table could be extended to common multiples of numbers can be infinite.

- Repeat the activity to list the multiples and common multiples of 4 and 6.

Understanding
Expected
- Multiple of a number is obtained by multiplying it by different numbers.
- There are infinite multiples of a number.
- The first multiple of the number is the number itself.

Application
- Write the first five multiples of 8.
- Write the first three multiples of 25.
- What are the first three common multiples of 15 and 30?
- What is the lowest common multiple of 15 and 30?
Analysis

- What are the multiples of 1?
- Which number is not a multiple of 1?
- How many multiples can a number have?
- What is the smallest multiple of 17?
- Name a multiple of 10 which is smaller than it.

Thinking Skills

- Write the third and fifth multiple of a number are 231 and 385. What is the number?
- Common multiples of 2 numbers are 18 and 27. What are the numbers?

Real life Connect

- A shop sells buns in packs of 6 and patties in packs of 4. Tick the number of packets and buns you would buy if you need both of them in equal number?
  » 4  » 6  » 12  » 18
- Count things in your house that come in pairs like chairs and tables, flowers and leaves etc. List the multiples of each to find how many of each you should have so that both are in same number.
### Learning Objective
To identify numbers as prime, composite, twin-primes and co-primes.

### Stress Words
Prime numbers, Composite numbers, Twin-primes and co-primes

### Activity
- Instruct each pair to write down the factors of each number from 2-10.
- Tell them to divide the numbers into 2 groups based on the number of factors they have.
- Discuss that numbers 2, 3, 5 and 7 have only 2 factors - 1 and the number themselves. Such numbers are called prime numbers. Share with them that the numbers with more than 2 factors (4, 6, 8, 9) are called composite numbers.
- Encourage the students to work out more examples of prime and composite numbers.
- Encourage the students to name the prime numbers that have a difference of 2.
- Share with them that the prime number pairs that have a difference of 2 are called twin primes.
- Instruct the students to name some number pairs which have only 1 as their common factor.
- Explain to them that numbers with only 1 as their common factor are called co-prime or relatively-prime numbers.
- Encourage the students to call out more examples of twin primes and co-primes.

### Understanding
**Expected**
- Whether a number is prime or composite depends on the number of factors it has.
- 2 is the smallest prime number.

### Application
- Write all prime and composite numbers from 11 to 20.
- Numbers 49 and 51 are:
  - prime
  - composite
  - twin prime
  - co-prime

### Analysis
- Is 1 a prime or composite number?
- Name a pair of numbers between 41 and 50 that is twin-prime as well as co-prime.
Can composite numbers be co-prime?
Are all twin prime numbers co-prime too? Give examples.
Are all co-prime numbers twin-prime too? Give examples.
Write a pair of numbers that have 1 prime number, 1 composite number and are co-primes.

Keep playing cards A-9 face down on a table. Pick 2 cards at a time to form a 2-digit number. Identify the number as prime, composite, twin prime or co-prime.
Count the number of forks and spoons you have at home. Identify the numbers as prime, composite, prime or co-prime.
There are 17 buns on a table. Can they be divided into equal groups of more than 1? Give reasons using the concept of prime and composite numbers.

Content Book Reference: Page 52, 53
Activity

- Share with the students: Anita and Amit want to decorate their cupboard with equal number of Barbie and Superman stickers. There are 4 Barbie stickers on one strip. There are 6 Doraemon stickers on one strip. How many stickers of each should be bought so that both are equal in number?
- Encourage the students to suggest methods to solve this problem.
- Give 16 red counters and 18 green counters to each pair.
- Give time to the students to work on the solution. Guide the students to put together groups of 4 red counters and 6 red counters each till both are equal in number.
- Ask the students how they could have solved the problem without counters.
- Show them that they could have found the answers by listing down the multiples of each number. Since the first common multiple of both the numbers is 12, we say that the Lowest Common Multiple or the LCM of 4 and 6 is 12.
- Barbie stickers: 4, 8, 12
- Superman stickers: 6, 12
- Ask the students if it would be just as easy to find LCM if there were 24 Barbie stickers on a strip and 30 Superman stickers.
- Share with the students that prime factorization can be used to find LCM of numbers.
- Show the students how to prime factorize a number.
  » Step 1: Divide the number by its smallest prime factor and write the quotient under it.
  » Step 2: Divide the quotient by its smallest prime factor and write the quotient under it.
  » Step 3: Repeat step 2 till you get 1 as the quotient.
  » Step 4: Find common and non-common factors.
  » Step 5: Multiply common and non-common factors to find LCM.
• Extend the problem further: Anita has 24 dresses and Amit has 30 shirts. What is the greatest number of piles they can make such that each pile has the same number of dresses and same number of shirts?

• Ask the students how they will solve the problem. Explain that they need to find the factors of each number to find how many equal piles of each they can make. Since they need to find the greatest number of piles, they need to find the Highest Common Factor or the HCF.

• Explain that HCF can also be found using prime factorization. After finding prime factorization, they have to multiply only the common factors. Show on the board:

$$24 = 2 \times 2 \times 2 \times 3$$  
$$30 = 2 \times 3 \times 5$$

Common factors = 2 and 3  
Non common factors = 2, 2 and 5  
LCM: \(2 \times 3 \times 2 \times 2 \times 5 = 120\)

• Share with the students that they can also divide the numbers together by their common prime factors. This method is known as common division method. Demonstrate:

• Give different pairs of numbers to students to find HCF and LCM as time permits.

$$2 \quad 24, \ 30$$  
$$3 \quad 12, \ 15$$  
$$2 \quad 4, \ 5$$

HCF = \(2 \times 3 = 6\)  
LCM = \(2 \times 3 \times 4 \times 5 = 120\)

• Give different pairs of numbers to students to find HCF and LCM as time permits.

To find the HCF, multiply all common factors. Since LCM will be the bigger number, we multiply the non-common factors too.

• Find HCF and LCM of:
  » 16 and 20  
  » 40 and 88

• Find the HCF and LCM of 12, 18 and 16.

• Put the following set of numbers in the ascending order of their HCF. Will the order change if you rearrange the numbers in the ascending order of their LCM?
  » Set A: 20 and 40  
  » Set B: 24 and 76  
  » Set C: 36 and 60
The diagram on the right shows prime factors and common factors of 2 numbers. What are the numbers?

Find the HCF and LCM of 36 and 60. Multiply the numbers. Multiply the HCF and LCM. What do you notice?

Take 2 prime numbers. Find their HCF and LCM. Repeat this with another set of prime numbers. What pattern do you see?

The HCF and LCM of 2 numbers is 15 and 315 respectively. If one number is 45, what is the second number?

- Find the LCM and HCF of your, your mother’s and your father’s age.
- Take balloons in 2 different colours. Tie the balloons of one colour in bunches of 6. Tie balloons of other colour in bunches of 8. Find how many of each you need such that both are same in number. Verify your count by finding LCM using prime factorization.
Learning Objective
To solve word problems on HCF and LCM.

Activity
- Share with the students: Mita wears her gloves every sixth day and her hat every eighth day. If she wore them together on 28 Feb, when will she wear them again?
- Encourage the students to suggest methods to solve this problem.
- Ask the pairs to make a calendar for March by writing all dates from 1st to 31st.
- Instruct them to draw a hat on every sixth day when she would wear a hat and a small hand on every eighth day when she would wear her gloves.
- Discuss the answer.
- Ask the students how they could have solved this problem without a calendar. Encourage them to think along the lines of factors and multiples.
- Show them that they were finding multiples of 6 and 8 and the common date was the LCM of 6 and 8.
- Share another problem: Mona has 24 English comic books and 16 Hindi comic books. She wants to arrange them on shelves such that each shelf has the same number of English and Hindi comic books. What is the greatest number of both shelves Mona can use such that no books are left over?
- Ask the students how they can solve this using factors and multiples.
- Point out that they need to divide the books on to shelves so they need to find factors. And since they need to find the greatest number of shelves, they need to find HCF.
- Find the HCF of 24 and 16 with the students to arrive at the answer 8.
- Encourage the students to suggest more situations where they need to calculate HCF and LCM.

Understanding
Expected
When we need to put together equal groups (or when an activity gets repeated), we find LCM. When we need to divide into equal groups, we find HCF.

Application
- A supermarket is running a promotional offer. It is giving 50 rupees off coupon to every 20th customer and 100 rupees off coupon to every 35th customer. Which customer will get both coupons?
- Keerti made 36 pieces of dark chocolate and 54 pieces of white chocolate. She wants to pack them into boxes such that each box has an equal number of each. What is the greatest number of boxes she can pack them in such that no chocolates are left over?
Analysis

- In a school there are separate bells for primary and senior students. The bell for primary school rings every 30 minutes and the bell for senior school rings every 45 minutes. If both bells rang together at 8:45 am, when will they ring together next?

- There are 84 students in class 4 and 96 students in class 5. During the annual function, students of class 4 will march followed by students in class 5. The principal wants to arrange the students in greatest number of equal columns. How many students will be there in each row in class 4 and class 5?

Thinking Skills

A rectangular piece of cloth is 20 m long and 8 m wide. What is the least number of squares that can be cut out such that no cloth is wasted?

Real life Connect

- Find objects that you generally need to use together but come in unequal numbers like buns and patties, bread and cheese slices etc. Calculate how many of each you need so that you have both in same number.

- Take 2 biscuit packs of different sizes (1 big pack, 1 small pack). Divide them into greatest number of equal groups such that each group has the same number of biscuits and no biscuits are left over.
Activity

- Divide the class into groups of 4.
- Give 2 coloured A4 sheets, a ruler and scissors to each group.
- Instruct the students to cut out 8 rectangles of same size and shade one-fourth of each.

- Ask the students to cut out the shaded portions from the rectangles to complete wholes.

- Point out to the students that they represented one-fourth eight times and they could make 2 wholes out of it.
- Write the numerical representation on the board:

  \[
  8 \cdot \frac{1}{4} = 2
  \]

- Encourage the students to identify the numbers being multiplied and the result obtained.
- Explain to them that to multiply a fraction by a whole number, they can multiply the whole number by the numerator and then simplify the fraction by dividing the numerator and the denominator by their common factor. In this case,

  \[
  8 \cdot \frac{1}{4} = \frac{8 \cdot 1}{4} = \frac{8}{4} = \frac{2 \cdot 4 - 1}{4 - 1} = \frac{8}{4} = \frac{2 \cdot 4}{4 - 1} = \frac{2}{1}
  \]

- Instruct the students to repeat the activity to solve \( \frac{5}{4} \cdot 2 \) using cut outs and verify the answer by solving numerically.
- Continue the activity by giving more fraction \( \times \) whole number problems as time permits.
A company has to make a payment of ₹ 20,000. They are required to give half of the total payment in advance. Three-fourth of the remaining payment at the time of delivery and the remaining after inspection of goods. How much are they supposed to pay after inspection?
Learning Objective
- To multiply a proper fraction by a proper fraction
- To multiply an improper fraction by a proper fraction.

Material Required
Coloured A4 sheets, Ruler, Scissors

Activity
- Divide the class into groups of 4.
- Give two coloured A4 sheets, ruler and scissors to each group.
- Instruct the students to cut out a rectangle and shade half of it.
- Ask students, “What part does the shaded area show?
- Instruct the students to shade three-fourth of the shaded portion in the other direction (if they divided vertically first, they will divide horizontally now and vice versa).
- Ask them to identify the double shaded fraction of the whole figure.
- Point out to the students that they represented half first and then found three-fourth of it.
- Share with the students that of in mathematics denotes multiplication.
- Write the numerical representation on the board:
  \[ \frac{3}{4} \text{ of } \frac{1}{2} = \frac{3}{4} \times \frac{1}{2} = \frac{3}{8} \]
- Encourage the students to identify how a fraction is multiplied by another fraction vertically.
- Explain to them that to multiply a fraction by a fraction, they multiply the numerators of the given fractions and the denominators together. Then, simplify the fraction formed.
  In this case, \( \frac{3}{4} \times \frac{1}{2} = \frac{3 \times 1}{4 \times 2} = \frac{3}{8} \)
- Write \( \frac{3}{4} \times \frac{5}{3} \) on the board.
- Encourage the students to solve this using cut outs and numerically.
- Ask the students to find the total fraction of both wholes to find the total shaded portion.
- Share the solution with the class on the board:
  - Step 1: Show the improper fraction. (\( \frac{5}{3} \) as \( 1 \frac{2}{3} \))
  - Step 2: Show the proper fraction. (\( \frac{3}{4} \) of \( \frac{5}{3} \))
Will your answer to \( \frac{3}{4} \times \frac{5}{3} \) still be \( \frac{5}{4} \) if you simplify numerators and denominators first and then simplify?

What is the similarity between multiplication of a fraction by a whole number and multiplication of fraction by a fraction?

Solve numerically:

- \( \frac{4}{5} \times \frac{1}{2} \)
- \( \frac{1}{6} \times \frac{3}{2} \)
- \( \frac{1}{4} \times \frac{8}{5} \)
- \( \frac{1}{3} \times \frac{3}{2} \)

Gayatri needs cut three-fourth of a half meter cloth. What fraction of a meter did she cut?

Will your answer to \( \frac{3}{4} \times \frac{5}{3} \) still be \( \frac{5}{4} \) if you simplify numerators and denominators first and then simplify?

Maria picked up \( \frac{3}{4} \) kg chocolate from store A and \( \frac{1}{2} \) kg chocolate from store B. She used three-fourth of it to make the cake and one-fourth to make icing. How many more grams of chocolate was used for cake than for icing?

Find fraction of different fractions using multiplication and then verify by dividing actual objects. For example, \( \frac{1}{3} \) of half of 12 balls, Half of three-fourth teaspoon salt etc.

A recipe calls for \( 1 \frac{1}{2} \) cups of flour. Half of it is to be used for gravy. What fraction of the cup should be used for the gravy?
Learning Objective
- To divide a whole number by a proper fraction.
- To find reciprocal of a fraction.

Material Required
Coloured A4 sheet (1 per pair), Scissors (1 per pair), Ruler (1 per pair).

Activity
- Give a coloured A4 sheet, scissors and a ruler to each pair.
- Instruct the students to draw a rectangle on the sheet and cut it out.
- Tell them to shade three-fourth of the rectangle and divide the rectangle into 2 equal parts.
- Remind them that if they shaded three-fourths vertically then they will divide horizontally into 2 equal parts and vice versa.

![Diagram of a rectangle divided into 4 parts, with 3 shaded parts]

- Ask: How many parts are shaded in one of the two parts? What is the fraction of this shaded part to the whole?
- Write $\frac{3}{4} \div 2 = \frac{3}{8}$ on the board.
- Encourage the students to identify the relationship between the numbers on the board.
- Write on the board: $\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$
- Explain to them that when we divide fractions, we interchange the numerator and denominator of the divisor and multiply the resulting fractions. Inverting the fraction is known as taking the reciprocal of a fraction. For example, reciprocal of $\frac{3}{4}$ is $\frac{4}{3}$, $\frac{1}{5}$ is $\frac{5}{1}$, 4 or $\frac{4}{1}$ is $\frac{1}{4}$.
- Call out different division statements and ask the students to convert them into multiplication statements by taking reciprocal of divisor.
- Instruct them to solve some of more problems using a model as well as numerically as time permits.

Understanding Expected

Associated Concepts
- Division of improper fraction by whole number.
- Division of whole number by fraction.
- Division of fraction by a fraction.
Application

• Find the reciprocal of the following fractions:
  » two-thirds
  » Six-fifths
  » Nine
  » half

• Solve the following numerically:
  » \(2 \div \frac{1}{4}\)
  » \(\frac{1}{4} \div 2\)
  » \(\frac{3}{4} \div \frac{9}{16}\)
  » \(\frac{18}{5} \div \frac{9}{10}\)
  » \(\frac{8}{6} \div 6\)
  » \(2 \frac{1}{2} \div 10\)

Analysis

• How will you divide an improper fraction by a whole number using bar model numerically?
• How will you divide whole number by a fraction using bar model numerically?
• How will you divide fraction by a fraction numerically?
• How will you divide mixed fractions numerically?

Thinking Skills

Rajat says that the reciprocal of the quotient of \(\frac{3}{4} \div \frac{6}{5}\) will be same as the quotient of the reciprocals of the fractions being divided. Check if he is correct? Give reasons for your answer.

Real Life Connect

• Mona wants to fill half a bucket of sand at the beach. She uses a scoop that fills one-tenth of a bucket at a time. How many scoops of sand does she need to fill half a bucket?
• A recipe requires \(\frac{1}{2}\) kg flour to make cookies. If we can make 10 cookies out of the recipe, how fraction of flour is there in each cookie?
Lesson Plan - 4

Learning Objective
To solve word problems on multiplication and division of fractions using a model.

Material Required
A4 sheets (1 per group)

Activity

- Encourage the students to share situations where multiplication and division are used in real life.
- Start by giving examples such as:
  » \( \frac{1}{5} \) of the 30 girls in class have short hair. How many of them have short hair?
  » Meena wants to fill \( \frac{1}{2} \) L juice evenly in 3 glasses. How many litres of juice will be there in each glass?
- Ask the students how they would solve these problems.
- Share with them that making a model to represent the problem helps in solving the problem.
- Demonstrate on the board:

  \[
  \frac{1}{5} \text{ of } 30 = \frac{1}{5} \times 30 = 6
  \]

  \[
  \frac{1}{2} \div 3 = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6} \text{ L}
  \]

- Instruct each group to tear their A4 sheet into 2 halves and write down one word problem on multiplication and one word problem on division of fractions on them.
- Collect the problem slips from the students and shuffle them.
- Distribute 2 slips to each pair and ask the students to solve the problems on the slips by making models.
- Pick some groups to share their problems, models and solutions.
- Instruct the remaining groups to verify if they are correct.
- Correct the students, where needed.
- Continue by picking more groups as time permits.
Making a model helps in deciding how to solve the problem.

**Application**

- Krisha made 8 balls of dough using $\frac{3}{4}$ cup of flour. How many cups of flour is there in each dough?
- How many $\frac{1}{10}$ L cups can be filled from $\frac{1}{2}$ L jar of milk?
- How do you know whether to use multiplication or division of fractions to solve a word problem?
- Rohan put $\frac{1}{3}$ of 300 g rice in a bowl. He then put $\frac{1}{2}$ of the rice from the bowl in a plate. How many grams of rice is in the plate?
- A $\frac{5}{3}$ m rope was cut into 6 pieces. Each piece was further cut into half. What is the length of the final piece?

**Analysis**

It took Sheetal three quarters of an hour to do her homework on Monday, twice as long to do her homework on Tuesday. She wants to spend half of the time taken on Monday and Tuesday to do her homework on Wednesday. How many minutes will it take her to complete her homework on Wednesday? On which day did she complete her home work in least amount of time?

**Thinking Skills**

- Ask your child to use fractions in real life situations and verify the answers numerically. For example, what fraction of the whole is there in one-fourth of half of a chocolate?
- Find a recipe to make a cake for 15 people. Use it to get the recipe to make cake for $\frac{2}{3}$ of the people.

**Real life Connect**

- Ask your child to use fractions in real life situations and verify the answers numerically. For example, what fraction of the whole is there in one-fourth of half of a chocolate?
Learning Objective
To compare and order decimal numbers.

Material Required
Ribbon (25 cm long), Ruler, Scissors

Activity
- Write 4.6, 3.5, 2.3, 4.2, 7.9 on the board.
- Give a ribbon, ruler and scissors to each pair.
- Give the following instructions:
  » Cut ribbons of lengths given on the board.
  » Write the length cut on each piece.
  » Arrange the ribbons in the ascending order of their length.
- Instruct the students to call out lengths in ascending order.
- Write the ascending order on the board.
- Encourage them to observe a pattern in comparison of numbers.
- Show them:
  » The number that has the smaller whole number is smaller.
  » If the whole number part in both numbers is equal, then the number with smaller tenths is smaller.
- Summarise the process to compare decimal numbers and order them.
- Write another set of decimal numbers on the board including places upto hundredths (e.g. 5.6, 7.98, 7.93, 5.65).
- Instruct the students to arrange the numbers in descending order.
- Explain:
  » If the number of digits after decimal point are unequal, we can add a 0 at the end such that the numbers have same number digits after the decimal point.
  » If the whole number part and tenths are equal, then we compare the hundredths. The number with the smaller hundredth part is smaller.
  » In the same way, if the whole number part, tenths and hundredths are equal, compare the thousandths. The number with the smaller thousandth is smaller.
- Repeat the activity by giving another set of numbers including decimals till thousandths as time permits.
- Change the order from ascending to descending in each round.

Understanding Expected
To compare decimal numbers, compare the digits from left to right. If the digit on the left is same, compare the next digits on the right.
Thinking Skills

An odd decimal number is greater than 1.57 but smaller than 1.6. What is the number?

Real Life Connect

- Measure the lengths of different objects like a pencil, a matchstick, an eraser, a spoon and arrange the lengths in the ascending order of their lengths. Verify your answer by arranging the objects from shortest to longest.
- Find bills from restaurants, your parents visit. Arrange the amounts in decimals on the bill in descending order.

Analysis

- Which is greater- 7.5 or 7.153? Why?
- Fill in the blank to make the comparison statement true.
  » 13.86 < 13. ____  
  » 45.76 = 45.7 ____  

Application

- Fill in the blanks with the correct comparison symbol.
  » 8.9 ____ 9.8  
  » 3.45 _____ 3.54  
  » 1.76_____ 1.72  
- City A received 25.3 cm rainfall. City B received 25.6 cm rainfall. Which city received more rainfall?
- Mona cut 4 ropes of length 1.98 m, 0.75 m and 1.92 m and 1.7 m. Arrange the lengths of ropes in the descending order.
Learning Objective
- To convert decimals to fractions.
- To convert fractions to decimals.

Material Required
1x10 grid, 10x10 grid, Decimal and number slips (with numbers 7/10, 0.7, 3/100, 0.03)

Activity
- Divide the class into groups of 4.
- Give 2 tens grid, 2 hundreds grid and a set of number slips (with numbers 7/10, 0.7, 3/100, 0.03) to each group.
- Instruct each student in the group to pick a number slip and represent the number on the grid.

\[
\begin{align*}
0.7 &= \frac{7}{10} \\
0.03 &= \frac{3}{100}
\end{align*}
\]

- Instruct the other students to look at the grids and call out numbers which have the same representation.
- Write \( \frac{7}{10} = 0.7, \frac{3}{100} = 0.03 \) on the board.
- Encourage the students to decipher the rule for conversion from fractions to decimals.
- Show the students
  » Each decimal number has as many digits after the decimal point as the number of 0s in the denominator.
  \[
  \frac{7}{10} \rightarrow 0.7, \quad \frac{3}{100} \rightarrow 0.03
  \]
  » To convert fraction to decimal, write the numerator, place a decimal point after as many digits from the right as the number 0s in the denominator.
  \[
  \frac{7}{10} \rightarrow 0.7
  \]
  » If numerator does not have enough digits, we add a 0 after the decimal point to match the number of digits after the point with the number of zeros in the denominator.
  \[
  \frac{57}{1000} \rightarrow 0.057
  \]
In the same way, to convert decimal to fractions, write the number as the numerator without the decimal points. Then write 1 in the denominator followed by as many 0s as the number of digits after the decimal point in the number.

- Write different fractions (with denominator 10, 100 or 1000) on the board and ask the students to convert them to decimals.
- Write different decimals on the board and ask the students to convert them to fractions.
- Continue as time permits.

For fractions ending with 10, 100 and 1000, each equivalent decimal number has as many digits after the decimal point as the number of 0s in the denominator.

- Convert the following fractions to decimals.
  » \[
  \frac{2}{10} \quad \frac{19}{100} \quad \frac{5}{100}
  \]
- Convert the following decimals to fractions.
  » 0.1 \quad 0.63 \quad 0.09

- How can you convert \( \frac{4}{5} \) into decimals? (Write an equivalent fraction with denominator 10.)
- Convert 19.83 into a fraction.

- The numerator of a fraction is 5. The fraction when converted to decimal is 0.005. What is the denominator of the fraction?
- Arrange the numbers in ascending order.
  » 0.5, 6/10, 0.32 and 7/20.

- Take 100 rajma beans. Close your eyes and pick some beans. Write fraction of beans picked and convert it to decimals.
- Read the maximum and minimum temperature of the day in the newspaper and convert the decimals to fractions.
Learning Objective
• To add decimal numbers.
• To subtract decimal numbers.

Material Required
Ribbon (25 cm length), Ruler, Tape

Activity
• Give a ribbon, ruler and tape to each pair.
• Instruct the students to cut pieces 7.3 cm and 6.8 cm ribbon, join them using tape without any overlaps and find the total length of the ribbon.
• Write the vertical representation on the board as the students answer:
\[
\begin{align*}
6.8 \\
+ 7.3 \\
\hline
14.1
\end{align*}
\]
• Encourage the students to decipher the method to add decimals using column addition.
• Show them that decimal numbers are added and regrouped as regular numbers with decimal point being written down at the exact place.
• Instruct the students to find how much longer the first piece is as compared to the second piece using a ruler.
• Write the vertical representation on the board as the students answer.
\[
\begin{align*}
7.3 \\
- 6.8 \\
\hline
0.5
\end{align*}
\]
• Encourage the students to decipher the method to subtract decimals using column method.
• Show them that decimal numbers are subtracted and regrouped as regular numbers with decimal point being written down at the exact place.
• Write more decimal numbers on the board for addition and subtraction. Include decimals till hundredths place.
• Remind the students to place a 0 at the end to make the number of digits equal, if needed, before adding or subtracting decimal numbers.
• Give more practice questions as time permits.

Understanding
Expected
Decimal numbers are added in the same way as whole numbers with the decimal number at the same place as in numbers being added.

Application
• Add the numbers.
  » 6.8 and 2.3  » 5.17 and 2.56  » 4.9 and 5.24
• Subtract the numbers.
  » 1.5 from 7.3  » 2.34 from 6.12  » 5.5 from 7.15
Analysis

- What is 8 – 6.5?
- Rajesh thought of a number which was 1.67 more than 5.9. What is his number?

Thinking Skills

Meenu’s weight is 2.9 kg less than Ramesh’s. Ramesh’s weight is 4.5 kg more than Raghav’s weight. If Raghav’s weight is 60 kg, what is the difference between Meenu and Raghav’s weight?

Real life Connect

- Measure your body temperature using a digital thermometer. Drink 1 glass of hot water and then take your temperature again. Find the difference between both temperatures.
- Find the total price of petrol and diesel at your nearest petrol pump and find the difference between the two.
Learning Objective

- To multiply a decimal by a whole number.
- To multiply a decimal by a decimal.

Material Required

Ribbon of 4.6 cm length, Ruler

Activity

- Write on the board: Mona wants to decorate a greeting card and put a 4.6 cm long ribbon on each of the 4 sides. What is the length of the ribbon that she needs?
- Encourage the students to suggest methods to solve the problem.
- Write $4 \times 4.6$ on the board.
- Give a 4.6 cm long ribbon and a ruler to each pair.
- Instruct the students to put the ribbon against the ruler (on number 0) and mark the point where the ribbon ends, then place the ribbon at this marking and mark the next point where the ribbon ends. Repeat the process and so on 4 times.
- Show the column representation on the board as the students answer.
- Ask the students how they can find the answer without using the ribbon.
- Share with them that to multiply decimal numbers, we can multiply the numbers without decimals and then place the decimal point in the product after as many places from the right as the number of digits after the decimal point in the numbers being multiplied.
- Explain using another example, if needed.
- Give more decimal by whole number and decimal by decimal multiplication sums for practice as time permits.

Understanding

Expected

Decimals are multiplied like whole numbers. The product of decimals has as many digits after the decimal as the total digits after the point in numbers being multiplied.

Application

- Find the product.
  » $6.5 \times 4$  » $5.9 \times 3.7$  » $6.14 \times 1.5$
- 0.3L water is needed to fill a glass. How many litres of water are needed to fill a tray of 24 such glasses?

Analysis

- What is $0.673 \times 10$?
  What is $0.673 \times 100$?
  What is $0.673 \times 1000$?
  What pattern do you see?
- The height of a plant is 4.5 cm. If it grows 0.12 cm each day, what will be its height after 15 days?
Mohit scored 36.4% marks in his exams. Rohit’s marks are 1.2 times more than Mohit’s. How much did Rohit score?

- Look for the nutrition content on food labels behind food items and number of servings. Find how much protein, fat, carbohydrates etc. are there in the whole pack by multiplying the number of servings.
- Find the price of petrol and multiply it by the litres of petrol you filled in your car to calculate how much you have to pay.
Learning Objective
- Divide a decimal by a whole number.
- Divide a decimal by a decimal number.

Material Required
Ribbon of length 12.8 cm, Ruler, Scissors

Activity
- Give a ribbon, ruler and scissors to each pair.
- Instruct the students to cut the ribbon into 4 equal parts and find the length of each part.
- Encourage them to find how they will divide length 12.8 cm by 4 numerically.
- Share with them that the decimal is placed at the same place in the quotient as in the dividend. So they can first place the decimal point at the exact place in the quotient, then divide the numbers like whole numbers.
- Divide 12.8 by 4 on the board and demonstrate.
- Ask the students how many parts of length 0.4 cm can be cut from a ribbon of length 3.2 cm?
- Encourage the students to tell the operation that will be used to solve this numerically.
- Ask the students how a decimal can be divided by another decimal. Encourage them to look for a method to turn the divisor into a whole number.
- Share with them that they can multiply both divisor and dividend by 10, 100 or 1000 i.e. with a number that will turn the divisor into a whole number.
- Show on the board
  
  \[
  0.4 \times 10 = 4 \\
  3.2 \times 10 = 32 \\
  32 \div 4 = 8
  \]
  
  So, 8 pieces of 0.4 cm length each can be cut from a ribbon of length 3.2 cm.
- Instruct the students to cut 3.2 cm ribbon into 0.4 cm pieces and verify.
- Give more decimal by whole number and decimal by decimal division sums for practice as time permits.

Understanding Expected
- Decimals are divided like whole numbers. The place of the decimal in the quotient is same as the place of the decimal in the dividend.
- If a divisor is a decimal number, we multiply divisor and dividend by same multiple of 10 such that the divisor turns into a whole number.
Application

• Divide the numbers.
  » 8.4 ÷ 4
  » 65.4 ÷ 6
  » 2.106 ÷ 0.6

• 12 laddoos are made from 1 laddoo using 961.2 g sugar. How much sugar is there in each laddoo?

Analysis

What is 5171.4 ÷ 10?

» What is 5171.4 ÷ 100?

» What is 5171.4 ÷ 1000?

» What pattern do you see?

Thinking Skills

Sheena cuts a length of ribbon into 1.4 cm pieces. After cutting 3 pieces, she was left with 1 cm ribbon. What was the total length of the ribbon?

Real life Connect

• Look for bills that have totals in decimals. Find how much you will owe if you split the bill amongst 4 people, 6 people etc.

• Divide the distance travelled by your car and the litres of petrol used to find how far your car travels using 1L petrol.
Learning Objective
To introduce the concept of percentage.

Material Required
10 × 10 square grid, pencil, colour, scale

Stress Words
Percent

Activity
- Ask the students to count and colour 32 squares.
- Instruct them to make a fraction of this situation. Guide the students how to write it. (i.e \( \frac{32}{100} \))
- Inform the students that 32% of the grid is shaded.
- Write 32% on board share with students that ‘%’ means ‘per hundred’ or ‘out of 100’.
- Ask the student to shade any number of boxes and exchange it with their partner, calculate their percentage and verify the answer by cross-checking.
- Next, encourage them to calculate the percentage of unshaded part also.

Understanding
- Percentage is a way to expressing a number as a fraction of 100.
- Shading on a square grid does not require any sequence. For example: If we are shading 34 number out of 100, any 34 square can be shaded.

Expected

Application

If a child got 90 marks out of 100, what is the percentage of marks?

Ritu collected 100 fruits from her garden. 24 were guavas and the rest were mangoes.

a) What percentage of the fruits were guavas?

b) What percentage of the fruits were mangoes?

Thinking Skills

Out of a salary of ₹7500, he kept \( \frac{1}{3} \) as savings. Out of the remaining money he spend 50% on food and 20% on house rent. How much do he spend on food and house rent?

Real Life Connect

Ask students to check how much population of India increased last year.

Content Book reference: Page 97-99
Guided Practice: Page 75, 76
**Learning Objective**
To explore the concept of fraction and decimals as a percentage.

**Material Required**
10 × 10 square grid, pencil

**Stress Words**
Percentage, fraction, decimals

### Activity
- Take 10 × 10 square sheet and treat it as a whole. Fold the paper into half.
- Instruct them to count the number of square in a half.
- Make them observe that $\frac{1}{2}$ of the square is 50. Write $\frac{1}{2} = \frac{50}{100}$ on the board.
- Guide the students to convert this fraction into percentage. $\frac{1}{2} = \frac{50}{100} = 50\%$
- Next, inform the students that to convert a decimal into percentage, we shift the decimal point by two places to the right and insert percentage symbol (%). Remind them of the hundredths place value and associate the concept. $\frac{1}{2} = \frac{50}{100} = 0.50 = 50\%$

### Understanding
- With which number do you multiply the fractions to get the percentage?
- To find the percentage of a fraction, convert the denominator of the fraction to 100.

### Application
Find the value of the following percentages
a) 30% of 60 min b) 50% of $\frac{1}{10}$

### Analysis
What percentage of the bar is shaded?

- a) Express 0.07 as percentage.
- b) Express $\frac{9}{90}$ as percentage?

### Thinking Skills
A 25p coin is what percentage of a rupee?

### Real Life Connect
Ask students to count the number of absentees in class and find out their percentage.
Lesson Plan - 3

Grade - 5

Learning Objective
To find the given percentage of a given quantity.

Material Required
10 × 10 square grids, colour pencils, a pair of scissors and glue

Activity
- Ask the student that we are going to find out 60% of 40.
- Ask the students first consider the number 40. Cut the first 4 vertical strips from the grid.
- Instruct the students to colour 6 boxes in each of the 4 vertical strips.
- Ask the students to count the number of boxes.
- Explain why 6 squares out of 10 are being shaded by solving 60%.
  
  Out of 100 parts, 60% → 60
  Out of 1 part, 1% → \( \frac{60}{100} \)
  Out of 10 parts, 10% \( \frac{60}{100} \times 10 \)
  So, 10 parts → 6

- Count all the 6 boxes shaded in 4 vertical strips. (24)
- Inform the students that they just calculated 60% of 40 which is 24 by associating it with bar and explain.
- To find a given percentage, draw a bar and divide it into 10 parts. Six shaded parts show 60%.

  ![Bar diagram](image)

- Encourage the students to find 30% of 120.

Understanding
Expected
- To find out value of quantity from number of quantity, we divide.
- To find out the value of more than one quantity where value of one quantity is given, we multiply.

Analysis

On Monday, 1500 people visited a zoo. 20% of the visitors were children and rest of the visitors were men and women.

a) How many children visited the zoo on Sunday?

b) How many men and women visited the zoo on Sunday?

Real Life Connect

If 20% of student in a class of 80 are absent, find out how many students are absent on that day.

Content Book reference: Page 103
Guided Practice: Page 81-82
Learning Objective
To express a quantity as a percentage of another.

Material Required
10 x 10 square grid, colour, scissors, paper

Activity
- Give a situation, "There are 50 kg of rice in a sack. 30 kg of the rice is sold. What percentage of the sack of rice is sold?"
- Instruct the students to cut the square grid into half so that there should be 50 squares in each half.
- Ask the student to first count the 30 squares and colour it in both the pieces.
- Instruct the student to count the total coloured part (60).
- Make students observe that out of 50, they shaded 30 and in total they shaded 60 out of 100 squares. Therefore, \(\frac{30}{50}\) is 60%.
- Draw the bar and explain 50 kg is represented by 5 units or parts.

```
100%
\[\equiv\]
5 parts = 100% 
1 part = \(\frac{100}{5}\) % = 20% 
3 parts = 3 \times 20% 
= 60% 
```

So, 60% of sack of rice is sold.
- Encourage the students to find out what percentage is 14 of 70.
- To find out value of quantity from number of quantity, we divide.
- To find out the value of more than one quantity where value of one quantity is given, we multiply.

Understanding Expected
- If 6 out of 45 students in a class are absent. What percentage of class is absent?
- If you ate 1 bowl of rice out of 5 bowls, what percentage of rice did you eat?

Application
There are 400 members in a swimming club. 48 of the members were children. The rest were adults. Find out the percentage of children in the club.

A tank can hold 50 litres of water. At present, it is only 30% full. How many litres of water shall I put in the tank, so that it is 50% full?

Thinking Skills
Tell students check their previous year report card. Verify that how much marks and percentage they had obtained in each subject.

Real Life Connect

Guided Practice: Page 83-87
Lesson Plan - 1

Grade - 5

Learning Objective
- To introduce the concept of averages.
- To calculate the average of numbers.

Material required
Counters (25 per group)

Stress words
Average

Activity
- Share with the class: Students from a class are playing in groups. One group has 4 students, second has 5 students, third group has 5 students and the fourth group has 6 students. How should the students in groups be shifted so that there are equal number of students in each group? Write the number of students in each group on the board.
- Pick 20 students to come to the front. Do not reveal the number of students to the class.
- Ask them to form groups as written on the board.
  » Group 1: 4 students ● ● ● ●
  » Group 2: 5 students ● ● ● ● ●
  » Group 3: 5 students ● ● ● ● ●
  » Group 4: 6 students ● ● ● ● ● ●
- Ask the students from all groups to stand together. Represent on the board with the help of dots. ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
- Instruct the students to count:
  » How many students formed the groups?
  » How many groups were formed?
- Instruct the students forming groups to form 4 equal groups. Allow students to shift from one group to the other, if required and ask the class to observe.
  ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
- Ask: How many students are in each group?
- Conclude with them that each group has 5 students if number of students are redistributed equally.
- Explain:
  » The count that you get if the total count is distributed equally among the number of counts is known as average.
  » We found the average number of students in each group by redistributing the students equally.
- Ask the students if they can represent the actions they performed using mathematical operations.
- Show them that they first counted all students by putting together students from all groups and then divided equally into 4 groups.
- Write on the board: average = sum of values ÷ number of values
- Instruct the students to go back to their seats.
- Divide the class into groups of 4.
- Give 25 beads to each group.
- Call out/write the number of beads that each student has and ask the students to find the average using the formula. For example student 1 has 8 beads, student 2 has 10 beads, student 3 has 4 beads and student 4 has 2 beads.
- Ensure that the number of beads you give leads to the average being a whole number and not a decimal.
- Have each student in the group take the number of beads assigned, redistribute and find the average to verify their answer.
- Continue as time permits.

**Understanding Expected**

Average = sum of values ÷ number of values

**Application**

Find the average of the following set of numbers.

a) 23, 25, 40, 21 and 31
b) 30, 49, 25, 22, 19 and 23

**Analysis**

- The price of 5 items is ₹21 and 50p, ₹25, ₹24 and 25p, ₹35 and 75p and ₹40. What is the average price of each item?
- The rainfall on each day was 24.8 cm, 12.3 cm and 5.8 cm. What is the average rainfall?

**Thinking Skills**

- The average of 5 numbers is 120. What is the sum of the numbers?
- Mansi has pencils in 4 boxes. The red box has 8 pencils, the blue box has 9 pencils, the green box has 11 pencils and the orange box has some pencils. If the average number of pencils in each box is 8, how many pencils are there in the orange box?

**Real Life Connect**

- Find the cost of 4-5 biscuit packs of your choice. Find the average cost of a biscuit pack.
- Find out how much your family has spent on groceries in the last 6 months. Find the average amount spent by your family on groceries in each month.
Learning Objective  
To solve problems on average.

Stress words  
Average, sum of values, number of values

Activity

- Write on the board: Kanika paid a total of ₹420 for 7 items. What is the average price of each item?
- Ask the students:
  - What is average?
  - How do we find average?
- Remind the students:
  - Average is the value which you will get if total count is distributed equally among the number of counts.
  - Average = sum of values ÷ number of values
- Show the students that they already have the sum of values with them.
- Ask them how they can find the average price. Seek answers. i.e. average = 420 ÷ 7 = 60.
- Write the following problems on the board one by one:
  - The average chapattis eaten by Rohit in 5 days is 6. How many chapattis has he eaten in all?
  - Mona has 2 beads, Kirti has 4 beads, Shanti has 3 beads and Mohan has some beads. If the average number of beads is 3, how many beads does Mohan have?
- Divide the class into pairs.
- Instruct the students to discuss and try to solve the problem in pairs.
- Pick students to share how they solved the problems.
- Share with the students that in the first problem, they know the average and the number of values.
- Explain on the board:
  - Average = Sum of values ÷ Number of values
  - Sum of values = Average × Number of values
  - Thus, 6 = Sum of values ÷ 5
- Ask the students what can be divided by 5 such that the quotient is 6?
- Write the answer 30 on the board.
- Discuss the second problem with the students.
- Explain on the board:
  - Sum of values ÷ Number of values = Average.
(Mona’s beads + Shanti’s beads + Mohan’s beads) \div 3 = 3

(6 + Mohan’s beads) \div 3 = 3

- Ask the students what should be added to 6 such that the sum when divided by 3 leaves the quotient 3.
- Remind them that 9 \div 3 = 3.
- Conclude with them:
  » 3 should be added to 6 so that sum \div 3 = 3.
  » Therefore, Mohan has 3 beads.

- Show the students that in each problem, number of items \times average = sum of items.
- Write more such problems on the board and instruct the students to solve them in pairs.
- Continue as time permits.

We can multiply the number of values by average to find the sum of values.

- Karan spent an average of ₹40 in 3 days. How much did he spend in all?
- Rahul scored 93 in Hindi, 90 in English. If the average marks scored by him in Hindi, English and Maths are 90, how much did he score in Maths?

- Rajat scored an average of 30 runs in 3 matches. He scored 0 runs in the fourth match. Will including these runs to find the average change the average? Why?
- Rashi woke up at the following times. What is the average time that she wakes up?
  Monday: 6:30 am, Tuesday: 7:00 am, Wednesday: 6:45 am

Rajan got an average of 50 marks in 5 subjects. It was later discovered that he got 53 marks instead of 43 in Maths. What is the new average?

- Take a different amount of money from your parents each day of the week such that the average money borrowed each day is ₹50.
- Find the average of marks in all subjects that you got in the previous term. Increase and decrease the marks in one of the subjects and observe how it affects the average and by how much.

Content Book Reference: Page 107-109  Guided Practice: Page 89-91
**Learning Objective**

- To identify angles.
- To identify parts on an angle.

**Material Required**

Match sticks, A4 sheets, glue

**Stress Words**

Angle, degree

**Activity**

- Divide the class into groups of 4.
- Give 10 match-sticks to each group.
- Instruct the groups to form a closed shape using some or all match sticks and stick the shape on the A4 sheet.
- Pick some groups to show their shapes to the class.
- Ask the students what is common in all these shapes.
- Show the students that all these shapes have straight lines that meet at a point.
- Explain to the students that 2 rays or line segments that meet at a common point form an angle between them.
- Point out the angles in some of the shapes formed by the students.
- Instruct the students to show their shapes to the class one by one and point out the angles in them.
- Point out angles around the classroom and in some of the alphabets.
- Pick students to show some angles using their body parts for example, a bent elbow, a bent knee, a ‘V’ formed by fingers etc.
- Instruct the other students to verify.
- Draw an angle on the board and point out its parts.

- Explain to the students that OA and OB are arms of the angle AOB with the vertex at O.
- Show the students that to name an angle, we write the alphabets at the end of the arms with the alphabet at the vertex between them.
- Draw different angles on the board and tell the students to name the arms, vertex and the angle in it.

- Continue as time permits.
When two lines meet at a point, an angle is formed between the arms of the angle.

Concept of measure of an angle.

- Fill in the blanks.

- Draw an angle ABC. Write the names of its arms and vertex.

- Draw an angle with arms HI and IJ. What is the name of its vertex?

- How many angles can you spot in the figure below?
  a.  
  b.  

- Name shapes that have:
  a. 3 angles  b. 4 angles

- How many angles are there in a circle?

Mona drew an angle with UV and VW as arms. What is the name of the vertex of the angle?

- Identify different angles around your house like between hands of a clock, corner of a door etc.

- Write your name, your mother’s name and your father’s name on a paper. Count the number of angles in each name.
Lesson Plan - 2

Learning Objective
- To measure the given angles.
- To make an angle of given measure using a protractor.
- To identify different types of angles.

Material Required
Protractor, straws

Stress Words
Right angle, acute angle, obtuse angle, straight angle, complete angle, reflex angle, zero angle

Activity
- Draw 2 angles on the board.
- Ask the students: How can you tell how big or small an angle is?
- Share with the students that we can measure an angle using a protractor to tell how big or small it is.
- Give a protractor to each pair.
- Instruct the students to observe the horizontal line and the angle markings from 0° to 180°.
- Point out the top and bottom scales on the protractor and explain that the top scale is used to measure the angles with vertex on the right and the bottom scale is used to measure the angle with vertex on the left.
- Show the students how to measure an angle on the board while explaining each step:
  » Place the horizontal line on the protractor on one of the arms of the angle.
  » Align the vertex of the angle with the centre point on the horizontal line.
  » Choose the scale depending upon where the vertex is.
  » Read the marking that touches the second arm of the angle.
- Draw some angles on the board and pick students to measure them using a protractor.
- Ask the students how they can draw an angle of a given measure.
- Demonstrate and explain:
  » Draw a horizontal line.
  » Keep the horizontal line of the protractor on this line.
  » Align one end of the line drawn with the centre point of the horizontal line on the protractor. This point will be the vertex.
  » Mark the point on the paper next to the angle you wish to make.
  » Join the vertex and this point.
• Call out a different angle measurement for each pair ranging from 0°-180° (including 0° and 180°).
• Instruct each pair of students to construct the angle assigned to them using a protractor on half a sheet of paper and write the measurement below it.
• Collect the angle constructed by each pair and display them on the board.
• Pick students and encourage them to display the similar looking angles together.
• Help them place all acute angles together, all obtuse angles together, all right angles together, all zero angles together and all straight angles together.
• Encourage them to observe the similarity in angle measurements in each group.
• Share:
  » Angles that measure 90° are right angles.
  » Angles that measure between 0° and 90° are acute angles.
  » Angles that measure between 90° and 180° are obtuse angles.
  » Angles that measure 180° are straight angles.
  » Angles that measure 0° are zero angles.
• Draw a reflex and complete angle on the board and show them the same.

• Divide the class into pairs. Give 2 straws to each pair.
• Call out different types of angles and ask the students to show the angle using straws.
• Instruct the students to look around and verify.
• Continue as time permits.

• We can draw and measure an angle using a protractor.
• Angle measure 0°-90° – Acute angle; 90° – Right angle; 90°; Obtuse angle; 90° - 180° Straight angle – 180° - 360°; Reflex angle – 180° - 360°; complete angle – 360°; zero angle – 0°.
Thinking Skills

What is the measure of angle ROQ if angle POR measures 45°?

Real Life Connect

- Look at the time on the clock at different times of the day. Identify the type of angle formed between the arms of the clock.
- Form different types of angles using body parts like arms, legs etc.

Application

- Write the type of each angle. Verify your answer by measuring.
  
  a. 
  b. 
  c. 
  d. 
  e.

- Draw an angle with measure 80°.

- Which angle would have wider arms- 60° or 120°?
- What is the difference between a zero and a complete angle?

Analysis

What is the measure of angle ROQ if angle POR measures 45°?

Content Book Reference: Page 114-117
Guided Practice: Page 92-94
Activity

- Ask the students what a triangle is and what they know about it.
- Encourage them to share some real life examples of triangles.
- Give 5 matchsticks to some pairs, 6 matchsticks to some pairs and 12 matchsticks to some pairs. Also give an A4 sheet and glue to each pair.
- Instruct the students to form a triangle using all sticks given to them and paste it on the A4 sheet.
- Collect all the triangles and display them in class.
- Pick students to display all similar looking triangles together.
- Help them put all triangles with equal sides together, all triangles with 2 sides equal together and all triangles with no sides equal together.
- Ask the students what they notice about the triangles in each group.
- Share:
  » Triangles with all sides equal are called equilateral triangles.
  » Triangles with 2 sides equal are called isosceles triangles.
  » Triangles with no sides equal are called scalene triangles.
- Put triangles with a right angle together. Put triangles with acute angle together and put triangles with obtuse angle together.
- Draw the triangles on the board if students have not made any of the above using matchsticks.
- Encourage the students to draw similar triangles and measure the angles in them.
- Show them that some triangles have an obtuse angle, some triangles have all acute angles and some triangles have a right angle.
- Share:
  » Triangles that have an acute angle are called acute angled triangle.
  » Triangles that have an obtuse angle are called obtuse angled triangle.
  » Triangles that have a right angle are called right angled triangle.
Triangles can be classified on the basis of sides as well as angles.

**Understanding**  
**Expected**

**Application**

- Identify the types of triangles on the basis of given measurements.  
  a. Sides 3 cm, 3 cm and 5 cm  
  b. Sides 4 cm, 6 cm and 8 cm  
  c. Sides 7 cm, 7 cm and 7 cm

- Identify the types of triangles on the basis of given angle measurements.  
  a. 30°, 40° and 110°  
  b. 60°, 70° and 50°  
  c. 90°, 45° and 45°

- Draw an acute angled, an obtuse angled and a right angled triangle. Find the sum of angles in each triangle. What did you notice?
- In an obtuse angled triangle, what will be the type of the other two angles?

- Find $x$.

- Look for triangles in your surroundings (e.g. a sandwich). Identify the type of triangle on the basis of sides and angles.
- Make a sandwich for your parents. Cut it into different types of triangles. See if your parents can identify what type it is by looking at it.

**Thinking Skills**

- Instruct one student in the pair to form acute, obtuse or right angled triangles using matchsticks and the other student to identify the type of triangle on the basis of side as well as angles.
- Ask students to switch roles in the next round.
- Continue as time permits.
Learning Objective
- To identify properties of quadrilaterals.
- To identify properties of trapezium, parallelogram, rectangle, square and rhombus.

Material Required
Geo board, rubber bands

Activity
- Divide the class into groups of 4.
- Give a geo-board and some rubber bands to each group.
- Assign a shape from trapezium, parallelogram, rectangle, square and rhombus to each group.
- Draw the shapes on the board if the students are not familiar with them.

- Instruct each group to form the shape on the geo-board using bands.
- Ask them to discuss the shape with their group members and talk about number of sides, corners, parallel and equal sides.
- Pick each group one by one to present their shape to the class and talk about its number of sides, corners, parallel and equal sides.
- Encourage the remaining students to verify the group’s observations by looking at the shape.
- Instruct the groups to show their shapes together.
- Ask the students to observe all shapes and tell how their shape is different from the other shapes.
- Conclude the following with the students.

<table>
<thead>
<tr>
<th>Shape</th>
<th>Number of sides</th>
<th>Number of corners</th>
<th>Parallel sides</th>
<th>Equal Sides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trapezium</td>
<td>4</td>
<td>4</td>
<td>1 pair of opposite parallel sides</td>
<td>May or may not be equal</td>
</tr>
<tr>
<td>Parallelogram</td>
<td>4</td>
<td>4</td>
<td>Both pair of opposite sides are parallel</td>
<td>Both pairs of opposite sides are equal</td>
</tr>
<tr>
<td>Rectangle</td>
<td>4</td>
<td>4</td>
<td>Both pair of opposite sides are parallel</td>
<td>Both pairs of opposite sides are equal</td>
</tr>
<tr>
<td>Square</td>
<td>4</td>
<td>4</td>
<td>Both pair of opposite sides are parallel</td>
<td>All sides are equal</td>
</tr>
<tr>
<td>Rhombus</td>
<td>4</td>
<td>4</td>
<td>All sides are equal</td>
<td></td>
</tr>
</tbody>
</table>
Quadrilaterals are shapes that have 4 sides and 4 corners. There are different types of quadrilaterals based on the number of parallel and equal sides.

- Write the names of parallel sides in the shape below.

Ritika drew perpendicular diagonals of equal length and joined the corners to form a quadrilateral. Observe the properties of the quadrilateral drawn and identify it.

- Form different types of quadrilaterals using straws. Check how many types of trapeziums and parallelograms you can make.
- Make sandwiches in the shapes of different quadrilaterals. Assign 1 quadrilateral to each family member. Call out the properties and ask the family member to guess which sandwich belongs to him.

Content Book Reference: Page 121-123
Guided Practice: Page 98-100
Learning Objective
- To identify a circle and its parts.
- To understand the relationship between the radius and diameter.
- To construct a circle of given radius.
- To find the circumference of the circle.

Material Required
A4 sheet, compass, scissors, ruler, blank chart, ribbon

Stress Words
Radius, diameter, chord

Activity
- Show a clock and base of the fan to the students.
- Ask the students what is common in them.
- Point out that both are circular in shape.
- Pick some students to draw a circle on the board.
- Ask the students how a proper circle can be drawn.
- Show a compass to the students.
- Share with them that we can make a circle of any size using a circle.
- Display a blank chart in class.
- Show the students how to insert a pencil in the compass.
- Point out that the tip of the pencil and the tip of the needle must be at the same level.
- Draw a circle using the compass on the chart.
- Stress upon the fact that while drawing a circle, we must hold the compass from the top and not from the arms.
- Give a compass and a ribbon to each student.
- Instruct the students:
  » Draw a circle in your notebook.
  » Mark the point made by the needle as O.
  » Mark any 3 points on the boundary of the circle.
  » Measure the distance from the point O till these points.
  » Note your observations.
  » Draw a straight line joining any two points on the boundary of the circle.
  » Draw a straight line joining any 2 points on the boundary of circle passing through O.
  » Measure the length of this line segment.
  » Compare the length of this line segment with the length of line segment from centre to the boundary of the circle.
  » Note down your observations.
  » Measure the length of the circle by covering it with ribbon and measuring the length of ribbon used to cover the circle against the ruler.
- Pick students to share the length from O to boundary of the circle and length of line segment passing through O.
- Note them on the board.
- Encourage the students to find the relation between the two.
- Conclude with them:
  » Point O is called the centre of the circle.
  » All the points on the boundary of the circle are at the same distance from the point O.
  » The distance from centre of the circle to any point on its boundary is called radius.
  » A line segment joining any 2 points on the boundary of the circle is known as a chord.
  » A chord that passes through the centre of the circle is known as the diameter.
  » The length of the diameter is twice the length of the radius.
  » The length of the boundary of the circle is called its circumference.
- Ask the students how they can construct a circle of given radius.
- Show the students that to make a circle of given radius, they need to keep the needle of the compass on 0 on the ruler and open the compass such that the distance between the needle and the pencil is equal to the radius. Now without disturbing the width of the compass, they can draw the circle.
- Instruct the students to construct a circle of radius 7 cm and mark the radius, chord and diameter. Encourage them to tell the length of the diameter without measuring it.
- Conclude with them that since the radius of the circle is 7 cm, diameter will be $2 \times \text{radius} = 14 \text{ cm}$.
- Repeat the activity by giving another radius for constructing the circle if time permits.
Thinking Skills

The longest chord in the circle measures 14 cm. What is the radius of the circle?

Real Life Connect

• Draw a circle using a compass on a paper and cut it out. Fold the circle into half and then again into half. Identify the centre, radius and diameter from the creases formed by folding.

• Look for different circular objects around your house. Identify which circle is bigger and which is smaller. Measure their radius. What relationship do you notice between the size of the circle and its radius?

Understanding

All points on the circle are at equal distance from the centre.

Application

• Write the name of the centre, chord, radius and diameter of the circle given below.

\[ \text{A E} \]
\[ \text{D} \]
\[ \text{O} \]
\[ \text{B} \]
\[ \text{C} \]

• Find the diameter of the circle of radius 6 cm.

• Draw a circle of diameter 10 cm.

• Which is the longest chord in the circle?

Analysis

The longest chord in the circle measures 14 cm. What is the radius of the circle?

• Draw a circle using a compass on a paper and cut it out. Fold the circle into half and then again into half. Identify the centre, radius and diameter from the creases formed by folding.

• Look for different circular objects around your house. Identify which circle is bigger and which is smaller. Measure their radius. What relationship do you notice between the size of the circle and its radius?

Content Book Reference: Page 123-126

Guided Practice: Page 101-105
### Lesson Plan - 1

**Grade - 5**

**PERIMETER, AREA AND VOLUME**

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>Material required</th>
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</table>
| - To find the perimeter of given shapes.  
- To derive the formula for perimeter of square and rectangle.  
- To find the perimeter of irregular shapes. | A4 sheet (1 per student), colours, ribbon (70 cm per student), ruler (1 per student) |

**Activity**

- Share with the students that today they will be making a greeting card for their partners.
- Encourage them to share what they would like to draw and write on the card.
- Tell them that they will have to put a ribbon along the border of the greeting card.
- Ask: What is the ribbon length you will need?
- Encourage the students to share how they can find this out.
- Explain:
  - We need to find out the total length of the boundary of the card.
  - The total length of boundary of a shape is called its perimeter.
- Draw a rectangle on the board and trace its perimeter.
- Give an A4 sheet, colours, ribbon and ruler to each student.
- Instruct the students:
  - Fold the A4 sheet into half.
  - Make the greeting card on top.
  - Write what you want to inside it.
  - Put ribbon along the border and measure the length of ribbon used.
- Measure the length of ribbon used along one greeting card and verify their answer.
- Ask the students what is the shape of their greeting card.
- Encourage the students to find the relationship between the length and breadth of the rectangle and its perimeter.
- Show on the board:
  - Perimeter = Sum of length of all sides of the shape
  - Perimeter = (length + breadth + length + breadth)
  - Perimeter = 2 (length + breadth)
• Repeat the activity by changing the shape of greeting card to a square.
• This time the students can make a greeting card for their best friend or parents.
• Conclude with them:
  Perimeter of a shape = Sum of length of all sides of a shape
  Perimeter of square = $4 \times$ length of one side of square
• Draw the following figures on the board and ask the students to tell their perimeter.

![Figures]

• Encourage the students to use the formula for perimeter of squares and rectangles for first two parts.
• Conclude:
  » Perimeter of square = $4 \times 4 = 16$ cm
  » Perimeter of rectangle = $2 (7 + 3) = 20$ cm
  » Perimeter of triangle = $3 + 5 + 4 = 12$ cm
  » Perimeter of rhombus/kite = $2 + 2 + 2 + 2 = 8$ cm
  » Perimeter of pentagon = $3 + 3 + 3 + 3 + 3 = 15$ cm
• Show to the students that they were adding the lengths of all sides along the boundary to find the perimeter of these shapes.
• Draw the following shape on the board.

![Shape]

• Ask the students to find the perimeter of the shape.
• Remind them that they need to add the length of all sides along the boundary to find the perimeter.
• Conclude with them: Perimeter = $3 + 1 + 5 + 5 + 1 + 3 + 2 = 20$ cm. Show them that they did not add the length of the side which are inside the shape because inner side is not a part of the boundary.
• Continue the activity by drawing more irregular shapes as time permits.
• The perimeter of any shape can be found if we know the measurement of all its sides.
• The length of the inner boundaries is not considered while calculating the perimeter of composite shapes.
**Thinking Skills**

- Find the perimeter of a shape twice the size of the given shape.

**Real Life Connect**

- Find the perimeter of different rectangular and square shaped objects around your house like picture frame, TV screen etc. using the formula. Verify your answer by adding up the length of all sides.
- Decide on a perimeter. Make as many shapes as you can of different sizes that have the perimeter you decided.

**Application**

- Find the perimeter of a rectangle of length 15 m and breadth 12 m.
- Shreya takes 5 rounds of a square park of side 500 m daily. How much distance does she run daily?

**Analysis**

- A rectangular farm is 1 km long and 750 m wide. What is the length of rope needed to put around the boundary of the farm?
- Find the perimeter of the following shape.

![Diagram](image)

Find the perimeter of a shape twice the size of the given shape.

- Find the perimeter of a rectangle of length 15 m and breadth 12 m.
- Shreya takes 5 rounds of a square park of side 500 m daily. How much distance does she run daily?
**Lesson Plan - 2**

**Grade - 5**

**Learning Objective**
- To find area of different shapes.
- To derive the formula for area of square and rectangle.
- To solve problems on area of square and rectangle.

**Material required**
Squared paper (1 per group)

**Activity**
- Give a squared paper to each student.
- Instruct the students to write their name on the squared paper by shading the squares such that they cover as many squares as possible.
- Specify that they must only cover whole squares to shade each alphabet.
- Show them an example:

```
tino
```

- Pick students to raise their sheets and show them to the class.
- Ask:
  - Whose name covers the most space?
  - How do we find out whose name covers most space?
- Explain:
  - The space occupied by a shape is known as area.
  - We can count the number of squares covered by each alphabet to find the area of each alphabet.
  - The student whose name occupies the most number of squares has the greatest area or covers most space.
  - Since we are counting squares to find the area, we will use squared units or square units as the unit for writing area.
- Draw a rectangle on a squared paper and count the squares within it to demonstrate how to calculate area of a square.

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<td>30</td>
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</tbody>
</table>
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Area of the rectangle or square = 30 square units
• Instruct the students to count the number of squares covered by each alphabet in their name to find the area covered by the name on paper.
• Move around the class and guide the students.
• Ask the students to call out the area covered by their names.
• Show the name sheet of the students who calls out the greatest area.
• Count the squares shaded in the name to verify the area.
• Declare the student whose name covers the greatest area as the winner.
• Share with the students:
  » All shapes occupy space.
  » We can find how much area each shape covers by covering them with squares of side 1 unit each.
  » The number of squares covered by a shape is its area.
• Instruct the students to draw a square and rectangle on squared paper and find their area.
• Specify that their shape must cover complete squares.
• Ask them to show how they found the area to the remaining class.
• Instruct the remaining class to verify the method.
• Encourage the students to find the relationship between the length, breadth and area.
• Conclude:
  » area of rectangle = length × breadth
  » area is measured in squared units
• Point out that we can also find the area of rectangle and square by multiplying length and breadth instead of tracing it on squared paper and counting the squares.
• Call out length and breadth of rectangles and side length of squares and ask the students to tell the area.
• Ask the students to draw the shapes of given dimensions on squared paper and verify their answer.
• Continue as time permits.

Application

• Find the area of the following rectangles:
  » length 12 cm breadth 8 cm  » length 14 cm breadth 11 cm

• A rectangular wall of length 7 m and breadth 5 m and a square wall of side 6 m are to be painted.
  » What is the area of each wall that is to be painted?
  » In which wall will you have to paint a greater area?
Analysis

- Find the area of the shaded portion if it covers half of a rectangle. Use this to write the formula for area of a right triangle.

![Diagram of a right triangle with sides 4 cm and 6 cm]

- A rectangular paper of length 9 cm and breadth 8 cm is cut into 12 equal pieces. What is the area of each piece?
- Length of a room is 18 m. What should be its breadth so that its area is 324 m²? What do you notice about the shape of the room?

Thinking Skills

- The perimeter of a square is 92 cm. What is its area?
- What should be the length of one side of a square for its perimeter and area to be equal?

Real life Connect

- Find the area of different rectangular and square shaped objects around your house like a bed sheet, table cover etc.
- Draw all possible rectangles of perimeter 40 cm. Find the area of each rectangle. What do you notice about the rectangle with the greatest area.
Learning Objective
To find the area of composite shapes.

Material required
Coloured A4 sheet (1 sheet per pair)

Activity
- Draw the following on the board:

```
          20 m
          7 m
          5 m
        13 m
          7 m
          5 m
          13 m
```

- Share with the students that this is the picture of Mohan’s farm. Mohan wants to plant grass all over his farm.
- Ask:
  » What is the area to be covered?
  » How will we find it?
  » What do we know about area?
  » How can we use it to find the area of the farm?
- Remind the students:
  » Area of a figure is the space enclosed within its boundary.
  » Area of rectangle = length \times breadth
  » Area of square = side \times side
- Divide the class into pairs.
- Give a coloured sheet to each pair.
- Instruct the students to make the shape in centimetres instead of metres and find its area.
- Give them a hint that they can cut the shape and use the formulae of squares and rectangles to find the area.
- Move around the class and observe the students’ work.
- Pick some pairs and ask them to share how they found the area.
- Explain that we can find area of shapes that are not squares and rectangles by dividing them into squares and rectangles.
- Show on the board:
Method 1:
Area of farm = area of rectangle + area of square
area of rectangle = 13 m × 12 m = 156 sq. m
area of square = 7 m × 7 m = 49 sq. m
total area of farm = 156 m² + 49 m² = 205 sq. m

Method 2:
Area of farm = area of rectangle 1 + area of rectangle 2
Area of rectangle 1 = 20 m × 7 m = 140 sq. m
Area of rectangle 2 = 13 m × 5 m = 65 sq. m
Area of farm = 140 m² + 65 m² = 205 sq. m

- Show to the students that no matter in which way they divide the figure into squares and rectangles, they will get the same area.
- Draw different shapes of farms on the board and ask the students to draw it on the coloured sheet, cut it into squares and rectangles and find the area. For example,

- Continue as time permits.

Composite shapes can be divided into squares and rectangles to find their area.

- Find the area of the shape below:

- Given on the right is a map of Rishi’s house. Find its area.
Find the area of the shaded portion.

Rajendra had a rectangular plot of length 250 m and breadth 175 m. He cut out a square plot of side 25 m from it and sold it. What is the area of the plot left with him?

Find the area of the shape below if the area of the triangle is half of the area of rectangle completed by it.

- Cut out squares and rectangles of different sizes. Put together 2 or more of these shapes by placing them next to each other or one inside the other and find the area.
- Mark the area covered by furniture in your room using squares and rectangles. Find the total area covered and area of free space.
Lesson Plan - 4

Grade - 5

Learning Objective
To find the volume of 3-D shapes using unit cubes.

Material Required
An empty sugar cube box, Sugar cubes, unit cubes (must be of side length 1 cm), tape

Stress Words
Volume

Activity
- Show a rectangle to the students.
- Ask: What is the space occupied by this rectangle?
- Pick students to point out its area.
- Show the empty sugar cube box to the students.
- Ask:
  » Does this box occupy space too?
  » What is the space occupied by this box?
- Point out that this box is a 3-D shape so the space is occupied by it in not just length and breadth but height too.
- Pick students to point out the space occupied by the box.
- Share:
  » All solids occupy space.
  » The space occupied by an object is known as its volume.
  » Ask the students how they can find the space occupied by this box.
- Explain to them:
  » Just like we cover a 2-D shape with unit squares to find its area, we can fill the 3-D shape with unit cubes to find its volume.
  » A unit cube is a cube of side 1 cm/m/km each.
  » The number of unit cubes that fill the object completely is the volume of the cube.
  » We use cubic units to measure the volume of the cube.
- Fill the sugar cube box with sugar cubes one by one and ask the students to count them side by side.
  Share the number of cubes that it took to fill the box completely as the volume of the box. Form different shapes using sugar cubes one by one.

  
  | ![Image 1] |
  | ![Image 2] |
  | ![Image 3] |

  • You can wet the cubes slightly to enable them to stick to each other.
  • Ask the students how they can find the volume of these shapes.
  • Explain that just like with the box, they can count the number of cubes in the shape to find its volume.
Hold each shape high and count the sugar cubes in it with the students to find its volume.

Divide the class into groups of 4. Give 20 unit cubes to each group.

Instruct the students to combine some unit cubes using tape to form a shape and find its volume by counting the number of cubes used.

Ask them to make cubes and cuboids using unit cubes as some of the shapes.

Instruct the students to measure the length, breadth and height of cubes and cuboids made by them.

Encourage them to find the relationship between length, breadth, height of a cube and cuboid and their volume.

Conclude with them:

» Volume of cuboid = length × breadth × height

» Volume of cube = side × side × side

Share with the students that they can also use this formula to find volume of cubes and cuboids instead of filling the cubes and cuboids with unit cubes.

Call out different side dimensions of cubes and cuboids and ask the students to calculate their volume.

Instruct them to form cubes and cuboids of dimensions called out using unit cubes and verify the volume.

Continue as time permits.

Understanding expected

Volume of cuboid = length × breadth × height

Volume of cube = side × side × side

Application

Find the volume of the shape on the right.

True or False.

Volume of the cube below is 27 unit.

Find the volume of the shape by counting the unit cubes.

Shivani filled her pencil case with 12 dice of side 1 cm each. If there was no space left in the box, what is the volume of Shivani’s pencil box?
Real life Connect

- Observe the space taken by each garment in your cupboard. Which garment has the greatest volume?
- Take 6 dice. Form as many shapes as you can using the 6 dice. What is the volume of each shape?

Thinking Skills

Find the volume of the solid below if the volume of each small cube is 1 cu. unit.
Learning Objective

- To derive the formula for volume of cube and cuboid.
- To find the volume of cube and cuboid using their area.

Material Required

Sugar cubes

Whole class

Activity

- Make a cuboid as shown below using sugar cubes.

![Cuboid Diagram]

- Show the cuboid and ask:
  » What is the volume of this cuboid?
  » What is volume?
- Remind the students:
  » Volume is the space occupied by a 3-D object.
  » The number of unit cubes it takes to fill the object completely is its volume.
  » We measure volume in cubic units.
- Count the unit cubes in the cuboid with the students to find its volume.
- Ask the students if they can think of a faster way to find the volume of the cuboid.
- Ask the students to count the cubes on the top face. Share with students that the sides of each cube is 1 unit.
- Show the students and write on the board:
  » There are 4 cubes in each row.
  » There are 3 rows of cubes.
  » Number of cubes in top layer = 3 × 4 = 12
  » There are 2 such layers of rows and columns.
  » Thus total number of cubes = 2 × 3 × 4 = 2 × 12 = 24.
- Show 4 units as length, 3 units as breadth and 2 units as height of the cuboid made.
- Conclude with the students that volume of cuboid = length × breadth × height.
- Repeat the activity for a cube by making a cube of side 3 cubic units each using sugar cubes.
- Arrive at the formula volume of cube = side × side × side. (top layer has $3 \times 3 = 9$ cubes. There are 3 such layers. volume of cuboid = $3 \times 3 \times 3 = 3 \times 9 = 27$ unit)

- Call out different dimensions of a cube and cuboid and ask the students to calculate their area by using the formula.

- Verify their answer by putting together sugar cubes equal to the length, breadth and height of shape called out and counting them with the students using the concept of arrays as shown above.

- Continue as time permits.

All the sides of a cube are equal.

- Find the volume of the following cuboids:
  a. length 3 cm, breadth 2 cm and height 4 cm
  b. length 5 cm, breadth 4 cm, height 10 cm

- Find the volume of water needed to fill a cube shaped water pool of side 6 m each.

- A cuboid of volume 20 cm is 5 cm long and 3 cm wide. What is its height?
- The length, breadth and height of a cuboid shaped warehouse is 60 m, 40 m and 10 m respectively. How many cube shaped cartons of side 20m each can fit into the warehouse?

The area of the base of a rectangular fish tank is 80 cm. If the height of water in it is 20 cm, what is the volume of the water in the tank?

- Measure the sides of cuboid shaped objects around your house like a matchbox, a toothpaste box, pencil box etc. and find their volume.

- Find the dimensions of each room in your house. Find the volume of air in each room. Which room has most air?

Content Book Reference: Page 140-143
Guided Practice: Page 115-116
Lesson Plan - 1

Grade - 5

CHAPTER

MEASUREMENT

Learning Objective
- To understand the relationship between units of measurement.
- To convert the bigger unit of measurement to a smaller unit.

Material Required
Ruler, a metre scale, ribbon (1 m long)

Stress Words
Kilometre, hectometre, decametre, metre, decimetre, centimetre and millimetre, kilogram, hectogram, decagram, gram, decigram, centigram and milligram, kilolitre, hectolitre, dekalitre, litre, decilitre, centilitre and millilitre

Activity
- Divide the class into groups of 4.
- Give a 1m long ribbon and a small cm ruler to each group.
- Instruct the students to measure the length of the ribbon using the ruler.
- Instruct them:
  » Keep the 0 marking of the ruler against one end of the ribbon.
  » Stretch the ribbon.
  » Mark the point where the last marking of the ruler touches the ribbon.
  » Note how many cm long that part of the ribbon is.
  » Keep the 0 marking again at the point marked and repeat the steps.
  » Continue like this till you reach the other end of the ribbon.
  » Add all the lengths you measured using ruler to get the length of ribbon.
- Conclude with the students that the length of the ribbon is 100 cm or 1 m.
- Ask the students if it was easy to measure the length of the ribbon using such a small unit.
- Encourage them to suggest a faster method to measure such long objects.
- Conclude from the discussion that it would have been easier to measure the length of the ribbon in metres using the metre scale.
- Ask:
  » Name a unit bigger that a metre.
  » How long is it?
  » How will you measure 1 km length using a metre scale?
  » How many times will you have to keep the metre scale to measure the 1 km length?
- Discuss:
  » Kilometre is the unit that is bigger than a metre.
  » If we walk for 8-10 minutes, we will cover a distance of 1 km.
  » We will use a metre scale in the same way as we used the ruler to measure the length of the ribbon.
  » We will have to keep the metre scale 1000 times to measure 1 km length!
Encourage the students to suggest a faster and easier method to measure such long distances.

Share with them that we need a unit bigger than metre to measure kilometre lengths easily. This is why we have addition units of length between standard units like km and metre as well as metre and centimetre-to make measurement of such lengths easier.

Write on the board:
Kilo  Hecto  Deca  Standard unit  Deci  Centi  Milli

Explain:

Kilometre, hectometre, decametre, metre, decimetre, centimetre and millimetre are standard units of length. Metre is the standard unit.

- Kilometre is the longest unit. Millimetre is the shortest unit.
- All units from top to bottom are from longest to shortest.
- The distance between each 2 consecutive units = 10 units.

Thus, 1 km = 10 hm, 1 hm = 10 dam, 1 dam = 10 m, 1 m = 10 dm, 1 dm = 10 cm, 1 cm = 10 mm

1 can keep a 1 hectometre scale 10 times to measure 1 km length which is easier than keeping a 1 m scale 1000 times.

Instruct the students to observe the cm and mm markings on the ruler.

Remind them that the small markings between the cm markings are in mm.

Call out different cm markings on the ruler and ask the students to count mm till the cm marking and tell how many mm are there in that many cm.

Write their responses on the board:

- 1 cm = 10 mm
- 2 cm = 20 mm
- 5 cm = 50 mm

Encourage the students to see a pattern in the conversion from cm to mm.

Show them that 10 × length in cm = length in mm.

Draw a 2m long line using the metre scale on the board.

Pick students to measure the length of the line in cm using the cm ruler.

Show them that 2 m = 200 cm.

Thus, 100 × length in m = length in cm.

Show the students that for converting greater to smaller units, we are multiplying by 10 for every step we move towards the right.

Explain using examples:

- To convert from metre to cm, we moved 2 steps to the right so we multiplied the length in metres by 10 × 10 = 100.
- To convert from km to m, we have to move 3 steps to the right so we multiply the length in km by 10 × 10 × 10 = 1000.
- In the same way to convert from decametre to mm, we have to move 4 steps to the right so we will multiply length in dam by 10 × 10 × 10 × 10 = 10,000.
• Call out some lengths in different units and ask the students to convert them into smaller units.
• Explain to the students that units of weight and capacity are also similar to the units of the length and are converted in the same way.
• Write on the board:

\[
\begin{array}{ccccccc}
\times 10 & \times 10 & \times 10 & \times 10 & \times 10 & \times 10 \\
\text{Weight:} & \text{Kg} & \text{hg} & \text{dag} & \text{g} & \text{dg} & \text{cg} & \text{mg} \\
\text{Capacity:} & \text{KL} & \text{hL} & \text{daL} & \text{L} & \text{dl} & \text{cL} & \text{mL} \\
\end{array}
\]

• Meter: km hm dam m dm cm mm
• Explain:
  » kilogram, hectogram, decagram, gram, decigram, centigram and milligram are units of weight.
  » kilolitre, hectolitre, decalitre, litre, decilitre, centilitre and millilitre are the units of capacity.
  » Just like units of length, when we convert units of weight and capacity to smaller units, we multiply by 10 for every step that we move towards the right. For example, 7 kg = 7 \times 10 \times 10 \text{ dag} = 700 \text{ dag}. 3 \text{ hl} = 3 \times 10 \times 10 \times 10 = 3000 \text{ dl}.
• Call out different quantities of weight and capacity and ask the students to convert them into a smaller unit.
• Discuss how the students converted the quantities in detail.
• Continue as time permits.

When we convert units of measurement to smaller units, we multiply by 10 for every step that we move towards the right.

• Fill in the blanks.
  a. 15 m = ____ dm  b. 10 daL = ____ dL  c. 12 dg = _____ mg
• Convert 43hL to all units smaller than it.
• Convert.
  a. 8.5 L to daL  b. 12.53 hm to dm  c. 18.067 g to cg
• Convert.
  a. 7 kg 4 hg to hg  b. 15 L 3 dl to dl  c. 8l 20 ml to ml
• Manjeet multiplied 16 km by 10,000 to convert it into another unit. To which unit did he convert 16 km?
• Measure different objects around your house like bed, cupboard, table in metres and convert the length to dm, cm and mm.
• Find objects around your house that have capacity of 1hL, 1 daL, 1 dL and 1 cL. Find how many times you can fill the smaller unit container from the bigger unit container. Verify the count by converting.
• Have your vegetable seller measure weights of fruits and vegetables less than 1 kg in grams. Convert these weights into hg and dag.
### Grade - 5 Lesson Plan - 2

#### Learning Objective
To convert the smaller unit of measurement to a bigger unit.

#### Material Required
- cm and m rulers
- Km, hm, dam, m, dm, cm, mm, kg, hg, dag, cg, mg, kl, hl, dal, l, dl, cl, ml

### Activity
- Remind the students the different units of length, weight and capacity that they have studied.
- Write on the board:

<table>
<thead>
<tr>
<th>Length</th>
<th>km</th>
<th>hm</th>
<th>dam</th>
<th>m</th>
<th>dm</th>
<th>cm</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>kg</td>
<td>hg</td>
<td>dag</td>
<td>g</td>
<td>dg</td>
<td>cg</td>
<td>mg</td>
</tr>
<tr>
<td>Capacity</td>
<td>kl</td>
<td>hL</td>
<td>daL</td>
<td>L</td>
<td>dL</td>
<td>cL</td>
<td>mL</td>
</tr>
</tbody>
</table>

- Divide the class into pairs.
- Instruct one student in the pair to draw lines of 30 mm, 50 mm and 70 mm.
- Ask the other student in the pairs to measure the lengths of these lines in cm.
- Use their response to write on the board:
  - 30 mm = 3 cm
  - 50 mm = 5 cm
  - 70 mm = 7 cm
- Encourage the students to see a pattern in conversion of units.
- Show them that length in mm ÷ 10 = length in cm.
- Pick a student to draw a 300 cm long line on the board using a long ruler.
- Pick another student to measure the length of this line in m.
- Write on the board:
  - 300 cm = 3 m
- Show them that length in cm ÷ 100 = length in m.
- Encourage the students to see a pattern in conversion of units from small to big.
- Draw on the board:
  - Kilo Hecto Deca Standard unit Deci Centi Milli
  - ÷10 ÷10 ÷10 ÷10 ÷10 ÷10
- Explain:
  - We use division to convert the smaller unit to a bigger unit.
  - We divide the smaller unit by 10 for every step that we move towards the left.
  - The same rule applies to conversion of units of weight and capacity as well.
  - Thus cm 100 = m, dL 1000 = hL, g 1000 = kg etc.
We divide the smaller unit by 10 for every step that we move towards the left.

Understanding

Expected

Application

Fill in the blanks.

a. 7000 ml = ____ dl 
   b. 65 g = ____ hg

Convert 850 cm to all units greater than it.

Analysis

Convert as stated.

a. 5268 L to kL 
   b. 71830 mg to dag

Thinking Skills

Convert 0.25 mg to cg.

Real Life Connect

Convert 750 hm 250 m to km and write the length in decimals.

Real Life Connect

Fill in the blanks using the correct comparison symbol.

0.065 dg _____ 0.0065 dag.

Measure the length of small objects around your house like a pencil, spoon etc, and convert their lengths to greater units.

Measure the height of your family members in metres. Convert the height into kilometres. Who is the tallest and by how much?

Content Book Reference: Page 147-152
Guided Practice: Page 117, 118
Lesson Plan - 3

Activity

- Divide the class into groups of 4.
- Give 2 ribbons and a meter scale to each group.
- Instruct the groups to measure the length of each ribbons in m and cm
- Tell the students to join the ribbons and measure the total length.
- Write the answer on the board using the addition sentence.
- Ask the students how they could have found the total length using simple addition instead of measuring both ribbons together.
- Pick some students to add the lengths on the board.
- Show the correct method on the board:

<table>
<thead>
<tr>
<th>m</th>
<th>cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>1</td>
<td>85</td>
</tr>
<tr>
<td>+</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

- Point out how 100 cm is regrouped as 1 m and carried over.
- Instruct students to cut a small part of length from their ribbons, measure the length of the 2 long ribbons and add their lengths to find the total length
- Have them find the total length against the ruler and verify the answer.
- Ask the students how they can find the length of ribbon from the original length without measuring.
- Share with them that just like they can add lengths using vertical addition, they can subtract them using vertical subtraction too.
- Share with them that they can regroup 1 m as 100 cm if there are not enough meters at the top to take away from.
- Allow the students to try to subtract lengths on their own.
- Tell them to measure the length of the ribbon cut to verify their answer.
- Pick some students to show how they subtracted the lengths on the board.
- Instruct the other students to verify.
- Show a sample subtraction on the board:

<table>
<thead>
<tr>
<th>m</th>
<th>cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>−</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>95</td>
</tr>
</tbody>
</table>
• Share with the students:
  » We can add and subtract the units m and km in the same way. Every 1000 m are converted to 1 km and carried over for addition. If there are not enough metres to take away from, we regroup 1 km as 1000 m and then subtract.
  » We can also add and subtract units by first converting them into the bigger unit in decimal form and then add and subtract as we add and subtract decimal numbers. For example, 10 km 500 m = 10.5 km, 4 km 75 m = 4.75 km

<table>
<thead>
<tr>
<th>km</th>
<th>m</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>500</td>
</tr>
<tr>
<td>+</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>50</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>=</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>250</td>
</tr>
</tbody>
</table>

• Units of weight and capacity are added and subtracted in the same way as units of length.

• Call out different problems on length, weight and capacity and ask the students to solve them by converting them to decimals as well as by separating the units.
  » There was 1L 250 ml milk in the fridge. Rohan’s family consumed 1L 5 ml of it in breakfast. How much milk is left?
  » Meera bought 1 kg 250 g oranges and 975 g watermelon. What is the total weight of fruit that she bought?

• Pick students to add and subtract on the board after the students finish.
• Instruct the remaining students to verify.
• Show the students that whichever method they use, the answer will be the same.
• Continue as time permits.

To add and subtract units of measurement, we separate the units, add/ subtract and regroup using the conversion rules or convert the units to the bigger unit as decimals and then add and subtract as decimal numbers.

• Find the sum of:
  a. 13 L 45 dl and 12 L 72 dl
  b. 67 hg 5 dag and 12 hg 9 dag
• Find the difference of:
  a. 87 kg 76 dag and 80 kg 70 dag
  b. 90 g 6 dg and 29 g 7 dg
• Add 6 m 85 cm and 4 m 160 mm.
• Subtract 5 km 50 m 5 cm from 80 km.
Thinking Skills

- How many 750 g packets of flour can be packed from 3kg flour? Use repeated addition or subtraction to find your answer.
- Shitij filled a 1L 874 ml jug and a 645 ml mug from a drum. If there is 1L 327 ml water left in the dispenser, how much water was in the dispenser to begin with?

Real Life Connect

- Find the capacity of different containers around your house in L and ml using a measuring cup. Find the total capacities and how much more one container can hold as compared to the other.
- Measure how much water you drink in a day. Then, find your weekly intake of water.
- Measure your father’s weight in kg and g on a weighing scale. Ask him to carry you and stand on the weighing scale. Note the weight now. Find your weight using these two weights.
Learning Objective
To multiply and divide units of measurement.

Material Required
Measuring cup, water

Stress Words
Litre, millilitre

Activity
- Divide the class into groups of 4.
- Give a measuring cup to each group.
- Instruct each group to fill it with 1L 750 ml water.
- Ask the students how much water is there in 7 such cups.
- Encourage the students to share the method to find the quantity of water in 7 cups.
- Ask 7 groups to keep their measuring cups on your table.
- Have students pour water from one \( \frac{3}{4} \) full cup to other \( \frac{3}{4} \) full cup, completing the quantity to 1 litre, to arrive at the quantity of water in 7 measuring cups.
- Ask the students to add 1L 750 ml 7 times to verify the answer.
- Encourage them to share a simpler method to find the answer and tell how they can multiply units of capacity.
- Pick some students to solve on the board using the method they suggest.
- Instruct the other students to verify or correct.
- Show the correct method on the board:

\[
\begin{array}{|c|c|}
\hline
L & ml \\
\hline
5 & 3 \\
1.750 & \times 7 \\
12.250 & \\
\hline
\end{array}
\]

Point out 1000 ml is regrouped to 1L.
- Share with the students that just like addition and subtraction, units of weight can also be converted to the higher unit as decimal numbers and then multiplied like decimal numbers.
- Demonstrate:
- 1L 750 ml = 1.75L

\[
\begin{array}{|c|c|}
\hline
L & ml \\
\hline
5 & 3 \\
1.750 & \times 7 \\
12.250 & \\
\hline
\end{array}
\]

- Ask further: If 1L 500 ml water is used to fill 2 measuring cups equally, how much water will be there in each measuring cup?
- Instruct the students to convert the measurement into decimals and divide the decimal numbers and answer.
To multiply and divide units of capacity, convert them into bigger unit as decimal number and multiply and divide as regular decimal numbers.

**Understanding**

Shalini has a 2 m 30 cm ribbon. She had to cut 5 mm long pieces of ribbons from it but by mistake she cut 4.6 mm long pieces. Will she have more or less number of pieces? How many more/less?

**Expected**

Real Life Connect

Find out the weight of 1 laddoo. Calculate how many laddoos are needed to fill a 1 kg box.

Find the distance from your house to school. Calculate the distance you travel in 5 days from your house to school.

Find the capacity of the glass that you use to drink water. Count the number of glasses of water that you drink in a day. Calculate how much water you drink in the entire day.

To multiply and divide units of capacity, convert them into bigger unit as decimal number and multiply and divide as regular decimal numbers.

**Application**

Convert to decimals and multiply.

a. 13 daL 5L by 2 

b. 45 m 75 cm by 5 

c. 27 kg 300 g by 3

Divide.

a. 35 hm 5 dam by 5 

b. 25L 2dL y 3 

b. 43kg2 g by 9

**Analysis**

Rajneesh divided 10g 50 mg by a number and got the quotient 2.01 g. What is the divisor?

How many 200 ml cups of water can be filled from a 2.5L jug?

**Thinking Skills**

Shalini has a 2 m 30 cm ribbon. She had to cut 5 mm long pieces of ribbons from it but by mistake she cut 4.6 mm long pieces. Will she have more or less number of pieces? How many more/less?

**Real Life Connect**

Find out the weight of 1 laddoo. Calculate how many laddoos are needed to fill a 1 kg box.

Find the distance from your house to school. Calculate the distance you travel in 5 days from your house to school.

Find the capacity of the glass that you use to drink water. Count the number of glasses of water that you drink in a day. Calculate how much water you drink in the entire day.

Content Book Reference: Page 153-155

Guided Practice: Page 120
Lesson Plan - 5

Learning Objective
To solve word problems on measurement by making models.

Material Required
Paper slips

Stress Words
Km, m

Activity

- Write on the board:
  - Mona walks 1 km 150 m to school everyday. On the way back, she takes a short cut and walks 1 km 20 m. How much distance does she walk in all?
- Encourage the students to share how they will solve this problem.
- Show the model on the board

```
1 Km 150 m 1 Km 20 m
```

- Show the students that they need to add to find the total distance.
- Instruct the students to add and share the answer.
- Encourage the students to share examples of situations where they need to perform operations on units of length, weight and capacity.
- Also ask them to share the operation that they will use to solve the situation shared.
- Divide the class into groups of 4.
- Give a paper slip to each group.
- Instruct the group to discuss and write a word problem on length, weight or capacity.
- Collect all the slips.
- Distribute the slips among the groups at random.
- Instruct the groups to discuss and solve the problem on the slip they got.
- Encourage them to make a model to determine how they will solve the problem.
- Instruct the students to solve word problem by using 4-steps i.e. understanding, planning, doing, checking.
- Shuffle the slips and redistribute after the students finish.
- Pick groups one by one to share the problem they got and how they solved it.
- Instruct the remaining students to verify the method.
- Repeat the activity as time permits.

Understanding

Expected

We can make a model to determine the operation that should be used to solve a word problem.
Thinking Skills

- Mahesh walks a distance of 16 km 100 m in a week. How much distance does he walk in 2 days?
- Capacity of a bottle is 2L 240 ml. Rajan poured \(\frac{3}{4}\) of the water into 2 jugs. How much less water will the jugs have as compared to the full bottle of water being poured into 2 jugs?
- Identify situations around you where you need to add, subtract, multiply or divide the measurements. Frame a word problem using the situation and solve it.
- Maps that are made on paper have a scale at the bottom which shows the comparison between the actual distance and the distance on the map. For example, 1cm on map = 1 km on ground. Get a map with a scale mentioned on it. Measure the distance of one place to the other on the map using a ruler. Multiply it using the relation between actual distance and distance on the map to find actual distance on the ground.

Analysis

- The bigger container can hold 1L 276 ml more water than the smaller container. If the capacity of the smaller container is 2L 736 ml, what is the total capacity of both containers?
- Siya bought onions and tomatoes. The quantity of tomatoes she bought is half the weight of the onions. If she bought 2 kg 768 g tomatoes, what is the weight of onions?

Application

- A recipe requires 1 kg 675 g of flour for making 5 portions of a dish. How much flour is needed to make 1 portion of a dish?
- 5 buckets of capacity 15 L 750 ml are filled completely with water. How much water is there in all?

Content Book Reference: Page 155-156
Guided Practice: Page 121-123
Lesson Plan - 1

Grade - 5

Chapter 11: Time and Money

Learning Objective
To read time on an analogue and digital clock in hours, minutes and seconds.

Material Required
- An analogue clock with minute and number markings on it without the seconds hand
- An analogue clock with minute and number markings on it with the seconds hand
- A digital clock that shows time in hours and minutes
- A digital clock that shows time in hours, minutes and seconds

Activity
- Show the analogue clock without the seconds hand to the students.
- Ask the students if they know how to read time on this clock.
- Ask:
  » Which hand tells the time in hours?
  » Which hand tells the time in minutes?
- Set different times on the clock and ask the students to tell the time.
- Show the same time on the on the digital clock (without seconds) and ask if the digital clock shows the same time.
- Encourage the students to tell how they decided the time on both clocks.
- Remind them:
  » The number that the hour hand is pointing to tells the time in hours.
  » If the hour hand is pointing between 2 numbers, then the smaller number is the time in hours.
  » If the minute hand is pointing to a number, multiply the number by 5 to tell the time in minutes.
  » If the minute hand is pointing between 2 numbers, multiply the smaller number by 5 and count forward the minute markings by 1 till the marking the minute hand is pointing to.
  » In a digital clock, the number before the dot(s) tells the time in hours and the numbers after the dot(s) tell the time in minutes.
- Show the analogue clock with the seconds hand and ask the students what is different in this clock and the other analogue clock.
- Show to the students that this clock has a third hand which tells the time in seconds.
- Explain that seconds are the smallest unit of time. It takes one second to do activities like clapping hands, blinking eyes etc.
- Encourage students to suggest more activities that can be done in 1 second.
• Explain to the students that we read time in seconds in the same way as we read time in minutes.
  » If the minute hand is pointing to a number, multiply the number by 5 to tell the time in minutes.
  » If the minute hand is pointing between 2 numbers, multiply the smaller number by 5 and count forward the minute markings till the marking the minute hand is pointing to.
• Set different times on this clock and encourage the students to tell the time in hours, minutes and seconds.
• Pick students to set the same time on digital clock with seconds.
• Point out that there is a dot after the minutes followed by a number. This number tells the time in seconds.
• Set some time on the digital clock (with seconds) and pick students to set the time on the analogue clock.
• Instruct the other students to verify.
• Alternate between reading time on analogue clock and setting time on it by showing the time on the digital clock.
• Continue as time permits.

The time in seconds is read in the same way as we read the time in minutes.

• Read the time shown by the clocks below.

  »  

• Mark the hands on the analogue clock to show the time shown by this digital clock.

• What time will be shown by the clock below after 5 minutes?

• A clock shows the time 1:54:23. Write the location of each hand of the clock.
Thinking Skills

On an analogue clock, the hour hand is pointing between 3 and 4, the minute hand is pointing to the 3rd marking after 6 and the seconds hand is pointing to the 1st marking after 5. What is the time in hours, minutes and seconds?

Real Life Connect

- Look at the time on the clock when you wake up in the morning, go to school, come back from school, sleep at night etc. Do you do these activities at the same time everyday?
- Take a note of the time when someone says they will come to meet you. Read the time on the clock when they actually arrive. Check if they come on time.
Learning Objective

- To understand the relationship between different units of time.
- To convert units of time from one unit to other

Material Required

A digital clock showing time in hours, minutes and seconds, A calendar

Activity

- Ask the students the different units of time that they know of.
- Write the units of time on the board: seconds, minutes, hours, days, weeks, months and years.
- Share with the students that all these units of length are inter-related and can be expressed in other units.
- Explain using example that when they go to see the movies, the duration of the movie on the ticket is always written in minutes and we need to convert it into hours and minutes to see how long the movie actually is. For that, they need to know the relationship between the units of time.
- Divide the class into groups of 4.
- Give a digital clock to each group.
- Instruct the students to set the hours, minutes and seconds at 0.
- Ask the students to click on the time setter for seconds.
- Tell them to count the seconds starting from 0 and continue till the time is 1 minute or 0 seconds again.
- Conclude with them that 1 minute has 60 seconds.
- Write the same on the board.
- Instruct the students to set the minutes to 0.
- Tell them to click on the minute setter and count the minutes till the time on the clock shows 1 hour or 0 minutes again.
- Conclude with them that 1 hour has 60 minutes.
- Write the same on the board.
- Ask the students to set the hours at 0 and count the hours.
- Remind them to count from 12 to 12 twice for the hours post noon if the clock that they have is a 12-hour clock.
- Conclude with them that there are 24 hours in a day.
- Write the same on the board.
- Give a calendar to each group.
- Ask the students to count and tell:
  » Number of days in a week
  » Number of days in a year
  » Number of months in a year
• Conclude with them and write on the board:
  » 1 week = 7 days
  » 1 year = 365 days
  » 1 year = 12 months
• Remind the students about conversion of units of length, weight and capacity.
• Remind them that to convert from a big unit to small unit we multiply and to convert from a small to a big unit we divide.
• Share with them that the same rule is used for units of time and the number we multiply or divide by depends on the relationship between units of time.
• Write the times like 3 years, 48 hours etc. and ask the students to convert them into days.
• Pick students to show on the board how they converted.
  3 years = 3 × 365 = 1095, 48 hours = 48 ÷ 24 = 2 days
• Instruct the other students to verify.
• Write more units of time in hours, minutes, seconds, days, months, years etc. and ask the students to convert them into other units.
• Pick some students to solve on board and instruct the other students to verify.
• Continue as time permits.

**Understanding**

**Expected**

To convert from a big unit to a small unit we multiply and to convert from a small unit to a big unit we divide using the relationship between units of length.

• Convert the following into days.
  » 6 weeks  » 72 hours  » 2 years
• A movie is 165 minutes long. How long is it in hours and minutes?
• Convert 3 years 45 days into months and days.
• Babies over 18 months of age are to be given a particular vaccination. Rama is 1 year 4 months old. Can she be given the vaccination?

**Application**

The day today is Monday. What day will it be 26 days later?

• Find how long your summer vacation is in months and days. Convert its duration in days.
• Find how many seconds are there in an hour, day, week, month and year.
Learning Objective
- To multiply and divide units of money.
- To solve problems on unitary method.

Activity
- Narrate: The cost of a pack of 6 juices is 91 rupees and 50 paise. A shopkeeper wants to open the box and sell 4 of the juices. How much should he charge for 4 juices?
- Encourage the students to share how they can solve this problem.
- Draw a model on the board:

```
<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>91 rupees 50 paise</td>
</tr>
<tr>
<td>?</td>
</tr>
<tr>
<td>?</td>
</tr>
</tbody>
</table>
```

- Explain to the students that the shopkeeper can find the price of each juice pack and then multiply it by 4 to find the cost of 4 packs.
- Ask the students
  » How will you find the price of each juice?
  » How will you divide rupees and paise?
- Conclude with them:
  » Price of 6 juices ÷ 6 = price of each juice
  » We can divide rupees and paise by converting the amount into rupees as decimals and then divide the resulting decimal number as we divide decimals.
- Demonstrate on the board:

```
<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>91.50</td>
</tr>
<tr>
<td>/</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>15.25</td>
</tr>
</tbody>
</table>
```

- Conclude with them that the cost of each juice is 15 rupees and 25 paise.
- Ask the students how they will find the price of 4 juices.
- Explain that the students can write the amount in rupees and paise in rupees as decimal number and multiply the resulting decimal number as we multiply decimals.
• Show on the board:
15 rupees and 25 paise = rupees 15.25

\[
\begin{array}{ccc}
2 & 1 & 1 \\
1 & 5 & . & 2 & 5 \\
\times & 4 & \hline \\
6 & 1 & . & 0 & 0
\end{array}
\]

Thus the price of 4 juices is 61 rupees.

• Share with the students:
  » This method of finding the value of some when we are given the value of many is known as unitary method.
  » To find the value of some, first we find the value of each item using division and then find the value of as many items as needed using multiplication.

• Divide the class into groups of 4.
• Share with the students that you will write the total price for a set of items on the board. Each group has to find the price of number of items allotted to them.
• Write 7 items for 22 rupees 50 paise on the board.
• Assign a number from 2 1 to 6 to each group.
• Instruct the groups to find the price of number of items allotted to them.
• Draw the following table on the board:

<table>
<thead>
<tr>
<th>No. of items</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22.50</td>
</tr>
</tbody>
</table>

• Pick a student from each group to fill the table for the number of items allotted to them.
• Encourage the students to check if the table makes sense and look for mistakes.
• Correct them, where needed.
• Repeat the activity by writing different prices for different number of items on the board.
• Continue as time permits.

Understanding
Expected

To find the cost of some when cost of many is given, first find the cost of 1 using division then find the cost of some using multiplication.

• A bag of 5 kg flour costs 227 rupees and 50 paise. What is the cost of 3 kg flour?
• A box of 10 chocolates costs 56 rupees and 50 paise. How much does Krisha need to pay for 7 chocolates?
Analysis

- Manika walks 15 km in 5 days. How much distance does she walk in 7 days?
- A box of 12 pens costs 80 rupees and 40 paise. If Ishita paid 33 rupees and 50 paise for some of these pens, how many pens did she buy?

Thinking Skills

The cost of oranges is 54 rupees a dozen and the cost of bananas is 45 rupees a dozen. At what quantity will both cost the same?

Real life Connect

- Go to a supermarket and look at prices of items that come in multipacks of 2, 3, 6 or 3 kg, 5 kg, 10 kg etc. Find which multipack is a better deal.
- Find the cost of a 100 page notebook. Use this to calculate how much a 75 page notebook should cost. Find the actual cost of the 75 page notebook. Does it cost what you think it would?
Lesson Plan - 1

Grade - 5

CHAPTER

SPEED AND TEMPERATURE

Lesson Plan - 1

106

Learning Objective
To calculate speed, distance or time, given the other two parameters.

Material Required
Stopwatch, measuring tape

Stress Words
Distance, speed, time

Activity

• Ask the students if they have ever noticed the odometer in their car.
• Encourage them to share what it shows.
• Point out that it shows:
  » The speed at which the car is travelling
  » Some also show the distance travelled by the car.
• Ask:
  » If the speed of the car is more, will it take more or less time to cover the distance?
  » If the speed of the car is less, will it take more or less time to cover the distance?
• Conclude:
  » If the car travels fast, it will cover distance quickly and take less time.
  » If the car is slow, it will cover the distance slowly and take more time.
  » Speed, distance and time are related to each other.
• Share with the students: A car travels at the speed of 54 km/hr for 3 hours. How much distance will it cover?
• Encourage the students to share what they understand and how they will find the answer.
• Show the students that if the car is traveling at 54 km each hour, in 3 hours it will travel 54 + 54 + 54 = 3 × 54 = 162 km.
• Encourage the students to identify the relationship between speed, distance and time from the problem.
• Show them: distance = speed × time.
• Share another problem: If a car travels a distance of 62 km in 2 hours, at what speed was it traveling?
• Encourage the students to share what they understand and how they will find the answer.
• Show them
  » If a car travels 62 km in 2 hours, then in 1 hour, it will travel 62 ÷ 2 = 31 km.
  » If the car travels 31 km in one hour, its speed is 31 km/hr.
Understanding

The table below shows the time taken by 3 students to run various distances. Who was the fastest?

<table>
<thead>
<tr>
<th>Name</th>
<th>Distance</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kabir</td>
<td>600 m</td>
<td>120 seconds</td>
</tr>
<tr>
<td>Shaurya</td>
<td>900 m</td>
<td>300 seconds</td>
</tr>
<tr>
<td>Amaya</td>
<td>1000 m</td>
<td>100 seconds</td>
</tr>
</tbody>
</table>

(Ans: Amays)

Ranjeet is travelling to a place 150 km from his house. He has only 3 hours to reach his destination. What should be his minimum speed? (50 km/hr)

Application

- Take the students to a playground.
- Mark a start and end point at a 50 m distance from each other.
- Pick a student to volunteer.
- Ask the student to run from the start to finish point as fast as he can.
- Time the student in seconds.
- Ask the students to calculate his speed.
- Show them that since the distance is in meters and the speed in seconds, the unit they will use for speed is metre/second.
- Continue the game by asking different students to volunteer.
- Ask the students how much distance the student will cover if he runs for 30 seconds at the same speed.
- Ask the students how much time a student will take to run a distance of 500 m at the same speed.
- Ask similar questions for different runners.
- Continue the game as time permits.

Analysis

- Tick the correct relation.
  a) Speed = distance × time
  b) Time = distance × speed
  c) Distance = speed × time
  d) Distance = speed ÷ time  (Ans: C)
- Complete the table.

<table>
<thead>
<tr>
<th>Distance</th>
<th>Speed</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 km/hr</td>
<td></td>
<td>4 hrs</td>
</tr>
<tr>
<td>360 km</td>
<td>45 km/hr</td>
<td></td>
</tr>
<tr>
<td>720 km</td>
<td></td>
<td>12 hours</td>
</tr>
</tbody>
</table>

(Ans: 80 km, 8 hours, 60 km/hr)

- The table below shows the time taken by 3 students to run various distances. Who was the fastest?

<table>
<thead>
<tr>
<th>Name</th>
<th>Distance</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kabir</td>
<td>600 m</td>
<td>120 seconds</td>
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<tr>
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<td>900 m</td>
<td>300 seconds</td>
</tr>
<tr>
<td>Amaya</td>
<td>1000 m</td>
<td>100 seconds</td>
</tr>
</tbody>
</table>

(Ans: Amays)

- Ranjeet is travelling to a place 150 km from his house. He has only 3 hours to reach his destination. What should be his minimum speed? (50 km/hr)
Thinking Skills

- Find out the distance to the place you are going. Note the speed of the car and calculate how long it will take you to reach your destination.
- Find out the world record for 100 m, 200 m and 400 m race. Calculate the record speed for the fastest runners.

Real Life Connect

Mahesh travelled towards his destination for 1 hour 30 minutes at the speed of 60 km/hour. He then took a U-turn and travelled 15 minutes at the speed of 40 km/hour. How far is he from his starting point? (80 km)
Learning Objective
To read the temperature on a thermometer

Material Required
Clinical thermometers with both Celsius and Fahrenheit markings

Activity
- Ask the students if they have ever had a fever.
- Ask:
  » How do you know if you have a fever?
  » What does the doctor do to see how much fever you have?
  » How do you measure temperature?
- Divide the class into groups of 4.
- Give a thermometer to each group.
- Share with the students that a thermometer is used to measure temperature.
- Instruct the students to observe the thermometer and share their observations.
- Discuss:
  » A thermometer has markings on 2 sides.
  » On one side the markings are in smaller numbers with the unit °C.
  » On the other side the markings are in bigger numbers with the unit °F.
  » °C stands for degree Celsius.
  » °F stands for degree Fahrenheit.
  » To measure the temperature, we put the temperature in mouth for a minute (under the tongue)
  » Then read the marking against the silver line shown by the mercury.
  » Instruct the students to take and read the temperature of any one student in their group in both Celsius and Fahrenheit.
  » Move around the class and guide them, if needed.
  » Pick students to share their body temperatures in Celsius and Fahrenheit.
  » Note them on the board.
  » Write on the board: \( \times \frac{9}{5}, \times \frac{5}{9}, + 32, - 32 \)
  » Encourage the students to find the relation between both sets of temperatures using the operations and numbers written on the board.
  » Show them that Celsius has small numbers so we will need to multiply it with a big number and use addition to reach a bigger number.
  » Thus, \( F = \frac{9}{5}C + 32 \)
• Encourage the students to work backwards to arrive at the formula to convert Fahrenheit to Celsius.

• Show:
  » Since we are adding 32 last, first, we will subtract 32 from Fahrenheit.
  » The opposite of $\frac{9}{5}$ is $\frac{5}{9}$.
  » Thus, $C = (F - 32) \times \frac{5}{9}$.

• Instruct the students to go and wash the thermometers.
• Ask them to take the temperature of another student in the group in Celsius.
• Instruct the students to convert it to Fahrenheit using the formula.
• Have them verify the conversion from the thermometer.
• In the next round, have the students take temperature in Fahrenheit and then convert to Celsius.
• Make sure the thermometer is washed at the end of each round.
• Continue as time permits.

$$F = \frac{9}{5}C + 32, \quad C = (F - 32) \times \frac{5}{9}$$

• Convert the temperature given on the thermometer to Fahrenheit. (Ans: 77 °F)
• Manya is baking a cake. The recipe asks her to bake the cake at 392 °F but her oven shows temperature in °C. At what temperature should she set the oven? (Ans: 200 °C)

• Read the temperature on the given thermometers.

• Complete the table.

<table>
<thead>
<tr>
<th>Celsius</th>
<th>Fahrenheit</th>
</tr>
</thead>
<tbody>
<tr>
<td>30°C</td>
<td></td>
</tr>
<tr>
<td>70°C</td>
<td>104°F</td>
</tr>
<tr>
<td></td>
<td>212°F</td>
</tr>
</tbody>
</table>

(Ans: 80°F, 40°C, 158°F, 100°C)
Thinking Skills

The temperature in Shimla is 5°C. The temperature in Manali is 0.8°F less than the temperature in Shimla. What is the temperature in Manali in °C? (4°C)

Real Life Connect

- Find the maximum and minimum temperature in Delhi and Washington DC. Convert them into the same unit to see which country is hotter/colder.
- Measure the temperature of hot and warm drinks in your house and convert them to different units.
# Lesson Plan - 1

## Grade - 5

### SYMMETRY, PATTERNS AND NETS

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>Material Required</th>
<th>Stress Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Identify shapes that are symmetrical. &lt;br&gt; - Identify and draw the reflection of a shape. &lt;br&gt; - Identify and draw what the shapes look like after rotation.</td>
<td>Mirror, scalene triangle cut out, clock with seconds hand</td>
<td>Reflection, rotation, clockwise, anti-clockwise</td>
</tr>
</tbody>
</table>

### Activity

- Ask the students if they remember what symmetry is.
- Remind them that when a shape or a figure is divided into two parts of same shape and size, it is symmetrical.
- Draw examples on the board as given on the right.
- Take the students out for a walk to a park or a playground.
- Instruct them to pick up one object that is symmetrical and one that is asymmetrical.
- Show them examples of leaves, flowers from around you that are symmetrical.
- Remind them that they cannot pluck flowers or leaves and can only pick up the ones that are fallen on the ground.
- Bring the students back to the class.
- Pick students to show the symmetrical object picked by them.
- Instruct the other students to verify if the object is symmetrical.
- Encourage them to fold and check for the various lines of symmetry.
- Display a mirror in the class.
- Hold a scalene triangle cut out next to the mirror.
- Ask the students to observe the reflection and share their observations.
- Conclude with them:
  - The distance of the reflection from the mirror is same as the distance of the object from the mirror.
  - The reflection is of the same size as the object.
  - The directions left and right become opposite in the reflection.
  - In a symmetrical figure, one half is a reflection of the other.
- Show some asymmetrical objects that were picked by the students to the class.
- Pick students to draw their reflection on the board.
- Ask the other students to verify.
- Hold the mirror next to the object to check the answer.
- Display the clock in class.
- Ask the students to observe the direction in which the hands of the clock move.
- Explain:
  - The direction in which the hands of the clock move is called the clockwise direction.
  - The opposite direction is called anti-clockwise direction.
- Instruct the students to trace a circle in the air if clockwise and then anti-clockwise direction.
- Demonstrate quarter, half, three-quarters and full clockwise and anti-clockwise turns using the triangle:
  
  ![Diagram of clockwise turns]

  - Pick students to come to the front with an object they had picked from the park/playground.
  - Instruct the student to rotate the object - one quarter / half/ three-quarters/full turn clockwise or anti-clockwise.
  - Instruct the other students to verify.
  - Continue as time permits.

- When a shape or a figure is divided into two parts of same shape and size, it is symmetrical.
- The distance of the reflection from the mirror is same as the distance of the object from the mirror, same size as the object and has opposite left and right direction.
- In a symmetrical figure, one half is a reflection of the other.

  ![Diagram of anti-clockwise turns]
**Application**

- Write the alphabets that are symmetrical.  
- Draw the reflection of the numbers 2, 5 and 9. (Ans: $\exists \in \emptyset$)
- Draw three-quarters anticlockwise turn of the following:  
  $\varphi \varphi \varphi$  
  (Ans: $\varnothing \varnothing \varnothing$)

**Analysis**

- Draw the reflection of the following:

  ![Reflection Example](image)

  Ans:

- Draw how the above grid would look like at quarter clockwise and quarter anti-clockwise turns. (Ans: $\text{Grid A} \text{ Grid B} \text{ Grid C}$)

**Real Life Connect**

- Find objects around your house that look the same at half, quarter, three-quarters clockwise or anti-clockwise turns.
- Observe the faces of various animals.

**Thinking Skills**

Rajiv and Mishika started from the same point at a circular block. Rajiv walked a quarter block clockwise, then half a block anticlockwise and then again three-quarters block clockwise. Mishika walked half a block anticlockwise, then three-quarters block clockwise and then three-quarters clockwise. Which one of them is farther from their starting point? (Ans: Rajiv)
## Lesson Plan - 2

### Learning Objective
Identify the rule behind the given patterns made of shapes, alphabets of numbers and extend them.

### Material Required
Tangram puzzles, A4 sheet

### Activity
- Divide the class into groups of 4.
- Give a tangram and an A4 sheet to each group.
- Pick some big triangles from tangrams of some groups.
- Show the pattern as under.

![Pattern](image)

- Ask: What pattern do you see in the triangles?
- Give them the hint of rotation if they are unable to answer.
- Show them that the shapes show a pattern of quarter clockwise rotation.
- Explain that some shapes form a rotating pattern.
- Instruct the students to keep the big triangle from the tangram on the table.
- Ask the students to pick out a shape from the tangram that can be kept adjoining the triangle without leaving any gap.
- Explain: When shapes form a pattern where they fit each other without any gaps or overlaps, it is a tessellating pattern.
- Demonstrate using the two big triangles from some tangrams:

![Demonstration](image)

- Instruct each group to draw a pattern using rotation or tessellation using shapes from the tangram.
- Allow them to use any one shape or a combination of 2 shapes.
- Pick some groups to come to the front.
- Ask them to show their pattern to the class.
- Instruct the class to:
  - Identify the pattern.
  - Tell which shape will come next in the pattern.
- Ask the group to verify.
- Continue as time permits.
- Share with the students that patterns can also be formed using numbers.
- Write the following on the board.
  - 1, 3, 5, 7, 9
  - 1, 2, 3, 5, 8, 13, 21
Encourage the students to identify the pattern in each set of numbers and tell the next number in the pattern.

Show the students:

- The first pattern lists odd numbers/skip counting by 2. So the next number in the pattern will be 11.
- In the second pattern, each number is the sum of the two numbers preceding it. So the next number will be $13 + 21 = 34$.
- Instruct the groups to write a pattern using numbers by forming a rule of their choice.
- Encourage them to be creative and create difficult patterns that no one in the class can identify.
- Pick the groups to write their pattern on the board.
- Instruct the students to identify the pattern and tell the next number.
- Ask the group to verify.
- Applaud the groups that have unique patterns.
- Continue as time permits.

Patterns can be formed using rotation, tessellation and different rules with numbers.

- Circle the shapes that can form a tessellating pattern.
  
  a) 
  
  b) 
  
  (Ans: square and rectangle  b. first two shapes)

- Which pattern will come next?
  
  a) 
  
  b) 
  
  (Ans:  b. )
• Identify the next number in the pattern.
  a) 2, 3, 6, 18, ___
  b) 50, 43, 36, 29, ___
  (Ans: 6 × 18 = 108  b) 22)

[Diagrams of triangles]

• Identify the pattern and fill in the boxes.

<table>
<thead>
<tr>
<th>3</th>
<th>1</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

  (Ans: A = 64, B = 256)

• Make a tangram of your own using 7 tessellating shapes. Use this tangram to make different figures.
• Note how the needles are pointing at 12:15. Find what time it will be at quarter clockwise rotations. Do this for different times of the day.
Activity

- Share with the students: Imagine that you have to share a secret message with your best friend and don’t want anyone else to see it. What are the ways in which you can send it as a code?
- Encourage the students to come up with different ways.
- Share with the students that one of the ways to code a message is to number all the alphabets and replace each alphabet with its number.
- Make the following table on the board:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>L</td>
<td>M</td>
<td>N</td>
<td>O</td>
<td>P</td>
<td>Q</td>
<td>R</td>
<td>S</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>V</td>
<td>W</td>
<td>X</td>
<td>Y</td>
<td>Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Show the students how FRIEND can be written as 6, 18, 9, 5, 14, 4.
- Share few more examples such as FAN = 6, 1, 14, EAR = 5, 1, 18 etc.
- Divide the class into 2 groups.
- Give the following instructions:
  - You will pick a student to come to the front and whisper the name of an object from the classroom in his ear.
  - The student will code the name of the object and write it on the board.
  - The group that decodes the name and identifies the object first wins the round.
  - The group that wins more rounds wins the game.
- Begin the game.
- Whisper names of objects like board, light, table, chair, shoes, clothes, pencil etc. in the ears of students picked.
- Maintain scores on the board side by side.
- Declare the group with more points as the winner.
- Play the game as time permits.

Material Required
Blank slips of paper

Learning Objective
- Decode the given pattern.
- Form patterns of your own.

Stress Words
Code, decode
One of the ways to code a message is to number all the alphabets and replace each alphabet with its number.

- Write the codes for the following alphabets.
  a) R b) M c) T d) U
  (Ans: a.18 b. 13 c. 20 d. 22)

- Code the names.
  a) Mahima b) Rohan c) Kritika
  (Ans: A. 13, 1, 8, 9, 13, 1 B. 18, 15, 8, 1, 14 C. 11, 18, 9, 20, 9, 11, 1)

- Correct the codes for the given objects.
  a) 🦆 5, 21, 3, 11 b) 🕯 12, 1, 14, 17
  (Ans: 4, 21, 3, 11 b. 12, 1, 13, 16)

- Match the codes with their names.
  A) 2, 1, 12, 12, 15, 15, 14 a) camera
  B) 3, 1, 13, 5, 18, 1 b) balloon
  C) 19, 1, 14, 4, 23, 9, 3, 8 c) umbrella
  D) 21, 13, 2, 18, 5, 12, 12, 1 d) sandwich
  (Ans: A-b, B-a, C-d, D-c)

Place commas at the correct places between the numbers and decode the word.

3 8 1 8 9 1 8 2 0 1 3 1 1 9
(Ans: Christmas)

- Find out more ways in which a message can be decoded. For example, writing the next alphabet in place of the alphabet to be used.
- Play scrabble with your parents. Instead of the points mentioned on each tile, use the codes for each alphabet for your scores.
Lesson Plan - 4

Activity

- Divide the class into groups of 4.
- Give a toothpaste box and a birthday cap to each group.
- Ask the students to name their 3-d shapes. (Cuboid and cone)
- Instruct the students to open each object and lay it flat on the table.
- Pick students to draw what the flat layout looks like on the board.
- Explain: When a 3-d shape is opened and laid flat, we see its net.
- Show the students the net of a cuboid.
- Point out that the birthday cap is a hollow/open cone.
- Encourage the students to draw what the net of a closed cone looks like.
- Draw the net of the closed cone on the board if the students are unable to do so.
- Draw the following on the board:
  - Cube
  - Triangular prism
  - Square based pyramid
  - Triangular based pyramid
  - Cylinder
  - Instruct the students to copy the same, cut out each net and fold it along the lines to form a 3-d shape.
  - Pick students to write the name of each 3-d shape below its net on the board.
  - Instruct the remaining students to verify.
  - Instruct the students to observe the faces in the 3-d shape formed and the shapes in the net on the board.
  - Encourage them to identify the relation between the two.
  - Show them that the shapes in the net of a shape are same as the shapes of the faces in a 3-d shape.

Understanding Expected

The net of a 3-d shape can be folded along the lines to form a 3-d object.
Analysis

- Shade all nets that can be folded to form a closed cube.
  (Ans: third and fourth net are to be coloured)

- Which of the following shapes would have only triangles in its net?
  a) An open cone  
  b) A triangular prism  
  c) A square based pyramid  
  d) A triangular based pyramid  
  (Ans: d)

Thinking Skills

- Draw the net of a cylinder and cone.
  (Ans: )

Real Life Connect

- How many different nets can a closed cube have? (11)

- Open some closed and open cuboid shaped boxes and compare their nets. Which face is missing in an open box?

- Draw nets of cuboid on thick coloured/patterned paper and fold them to make beautiful gift boxes.
### Lesson Plan - 1

**Grade - 5**

**Chapter 14: Maps and Directions**

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>Material Required</th>
<th>Stress Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>To understand the different types of maps.</td>
<td>World map, Asia map, India map, Delhi map, Localised area map</td>
<td>Map</td>
</tr>
<tr>
<td>To identify and use directions such as north-east and south-west.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Activity

- Divide the class into groups of 4.
- Give one map to each group.
- Instruct the students to observe the map given to them and note down what it has.
- Move around the class and guide the students, if needed.
- Pick students to share their observations about their map one by one.
- Conclude the following from the discussion:
  - A map is a diagrammatic representation of a place.
  - Maps can show big places like the whole world and even small places like the locality we live in.
  - A world map shows all the countries and the seas and oceans between them.
  - It shows which countries are next to each other, near each other and far from each other.
  - The map of a continent shows the countries only within that continent and where they lie.
  - The map of a country shows the states within the country the part of the country they lie in and their distance with respect to each other.
- Ask the students if they remember the directions.
- Draw the following on the board (without writing directions) and pick a student to write the directions East, West, North and South at the correct place.
- Instruct the others to verify.
- Pick students to name an object that lies to their east/west/north or south.
- Instruct the others to verify.
- Draw a point between north and east, closer to north and ask the students to name the direction.
- Draw a point between north and east, closer to east and ask the students to name the direction.
• Share with the students:
  » Many times a person, place or an object is not directly in north, south, east or west.
  » In such a case, to describe their direction, we combine the two directions between which the person, place or an object is.
• Complete the diagram on the board:
• Pick 9 students to come to the front.
• Arrange them in a 3x3 grid as shown.
• Name the student in the centre and ask:
  » Who is standing to the North of ______ (name of the student)?
  » Who is standing to the South of ______?
  » Who is standing to the West of ______?
  » Who is standing to the North-west of ______?
  » Who is standing to the south-east of ______?
• Pick more groups of students to come to the front and ask more such questions as time permits.

A map is a diagrammatic representation of a place.
We can use directions like north-east, south-west etc. To describe person, place or objects that lie between two directions.

1. A. Name 2 places that lie to the south of the hospital.
   (Ans: city hall, post office)
B. Name 2 places to the south east of the book store.
   (Ans: post office, zoo)
C. Name 2 places to the north west of the city hall. (Ans: hotel, bank)

2. A. Name the northern most state in India.
   (Ans: Jammu and Kashmir)
B. Name the southernmost states in India.
   (Ans: Tamil Nadu and Kerala)
C. Andhra Pradesh lies to the _____ of Kerala. (North east/ North west)
   (Ans: North east)
• Draw as directed.
  » A star in the middle.
  » A circle to the north of the star.
  » A rectangle to the east of the star.
  » A square to the south of the star.
  » A triangle to the west of the star.

• Fill in the blanks using the directions.
  a) The bench is to the ______ of the tree.
  b) The tree is to the _____ of the sandbox.
  c) The pond is to the _____ of the tree.
  d) The swings are to the _____ of the sandbox.

Write alphabets b, a and x such that A is in the south-west of X, X is to the north-east of B and a is to the north-west of b.

• Obtain a map of your locality. Give directions using the words east, west, north, south etc. to reach various places from your house.
• Make a map of your room to remember the places of things you keep.
Lesson Plan - 2

Learning Objective
- To understand the scale on a map.
- To draw objects on a grid based on the given scale.

Material Required
Square grid

Stress Words
Scale

Activity
- Draw the following map on the board.
- Ensure that the distance between any two dots is in whole number places.
- Share with the students that this is the map of an island.
- Ask the students:
  » Do you think that the island is as big as it is shown?
  » How big do you think the island is?
  » Is there any way to find out how big the island is or how far the places are from each other from the map?
  » How?
- Share with the students:
  » The map is drawn in the same shape as the original shape of the place.
  » It is drawn according to scale.
  » For example, if 2 places are 200 m far, they may be shown at a distance of 2 cm on the map.
- Measure the distance from A to B on the board in front of the students.
- Ask the students: The distance from A to B is ____ cm on the map. How far is A from B actually?
- Encourage the students to think and respond.
- Point to the scale written at the bottom of the map.
- Multiply the distance between A and B to arrive at the actual distance.
- Pick students to calculate the actual distance between various places using the map.
- Continue as time permits.
- Give a graph sheet to each student.
- Enlarge, print and display the following or draw with grid on the board:
- Ask the students how they can make the same apple on the 1 cm grid.
Analysis

- The distance from Delhi to Mumbai is 1148 km. If Delhi and Mumbai are 4 cm apart on the map, the scale of the map is 1 cm = _____ km.
- Mark places on the map below if the scale is 1 cm = 12 km.
  » The hospital lies to the north of the school. The distance of school from the hospital is 24 km.
  » The zoo lies to the west of the school. It is 36 km away from the school.
  (Ans: Students are expected to mark the hospital 2 cm above the school and the zoo 3 cm to the right of the school.)

Application

- Find the actual distance between the places shown on the map if 1 cm = 5 m.
  » How far is the cycle from the post box? (Ans: 20 m)
  » How far is the flower from the tree? (Ans: 30 m)
  » How far is the ball from the post box? (Ans: 10 m)
- Copy the dolphin on the bigger grid.

Understanding

- Share with the students that since the graph they have is already scaled down, they can count how many squares each part of the apple covers and cover as many squares in their grid. For example, the bottom of the apple covers 3 squares.
- Instruct the students to use this method to make the apple on their grid sheet.
- Pick students to show the apple made by them to the class.
- Instruct the other students to verify if the apple is scaled down correctly.
- Continue as time permits.

A scale drawing is a picture with the same shape as the original but in different size.
Thinking Skills

Find the distance from A to B

Real Life Connect

- Trace your hand on a grid sheet with large squares. Draw a scaled drawing of the same on a 1 cm grid sheet.
- Choose 5 places in your city of your choice. Find the distance between them. Draw a scaled map to show the same.

Content Book Reference: Page 198
**Learning Objective**

To understand and use key in maps.

**Stress Words**

Key

**Activity**

Enlarge, print and display the following map in class or make a similar map on the board.

- Point to the benches and ask the students what these could be.
- Encourage the students to share how they know they are benches.
- Explain: The key in the map tells us the meaning of different symbols used.
- We can see the symbol of bench in the key to find out what it stands for.
- Ask further:
  » Which is the symbol for flower garden?
  » How many flower gardens are there in the park?
  » Which is the symbol for tree?
  » How many trees are to the west of the duck pond?
- Divide the class into pairs.
- Instruct each pair to make a map of their classroom using symbols and a key.
- Specify that they should use the symbol for all students’ desks, the same symbol for all students’ chairs and so on.
- Move around the class and guide the students, if needed.
- Pick students to show their map to the class.
- Ask the class if the map is correct.
- Question them on which symbol is used for board, which for teacher’s table and so on.
- Continue as time permits.
The key in the map tells us the meaning of different symbols used.

- Make a map using the given key, following the directions.
  A. The mountains lie to the north.
  B. The city lies to the northeast.
  C. To the south of the city lies a lake.
  D. There is a forest on the east of the city and a road to its west.
  E. The river flows through the middle of the lake.

- Look at the map and write true or false.
  a. The water fountain is to the south of the theatre.
  b. There are 2 refreshment centres.
  c. There are 3 restrooms.
  d. There is a restroom to the east of the stairs.

- Draw the symbols at their correct place.

- The architect is planning on installing another set of stairs to the south of the refreshment centre in the west. Draw the stairs in the map at the correct place using the correct symbol.

Draw the map of a house with 5 rooms, three on the west and 2 on the east. The kitchen is in the south east with both the rooms in its north. The living room, in the centre is twice the size of the rooms in the east but equal to the size of the rooms in the east. Use appropriate symbols to mark each kind of room.

- Draw and compare the maps of two of your neighbourhood parks and see how they are different.

- Draw the map of your current bedroom. Make a map of how your bedroom would look if you changed the placement of everything as per your wishes.
Learning Objective

- Identify pie chart as a method of representing data.
- Read a pie chart.

Activity

- Share with the students that today they will be seeing data being represented in a new format.
- Draw the following pie chart on the board.
- Encourage the students to share what they notice about it.
- Conclude from the discussion:
  - The data is shown in a circle.
  - Each category is shown as a part of the whole.
  - Each part is as big as the fraction it represents in the whole.
- Ask:
  - What is the data about?
  - Which type of vehicle were seen most at the red light?
  - Which type of vehicle were seen least at the red light?
  - Which type of vehicle were seen in equal numbers at the red light?
  - Which were more- bus or two-wheelers?
- Encourage the students to give reasons for their choice.
- Explain:
  - The greatest portion on the pie chart is occupied by the car so car was seen the most.
  - The smallest portion is occupied by the bus so buses were least in number.
  - Equal portion is covered by two and three-wheeler so both were in equal numbers at the red light.
  - Two-wheelers occupy a greater portion than bus so there were more two-wheelers than buses.
- Draw another pie chart on the board without labelling it.
- Share the following observations.
  - Most students keep their shoes in their cupboard.
  - An equal number of students leave their shows outside or just inside the entrance.
  - Least students just throw their shoes around at random places.
- Pick students to label the categories on the pie chart based on observations shared.
1. Read the pie chart and fill in the blanks.
   a. Vedika scored maximum marks in ____________.
   b. Vedika scored equal marks in ____________ and ____________
   c. Vedika scored less marks in Maths as compared to ____________.
   d. Between Maths and science, Vedika scored more marks in ____________.

2. a. Write the names of the students in the decreasing order of the votes received by them. 
   (Ans: Rahul, Kanika, Ishika, Arjun, Vrinda)
   b. Which student won the election? (Ans: Rahul)
   c. Who scored less votes than Arjun? (Ans: Vrinda)

   Label the categories based on given observations. 
   (orange – Shimla, green and brown – Nainital and Mussoorie, Purple- Manali)
   a. Most people voted for Shimla.
   b. An equal number of people voted for Mussoorie and Nainital.
   c. Manali got less votes than Shimla but more votes than Mussoorie and Nainital.

   How would the above pie chart change if Shimla and Manali got equal votes, Nainital got more votes than Shimla or Manali and Mussoorie got the most votes? (Ans: Orange – Mussoorie purple – Nainital, green and brown : Shimla/ Manali)
**Thinking Skills**

Draw a pie chart - More than half the people came on Saturday and Sunday where equal number of people came to the zoo on Saturday and Sunday. People who came on Monday were more than people who came on Tuesday but less than the people who came on Saturday and Sunday combined. Minimum people came on Wednesday.

- Find pie charts in newspapers, finance magazines and interpret them.
- Find out which type of data is best shown using a pie chart.

**Real Life Connect**

- Find pie charts in newspapers, finance magazines and interpret them.
- Find out which type of data is best shown using a pie chart.
Lesson Plan - 2

Learning Objective
Represent data using a Pie Chart

Material Required
Dice

Activity

- Make the following table on the board.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Studying</th>
<th>Eating</th>
<th>Watching TV</th>
<th>Sleeping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Spent (mins)</td>
<td>100</td>
<td>25</td>
<td>25</td>
<td>50</td>
</tr>
</tbody>
</table>

- Share with the students that they are going to show this data using a pie chart.
- Ask the students if they remember what a pie graph is.
- Remind the students that a pie chart is a circular representation of data in which each category is shown as a part of the whole.
- Stress upon part of the whole.
- Ask:
  - Where else have you heard part of whole?
  - Which concept deals with part of whole?
  - How can fractions be used to make a pie chart?
- Explain:
  - Since each category is a part of the whole, first we add all parts to find the whole.
  - Then we write each category as a fraction of the whole.
- Show on the board:
  - Whole = 100 + 25 + 25 + 50 = 200.
  - Fraction of time spent studying = \( \frac{100}{200} = \frac{1}{2} \).
  - Fraction of time spent eating = \( \frac{25}{200} = \frac{1}{8} \).
  - Fraction of time spent watching TV = \( \frac{25}{200} = \frac{1}{8} \).
  - Fraction of time spent sleeping = \( \frac{50}{200} = \frac{1}{4} \).
- Explain to the students that now that they have the fractions, they will divide the circle into fractions.
- Draw a circle on the board.
- Point to fraction of time spent studying and pick a student to shade half of the circle.
- Point to the fraction of time spent sleeping and pick a student to shade quarter of the same circle.
• Point to fraction of time spent eating and watching TV.
• Ask the students how they will show $\frac{1}{8}$.
• Remind them that half of $\frac{1}{4}$ is $\frac{1}{8}$. So, they can mark one fourth circle using dotted lines and shade half of it to show $\frac{1}{8}$.
• Label the categories side by side.
• Summarise the steps:
  » Add all counts to find the whole.
  » Find fraction of whole for each category and simplify it.
  » Mark the fractions in the circle and label each category.
• Divide the class into pairs.
• Give a dice to each pair.
• Instruct the students:
  » Draw a circle and divide it into 8 equal parts.
  » Throw a dice 8 times.
  » Record the number that comes up on the dice each time using a table.
  » Show this data using a pie chart.
• Move around the class and guide the students, if needed.
• Remind them that if a number does not come up on the dice, they will now show it on the pie chart because $0/8 = 0$.
• Pick students to show their pie chart to the students.
• Have the pair ask questions to the class on it. For example
  » Which number came the most?
  » Which number came more times – 2 or 4?
  » Which numbers did not come at all?
• Encourage the students to share how they found the answer.
• Instruct the pair to verify.
• Continue by picking more pairs as time permits.

To make a pie chart, we find fraction of whole for each category and mark the fractions on the same circle.

• What fraction of the circle will you mark for each category?

<table>
<thead>
<tr>
<th>Trees planted by students</th>
<th>Name</th>
<th>Raghav</th>
<th>Piyush</th>
<th>Abhishek</th>
<th>Kritika</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>64</td>
<td>32</td>
<td>16</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Fraction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Ans: $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{8}$)
• Make a pie chart to show the data below.

<table>
<thead>
<tr>
<th>Day</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>25</td>
<td>50</td>
<td>25</td>
<td>0</td>
</tr>
</tbody>
</table>

**Ans:**

![Pie chart](image)

• Draw a pie chart to show the data in the following pictograph.

<table>
<thead>
<tr>
<th>Favourite Pizza Topping</th>
<th>Number of Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheese</td>
<td></td>
</tr>
<tr>
<td>Corn</td>
<td></td>
</tr>
<tr>
<td>Mushroom</td>
<td></td>
</tr>
</tbody>
</table>

Mona says that the whole pie chart if 4 more people ordered for Mushroom. Tina says that only the part for Mushroom on the pie chart will get bigger. Who is correct? Give reasons. (Ans: The whole will change from 16 to 20 and the fractions of the whole will change as a result, leading the whole pie chart to change.)

Complete the table based on the given pie chart where 24 students voted.

<table>
<thead>
<tr>
<th>Favourite Holiday Activity</th>
<th>Counts</th>
<th>Vacation</th>
<th>Waking up Late</th>
<th>Playing</th>
</tr>
</thead>
</table>

(Ans: Vacation: 12, waking up late 6, playing 6)

• Find ways in which you can make a pie chart where fractions to be marked are not so easy.

• Ask 8 friends which subject they like the most. Show this data using a pie chart.