Lesson Plans
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.
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Numbers</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>Addition and Subtraction</td>
<td>15</td>
</tr>
<tr>
<td>3.</td>
<td>Multiplication</td>
<td>19</td>
</tr>
<tr>
<td>4.</td>
<td>Division</td>
<td>27</td>
</tr>
<tr>
<td>5.</td>
<td>Factors and Multiples</td>
<td>37</td>
</tr>
<tr>
<td>6.</td>
<td>Fractions</td>
<td>41</td>
</tr>
<tr>
<td>7.</td>
<td>Decimals</td>
<td>61</td>
</tr>
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<td>8.</td>
<td>Geometry</td>
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<td>9.</td>
<td>Patterns</td>
<td>85</td>
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<td>10.</td>
<td>Measurement</td>
<td>95</td>
</tr>
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<td>11.</td>
<td>Perimeter and Area</td>
<td>104</td>
</tr>
<tr>
<td>12.</td>
<td>Time</td>
<td>112</td>
</tr>
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<td>13.</td>
<td>Money</td>
<td>125</td>
</tr>
<tr>
<td>14.</td>
<td>Data Handling</td>
<td>134</td>
</tr>
</tbody>
</table>
Activity

- Divide the class into groups of 7 students.
- Write the following on the board.

<table>
<thead>
<tr>
<th>Lakhs</th>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL</td>
<td>L</td>
<td>TTh</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Th</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O</td>
</tr>
</tbody>
</table>

- Recall that the number on the extreme right is ones, then tens, hundreds (H), thousands (Th), ten thousands (TTh), lakhs (L) and ten lakhs (TL).
- Put the number cards in a bowl and shuffle them.
- Tell the students to pick a card and write his/her number on the extreme right box.
- Each student does the same, filling the empty box on the right. Ask the students to read and write the number as well as the number name after each number is written.
- Ask the children to continue till all the number cards have been used. Speak out the 7-digit number formed. Let the number be 70,12,589.
- Conclude using students responses that the above number has 70 lakhs, 12 thousands, 5 hundreds, 8 tens and 9 ones.
- Share with them that the number is written as 70,12,589 and read as seventy lakh twelve thousand five hundred eighty-nine.
- Ask the students to say aloud the number formed.
- Repeat this activity at least two times with each group.
- Encourage them to identify and say aloud the numbers so formed.
- Ask them to write these numbers in their notebooks.
- Practice with more numbers till time permits.

Understanding

- While writing the number in words, ‘and’ is not used; e.g. Four lakh and seventeen hundred and three hundred and fifty-two is incorrect.
- While writing tens and ones in words, hyphen is used. e.g. fifty-two, twenty-four, and so on.
Application

- Write the number names for the following:
  » 7,82,153
  » 32,65,204
  » 96,38,574

- Write the numeral for the following number names:
  » Eighty lakh five hundred;
  » Two lakh seven thousand three hundred twenty-nine
  » Ninety-three lakh fifty-two thousand seven hundred fifty-one

Analysis

- Which is the smallest 6-digit number?
- Which is the greatest 7-digit number?

Thinking Skills

- What number is obtained when 1 is added to the greatest 7-digit number? Can you identify and write its number name?
- How many numbers are there between one lakh to ten lakh?
- Subtract seven lakh eight thousand five from twenty-two lakh eight.

Real Life Connect

- Circle the 6-digit and 7-digit numbers from the newspapers. Then, read these numbers in words.
Learning Objective

- To identify the place value and of digits in seven digit numbers.
- To express 7-digit numbers in expanded form and standard form.

Material Required

- Sticky notes

Stress Words

- Expanded form, Standard form

Activity

- Draw the place value chart on the board.

<table>
<thead>
<tr>
<th>Lakhs</th>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL</td>
<td>L</td>
<td>TTh</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Call any one student from the class and ask him/her to write a number on the sticky paper and stick over any one zeros on the board.

- Repeat this activity till all the places have been filled.

- Let the following number formed be:

<table>
<thead>
<tr>
<th>Lakhs</th>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL</td>
<td>L</td>
<td>TTh</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

- Ask the students to say aloud the number so formed.

- Now explain the place value of the numbers by removing other papers.

For example:

<table>
<thead>
<tr>
<th>Lakhs</th>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>TL</td>
<td>L</td>
<td>TTh</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- The place value of 2 is $2 \times 10,00,000 = 20,00,000$.

- Similarly tell them the place value of all the remaining digits in the number.

- Now show that number 23,58,019 can also be written as:

$$23,58,019 = 20 \text{ lakh} + 3 \text{ lakh} + 50 \text{ thousand} + 8 \text{ thousand} + 1 \text{ tens} + 9 \text{ ones}$$

or

$$23,58,019 = 20,00,000 + 3,00,000 + 50,000 + 8,000 + 10 + 9$$

- Inform them that expressing a number with the place value of each of its digits is called the expanded form.

- Recall that the face value of the digits in a number is the digit itself.

- Ask the students to say aloud the face value of each digit in 23,58,019.
Inform them that expressing a number with the place value of each of its digits is called the expanded form.

Recall that the face value of the digits in a number is the digit itself.

Ask the students to say aloud the face value of each digit in 23,58,019.

Ask the students to form different 7-digit numbers.

Call students and ask them to say aloud the place value and the face value of the number so formed.

Ask them to express the number formed in its expanded form.

Practice with more numbers. Continue the activity till time permits.

Numbers can be expressed in either standard form or expanded form. Both of them have the same meaning.

The face value of a number is same irrespective of its place value.

Write the numbers in standard form.

- 40,00,000 + 60,000 + 5000 + 600 + 2
- 40 lakhs + 60 thousands + 5 thousands + 6 hundreds + 2 ones

Express the following numbers in expanded form.

- 6523010
- 3001025
- 8003601

What is the face value of the digit at the lakh's place in 1826512?

What is the place value of the digit 6 in the above number?

What is the place value of the digit 1?

What is the place value of 6 in the number 60,65,663?

Write the number 900000 + 20 in the standard form?

Read large numbers in newspaper, magazines etc. and practice place values and face values with them.
Learning Objective
- To find predecessor and successor of the numbers.
- To compare and order the numbers.

Stress Words
Predecessor, successor, ascending and descending.

Activity
- Draw a place value chart on the board as follow

<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>4</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

- Call out a student and ask him/her to write a 7-digit number in the place value chart on the board say, (52,63,104).
- Ask another student to add one to the number written (52,63,105) on the place value chart on board.
- Now, explain the students that the number 52,63,105 is the successor of the number 52,63,104. The successor is the number just after the given number. Say aloud a number say, “fifty-two lakh sixty three thousand one hundred five is the successor of fifty-two lakh sixty three thousand one hundred four”.
- Ask a student to subtract one from the first number and write down the resultant (52,63,103) in the place value chart on the board.
- Inform the student that the number (52,63,103) is predecessor of 52,63,104 and the predecessor is the number just after the given number.
- Ask a student to say aloud that “fifty-two lakh sixty three thousand one hundred three is predecessor of the number fifty-two lakh sixty three thousand one hundred four”.
- Now ask a student to write a 6-digit number in the place value chat on the board, say, (4,04,765).
- Ask another student to write any 7-digit number in the place value chart on the board, say, (25,42,105)

- Now ask them to compare numbers. Explain that we always start by comparing the digits from the greatest place value, if highest place value is equal, then check second greatest place value, then next.
Ask “Which digit is greater in ten lakhs place”?

Repeat this whenever student does not find the greatest number.

Reinforce students by call out on the board and guide them to find next greater number to smaller number.

Write the numbers on the board in ascending order and explain the student about the sign “<”.

\[(4,04,765 < 25,42,105 < 52,63,103 < 52,63,104 < 52,63,105)\]

Write the numbers on the board in descending order and explain the student about the sign “>”.

\[(52,63,105 > 52,63,104 > 52,63,103 > 25,42,105 > 4,04,765)\]

Ask four students to speak aloud numbers and ask the class to write them in ascending/ descending order.

1. The predecessor of a number is 1 less than the number.
2. The successor of a number is 1 more than the number.
3. When a number is more than another number it is the successor of the given number.
4. When a number is less than another number it is the predecessor of the given number.
5. Ascending order means to arrange the numbers from smaller to greater.
6. Descending order means to arrange the numbers from greater to smaller.

Compare these numbers by the sign >, < or =

- 265321 and 245624
- 1526423 and 1526531
- 8525 and 458525

Write the predecessor of the numbers

- 309295
- 2014586
- 3652450

Write the successor of the numbers

- 145263
- 3266541
- 2458626

How will you know that a number is greater?

Which is greater 245103 or 2451033?

Find the successor of 999999.

Find the predecessor of 1000000.

Ask your children to find the pin code of their place and find their successor and predecessor pin code.

Tell your child about the pin code of any five areas near by him/her and ask his/her to compare them.

Content Book Reference: Page 17-19

Guided Practice: Page 8-10
Learning Objective: To form the greatest and the smallest 7-digit numbers by the given numbers.

Stress Words: Number cards from 0 to 9

Activity:
- Divide the class into groups of 3 students. Draw a place value chart on the board.

<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
</table>

- Shuffle the number cards in the bowl.
- Ask a student from each group to pick any 7 cards from the bowl and note down it in his/her notebook. (Let the children have the digits 2, 8, 4, 5, 3, 6 and 1.)
- Now explain to student through example that to form the greatest number of 7-digit without repetition of any digit of given digits, write the digits in descending order in the place value table.

<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

- Ask each group to pick 7 cards one by one and make the greatest 7-digit number from them.
- Ask them to form the smallest 7-digit number, write the digits in ascending order in the place value table.

<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

- Ask each group to make smallest number from the numbers they noted in their notebook.
- Ask a student from each group to pick any 4 cards from the bowl and note down it in his/her notebook. (Let the student pick 4, 6, 8 and 2)
- Explain that to form the greatest number of 7-digit with repetition of given numbers, repeat the greatest digit most times in higher place values and the write the remaining digits once in their descending order.

<table>
<thead>
<tr>
<th>TL</th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

- Ask each group to pick 4 cards one by one and make the greatest 7-digit number from them.
- Inform them that to form the smallest 7-digit number, repeat the smallest digit most times and the rest of the digits once.
• Ask to each group to form the smallest and greatest number of 7-digit number with repetition of given numbers.
• Continue the activity in similar way.

• Place value of numbers.

• Form a greatest 7-digit number using the digits 4, 5, 6, 2, 1, 8 and 9.
• Form a smallest 7-digit number using the digits 2, 8, 9, 7, 4, 3 and 5.

• Form a smallest 7-digit number using the digits 2, 4, 5, 5, 2, 6 and 4.
• Form a greatest 7-digit number using the digits 1, 1, 2, 4, 8, 9 and 7.

• Write a smallest 7-digit number from the digits 0, 1, 5, and 7.
• Write a greatest 7-digit number from the digits 9, 4 and 0.

• Form 7-digit numbers with different digits, like telephone numbers and pin codes.
Learning Objective: To round off the numbers to nearest ten, hundred, thousand and ten thousand.

Activity:

- Draw the number line as given below.

```
10 11 12 13 14 15 16 17 18 19 20

Near  Far
```

- Tell the students to recall that number 17 is close to 20 than 10. So, the number 17 is rounded up to 20.

- Now, share that to round off a number to nearest tens, we look at the digit at the one’s place. If the digit at the ones place is less than 5, round down the number to the previous tens. If the digit at the ones place is equal to or greater than 5, round up the number to the next tens.

- Similarly, share that to round off to the nearest hundreds observe the digit at the tens place. If it is less than 5, round down the number to the previous hundreds. If the digit at the tens place is greater than or equal to 5, round up the number to the next hundreds.

- Again, explain with examples that to rounding off to nearest thousands observe the digit at the hundreds place. If it is less than 5, round down the number to the previous thousands. If the digit at the hundreds place is greater than or equal to 5, round up the number to the next thousands.

- Write few numbers such as 1345, 2681, 7034 and 2198 on the board and ask the students to round off to nearest 10s, 100s and 1000s.

- Now, tell them that the numbers can be rounded off to the nearest ten thousands in the same manner. Tell them that to round off a number to the nearest ten thousand, we look for the digit at the thousands place. If it is less than 5, keep the ten thousands digit as same and replace thousands, hundreds, tens and ones digits by 0. If the digit at thousands place is 5 or greater than 5, increase the ten thousands digit by 1 and replace thousands, hundreds, tens and ones digits by 0.

- Write few numbers such as 71265, 29654 and 40352 on the board and ask the students to round off to the nearest ten thousand.

Understanding Expected:

- To round off a number to a certain place value, observe at the digit on its immediate right at one lower place.

- In real life, in numbers where the word ‘about’ is written, are generally rounded off numbers.
• Rounding off can be done for numbers in lakhs.

• Round off the following numbers to nearest ten.
  a) 2456  b) 6872  c) 4325

• Round off the following numbers to nearest hundred.
  a) 4521  b) 19,856  c) 25,328

• Round off the following numbers to nearest thousand.
  a) 8647  b) 23,217  c) 36,582

• Round off the following numbers to nearest ten thousand.
  a) 12,361  b) 45,924  c) 60,203

• What is the use of rounding off numbers in day to day life?

  • A person estimated the number of visitors in an adventure park to be 65000. What could be the minimum number of visitors in the park?

  • Let your child find population of some villages nearby your city help him/her estimate the population by rounding off.

  • Help your child to find out the price of some two wheelers and round off their prices.
Lesson Plan - 1

Grade - 4

ADDICTION AND SUBTRACTION

Learning Objective
To add 6-digit numbers without regrouping.

Material Required
Place value mat, counters

Activity
- Divide a class into group of 5.
- Draw a place value chart on the board for 6 digits numbers.
- Write 2,59,212 and 1,20,127 on the board and ask the students to place counters in the place value mat to represent 2,59,212 and 1,20,127 as shown below:

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

- Ask the students to add the ones by combining the counters in the ones column of the place value mat. Write 5 in ones column.
- Now, ask the students to add the tens. Ask them to combine the counters in the tens column. Write 3 in tens column.
- Ask the students add the hundreds. Tell them to combine the counters in the hundreds column of the place value mat.
- Add 2 hundreds and 1 hundred. Write 3 in hundreds column.
- Similarly, do this for thousands, ten thousands and lakhs place.
- Ask the students to read out the sum. Write 3,79,339 on the board.
- Repeat this activity with at least 5 sets of numbers.
- Addition means to find out the sum of two or more numbers.
- The method of adding large numbers is the same as adding smaller numbers.

Understanding
- LTT
- Expected

Application
- Find the sum of 3,56,241; 3,21,425 and 3,12,132.
- Add 52,142; 32,412 and 1,15,325.
- What is the sum of 7,23,102 and 1,00,000?

Analysis
- Thinking Skills

Real Life Connect
- Find the sum of the smallest 6-digit odd number and the smallest 6-digit even number.
- Form two 6-digit numbers by using 0, 1, 2, 3, 4 and add them.

Content Book Reference: Page 30, 31
Guided Practice: Page 18
**Learning Objective**
To add 6-digit numbers with regrouping.

**Material Required**
Place value mat, counters

**Activity**
- Divide a class into group of 5.
- Draw a place value chart on the board for 6-digit numbers.
- Write 7,12,625 and 2,21,536 on the board and ask students to place counters in place value mat to represent 7,12,625 and 2,21,536.

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

- Ask the students to add the ones by combining the counters in the ones column of the place value mat.
- Recall the regrouping of numbers. Tell them 5 ones and 6 ones makes 11 ones which is 1 ten and 1 one. Write 1 at the ones place in the place value chart and 1 tens get carried over to the tens place.
- Now, call a student to add tens place digits. Remind that 1 tens was carried over from ones place which has to be added too. (1 + 2 + 3 = 6)
- Write 6 on the tens place on the place value chart on the board.
- Again ask the students to add the hundreds by combining the counters in the hundreds place of the place value mat.
- Similarly, explain the students that 6 hundreds and 5 hundreds makes 11 hundreds and 11 hundreds are equal to 1 thousand and 1 hundred.
- Write 1 at the hundreds place in the place value chart on the board and carry 1 thousand to thousands place.
- Similarly, explain this for thousands, ten thousands and lakhs place.
- Write 9,34,161 on board and ask to students to read this number.
- Repeat this activity with at least 5 sets of other numbers.
- Add 4,52,146; 12,458 and 3,45,899.
- Add 1,52,364; 2,14,543 and 145.
- What is the sum of 9,56,331 and 99,990?
- Find the sum of 5,55,106 and 1,87,756.
- Find the sum of greatest 5-digit number and smallest 6-digit number. Write the answer as a number name in the international form.
- Find 6-digit numbers from newspapers and add them.

**Thinking Skills**
- Find the sum of greatest 5-digit number and smallest 6-digit number.
- Write the answer as a number name in the international form.

**Real life Connect**
- What is the sum of 9,56,331 and 99,990?
- Find the sum of 5,55,106 and 1,87,756.
- Find the sum of greatest 5-digit number and smallest 6-digit number.
- Write the answer as a number name in the international form.
- Find 6-digit numbers from newspapers and add them.

**Application**
Content Book Reference: Page 32, 33
Guided Practice: Page 19-25
Lesson Plan - 3

Grade - 4

Learning Objective
To subtract 6-digit numbers without regrouping.

Material Required
Place value mat, counters.

Activity
- Divide a class into groups of 5.
- Draw a place value chart on the board for 6 digits numbers.
- Write 9,63,254 and 8,21,142 on the board and ask students to place counters in place value mat to represent 9,63,254.

<table>
<thead>
<tr>
<th>L</th>
<th>TTh</th>
<th>Th</th>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

- Ask the students to subtract the ones. Subtract 2 ones from 4 ones.
- Tell the students to remove 2 counters from the ones column from the place value mat.
- Call out a student and ask to write remaining number of counters on the board at the ones place.
- Now ask form students subtract the tens. Subtract 4 tens from 5 tens.
- Tell the students to remove 4 counters from the tens column from the place value mat.
- Call out a student and ask him/her to write the remaining number of counters on the board at the tens place.
- Similarly, do this for hundreds, thousands, ten thousands and lakhs place.
- Finally when complete the subtraction ask to students to note down the subtraction written on the board.
- Call out numbers and ask the students to subtract the numbers. Discuss the answers in class.
- Continue the activity till time permits.

Application
- Find the difference between 7,14,520 and 5,21,840.
- What should we subtract from 4,45,145 to find 3,98,175?
- Subtract 99,999 from 1,00,000.

Analysis
- Subtract 99,999 from 1,00,000.

Thinking Skills
- Which number is 6,24,986 less than 9,43,423?

Real life Connect
- Form the largest six digit number by using digits 5, 6, 7, 8, 8, 9 and smallest six digit number using the digits 2, 3, 4, 1, 5, 0. Subtract the greater number from the smaller number.

Content Book Reference: Page 38, 39
Guided Practice: Page 26
Grade - 4

Activity

- Divide a class into group of 5.
- Draw a place value chart on the board for 6 digits numbers.
- Write 5,36,257 and 4,28,424 on the board and ask the students to place counters in place value mat to represent 5,36,257.

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- Ask for student to subtract the ones. Subtract 4 ones from 7 ones.
- Tell them to remove 4 counters from the ones column.
- Call out a student and ask for write the remaining number of counters on the board at the ones place.
- Again ask for students to subtract the tens. Subtract 2 tens from 5 tens.
- Tell the student to remove 2 counters from the tens column.
- Ask the student to write remaining number of counters on the board at the tens place. (3)
- Now ask them that “Can you subtract 4 hundreds from 2 hundreds?”
- Share that since 4 hundreds cannot be subtracted from 2 hundreds, regrouping of numbers will be done. Recall the regrouping of numbers in subtraction. Tell them to regroup the thousands and hundreds.
- Ask them to regroup 6 thousands 2 hundreds into 5 thousands 12 hundreds by removing counter from thousands column and add 10 counters in hundreds column.
- Tell them to remove 4 counters from the hundreds column.
- Now call a student and ask them to write numbers to remaining counters in hundreds column. (12 hundreds – 4 hundreds = 8 hundred)
- Similarly, do this for thousands, hundreds and lakhs place value column.
- Conclude that the difference of the two numbers is 107833.
- Continue the activity till time permits.

Application

- Subtract » 134676 from 763425 » 345235 from 981232

Analysis

- Subtract two lakhs nine thousand one from six lakh ten.

Thinking Skills

- Subtract the difference of 653427 and 654372 from the sum of 561413 and 2344.

Real life Connect

- Find the approximate distance from your house to school and market in centimetres. Then find which is nearest and how much?

Content Book Reference: Page 40, 41

Guided Practice: Page 27-36
Activity

- Divide students into groups of 4.
- Ask each group to take a cardboard of any size and paste a grid paper on it.
- Ask two students of each group to show $4 \times 3$ on a grid paper by colouring 4 columns of 3 rows with red colour.
- Now, ask other two students of each group to show a grid of $3 \times 4$ by colouring 3 columns of 4 rows with blue colour.
- Now, ask each pair to count the number of squares.
  
  » Number of squares of red colour = \[\text{_______}\] = \[\text{______ \times 3}\]
  
  » Number of squares of blue colour = \[\text{_______}\] = \[3 \times \text{_______}\]
- Ask students to observe that both the products are same i.e., $4 \times 3 = 3 \times 4 = 12$
- Explain students that the product of two numbers remains the same even if we change the order of the numbers. It is known as order property of multiplication.
- Again, ask two students of the group to show $5 \times 1$, colour 5 columns of 1 row of the grid with green colour.
- Ask other two students of the group to show $1 \times 5$, colour 1 column of 5 rows of the grid with yellow colour.
- Now, ask each pair to count the number of squares.
  
  Number of squares of green colour = \[\text{_______}\] = \[\text{______ \times 1}\]
  
  Number of squares of yellow colour = \[\text{_______}\] = \[1 \times \text{_______}\]
- Ask students to observe both the products and tell them 1 is known as the multiplicative identity.
- Tell them students that the product of a number and 1 is the number itself.
• Ask each group to take any 3 numbers say 12, 7 and 9 and multiply these numbers using the multiplication properties.
• For example, \((12 \times 7) \times 9 = 84 \times 9 = 756\)
\[12 \times (7 \times 9) = 12 \times 63 = 756 \quad (12 \times 9) \times 7 = 108 \times 7 = 756\]
• Ask students to observe their answers.
• Repeat the same activity to find the product of 3 numbers.
• Introduce the grouping property of multiplication.
• Ask students to multiply a number, say 15 with 0 and write the answer on the blackboard and tell that this is the property of zero.
• Continue the activity till time permits taking various numbers.
• The product of 3 numbers remains the same even if we change the order in which number are multiplied. It is known as grouping property of multiplication.
• The product of a number and zero is always zero.
• Rahul and Rajat got an assignment on multiplication from school. Rahul multiplied 3 by 7 and then multiply the product by 9. On the other hand, Rajat multiplied 7 and 9 and then multiplied the product by 3. Is the product same?
• Fill in the blanks.
  » \(18 \times 0 = \) ________
  » \(346 \times 0 = \) ________
  » \(171 \times 15 = \) _____ \(\times 171\)
  » \(198 \times (26 \times \) ___\) = (___ \(\times 67\)) \(\times 26\)
• \(10 \times (17 \times 3) = \) ________ and \((10 \times 3) \times 17 = \) ____________
  Is the product same? Yes/No
• State true or false and write correct statement for the false statement.
  » Property of zero is also called multiplicative identity.
  » The product of a number and 1 is the number itself.
  » Order property of multiplication cannot be used for more than 2 numbers.
• Which of the following represents order property of multiplication?
  » \(167 \times 57 = 57 \times 167\)
  » \(235 \times 0 = 0\)
  » \(7890 \times 1\)
• Which property will be more suitable for solving \(1786 \times 16 \times 0\)?
  » Grouping Property
  » Property of zero
  » Order Property
• Find the cost of milk consumed in one day and in one week using the grouping property of multiplication.
• Find the amount spent on buying fruits and vegetables for one week and check the answer using the order property of multiplication.
**Activity**

- Divide students into pairs.
- Ask each pair to take 10 unit cubes and join them to form a tens block.

  ![One unit cube](image1)
  ![Ten unit cubes](image2)

- Ask pairs to write a multiplication statement, i.e., \(1 \times 10 = 10\)
- Now, ask pairs to take 4 such tens blocks and join them.
- Ask students to count the number of unit cubes in it. \(4 \times 10 = \) ______
- Now, ask pairs to take 10 such tens blocks and join them.
- Ask students to count the number of unit cubes in the flat hundred formed. \(10 \times 10 = \) ______
- Ask students to observe all the answers and tell them to get the product of a number and 10, add a zero to the right side of the number.
- Instruct the pairs to take 2 flat hundreds and join them.
- Ask students to count the number of unit cubes in these: \(2 \times 100 = \) ______
- Now, instruct the pairs to 5 flat hundreds and join them.
- Ask them to count number of unit cubes and write the answer. \(5 \times 100 = \) ______
- Make students observe both the answers and conclude that to get the product of a number and 100, add two zeros to the right side of the number.
- To get the product of a number and 1000, add three zeros to the right side of the number. Ask the students to verify this by taking two numbers.
- To get the product of a number and another number which has zeros at the end, first multiply the two numbers (without the zeros). Then, count the number of zeros and write an equal number of zeros to right side of the number.
Application

- Multiply the following:
  » $456 \times 10 = \underline{}$
  » $143 \times 100 = \underline{}$
  » $567 \times 1000 = \underline{}$
  » $28 \times 40 = \underline{}$

Analysis

- $145 \times 400 = \underline{}$
- What is $678 \times 1000$?
- $768 \times 200 = (\underline{} \times \underline{}) \times 100$

Thinking Skills

- Is $278 \times 2 \times 5 = 278 \times 20$?
- Verify that $432 \times 25 \times 4 = 432 \times 100$
- We can use the properties of multiplication to multiply by 10, 100 and 1000. Verify the statement by giving two examples.

Real Life Connect

- Find the amount of school fees paid by your parents in one month and then for 10 months.
- Find the amount spent on household expenses for one month and then calculate it for 10 days.
### Grade - 4

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>To learn multiplication of numbers by 1-digit and 2-digit numbers.</th>
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<tbody>
<tr>
<td>Material Required</td>
<td>Paper chits, sheet of paper</td>
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<tr>
<td>Note for Teacher</td>
<td>Prepare some multiplication paper chits in advance as per the number of students in the class. Write multiplication questions of 4-digit number by 1-digit numbers.</td>
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**Activity**

- Recall the concept of multiplication by 1-digit numbers with students. Recapitulate the terms associated with multiplication.
- Tell students that multiplication of 4-digits by 1-digits numbers is same as the multiplication of 3-digit numbers by 1-digit numbers. Also, recall the steps.
- Place all folded chits of your table.
- Ask the students to get into pairs.
- Call each pair forward and ask them to pick two folded chits, say, a chit with $1345 \times 3$ and second chit with $3456 \times 4$.
- Now, ask each student of the pair to take one chit and solve the question written on it on a sheet of paper.
- Also, write the multiplicand, multiplier and product in the answer.
- For example,
  - **Multiplicand =**1345, **Multiplier =** 3 and **Product =** 4035
  - **Multiplicand =**3456, **Multiplier =** 4 and **Product =** 13824
- Take rounds and help students wherever required.
- Ask students to exchange their sheets of paper and check each other work.
- Ask students to rectify the mistake of their partner and discuss with them.
- Tell students that multiplication by 1-digit number is very simple.
- Product of 4-digit number by 1-digit number can be a 4 or 5-digit number.
- Multiplication by 2 and 3-digit numbers can be performed by writing multiplicand into tens and ones or hundreds, tens and ones, respectively.
- Find the product.
  - $4323 \times 5$
  - $1768 \times 9$
**Analysis**

- Multiply the following.
  - \(34 \times 1567\)
  - \(156 \times 2678\)

**Thinking Skills**

- How many seconds are there in 4 hours, if 1 hour = 60 minutes and 1 minute = 60 seconds?
- Find: \(95 \times 78 \times 7\)
- If \(A \times 800 = B\). Which of the following best describes \(A\) and \(B\)?
  - \(A = 25\) and \(B = 20000\)
  - \(A = 1\) and \(B = 10000\)
  - \(A = 20\) and \(B = 2000\)

**Real Life Connect**

- Ask the cost of your school uniform from your parents and calculate the cost of such 9 dresses.
- Find the amount spent on milk for one month by your parents and then calculate the amount spent for 6 such months.
Lesson Plan - 4

Grade - 4

Learning Objective
To explore the concept of estimated product.

Material Required
Blackboard, chalk

Stress Words
Rounding off, Estimating product

Activity
- Recall the concept of rounding off numbers with students.
- Write 1567 on the blackboard. Ask students to round off this number to nearest tens, hundreds and thousands.
- Introduce the concept of how to estimate the product of numbers.
- Play a game with students.
- Write a multiplication question on the blackboard, say 2107 \times 8.
- Ask students to tell the answer is more than 20,000, equal to 20,000 or less than 20,000.
- Tell students to round off the number to its greatest place. For example, 2107 is rounded off to nearest thousands, i.e., 2000 and 8 is rounded off to nearest tens, i.e., 10
- Repeat the same game by taking other questions so that all students get a chance.
- Ask students to tell the use of estimation in their day-to-day life.
- Tell students that estimation helps us to find a number quickly which is close enough to the right answer.
- Discuss the symbols used for estimation. Tell students that the ‘\( \approx \)’ symbol means ‘is approximate to’. In some places, we use ‘\( \rightarrow \)’ in place of ‘\( \approx \)’ and ‘\( = \)’ is used for actual value.

Understanding
Expected
- Estimated product always lies closer to the actual product.

Application
- Estimate the product of the following.
  - 1211 \times 764
  - 2876 \times 87
- A shelf in a music shop can contain 874 music CDs. Estimate how many CDs can 196 similar shelves contain.

Analysis
- The product of 458 and 52 was estimated to be 22,000. Check the estimated answer. How far is it from the actual product?
- Find the estimated product of 3678 and 65. Is it closer to 25000? Also, compare the estimated product with the actual product.
Thinking Skills

- Which of the two numbers give the 16000 as product?
  » 825 × 32
  » 816 × 28
  » 798 × 22

- Verify that estimated product always lies closer to the actual product by taking 2 examples.

- Ask your parents about the monthly charges levied in your society. Find the number of houses in your society. Estimate the amount of money collected every month.

- Collect grocery bills of one month. Add all the amounts of grocery bills and then estimate the amount of grocery bills for 12 such months.

Real Life Connect

Content Book Reference: Page 58, 59
Guided Practice: Page 44-48
Lesson Plan - 1
Grade - 4

CHAPTER
DIVISION

Learning Objective
• To understand properties of division.
• To divide a number by 10, 100 and 1000.

Material Required
Counters

Activity
• Divide the class into groups of 4 and give 50 counters to each group.
• Ask the students to make groups of 1 counter each.
• Ask:  » How many groups were you able to make?
  » What is the division sentence for the group you made?
• Use the students’ response and write on the board: \(10 \div 1 = 10\).
• Repeat the activity 2 more times by asking the students to take 12 counters and 25 counters.
• Use their response to write on the board:  » \(12 \div 1 = 12\)  » \(25 \div 1 = 25\)
• Encourage the students to notice a pattern.
• Conclude with them that when a number is divided by 1, we get the same number as the quotient.
• Let the students pick any number of counters and verify the rule.
• Instruct the students to take 15 counters.
• Ask them to make groups of 15 counters each.
• Ask:  » How many groups were you able to make?
  » What is the division sentence?
• Use their response to write on the board: \(15 \div 15 = 1\).
• Repeat the activity for 8 counters and 20 counters.
• Write on the board after the students finish:
  » \(8 \div 8 = 1\)
  » \(20 \div 20 = 1\)
• Encourage the students to see a pattern in the division sentences.
• Conclude with them that when a number is divided by itself, we get 1 as the quotient.
• Let the students pick any number of counters and verify the rule.
• Ask the students to keep 0 counters on the table. Check that they have no counters on their table.
• Ask the students how many groups they can make if they put 0 counters in equal groups.
• Conclude with the students that \(0 \div \text{any number} = 0\).
• Ask the students to take all 50 counters.
• Tell them to make 0 groups of the counters.
• Show them that even if they keep all 50 counters together, they will make 1 group.
• Conclude with them that they cannot divide any number by 0.
• Point out the difference between above two facts. If they have 0 and they divide it into any number of groups, they will get 0. However, they cannot divide any number of items into 0 groups because they will have at least 1 group.
• Instruct each group to pick any number of counters.
• Tell them to make groups of 10 each.
• Pick each group to write a division sentence for the same on the board, including how many are left. For example,
  » 23 ÷ 10 = 2 with remainder 3
  » 34 ÷ 10 = 3 with remainder 4
• Encourage the students to observe a pattern.
• Show them that when we divide a number by 10, the digit at the ones place is the remainder and the remaining number is the quotient.
• Explain to them that in the same way,
• When they divide a number by 100, the digits at the tens and ones place are the remainder and the remaining number is the quotient.
• When they divide a number by 1000, the digits at hundreds tens and ones are the remainder and the remaining number is the quotient.
• Write different division sentences for division by 10, 100 and 1000 on the board and instruct the students to tell the quotient and remainder without dividing the numbers. Continue as time permits.

Understanding Expected

• Number ÷ 1 = same number, number ÷ same number = 1, 0 ÷ number = 0, number ÷ 0 is not possible.

Application

• Fill in the blanks.
  » 1092 ÷ 1 = __________  » 19,282 ÷ _______ = 1
  » _____ ÷ 54 = 0  » 7364 ÷ ____ = division cannot be done.
• Write true or false.
  » 17,283 ÷ 10 = 1, R 7283  » 1738 ÷ 100 = 17, R 38

Analysis

• Krishna divided 73,649 by a number and got the quotient 736 and remainder 49. What is the number?
• What should be added to 7654 so that it is completely divisible by 1000 and leaves no remainder?

Thinking Skills

• Write the smallest 5-digit even number which when divided by 10, 100 and 1000 will leave no remainder in each case.
• Take 1 kg rajma beans. Count how many beans are there in all. Divide them into groups of 100. Write the division sentence and the remainder. Repeat activity with different number of rajma beans. What pattern do you notice?

Real Life Connect

Content Book Reference: Page 66-68  Guided Practice: Page 49-51
Learning Objective: To divide a 5-digit number by a 1-digit number without and with remainder.

Activity:

- Check with the students that they remember what division is.
- Ask them to give examples of where division is used in real life.
- Share with the students that there are 17,285 students in the school and the principal has asked you to put 5 students in each row for the school march.
- Ask: « How many rows will be there? » How will you find out?
- Conclude with them that they need to divide 17,285 by 5 to find the number of rows.
- Ask the students if it is easy to find the number of rows by making equal groups.
- Encourage them to suggest a faster method to find the answer.
- Share with the students that they can use long division method to divide numbers quickly.
- Tell them that this method is particularly useful when they need to divide large numbers where it is not possible to form equal groups and find the answer.
- Draw the following on the board.
- Share with the students that this is the ‘division man who will always help them remember the steps for the long division method.
- Show that his eyes have division symbols which remind us to see which digit we have to divide.
- Point out that next comes his nose which is a multiplication symbol which reminds us that we have to multiply the divisor by a number and look for a product closest to the dividend.
- Explain that next come his lips which have a subtraction sign. It reminds us to subtract the product from the dividend. Last comes his neck saying bring down, reminding us to bring down the next digit from the dividend.
- Share with the students that the same steps are repeated till all the digits of the dividend have been divided by the divisor.
- Write 17,285 ÷ 5 on the board.
- Remind the students that 17,285 is the dividend and 5 is the divisor.
- Arrange them as shown.

```
     1 7 2 8 5
5 | 1 7 2 8 5
```

- Instruct the students to look at the division man and tell the first step.
- Show that they have to divide 1 by 5. Point to the nose of division man.
• Ask the students which product of 5 is closest to but smaller than 1.
• Remind them of division fact $0 \times 5 = 10$ as $1 \times 5 = 5$ will give a product greater than 1.
• Write 0 above the line and 0 below 1 in the dividend.
• Point out the subtraction being the next step according to the division man.
• Subtract 0 from 1 and write 1 as the difference.
• Point to the neck and bring down 7 and write it next to difference 1.
• Use the division man to divide 17 by 5. (Use multiplication fact $3 \times 5 = 15$. Write 3 next to 0 in the quotient and 15 below 17. Subtract 15 from 17 and write 2 below them.)
• Bring down 2 and write it next to difference 2. Repeat the steps from division man to divide 22 by 2.
• Continue in the same way to divide the remaining number by 5.
• Show that 17,285 $\div$ 5 = 3457 so there will be 3457 rows of 5 students each in the school march.
• Write another division question on the board: 37,328 $\div$ 3 and ask the students to follow the steps performed above.
• Pose such more examples to the students if time permits.

- To divide each digit in the dividend by divisor, we divide, multiply, subtract and then bring down the next digit.

• Divide the numbers.
  » $87,126 \div 2$  
  » $78,173 \div 4$  
  » $18,289 \div 5$

• A parking lot collects ₹12,560 in 4 days. How much does it collect in one day?

• A company needs to divide its 9726 males and 8912 females working for it equally in 2 buildings. How many workers will be in each building?

• Mansi bought a TV worth ₹37,800. She can either pay in 6 instalments or 9 instalments. How much more does she have to pay in each instalment if she pays in 6 instalments as compared to 9 instalments?

• Ritika divided a number by 8. She got 1724 as the quotient and 5 as the remainder. What is the number?

• Throw a dice 5 times to get a 5-digit number. Throw a dice one more time to get a 1-digit number. Divide the 5-digit number by the 1-digit number you got.

• A rider wants to cover a distance of 12,663 km in 9 days. How much distance should he cover in each day?
Learning Objective
To divide a 5-digit number by a 2-digit number with and without remainder.

Activity
- Ask the students if they remember what division man looks like.
- Draw on the board using students’ response.
- Point to each part of the division man and share with the students that they use the steps divide, multiply, subtract and bring down to divide each digit in the dividend by divisor.
- Divide 34,768 by 2 on the board with the students and explain each step side by side.
- Ask:
  » How can you divide a number by a 2-digit number?
  » Do you know the multiplication facts of 25?
  » How can you get multiplication facts of 25?
- Share with the students that they can multiply 25 by different numbers to look for the products closest to the dividend.
- Divide the class into groups of 4.
- Instruct the students to divide 34,768 by 25 by finding multiplication facts of 25.
- Tell them that the group that finishes first wins.
- Encourage them to use the division man for the steps, if needed.
- Pick the group that finishes first to divide 34768 by 25 on the board using the steps below.
  » Write 34,768 and 25 in division brackets.
  » Multiply 25 by 0 to get the product closest to 3.
  » Write 0 in the quotient and 0 below 3 on the board. Subtract 0 from 3 and write 3 in the difference.
  » Bring down 4 and write it next to 3. Look for a multiplication fact of 25 that will give product closest to 34. $1 \times 25 = 25$. Write 1 in the quotient and 25 below 34 on the board. Subtract 25 from 34 and write difference 9 below them.
  » Bring down 7 and write next to 9. Look for a multiplication fact of 25 that gives product closest to 97. $3 \times 25 = 75$. Write 3 next to 1 in the quotient and 75 below 97. Subtract 75 from 97 and write difference 22 below them.
  » Bring down 6. Look for a multiplication fact of 25 that will give
the product closest to 226. $9 \times 25 = 225$.
Write 9 in the quotient and 225 below
226. Subtract 225 from 226 and write the
difference 1 below them.

» Bring down 8. Look for a multiplication fact
of 25 that gives the product closest to 18.
$0 \times 25 = 0$. Write 0 in the quotient and write
0 below 18. Subtract 0 from 18 and write the
difference 18 below them.

» There are no more digits left to divide. Thus,
$34,768 \div 25 = 1390$, remainder 18.

- Write another division question on the board
(5-digit ÷ 2-digit).
- Ask them to follow the same steps done above.
- If the divisor is a 2-digit number we multiply it by different numbers to
get a multiplication fact that gives the product closest to the dividend.

- Divide the numbers.

» $56,163 \div 42$  » $19,264 \div 28$  » $89,382 \div 50$
- Fill in the blanks:

» $15,216 \div 24 = \underline{633}$ remainder \underline{12}

» $63,726 \div 55 = \underline{1152}$ remainder \underline{16}
- Which of the following numbers when divided by 15 will give quotient
2400 remainder 7?

» $36,007$  » $35,993$  » $36,000$  » $16,815$
- Krisha says that $18635 \div 30 = 620$ with remainder 5. Is she correct?
Answer without dividing the numbers.

- What should 76,352 be divided by to get quotient 2936 and remainder
16?
- There are 86,400 seconds in a day. How many seconds are there in
1 hour?
- Amrita saved ₹11,736 in a year. How much did she save every month if
she saved the same amount each month?
Learning Objective
To estimate the quotient of division problems.

Material Required
Paper slips

Activity

- Narrate: You need 10 m fabric for a wedding dress. There is a 156 m fabric roll that is being cut into 12 pieces. If you buy 1 piece, will you have enough fabric for the dress?
- Ask the students: How can you quickly find out whether you should buy the fabric?
- Share with the students that many times we don’t need to know the exact quotient and only an estimate is enough.
- Explain that to estimate a quotient, we can round off the numbers and then divide.
- Show on the board:
  » 156 - since digit at the ones place is greater than 5, we will round it to 160.
  » 12 - since digit at the ones place is less than 5, we will round it to 10.
  » 160 ÷ 10 = 16. So we have enough fabric.
- Instruct the students to find the exact quotient and compare it with the estimate.
- Show them that the exact quotient 13 m is near to our estimate of 16 m.
- Encourage the students to share more situations where estimating the quotient will be enough.
- Write the following in jumbled order on the board.
  » 216 ÷ 18
  » 1980 ÷ 9
  » 1260 ÷ 12,
  » 549 ÷ 9,
  » 61
  » 105
  » 220
  » 12
- Divide the class into groups of 4.
- Give 8 paper slips to each group.
- Instruct the groups:
  » Write division questions and their quotients on separate slips.
  » Shuffle the slips.
  » Pick each slip one by one.
  » Estimate the quotient of each division question to match it with its actual quotient.
  » The first group to correctly match all division questions with their answers wins.
Move around the class and observe the students’ work.
Declare the group that matches the slips correctly first as the winner.
Pick the groups to discuss their strategies.
Conclude: To estimate the quotient, we need to round off the numbers and divide.
Repeat the activity by giving more slips, division questions and jumbled answers if time permits.

To estimate the quotients, we need to round off the numbers and divide.

Estimate the quotient for:
» 1980 ÷ 18
» 819 ÷ 39
» 1617 ÷ 21

True or False.
If there are 189 people and 9 boats, approximately 10 people will be there in each boat. _____________
Write the correct estimate if your answer is false. _____________

Mehak estimated the quotient of a number divided by 48 as 5. Which of them could be the dividend?
» 25
» 288
» 245

Estimate and tick the correct divisor.
6480 ÷ ____ = approximately 325
» 12
» 18

Estimate the quotient of the smallest 5-digit number with 1 at the tens place and the largest 3-digit number with 5 at the ones place.

Count the number of children in your class and the number of rows of seats. Estimate the number of students sitting in each row.
Find out the bill amount when you go to a restaurant with your family members or friends. Estimate how much you had to pay per person.
Go for shopping with your parents. Ask them how much amount you can spend. Find the price of the item you like and estimate how many of those you can buy using the money you have.

Content Book Reference: Page 71, 72
Guided Practice: Page 56
Lesson Plan - 5

Grade - 4

Learning Objective
To solve division problems by making models.

Material Required
Problem cards

Activity

- Write some problems on the problem cards like;
  » Prateek paid a hotel bill of ₹37,250 for 5 days. How much was he charged per day?
  » A company has installed 12 water stands at equal distances in a 10,272 m marathon. What is the distance between each water stand?
  » A courier company needs to send 11,382 parcels for shipping. If it wants to divide the parcels equally among 21 vans, how many parcels will each van carry?
  » A decorator needs 15,875 stickers for a birthday party. If a pack has 25 stickers, how many packs of stickers should he buy?

- Ask the students where they can use division in real life.
- Explain to them that whenever they are given the value of many and they have to find the value of one, they need to perform division.
- Draw the following model on the board to clarify.

```
[Given]

Find value of one
```

- Divide the class into groups of 4.
- Give a problem card to each group.
- Instruct the students to solve the problem on their cards.
- Encourage them to draw a model to represent the problem, as shown on the board, to plan how they will solve it.
- Instruct the students to exchange their card with another group after they finish.
- Continue as time permits.
- Pick some groups to share their problem and the steps they followed to solve it.
- Make them represent their problem using a model on the board.
- Instruct the other students to verify.
- Ask the students what steps will be followed to solve their problems.
• Conclude with them that to solve a word problem they should:
  » Understand what is given and what they need to find.
  » Plan which operation you will use to solve the problem.
  » Solve the problem using operation decided.
  » Check back to see if your answer makes sense.
  » Encourage the students to clarify any doubts that they may have.

• When we have value of many and we need to find value of one, we use division.

  • Mr. Sharma earns ₹70,788 in a year. How much does he earn in one month?
  • A class raised ₹5250 for donating to earthquake victims. How much did each student donate if each of the 35 students donated the same amount?

• A catering company has placed an order of 52,644 chocolates to be packed in boxes of 6 chocolates each. Later, the company requested that there be only 4 chocolates in each box. How many extra boxes are needed?

• A worker has 12 boxes of 190 beads each. How many bracelets can it make if he puts together 20 beads for each bracelet?

• 33,960 bulbs are to be packed in cartons of 60 each. After packing the cartons, the workers were able to put 5 more bulbs in each carton. How many bulbs did it ship in all?

• Find out how much crates of 6/12/24 and 36 juices cost. Find the cost per juice in each crate. Which is the best deal?

• Frame division problems using the numbers you come across in daily life and solve them.
Learning Objective: To find out the factors of a given number.

Material Required: 8 notebooks, pencil, paper

Stress Words: Row, columns, factors

Activity:
- Ask one student to collect 8 notebooks from students.
- Then, ask another student to arrange these notebooks in different ways one by one such that the number of books in each group is same.
- Instruct the students to arrange in one row. Guide the students to write their multiplication sentence, $1 \times 8$.
- Instruct the students to arrange these notebooks in two rows. Guide the students to write their multiplication sentence, $2 \times 4$.
- Make the student arrange books in all possible orders and write multiplication sentence for each and associate with representation.

- Explain that there are different number of ways to represent a number in form of their factor.
- Make students observe that they have just calculated the factors of 8. These are: 1, 2, 4 and 8.
- Write these numbers on the board and associate with representation again.
- Ask the children to represent 12 in the same form and find its factors.
- 1 is a factor of every number. The greatest factor of every number is the number itself.
- Find out the factors of 250 and 120.
- How many ways can 25 be represented with the help of multiplication sentences?
- What is common about the factors of any numbers?
- I am thinking of number from 40 to 60. When it is divided by 5, the remainder is 3. When it is divided by 4, the remainder is 1. What is the number?
- Arrange 18 biscuits in different ways in a tray such that the number of biscuits is same in each row. How many arrangements could you make?
Learning Objective: To introduce the concept of the Highest Common Factor or HCF.

Material Required: Square ruled sheet, scissor, pen, paper

Stress Words: Common factor, Highest Common Factor

Activity:
- Give any 2 numbers to the class, say 12 and 8.
- Guide the students to make possible groups of 12, by cutting the strips of 12 from squared paper and dividing it into groups. Represent:
  - ones
  - twos
  - threes
  - fours
  - sixes
- Guide the students to make possible groups of 8, by cutting strips of 8 from paper and dividing it into groups. Represent:
  - ones
  - twos
  - fours
- Ask the students to find out the longest common strip in both the cases. (4)
- Conclude that 4 is the Highest Common Factor of 4 and explain the method of calculating it.
- Encourage students to find the HCF of 10 and 15 in the same way.

Understanding
Expected

Application

Analysis

Thinking Skill

Real Life Connect

- Find out the HCF of 40, 45 and 20, 60, 90.
- Find out the common factors of 12, 18, and 30.
- List the first 12 multiples of 6. List the first 12 multiples of 8. Name 3 common multiples of 6 and 8 which one is highest one among three of them.
- What is the greatest common factor of the two consecutive numbers?
- There are 48 apple juice cans and 84 mango juice cans in a shop. These cans are to be put in boxes so that each box has the same number of cans with same juice. Find the greatest number of cans in each box.
<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>To find out multiples of a given number.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Required</td>
<td>Straws of equal length, glue, soft board, drawing pins</td>
</tr>
<tr>
<td>Stress Words</td>
<td>Multiples, more, multiply</td>
</tr>
</tbody>
</table>

**Activity**

- Inform the students that they will find the multiples of 4.
- Ask the students to take 4 straws of equal length and paste them on a soft board with glue vertically. Label them \( l_1, l_2, l_3 \) and \( l_4 \).
- Ask the student take 1 equal straw and fix them horizontally over the four vertical straws with drawing pins. Count the number of drawing pins i.e. \( 1 \times 4 = 4 \). Guide the students that they have multiplied 4 one time.
- Ask the student to place one more straw and count the total drawing pin i.e. \( 2 \times 4 = 8 \). Guide the students that they have multiplied 4 two times.
- Repeat with third straw and associate with representation

![Diagram of multiples]

- Make students observe that each time they are pasting a straw and counting, they are finding the multiples of 4.
- Ask the students to find out first 5 multiples of 3 in the same way.
- There can be infinite multiples of a number.
- A number which leaves no remainder when divided by that number is a multiple of it.
- List five multiples of 5, 14 and 20.
- Is 28 a multiple of 5? Why?

**Analysis**

- How many multiples of 5 up to 200 are even?
- Find the smallest odd multiple of 9 between 36 and 81.
- How many multiples can a number have?

**Thinking Skill**

- There are fewer than 90 chairs in a room. All the chairs are arranged in equal rows of 7 or 11. How many chairs are there in the room?
- Provide two spoons and ask the students to collect more students to find the multiple of it.

**Understanding Expected**

- Provide two spoons and ask the students to collect more students to find the multiple of it.

**Real Life Connect**

- Content Book Reference: Page 79, 80
- Guided Practice: Page 63
Learning Objective
To introduce the concept of Least Common Multiple or LCM

Material Required
Scale, A4 sheet, pen, colours

Stress Words
Common multiple, Lowest Common Multiple

Activity
• Instruct the students to draw the grid of $8 \times 13$ (8 rows and 13 columns) on a paper.
• Tell the students to write 1 to 12 on the columns and 2, 3, 5, 7, 10, 15, 20 in the first column.
• Multiply the numbers in the same row and column so that grid shows the first 12 multiples of numbers 2, 3, 5, 7, 10, 15 and 20.
• Ask one student to compare the multiple of 2 and 3. Again ask to find the common multiples of these two.
• Instruct them to colour those.
• Call another student to compare the multiple of 10 and 15, instruct them to colour it.
• Write their results on the board i.e.
  Common multiple of 2 and 3 are 6, 12, 18, 24
  Common multiple of 10 and 15 are 30, 60, 90, 120
• Make student observe that of the common multiple of 2 and 3, 6 is the lowest common multiple and of the common multiple of 10 and 15, 30 is the lowest common multiple.
• The smallest multiple that is common to two or more given number is their LCM.
• Encourage students to find out the LCM of other number like 5 and 7.
  LCM of two or more given number is divisible by each one of them.
• Find the LCM of $49, 76$ $11,121, 1331.$
• Find the LCM of 36, 56 and 60.
• Find the smallest number which is exactly divisible by 48, 36 and 80.
• Find the LCM of all odd primes between 1 to 20.
• You and your parent take some steps and cover a distance of 15m, 20m and 25 m respectively. After covering how many more metres will the three of you be at the same place.

Understanding Expected

Application

Analysis

Thinking Skill

Real Life Connect

Content Book Reference: Page 81

Guided Practice: Page 64
### Learning Objective
- To recognize equivalent fractions.
- To develop fractions equivalent to the given fraction.

### Material Required
Strips of paper, crayons

### Stress Words
Equivalent fractions

### Activity
- Narrate: You and your sister/brother want to share a pizza equally, how much will each person get? (Each one will get half the pizza). Your mother gave you half pizza but made 4 pieces of the other half pizza for your sister/brother. Your sister/brother was very happy to get more pizza than you. But your mother explained that both of you got an equal share. Can you explain how? Seek responses.

- Draw on the board as shown here.

- Ask the students to say aloud the fraction of the shaded region in both the figures; $\frac{1}{2}$ and $\frac{4}{8}$.

- Make them observe that in both the cases, the portion of the pizza that is shaded is the same.

- Elucidate that in both the above cases, the shaded portion represents the same part of the whole; so we say that $\frac{1}{2} = \frac{4}{8}$.

- Share with them that fractions that have the same value are called equivalent fractions.

- Divide the class into groups of four students each.

- Distribute one paper strip to each student and crayons to each group.

- Give clear instructions for each group as under:
  - One student will fold the strip into 2 equal halves and shade one part.
  - Second student will fold the strip into 4 equal parts and shade two parts.
  - Third student will fold the strip into 6 equal parts and shade three parts.
  - Fourth student will fold the strip into 8 equal parts and shade four parts.

- Ask each one of them to write the fraction of the shaded region in his/her strip; here, $\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{6}$ and $\frac{4}{8}$.

- Tell them to place the strips side by side and share their observation about the shaded portion in each strip. Seek responses.
• Represent them on the board as shown.

\[
\begin{array}{c}
\frac{1}{2} & \frac{2}{4} \\
\frac{3}{6} & \frac{4}{8}
\end{array}
\]

• Reiterate that the shaded portion of each strip represents the same part of the whole strip. Hence, \(\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}\) are equivalent fractions.

• Share with the students that to develop an equivalent fraction of a given fraction, multiply or divide the numerator and the denominator of the given fraction by the same number.

• Explain each step on the board to find three equivalent fractions of \(\frac{2}{5}\) and \(\frac{18}{36}\).

• Multiply the numerator and the denominator of \(\frac{2}{5}\) by 2, 3 and 4.

Show on the board:

\[
\frac{2}{5} = \frac{2 \times 2}{5 \times 5} = \frac{4}{10}; \frac{2}{5} = \frac{2 \times 3}{5 \times 3} = \frac{6}{15}; \frac{2}{5} = \frac{2 \times 4}{5 \times 4} = \frac{8}{20}; \text{ hence } \frac{4}{10}, \frac{6}{15} \text{ and } \frac{8}{20}
\]

are the required equivalent fractions.

• Similarly show that:

\[
\frac{18}{36} = \frac{18 \div 2}{36 \div 2} = \frac{9}{18} = \frac{18 \div 3}{36 \div 3} = \frac{6}{12} = \frac{18 \div 6}{36 \div 6} = \frac{3}{6}; \text{ hence } \frac{9}{18}, \frac{6}{12} \text{ and } \frac{3}{6}
\]

are the required equivalent fractions.

• Instruct all the students to find 2 equivalent fractions of \(\frac{3}{4}\) and \(\frac{12}{20}\).

• Guide and help them, if required.

• Ask them to exchange their notebooks with their partners.

• Discuss the answers and ask the students to verify them.

• Provide more questions, till time permits.

Equivalent fraction can be obtained if we multiply or divide the numerator and the denominator of the given fraction by the same number.

• Write 3 equivalent fractions of \(\frac{3}{5}\) and \(\frac{18}{24}\). (Ans: 6, 9, 12, 6, 8, 3)

• Fill in the blanks to make equivalent fractions.

\[
\begin{array}{c}
\frac{3}{7} = \frac{9}{21} = \frac{24}{56} = \frac{4}{9} \\
\frac{3}{7} = \frac{14}{28} = \frac{30}{63} = \frac{12}{21}
\end{array}
\]

(Ans: 6, 21, 12) (Ans: 15, 8, 5)

• Are \(\frac{3}{4}\) and \(\frac{6}{8}\) equivalent? (Yes)

• What is the missing number? \(\frac{2}{3} = \frac{56}{63} = \frac{12}{18} = \frac{8}{9}\). (Ans: 18, 8)
Thinking Skills

- Find the odd one out; \( \frac{2}{5}, \frac{6}{15}, \frac{9}{20}, \frac{4}{10} \). (Hint: Equivalent fractions)

- Find an equivalent fraction of \( \frac{16}{20} \) with numerator 4.

- Show a string with colourful beads to your child. Ask him/her find the fraction of each coloured bead and find 2 equivalent fractions of each.

- Make your child form a fraction with the number of children in the house as the numerator and the total members of the family as the denominator. Encourage him/her to write 3 equivalent fractions of the fraction obtained.

Parent Connect

- Show a string with colourful beads to your child. Ask him/her find the fraction of each coloured bead and find 2 equivalent fractions of each.

- Make your child form a fraction with the number of children in the house as the numerator and the total members of the family as the denominator. Encourage him/her to write 3 equivalent fractions of the fraction obtained.

Content Book Reference: Page 90, 91

Guided Practice: Page 73
Lesson Plan - 2

Grade - 4

Learning Objective
To reduce a fraction to its lowest form or simplifying a fraction.

Material Required
Strips of paper, crayons

Class, Group

Activity

- Recall equivalent fractions by enquiring from the students how to find two equivalent fractions of \( \frac{18}{24} \).
- Appreciate if they mention that they will divide the numerator and the denominator of \( \frac{18}{24} \) by the same number.
- Invite one student to show on the board:
  \[
  \frac{18}{24} = \frac{18 \div 2}{24 \div 2} = \frac{9}{12}, \quad \frac{18}{24} = \frac{18 \div 3}{24 \div 3} = \frac{6}{8};
  \]
hence \( \frac{9}{12} \) and \( \frac{6}{8} \) are equivalent fractions of \( \frac{18}{24} \).
- Encourage the students to check if there is any other common factor with which \( \frac{18}{24} \) can be divided to obtain more equivalent fraction. Seek responses.
- Summarise that 6 is another common factor, hence \( \frac{18}{24} \) can be divided to obtain more equivalent fraction. Seek responses.
- Make them observe that fractions \( \frac{18}{24}, \frac{9}{12} \) and \( \frac{6}{8} \) can be further divided by common factors to reduce them to \( \frac{3}{4} \), however there is no common factor between 3 and 4 in the fraction \( \frac{3}{4} \) other than 1 to reduce it further. Such a fraction is said to be in the lowest form or simplest form.
- Conclude; to reduce a fraction to its lowest/simpliest form, divide the numerator and the denominator of the given fraction by their highest common factor; here \( \frac{3}{4} \) is the simplest form of \( \frac{18}{24} \) and the highest common factor is 6.
- Write few fractions on the board and ask the students to reduce them to the simplest form: \( \frac{4}{8} \) and \( \frac{12}{18} \).
- Instruct them to solve the questions individually without discussing.
- Discuss the solutions and ask the students to verify their answers; \( \frac{1}{2} \) and \( \frac{2}{3} \).
Understanding
Expected

- Reduce a fraction to its lowest/simplest form by dividing the numerator and the denominator of the given fraction by their highest common factor.

- Express the following fractions in their simplest form.
  \[ \frac{9}{21}, \frac{36}{48}, \frac{16}{18} \] (Ans: \( \frac{3}{7}, \frac{3}{4}, \frac{8}{9} \))

- Which of the following fractions are not in the lowest term?
  \[ \frac{3}{5}, \frac{13}{33}, \frac{6}{8} \] (Ans: \( \frac{6}{8} \))

- Find the odd one out; \( \frac{12}{15}, \frac{16}{22}, \frac{9}{20}, \frac{6}{10} \). (Hint: Simplest form)

- Make your child form fractions with the number of marks obtained to the total number of marks in various subjects, say, English, Maths and Science. Also, ask him/her to reduce the fractions of marks obtained in their simplest form.

Application

Analysis

Thinking Skills

Parent Connect

Content Book Reference: Page 92
Guided Practice: Page 74
Learning Objective
To define and identify proper and improper fractions.

Material Required
Identical square sheets

Activity

- Get students to work in groups of four students. Provide four identical square sheets to each group. Ask them to place one sheet above the other to observe that all given sheets have same size and shape.
- Interact with students and ask them “What does the given sheet shows?”
- Discuss answers and lead students to recollect that a given sheet represents a whole.
- Ask each group to fold the given sheets in two equal parts (fold through middle such that the two parts overlap each other and matches exactly with each other), unfold the sheet, draw a line on folded crease and shade any one part of the sheet in any colour.
- Ask them “What does the shaded part show?” Lead students to visualise that folded part is one part out of the two equal parts and therefore it shows \( \frac{1}{2} \) and read as halves.
- Again provide four square sheets to each group and then ask them to first fold the sheets into halves and then again fold the sheet one more time to get two equal parts of first fold.
- Ask students to open the folds and draw the lines on folded creases. Ask them about the number of folds and number of equal parts thus obtained. Lead them to visualise that they have folded the sheet two times into halves and got total four equal parts.
- Now, ask one student of the group to shade one part, second to shade two parts, third to shade three parts and fourth to shade four parts with same colour and write the fraction for each corresponding shaded part.
- Let students come up that the corresponding fractions are \( \frac{1}{4}, \frac{2}{4}, \frac{3}{4} \) and \( \frac{4}{4} \).
- Lead students to recollect that \( \frac{4}{4} \) shows a whole, i.e. when numerator and denominators are same, the fraction represents a whole.
- Inform students that when numerator < denominator the fraction is called a proper fraction and each part shows \( \frac{1}{4} \) of a whole and read as one fourths.
- Now ask each group to place any two sheets together such that one of the sheets shows four shaded parts out of four equal parts, i.e. a whole and another sheet shows any proper fraction.
Now ask them to count the total number of fourths in those pair of sheets altogether and come up with a result (their result may be five fourths, sixth fourths or seven fourths)

Lead students to write the five fourths, sixth fourths or seven fourths mathematically, i.e. \( \frac{5}{4} \), \( \frac{6}{4} \) and \( \frac{7}{4} \) and introduce the name for such fractions as improper fractions. Define improper fractions as fractions whose numerator is equal to or greater than the denominator.

Conclude that proper fractions are less than whole while improper fractions are more than whole.

Parts of a fraction. Students will be able to identify proper and improper fractions.

Decimals

- Write the fractions for corresponding shade part for following?
  
  (i) 
  
  (ii) 

  (Ans: (i) \( \frac{10}{3} \), (ii) \( \frac{1}{4} \))

- Identify proper and improper fractions among given fractions.
  \( \frac{3}{4} , \frac{5}{6} , \frac{7}{5} , \frac{8}{4} , \frac{3}{7} \)  

  (Proper Fractions: \( \frac{3}{4} , \frac{5}{6} , \frac{3}{7} \) Improper Fractions: \( \frac{7}{5} , \frac{8}{4} \))

- How many eighths will make a whole? (8)

Thinking Skills

- How many halves are there in \( 6 \frac{1}{2} \) and \( 3 \frac{1}{2} \)? (20)

- Which is greater \( \frac{4}{5} \) or \( \frac{5}{4} \)? (\( \frac{5}{4} \), as it is an improper fraction)

Real Life Connect

- Find the total number of students in your class and find what part of your class are girls or boys.
**Lesson Plan - 4**

**Grade - 4**

**Learning Objective**
To define mixed fractions and understand representation of that on a number line.

**Material Required**
Identical circular shape cut outs

**Activity**
- Get students to work in pairs.
- Provide a set of three identical circular shape cut outs to each pair.
- Ask them “What does a cut out represent mathematically?” Let them come up that a circular cut out shows a whole.
- Ask them to fold any one cut out into two equal parts twice, unfold the sheet, and observe the number of equal parts of sheet. Let them come up with a result that there are four equal parts. Ask them to shade any one part and write the fraction for shaded part.
- Instruct them to place all three cut outs altogether and write corresponding whole number/fraction below each cut out.

```
1 1 1/4
```
- Led students to visualise that there are 2 wholes and one proper fraction altogether.
- Explain here, that when a whole is added with a fraction, the obtained fraction is called a mixed fraction and show the style of writing a mixed fraction on the board i.e. $1 + 1 \frac{1}{4} = 2 + \frac{1}{4} = 2\frac{1}{4}$, which clearly shows the whole part and fractional part.
- Now repeat the activity for $1\frac{1}{2}$ and help students to understand the concept of mixed fractions.
- Explain representation of mixed fraction on number line to represent $1\frac{3}{4}$ as follows:
  » Identify the whole number part of mixed fraction
  » Locate that whole number and its next whole number on a number line, i.e. 1 and 2 here.
  » Observe the denominator of given fraction. Divide the number line between the marked whole numbers, in that many parts as equal to denominator of fraction, i.e. here denominator is 4, so divide the number line between 1 and 2 into four equal parts
  » Write the mixed fraction for each part and locate the required fraction, i.e. the mixed fraction for each part between 1 and 2 are $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}$.
The required mixed fraction is $1 \frac{3}{4}$, third mark from 1.

Write, $1 \frac{2}{4}$ on board and refer to the numerator and denominator of the proper fraction part of mixed fraction and explain that it can be further simplified as $\frac{1}{2}$ by dividing the numerator and denominator by 2, as 4 is a multiple of 2. i.e. $\frac{2}{4} \div 2 = \frac{1}{2}$. Thus the mixed fraction $1 \frac{2}{4}$, is actually written as $1 \frac{1}{2}$.

Conclude that mixed fractions are written by combining whole and fractional part and whole part is written first. Also summarise that a mixed fraction is always represented in its simplest form.

Students will be able to identify mixed fractions and represent them using a model.

**Decimals**

- Express following fraction in its simplest form.
  
  (i) $2 \frac{4}{8}$  
  (ii) $5 \frac{3}{6}$  
  (iii) $1 \frac{2}{8}$

  (Ans: (i) $2 \frac{1}{2}$  
  (ii) $5 \frac{1}{2}$  
  (iii) $1 \frac{1}{4}$)

- Draw a model to represent $2 \frac{1}{3}$ and $4 \frac{1}{5}$

Write the fraction for following:

(i) 

(ii)

(Ans: (i) $3 \frac{3}{4}$  
(ii) $2 \frac{1}{5}$)

- Ranu locates two whole numbers 6 and 10 on a number line. Then she finds a number which is equidistant from both these numbers and marks that as O. Then she divides the number line between point O and its predecessor in equal parts and marks them as A, B, C, and D. Find what number does the point C represent? ($\frac{73}{5}$)

- Rekha had two identical circles. She divided each circle into six equal parts. Her mother gave her three more identical circles having same size as of earlier. She divides each of them in 3 identical parts. Later she gave 2 parts from a circle divided into 3 equal parts and 2 parts from a circle divided into 6 equal parts to her sister. Write the fraction for the parts left with Rekha. (4 wholes are left with Rekha)

Find the quantity of vegetables/ fruits bought at your home in a day/week and find whether the bought quantity shows a proper fraction or an improper fraction, e.g. $1 \frac{1}{2}$ kg potatoes and 2 kg onions etc.
Learning Objective
To convert improper fraction into mixed fraction and vice versa.

Material Required
Cards

Activity

• Get students to work in pairs. Randomly distribute a card to each pair on which a mixed fraction is written.
• Ask them to identify the nature of fraction and represent that using a model.
• Ask students to find the total number of \( \frac{n}{3} \) (where \( n \) is the denominator of a mixed fraction) they have, say a student have \( 2\frac{1}{3} \) on his card. He has to find the total number of one thirds they have altogether. Let them come up with a result that they have seven one thirds.
• Ask them to write the fraction corresponding to total number of \( \frac{n}{3} \) parts they have, i.e. \( \frac{7}{3} \). Lead them to realise that \( \frac{7}{3} \) is an improper fraction and they have find the corresponding improper fraction for given fraction.
• Explain the rule as, multiply denominator to whole part and add the numerator in the product. Write the sum as numerator of improper fraction and keep the denominator same as of fraction part of mixed fraction. E.g. \( 2\frac{1}{3} = \frac{2 \times 3 + 1}{3} = \frac{7}{3} \)
• Now provide a card to each pair on which an improper fraction is written. Ask students to identify the type of fraction it is and also identify the denominator and numerator of fraction.
• Ask them to split that improper fraction into sum of two like fractions such that one of the fractions can be simplified as whole number or whose numerator is equal to denominator or multiple of that. Exemplify the case as: \( \frac{11}{9} = \frac{9}{9} + \frac{2}{9} = 1 + \frac{2}{9} = 1\frac{2}{9} \)
• Also explain the division method for converting an improper fraction to mixed fraction, i.e. divide the numerator by denominator, the quotient will be the whole part of mixed fraction and the remainder /divisor will be the proper fraction part of mixed fraction. E.g. If fraction is \( \frac{14}{3} \), then one dividing 14 by 3, we get 4 as quotient and 2 as remainder. Then the corresponding mixed fraction is \( 4\frac{2}{3} \).
• Conclude that to convert a mixed fraction into an improper fraction, the numerator of improper fraction equals the sum of product of whole number part with denominator and the numerator of proper fraction, while denominator is same as of proper fraction. While for converting an improper to mixed fraction, use division operation.

Understanding
Multiplication and Division operation, Students will be able to convert mixed fraction into an improper fraction and vice versa.
Thinking Skills

Priya walks for \(4 \frac{2}{5}\) km while Meenu walks for \(23\frac{3}{5}\) km. Find who walks more distance. (Meenu)

Sachin writes an improper fraction whose numerator is thrice of 7 and denominator is equal to 2 more than half of 18. Find the corresponding mixed fraction for improper fraction written by Sachin. \(1 \frac{10}{11}\)

Real Life Connect

Find the length of cloth required to make a trouser, a shirt and a door curtain. If it is in mixed fractions, convert them into improper fractions

Understanding Expected

Multiplication and Division operation, Students will be able to convert mixed fraction into an improper fraction and vice versa.
Lesson Plan - 6

Grade - 4

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>To compare and order like fractions, unlike fractions and mixed fractions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Required</td>
<td>Circular cut outs having 4 parts and 5 parts respectively</td>
</tr>
</tbody>
</table>

**Activity**

- Write following problem on the board:
- A *chappati* was cut into five equal parts. Juhi ate \( \frac{2}{5} \) parts while Rashi ate \( \frac{3}{5} \) parts of roti. Who ate more parts?
- Get students to work in pairs and ask them to answer the given problem.
- Let them realise that to answer the given problem they have to compare like fractions.
- Let them come up with a result that Rashi ate more parts, as Juhi ate 2 parts out of 5 equal parts while Rashi ate 3 parts out of 5 equal parts.
- Now write following fractions on the board and ask them to arrange them in ascending order: \( \frac{7}{9} \), \( \frac{3}{9} \), \( \frac{5}{9} \)
- Let them realise that all fractions are like fractions and come up with a result that \( \frac{3}{9} < \frac{5}{9} < \frac{7}{9} \)
- Explain that to compare like fractions, just compare numerators and the fraction with least numerator is the smallest one while the fraction with largest numerator is the greatest one.
- Now write following problem on the board:
- There were two chapattis. One was cut into 4 equal pieces and other was cut into five equal pieces. If Raju ate 1 piece of a roti cut into 4 equal pieces and Malu ate \( \frac{1}{5} \) part of a roti, find who did eat more parts of roti?
- Get students to work in pairs and answer the given problem. Let them realise that to answer the given problem, they need to compare two unlike fractions, i.e. \( \frac{1}{4} \) and \( \frac{1}{5} \).
- Provide circular cut outs having 4 parts and 5 parts respectively to each pair and ask them to shade 1 part in each and answer the posed question. Let students visualise that 1 piece of a roti having 4 equal parts is bigger than the other. In other ways \( \frac{1}{4} > \frac{1}{5} \).
- Lead students to understand that when unlike fractions have same numerators the fraction with smaller denominator is larger.
- Write following problem on the board and ask students to arrange them in descending order: \( \frac{1}{4} \), \( \frac{3}{5} \), \( \frac{2}{3} \)
- Let students realise that all given fractions are unlike fractions and they have distinct numerators too.
- Explain them that in such case we first find the lowest common multiple of denominators of all given fractions and then convert each fraction into
an equivalent fractions such that all have common denominators, i.e. all become like fractions.

- Tell students that then compare numerators of all obtained like fractions. E.g. Here LCM of 4, 5 and 3 is \(4 \times 5 \times 3 = 60\). The equivalent fractions for given fractions are: \(\frac{1}{4} = \frac{15}{60}, \frac{3}{5} = \frac{36}{60}, \frac{2}{3} = \frac{40}{60}\)

- Now comparing like fractions, we get, \(\frac{40}{60} > \frac{36}{60} > \frac{15}{60}\) or \(\frac{2}{3} > \frac{3}{5} > \frac{1}{4}\)

- Discuss following example to compare mixed fractions: \(3 \frac{4}{5}\) and \(4 \frac{1}{4}\)

- Help students to compare given fractions just by observing whole number part, as \(4 > 3\) so \(4 \frac{1}{4} > 3 \frac{4}{5}\)

- Write \(3 \frac{3}{4}\) and \(3 \frac{2}{5}\) on the board and ask students to compare given fractions.

- Help students to realise that whole number part is same in both given fractions. Explain that in such a case, we need to compare fractional parts, i.e. \(\frac{3}{4}\) and \(\frac{2}{5}\).

- Let them realise that fractional parts are unlike fractions and to compare them convert them into equivalent fractions having same denominators, i.e. \(\frac{2}{5} = \frac{8}{20}\) and \(\frac{3}{4} = \frac{15}{20}\). Thus \(\frac{15}{20} > \frac{8}{20}\). Therefore \(\frac{3}{4} > \frac{2}{5}\). Thus \(3 \frac{3}{4} > 3 \frac{2}{5}\)

- Conclude that to compare like fractions compare numerators while for comparing unlike fractions convert them into equivalent fractions such that they have common denominators. In case of mixed fractions, compare whole parts first, the fraction having greater whole part is greater. If whole parts are same compare fractional parts.

**Equivalent Fractions, Lowest common multiple**

**Decimals**

- Arrange the given fractions in descending order. \(\frac{5}{6}, \frac{5}{12}, \frac{5}{7}, \frac{5}{9}\) \(\left(\frac{5}{6}, \frac{5}{7}, \frac{5}{9}, \frac{5}{12}\right)\)

- Neha completes \(\frac{4}{7}\) part of a work in half an hour while Sonu completes \(\frac{3}{7}\) part of same work in same time period. Who works faster? (Neha)

- Compare using an appropriate symbol.
  (i) \(\frac{9}{10}\) and \(\frac{5}{6}\) \(\left(\frac{9}{10}, \frac{5}{6}\right)\)
  (ii) \(\frac{4}{5}\) and \(\frac{7}{8}\) \(\left(\frac{4}{5}, \frac{7}{8}\right)\) \(\text{(Ans: (i) >, (ii) <)}\)

- Arrange the given fractions in ascending order. \(\frac{2}{5}, \frac{1}{5}, \frac{4}{5}, \frac{3}{5}\) \(\left(\frac{2}{5}, \frac{4}{5}, \frac{3}{5}, \frac{1}{5}\right)\)
• Follow the given pattern and write the next two fractions. Also arrange them in ascending order.

\[
\frac{6}{11}, \frac{6}{14}, \frac{6}{17}, \ldots, \frac{6}{11}.
\]

(Ans: \(\frac{6}{20}, \frac{6}{23}\); ascending order: \(\frac{6}{23}, \frac{6}{20}, \frac{6}{17}, \frac{6}{14}, \frac{6}{11}\))

• Naina used \(\frac{2}{5}\) kg of sugar to make a sweet dish while Kavita used \(\frac{3}{7}\) kg of sugar to make another sweet dish. Who has used more amount of sugar? (Naina)

Express the marks obtained in a test as fraction and compare your marks with your friends, studying in different school or same school.
Lesson Plan - 7

Grade - 4

Learning Objective
To add like fractions and unlike fractions

Material Required
White colour identical fraction strips divided in 5 equal parts

Activity

- Write following problem on the board:
- Anu needs $\frac{2}{5}$ m cloth for making a table cover and $\frac{1}{5}$ m cloth for making a cushion cover. What length of cloth does she need to buy altogether?
- Ask students to analyse the problem and let them realise that to find the total length of cloth, one has to add the given fractions.
- Get students to work in pairs.
- Provide two copies of identical fraction strips divided in 5 equal parts, to each pair and ask students to identify the fraction for each part of given strip.
- Ask them to shade one and two parts respectively in those strips with same colour. Ask students to write the fraction for shaded parts in each and lead them to realise that both are like fractions, i.e. $\frac{1}{5}$ and $\frac{2}{5}$
- Instruct them to place both strips just adjacent to each other and ask them to count the total number of shaded parts in both strips and find how many fifths are shaded in all.
- Let students realise that three fifths are shaded.
- Lead students to understand addition of two like fractions, i.e. add numerators and keep the same denominator as in given fraction and simplify the obtained fraction if required, e.g. $\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$
- Now write following addition problem on the board: $\frac{1}{3} + \frac{1}{6}$
- Ask students to solve the given problem. Let them realise that both are unlike fractions and pose a question “How to add unlike fractions?”
- Provide a set of fraction strip of $\frac{1}{3}$ and $\frac{1}{6}$ to each pair (without informing them). Ask them to identify the fraction for each part of strip and shade the strips to show the given fractions respectively.
- Ask students to observe the denominators and find the lowest common multiple of those. Here LCM of 3 and 6 is 6.
- Then ask students to divide the strips into as many parts as equal to LCM of denominators. Here one of the strips already have 6 parts, so divide another strip into 6 equal parts, by folding the strips, i.e. first fold the strip into one thirds and then fold the strip into halves, open the fold and draw the line on folded crease. Observe the number of parts thus obtained. Lead them to visualise that each part of $\frac{1}{3}$ strip now shows $\frac{2}{6}$ and $\frac{1}{3} = \frac{2}{6}$.
- Refer to addition statement and ask students to replace $\frac{1}{3}$ by $\frac{2}{6}$ and rewrite the addition expression $\frac{2}{6} + \frac{1}{6}$.
Explain here that by folding the strip or strips, they have converted strip/strips into equivalent fractions such that both strips show equal number of parts or represent like fractions.

Explain the addition of two unlike fractions here, i.e. convert the given fractions into equivalent fractions such that they become like fractions. Now ask them to add the obtained like fractions and come up with a result that $\frac{2}{6} + \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$

Write following problem on the board: $\frac{1}{3} + \frac{1}{4}$

Ask students to solve the given problem and draw the model for the same.

Lead students to realise that lowest common multiple of 3 and 4 is 12, hence convert them into equivalent fractions such that their common denominator becomes 12, i.e. $\frac{1}{3} = \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$ and $\frac{1}{4} = \frac{1 \times 3}{4 \times 3} = \frac{3}{12}$

Draw the following model on the board in support:

\[
\begin{array}{c}
\frac{1}{3} + \frac{1}{4} = \frac{4}{12} + \frac{3}{12} = \frac{7}{12}
\end{array}
\]

Conclude that addition of like fraction equals: sum of the numerator/common denominator. While to add unlike fractions express given fractions into their equivalent fractions such that they have same denominator and then add them as like fractions.

Equivalent Fractions, Lowest Common Multiple

Decimals

Find the sum of following:

(i) $\frac{9}{16} + \frac{5}{16}$
(ii) $\frac{6}{12} + \frac{4}{10}$
(iii) $\frac{2}{9} + \frac{1}{10}$

Susheel ate $\frac{3}{8}$, Sunil ate $\frac{1}{8}$ and Neeta ate $\frac{2}{8}$ of a pizza. How much of a pizza did they eat together? ($\frac{3}{4}$ of a pizza)

Add following Fractions

(i) $\frac{7}{18} + \frac{5}{18} + \frac{3}{18}$
(ii) $\frac{7}{13} + \frac{3}{26} + \frac{2}{13}$

Surbhī jogged half of a kilometre, walked $\frac{1}{5}$ of two kilometres, ran $\frac{3}{10}$ km, walked another $\frac{7}{10}$ km, and then jogged for a quarter of two kilometres. How many kilometres did she travel in all? ($2 \frac{2}{5}$ km)

Maya’s school bag contents are $\frac{3}{7}$ parts of textbooks, $\frac{2}{7}$ parts for notebooks and $\frac{1}{7}$ part tiffin box. What fraction of her bag is filled? ($\frac{6}{7}$)

Find what fraction of one litre of water, a glass hold. Find how much water is drink by you every day.

Content Book Reference: Page 102,104  
Guided Practice: Page 81, 82
Activity

- Write following problem on the board: \(4 \frac{1}{2} + 1 \frac{1}{4}\).
- Ask students to solve the given problem and draw the model for the same.
- Let them realise that given fractions are mixed fractions and pose a query “How to add mixed fractions?”
- Explain mixed fractions can be added in following way:
- Draw following model on the board to visualise the situation:

\[
\begin{array}{c}
\hline
\text{4} & \text{2} & \text{1} & \text{4} \\
+ & \frac{1}{2} & 1 & \frac{1}{4} \\
\hline
\end{array}
\]

- Now, ask them to split the mixed fractions as whole number part and proper fractional part and rewrite the addition statement, i.e.

\[4 + \frac{1}{2} + 1 + \frac{1}{4} = 4 + 1 + \frac{1}{2} + \frac{1}{4}\]

- Ask them to add the whole number parts separately and then add the fractional part separately.

\[
\begin{array}{c}
\hline
\text{5} & \frac{1}{2} & \frac{1}{4} \\
+ & & & \\
\hline
\end{array}
\]

- Explain that to add the fractional part, identify whether they are like or unlike fraction and adopt appropriate method for adding them.
- Let students come up with a result that here fractional parts are unlike fractions.
- Ask students to add fractional parts and come up with a result that lowest common multiple of 2 and 4 is 4 and converting \(\frac{1}{2}\) as equivalent fraction such that its denominator is 4, we get; \(\frac{1}{2} = \frac{2}{4}\).
- Now adding fractional part, we get; \(\frac{2}{4} + \frac{1}{4} = \frac{3}{4}\).
- Now, ask students to combine both whole number part and fractional part, i.e. \(5 + \frac{3}{4} = 5 \frac{3}{4}\).
- Draw following model on the board in support:

\[
\begin{array}{c}
\hline
\text{5} & \frac{2}{4} & \frac{1}{4} \\
+ & \frac{3}{4} \\
\hline
\end{array}
\]
Ask students “Can they think any other method to add mixed fractions?”

Explain the alternative method to add mixed fractions, i.e. first convert them into improper fractions and then add them as like or unlike fractions (whatever case may be).

Exemplify the alternative method for the same problem as discussed above, i.e. $4 \frac{2}{3} + 1 \frac{1}{4} = \frac{14}{3} + \frac{5}{4} = \frac{56}{12} + \frac{15}{12} = \frac{71}{12} = 5 \frac{11}{12}$.

Conclude that addition of like fraction equals Sum of the numerators/ Common denominator while to add unlike fractions express given fractions (whatever case may be). Convert the alternative method to add mixed fractions, i.e. first convert them into improper fractions and then add them as like or unlike fractions.

Content Book Reference: Page 103, 104

Guided Practice: Page 81, 82

Equivalent Fractions, Lowest Common Multiple

Add the following fractions:

(i) $\frac{2}{4} + \frac{1}{3} = \frac{6}{12} + \frac{4}{12} = \frac{10}{12} = \frac{5}{6}$

(ii) $\frac{4}{3} + \frac{5}{6} = \frac{8}{6} + \frac{5}{6} = \frac{13}{6}$

There was $20 \frac{1}{4}$ kg of wheat in a drum. Vicky put $12 \frac{1}{5}$ kg more in the drum. Find the total amount of wheat in the drum?

$20 \frac{1}{4} + 12 \frac{1}{5} = \frac{81}{4} + \frac{61}{5} = \frac{405 + 244}{20} = \frac{649}{20} = 32 \frac{9}{20}$ kg
Lesson Plan - 9

Grade - 4

Learning Objective
To subtract like, unlike and mixed fractions

Material Required
White colour fraction strips divided in 5 equal parts

Pair Activity

Activity

- Write following problem on the board:
  - Nisha had $\frac{3}{5}$ m long ribbon. She gave $\frac{1}{5}$ m long ribbon to her friend. Find the length of ribbon left with Nisha.
- Get students to work in pairs and ask them to solve the given problem. Let them realise that to solve the given problem subtraction operation has to be applied on fractions and write a subtraction expression for the same, i.e. $\frac{3}{5} - \frac{1}{5}$
- Ask students to identify the fractions involved in given subtraction problem and let them come up with a result that they are like fractions.
- To explain subtraction of fractions, provide a fraction strip divided in 5 equal parts (of $\frac{1}{5}$) to each pair.
- Ask them to shade the given strips to show minuend, i.e. $\frac{3}{5}$.
- Then ask them to fold that many shaded parts as equal to subtrahend back side or cut those parts and observe the number of shade parts visible on front side and write the fraction for same i.e. $\frac{2}{5}$ here.
- Draw the following model on board in support.

\[
\begin{array}{c}
\hline
\hline
\hline
\hline
\hline
\end{array}
\quad \frac{3}{5}
\quad \frac{2}{5}
\quad \text{After Fold/cut}
\end{array}
\]

- Explain the subtraction of like fractions, i.e. subtract numerators and keep the same denominator.
- Now, write following problem on the board: $\frac{5}{7} - \frac{1}{4}$
- Ask students to solve the given problem and let them come up with a result that given fractions are unlike fractions.
- Explain that subtraction of unlike fractions is done in similar way as addition of unlike fractions.
- Ask them to find the lowest common multiple (LCM) of denominators of given fractions and then convert them into equivalent fractions such that both have common denominators.
- Then instruct them to subtract them as like fractions. E.g. LCM of 7 and 4 is 28. Equivalent fraction for $\frac{5}{7}$ having 28 as denominator is; $\frac{5}{7} = \frac{5 \times 4}{7 \times 4} = \frac{20}{28}$ and equivalent fraction for $\frac{1}{4}$ is; $\frac{1 \times 7}{4 \times 7} = \frac{7}{28}$. Then the subtraction problem becomes: $\frac{20}{28} - \frac{7}{28} = \frac{13}{28}$.
- Draw following model in support, where first strip shows; $\frac{5}{7}$ or $\frac{20}{28}$. The second strip shows the number of shaded parts left after folding/cut the strip.
Now write following problem on the board:

\[ 3\frac{1}{2} - 1\frac{3}{4} \]

Ask students to solve the given problem and let them realise that given fractions are mixed fractions. Let them pose a query “How to subtract mixed fractions?”

Ask students to convert the given mixed fractions as improper fractions and then subtract as unlike / like fractions (whatever case may be), i.e.

\[ \frac{7}{2} - \frac{7}{4} = \frac{14}{4} - \frac{7}{4} = \frac{7}{4} = 1\frac{3}{4} \]

Conclude that subtraction of like fractions equals difference of numerators /common denominators while to subtract unlike fractions, express given fractions into their equivalent fractions such that they have common denominator and then subtract them as like fractions. In case of mixed fractions convert them into improper fractions and then follow the same rule for subtracting like or unlike fractions.

Students will be able to apply subtraction of fraction for solving practical problems.

**Decimals**

- Aruna had a 3\( \frac{1}{2} \) m long string. She gave 1\( \frac{1}{2} \) m string to Radha. What length of string was left with Aruna? (2 m)
- Hina bought 5\( \frac{1}{4} \) litres of juice. She served 3\( \frac{5}{6} \) litres of juice to guest. Find how much juice is left? (1\( \frac{5}{12} \) litres of juice)

Subtract the following:

\[
\begin{align*}
(i) & \quad \frac{1}{2} - \frac{1}{6} \\
(ii) & \quad \frac{1}{3} - \frac{2}{7} \\
(iii) & \quad \frac{2}{3} - \frac{4}{8} \\
(iv) & \quad 2\frac{3}{4} - 1\frac{1}{3} \quad (\text{Ans: } \frac{1}{3}, \frac{1}{21}, \frac{1}{6}, 1\frac{5}{12})
\end{align*}
\]

**Real Life Connect**

- The distance of Lucky’s school from home is 2\( \frac{3}{10} \) km and that of PInki’s house is 3\( \frac{5}{10} \) km. Whose school is farther and by how much distance? (PInki’s house is farther from school and by 1\( \frac{1}{5} \) km more farther than Lucky’s house).
- Neelam bought 2\( \frac{1}{4} \) m long ribbon, Seema gave a certain length of ribbon to Neelam such the total length of ribbon is 1\( \frac{1}{5} \) m less than 5\( \frac{1}{4} \) m. Find the length of ribbon given by Seema to Neelam? (1\( \frac{4}{5} \) m).
- Find what fraction of one litre of milk is consumed by you every day and how much milk is left.
- Find what part of a day you spend on playing and sleeping. Also find out the left out part of a day.

Content Book Reference: Page 105-107  
Guided Practice: Page 83-88
Lesson Plan - 1

Grade - 4

WHOLE AND PART : DECIMALS

Learning Objective
- To identify parts of a decimal number.
- To read and write decimal numbers.
- To write the place value and expanded form of a decimal number.

Material Required
Strips divided into 10 equal parts, grid divided into 100 equal parts, a block of thousandths

Activity
- Get students to work in groups of 9 students. Provide a strip divided into 10 equal parts to each student of a group and ask them to shade 1, 2, 3, 4, 5, 6, 7, 8 and 9 parts of sheets respectively.
- Instruct them to write the fraction for corresponding shaded part for each strip. Let them come up that respective fractions are \( \frac{1}{10}, \frac{2}{10}, \frac{3}{10}, \frac{4}{10}, \frac{5}{10}, \frac{6}{10}, \frac{7}{10}, \frac{8}{10} \) and \( \frac{9}{10} \).
- Lead students to recollect that \( \frac{1}{10} \) can also be written as 0.1 and read as zero point one. Tell students that the point is called a decimal and decimals also show parts of a whole as similar to fraction.
- Lead students to write the decimals for corresponding fraction for shaded part of their strips. Help them to write 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9
- Draw a number line from 0 to 1 and divide that into 10 equal parts on board. Write corresponding fraction and decimal for each mark on number line between 0 and 1.
- Explain that in a decimal number, decimal point separates whole number part and decimal/fractional part, e.g. in 0.6, 0 is a whole number while 6 is fractional part or decimal part.
- Share with students that 0.1 corresponds to \( \frac{1}{10} \), therefore the name of its place value is ‘tenths’.
- Now get students to work in pairs. Provide two strips, each divided in 10 equal parts to each pair. Ask them to shade 10 parts of a strip and ask them what does the shaded part show?
- Let them recall the meaning of whole and ask them to shade 4 parts of another strip and place both strips together and write the corresponding decimal for shaded parts. Lead them to visualise that the corresponding decimal is 1.4
- Write 6.7 on the board and ask students to write the expanded form of given decimal. Let them arrange the given decimal according to its place value and write the corresponding expanded form of that, i.e. 6 ones + 7 tenths and read them as six point seven.
Now provide a grid divided in 100 equal parts to each pair of students and ask them to shade 1 part of that and write the corresponding fraction for that, i.e. \( \frac{1}{100} \).

Lead students to realise that every tenth of a sheet is further divided into tenths (ten equal parts) and thus each part representing one hundredth of a whole and in decimal form it is written as 0.01, i.e. \( \frac{1}{100} = 0.01 \).

Ask them to shade some more part of sheet to show total five shaded parts of the grid (they will shade four more parts) and write the fraction and decimal for that, i.e. \( \frac{5}{100} = 0.05 \). Repeat the process for total 10 shaded parts and lead students to visualise that \( \frac{10}{100} = \frac{1}{10} = 0.10 \).

Draw a number line from 0 to 0.1 and show ten division of that and write corresponding fraction and decimal for each part.

Tell students that when a tenth is divided into ten equal parts, each part represent one hundredth and therefore one hundredth is smaller than one tenths. Also tell students, how a hundredth is read, e.g. 0.06 is read as zero point zero six.

Write 5.43 on the board and ask students to arrange the digits in place value chart and write expanded form of that, i.e. 5 ones + 4 tenths + 3 hundredths or \( 5 + \frac{4}{10} + \frac{3}{100} \).

Ask following question to students, if one hundredths is divided into ten equal parts, what does that represent? Let students analyse the problem and attempt to answer that.

Show a block of thousandths and help students to visualise that each part of it shows thousandths.

To represent thousandths on a number line, draw a number line, mark points 0 and 0.01 on that and divide the number line between these two numbers into ten equal parts.

Show the corresponding fraction and decimal for each part on that. Tell students that one thousandths is written as 0.001 and read as zero point zero zero one.

Randomly ask students to write decimals for a few decimals numbers, e.g. forty five thousandths (0.045), two hundred twenty three thousandths (0.223) etc.

Write 4.567 on board and ask students to write the expanding form of that, i.e. \( 4 + \frac{5}{10} + \frac{6}{100} + \frac{7}{1000} \).

Conclude that decimals are parts of a whole, when a whole is divided into ten equal parts, each part is called tenths, when a whole is divided into 100 equal parts, each part is called a hundredths and when a whole is divided into 1000 equal parts, then each part is called thousandths.
Application
Write the expanding form of following decimals:

» 5.11 \ (Ans: 5 + \frac{1}{10} + \frac{1}{100}) \\
» 3.67 \ (Ans: 3 + \frac{6}{10} + \frac{7}{100}) \\
» 8.90 \ (Ans: 8 + \frac{9}{10})

Analysis
- Draw a model to show eight tenths.
- Write the decimal for following:
  » 3 at ones place and 5 at hundredths place. (Ans: 3.05)
  » 4 at tenths place, 6 at tens place, 2 at ones place, 8 at hundredths place. (Ans: 62.48)

Thinking Skills
- Compare two tenths and twenty hundredths. (Ans: both are same)
- Complete the following pattern for next two terms:
  5.61, 6.61, 7.61, 8.61, _____ , _____ (Ans: 9.61, 10.61)

Real Life Connect
- Observe the grocery bills and find decimals there.
- Find the weight of your family member using digital balance and observe use of decimals there.

Content Book Reference: Page 113-116
Guided Practice: Page 89, 90
Learning Objective
To convert fractions to decimals and vice versa

Material Required
Chits on which decimal fractions are written and chits on which corresponding decimals are written

Activity
- Write following decimals/fractions (in words) on the board: Two tenths, thirty hundredths
- Ask students to write the decimals and fractions for given parts of a whole. Let them come up with a result that two tenths can be written as \( \frac{2}{10} \) or 0.2 and thirty hundredths can be written as \( \frac{30}{100} \) or 0.30.
- Help them to realise that decimals and fractions have a relation and fraction can be converted into decimal and vice versa.
- Explain the conversion rule for fraction to decimal, i.e. observe the denominator and identify the number of zeros it has. Write the numerator of given fraction and count that many places from right digit of numerator as many zeros in the denominator and place decimal point there. E.g. \( \frac{6}{100} = 0.06 \), \( \frac{66}{100} = 0.66 \), \( \frac{123}{100} = 1.23 \)
- Get students to work in pairs.
- Divide the class into two teams. Randomly provide some chits on which decimal fractions are written to one team.
- Also randomly provide chits having respective decimals for those decimal fractions (given to first team) to other team.
- Now ask students of first team to come forward in turn and say the fraction written in their slip in audible volume in front of the entire class.
- Instruct students of other team to be attentive and listen carefully the fraction said by first team. Tell them to check their decimal as a student from first team takes its turn and says a decimal fraction.
- The student having corresponding decimal number to raise his/her hand and say it loudly. Let rest of the students of other team to help each other to find the corresponding decimal.
- Continue the activity till for each decimal fraction, corresponding decimal has been identified.
- Now write 4.35 on the board and ask students to express it as fraction.
- Let them attempt themselves and show their result or pose a query, “How to convert a decimal into a fraction?”
- Explain that to convert a decimal into a fraction, first count the number of places to right of decimal number, here in 4.35, there are 2 places after decimal point (towards right of point).
- Tell them to re-write the decimal number without point. The obtained number will be the numerator of fraction.
- Explain that the denominator of fraction can be found by affixing that
many zeros to 1 (towards right of 1) as equal to the number of places towards right of given decimal number. E.g. \(4.35 = \frac{435}{100}\).

- Conclude that to convert a fraction to decimal, remove denominator and rewrite the numerator of fraction, by placing decimal point at appropriate place (at that many places from right as number of zeros in denominator). In inverse case, remove the point and write the given number without decimal as numerator of fraction and place that many zeros affixing to 1 as equal to places towards right of decimal point.

Students will be able to convert decimals to fractions and vice versa.

**Measurements, Money**

- Convert following fractions into decimals.
  \(\frac{5}{10} \quad \frac{32}{100} \quad \frac{56}{1000}\)
- Convert following decimals into fractions.
  \(3.8 \quad 2.29 \quad 34.03\)

- Pankaj cut a circle into 5 equal parts and write the fraction corresponding to each part as \(\frac{1}{5}\). Find the corresponding decimals for two such parts.

- Vinita had some grids of hundredths. She shaded some parts of those grids such that total 345 hundredths are shaded. Write the decimal for shaded part and find how many grids did Vinita have?

- Ruchi wrote a decimal whose tenths is 5, thousandths is 9, ones is 4, tens is 6. Write the corresponding fraction for that decimal.

Observe the digital weighing machine at shopping malls. Measure weight of a few items on that and express the obtained decimals into fractions.
Lesson Plan - 3

Grade - 4

Learning Objective
To find equivalent decimals of a given decimal.

Material Required
Cards on which distinct decimal fractions are written (such that for a decimal fraction there are two equivalent decimal fractions written on distinct cards)

Activity
- Write a decimal say, 0.4 on the board. Ask students to write the corresponding fraction for given decimal, i.e. \( \frac{4}{10} \).
- Now ask students to find any two equivalent fractions for obtained fraction (students’ response could be \( \frac{4}{10} = \frac{2}{5} = \frac{8}{20} \)).
- Ask students “As we can get equivalent fractions for every fraction, can we get equivalent decimals for a given decimal too?”
- Explain the meaning of equivalent decimals, i.e. decimals having same value are called equivalent decimals.
- To explain the concept of equivalent decimals, randomly provide cards to each student. Write distinct decimal fractions such that for each decimal fraction there are two equivalent decimal fractions written on distinct cards. E.g. \( \frac{4}{10} \) is written on a card then its two equivalent decimals fractions are \( \frac{40}{100} \) and \( \frac{400}{1000} \).
- Ask students to stand up in turn and show their card to entire class.
- Instruct rest of the students to observe the cards and find the equivalent fractions of that and ask students who have cards having equivalent fractions for shown fraction, to raise their hands.
- Ask those students to sit together in a group and repeat the activity with rest of the students till each card got its corresponding cards showing equivalent fractions.
- Take an example from a group of students and write the same on the board and review the meaning of equivalent fractions.
- Ask students to write the corresponding decimals for those equivalent fractions and ask them “Does it mean those decimals are also equivalent decimals?”
- Let students’ analyses the situation and come up with a result that corresponding decimals are also equivalent decimals. E.g. 0.4, 0.40 and 0.400 are equivalent decimals.
- Explain that an equivalent decimal of given decimal can be found by adding zero or zeros to extreme right digit of decimal number, because it does not change the value of a decimal number.
- Write 5.6 on the board and ask students to get two equivalent decimals of that and come up with a result, i.e. 5.60 and 5.600.
- Conclude that an equivalent decimal of given decimal number can be obtained by adding zero/zeros to the right most digit of decimal number (in decimal places).
### Understanding Expected
Students will be able to identify the equivalent decimals.

### Associated Concepts
Measurements, Money

### Application
Write the equivalent decimals of following decimal numbers

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4</td>
<td>1.2</td>
<td>99.8</td>
</tr>
</tbody>
</table>

Are 6.6, 6.06 and 6.006 decimal numbers equivalent?

### Analysis
Manoj had ₹86.6, Vinit had ₹80.6 and Manjeet had ₹86.66. Find who has largest amounts. Do the given amounts represent equivalent decimals? If yes justify your answer and if not write equivalent decimals of given amounts.

### Thinking Skills
Observe the use of equivalent decimals in measurement units, i.e. converting smaller to larger unit of metric measure, e.g. (200 g = 0.2 kg = 0.20 kg = 0.200 kg).

### Real Life Connect
Observe the use of equivalent decimals in measurement units, i.e. converting smaller to larger unit of metric measure, e.g. (200 g = 0.2 kg = 0.20 kg = 0.200 kg).
Learning Objective
- To categories decimals as like and unlike decimals
- To compare and order decimals

Material Required
Set of cards having two like decimals and two unlike decimals

Activity
- Get students to work in groups of four. Provide four cards to each group such that on each card distinct decimals are written and the set of cards given to a group have two like decimals and two unlike decimals.
- Ask students of a group to identify the number of decimal places and ask them to find the decimals having same number of decimal places, e.g. 45.67 and 2.34
- Also ask them to find the decimals having distinct number of decimal places, e.g. 3.1 and 5.22
- Introduce the term like decimals for those decimals having same number of decimal places and introduce the name unlike decimals for those decimals having distinct number of decimal places.
- Write following decimals on the board and ask students to identify like decimals and unlike decimals among them:
  - 4.5, 68.98, 2.345 and 1.23
- Let students realise that only 68.98 and 1.23 are like decimals while 4.5 and 2.345 are unlike decimals.
- Ask them “How can we convert unlike decimals into like decimals?”
- Lead them to use the concept of equivalent decimals for converting unlike decimals into like decimals.
- Explain them that first observe the maximum number of decimal places in unlike decimals. Then place the required number of zeros to the extreme right digit of decimals in unlike decimal numbers such that all decimals have same number of decimal places. E.g. The maximum number of decimal places in given decimals, is 3 (in 2.345), so converting all other decimals to their equivalent decimals, we get; 4.500, 68.980 and 1.230.
- Now write following problem on board:
  - Anita bought 2.3 kg of sugar while Manali bought 2.34 kg of sugar. Find who bought more sugar?
- Ask students to find the answer of given problem and let them realise that they have to compare the weights or decimals.
- Explain that to compare decimals first compare the whole number part of given decimals. The decimal having larger whole number part is greater than the other. E.g. 3.4 > 2.3.
- Now referring to given problem, where whole number part is same, ask students to observe the decimal places each have and if they are unlike decimals, express them as like decimals, i.e. 2.30 and 2.34
• Then compare the decimal/fractional part at each place, here the tenths are also same, now compare the next place, which is hundredths here. As $4 > 0$, so corresponding decimal is also greater than the other, i.e. $2.34 > 2.30$.

• Now get students to work in groups of three. Provide a number card to each student of a group on which distinct decimals are written (on each card). Ask them to compare the decimals written there and arrange them in an ascending order. Let them attempt themselves first and show their work.

• Explain that to compare and order given decimals, first check whether all are like decimals or not! If not express them as like decimals and arrange them in a place value chart. Then compare the whole number part first and if whole number parts are same, then compare decimal part from tenth place onwards till you get distinct digits at same place in both numbers.

• Exemplify the method for following decimals: $4.6, 4.57$ and $5.67$

• Expressing all decimals as like decimals, we get: $4.60, 4.57$ and $5.67$

• Comparing whole number part, we get the largest decimal is $5.67$.

• Comparing $4.60$ and $4.57$, the whole number part is same, so comparing tenths place, we get: $4.60 > 4.57$

• Arranging decimals in ascending order, we get; $4.57, 4.60, 5.67$

• Conclude that decimals having same number of decimal places are called like decimals. To compare given decimals, first check whole number parts. If whole number parts are same, express them as like decimals and compare digits at each place in decimal part of given decimals till you get distinct digits at a place.

Students will be able to identify like and unlike decimals as well as will be able to compare the given set of decimals.

Measurements, Money

Convert following pair of decimals into like decimals

» $9.8$ and $8.80$  » $12.23$ and $23.2$

Identify like decimals among following:

» $88.09, 123.1, 34.2, 6.70, 3.201, 4.67$

• Ashok, Vijay, Sunil and Vishal started cycling from the same point and did cycling for same time period. They covered $3.4$ km, $2.5$ km, $4.1$ km and $1.9$ km respectively. Arrange the data in ascending order and find who covered the least and longest distance.

• Sheela had $13$ coins of ₹$1$ and $5$ coins of $50$ p. While Mita had ₹$15.50$. Find who has more amounts.

• Find the records of distances covered by various athletes in a race competition. Observe the data for winner and arrange those data in ascending form.
**Learning Objective**
To add and subtract decimal numbers.

**Material Required**
Cards on which distinct decimals are written (include unlike decimals)

**Activity**
- Write following problem on board:
  - There was 23.5 kg of wheat in a drum. Sheetal put 12.5 kg more wheat in that drum. How much wheat is there in the drum?
- Get students to work in pair and ask them to solve the given problem. Let them realise that to solve the given problem; decimals are to be added and pose a query “How to add decimals?”
- To explain addition of decimals, get students to work in pairs.
- Randomly provide a number card (write distinct decimals on each card) to each student and ask them to write the addition statement /expression for given decimals, e.g. say decimals are 5.6 and 4.87, then addition statement is 5.6 + 4.87
- Instruct them to check whether given decimals are like or unlike. If unlike express them as like decimals. E.g. 5.60 and 4.87
- Ask them to arrange the decimals in columns such that digits at a place align in same columns and decimal aligns in same columns, as shown below:

```
  O . t h
  5 . 6 0
  + 4 . 8 7
  1 0 4 7
```

- Then ask them to add the numbers as usually they add whole numbers (without considering decimal point)i.e. start adding digits from the right most digit and move ahead towards the left places till they reach the left most digit and use regrouping rules wherever required.
- Then, in last, ask them to place the decimal in same column as it was in addends and write the sum as a decimal number, i.e. 5.6 + 4.87 = 10.47

```
  O . t h
  1
  5 . 6 0
  + 4 . 8 7
  1 0 4 7
```

- Now ask them to solve the problem given in the beginning. Let them come up with a result that there 36.0 kg of wheat in the drum.
- Write following problem on the board:
  - In the month of March Suman weighed 34.4 kg while in the month of
December of same year she weighed 30.8 kg. Find the gain/loss in her weight during 9 months.

- Ask students to solve the given problem. Let them realise to solve the given problem they need to understand subtraction of decimals.
- To explain subtraction of decimals refer to same number cards, each student have and ask them to compare the decimals written in their cards.
- Instruct them to consider the larger decimal as minuend and smaller as subtrahend and frame a subtraction statement using those decimals. E.g. 5.60 – 4.87, as 5.60 > 4.87
- Ask them to follow the same column method as they did in addition and arrange the numbers in respective columns like:

```
<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>h</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>-</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>
```

- Start subtraction from right most digits as they do for numbers, use regrouping rules where ever required and continue the subtraction operation till left most digit got subtracted.
- In last, ask them to place the decimal point in answer in same column as it was in given decimals, i.e. 5.60 – 4.87 = 0.73

```latex
<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>h</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>-</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>0</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>
```

- Ask students to solve the problem written on the board. Let them come up with a result that Suman lost 3.6 kg in 9 months.
- Conclude that while adding or subtracting decimals, use same column method of addition/subtraction as we do for numbers, just be careful while placing the digits in respective columns and aligning decimals. Share with students that it is a good practice to convert all given decimals into like decimals prior to addition or subtraction in order to avoid any error. In last, place the decimal in same column as it was in the column for given decimals.

Addition and Subtraction of Numbers, Students will be able to apply addition and subtraction operation on decimals.

**Understanding**

Expected

**Associated Concepts**

Measurements, Money
• A digital weighing machine shows 0.15 kg when empty. When some sugar is kept on its pan it showed 2.3 kg. How much does sugar weigh?
• Hetal observed the height of a plant as 10.5 cm in January month. She observed that plant grew by 3.4 cm in next month. In March she found that height of plant was 15.1 cm. Find the growth of plant in March month.

Real Life Connect
• Find the distance from your house to your school and your house to nearby garden. Add both distances.
• Check your medical reports of previous years and find the gain/loss in your height and weight.
Learning Objective

- To extend and apply previous understanding of point, lines, line segments.
- To identify various types of lines.
- To identify pair of lines.

Material Required

Square sheets of paper

Individual Activity

Activity

- Provide three square sheets to each student.
- Ask them to fold one of the sheet horizontally, other vertically and last one diagonally.
- Ask them to open the folds and draw the lines on the folded creases.
- Lead students to categorize the drawn lines as horizontal, vertical and slanting /oblique lines and share the fact that drawn lines are actually line segments which has two fixed end points. If we extend those line segments endlessly on both sides, we get corresponding lines, i.e. horizontal, vertical and oblique lines. Using this, lead students to understand that a line segment is a part of a line.
- Draw a line and a line segment on the board and help students to recollect the facts about them, i.e. a line segment has two end points while a line does not have. Also share the fact that we can only draw a model of a line on a paper and not the actual line, as line does not have definite length.
- Now, provide a square sheet to each student and ask them to observe the sides of the given square sheet and find the pair of line segments which does not meet. Ask them to trace any one pair of opposite sides of a square sheet on a paper, extend them in both the directions indefinitely, put arrows on both sides and name those lines as “l” and “m”.
- Again ask students “Will lines “l” and “m” meet even if they would be extended in both the directions?”
- Introduce such pair of line segments (for sides of paper) and lines (for drawn lines “l” and “m”) as parallel line segments and parallel lines and share the fact that a paper has two opposite pairs of parallel sides.
- Now ask them to observe the line segments in the same square sheet forming an “L” Shape, i.e. they intersect and form a “L” shape.
- Lead students to observe the pair of line segments that intersect at a point forming “L” shape and name “Perpendicular line segments” for such pair of line segments. Share with students that all adjacent sides of a square form “L” shape.
Thinking Skills

- If line “l” and “m” are parallel to each other and line “m” and “n” are parallel to each other, will line “l” be parallel to line “n”?
- Why railway lines are made parallel?

Real Life Connect

- Find the objects/structures having intersecting line segments and perpendicular line segments at your home.
- How many pairs of intersecting, parallel and perpendicular lines does your first name have?

Analysis

A line is a _____ dimensional figure while a point is a _____ dimensional figure.

- Explain the idea of perpendicular lines by asking students to trace the adjacent sides of a square sheet forming “L” shape on a paper, extend them in both the sides indefinitely, put arrows on both sides and name them as “x” and “y” and name them as “Perpendicular lines”.
- Ask students to fold the square sheet diagonally twice, open the fold and draw the lines on folded crease.
- Lead them to observe the pair of line segments that intersects at a point and name them as intersecting line segments. Ask them to trace those folded lines on a paper, extend them indefinitely on both the sides, mark arrow on both sides and name them as “a” and “b” and name them as intersecting lines.
- Refer to intersecting point and review the idea of a point, i.e. it shows an exact position or location in space and is named using capital letters.
- Conclude that a square sheet has two pair of opposite sides parallel and all adjacent sides of a square, intersect at right angles, i.e. they are perpendicular to each other.

Application

Fill in the blanks:

» A line segment has _______ end points.
» A pair of lines is parallel if it does not _______even extended in both the directions.
» Two lines intersect each other at only ______ point.
» A line has no definite _______.

Content Book Reference: Page 126, 127
Guided Practice: Page 97-100
## Learning Objective
- To get an idea of angles
- To learn naming an angle
- To learn about various types of angles

## Material Required
Pencils and rubber bands, protractor, square sheet

## Activity
- Get students to work in pairs.
- Provide two sharpened pencils (pencils need not be equal) and a rubber band to each pair of student.
- Ask them to hold the pencils together, bind the flat/blunt ends of two pencils together with the help of a rubber band and keep the pointed end upwards.
- Ask students to move the pointed ends apart from each other and observe the shape the pair of pencils makes.
- Guide them to understand that as the opening between the pencils increases they make the shape “V” or “∠” and then “L”.
- Share with students that the opening between the pencils shows an angle between them, i.e. an angle is the measure of the opening between two arms.
- Lead them to understand that as opening between two pencils increases the angle increases.
- Use this to define the attributes of an angle, i.e. vertex, arms of the angle etc.
- Share with students that angles are measured in degrees and introduce the symbol for that.
- Show a protractor in front of the entire class and name it “Protractor” and share the fact that it is used to measure an angle between two rays/lines.
- Draw an angle of 50° on the board and illustrate naming of that angle in various ways, e.g. ∠ABC = ∠CBA = ∠B, where B is the vertex and BA and BC are the two arms of an angle.
- Hold the banded pair of pencils (without opening it) and tell students that at this position both arms overlap each other and makes 0° angle.
- Now hold the pencils such that their pointed end are just opposite to each other and name that angle as 180°.
- Show again a protractor and lead them to observe 180° mark in the protractor.
- Show when two arms are perpendicular, it forms an angle equal to 90°. Share with students that an angle equal to 90° is called a right angle.
Use the pair of banded pencils and show that if an angle between two arms is less than 90°, it is known as acute angle and if it is more than 90° and less than 180°, it is called an obtuse angle.

Provide a sheet of paper to each student, ask them to fold the sheet to get perpendicular lines and intersecting lines (other than perpendicular) and ask them to observe the measure of angles between two perpendicular lines and intersecting lines.

Guide them to understand the measurement of angles using protractor.

Knowledge of Point, Lines, line segments, Rays

Application

Fill in the blanks:

» The measure of an acute angle is ________ the measure of an obtuse angle.
» An angle is measured in ________.
» An angle is measured with the help of a ________.
» In ∠ XYZ, the vertex is ________.

What is that angle whose measure is 30° more than the right angle?

When two lines intersect each other at a point, how many non-overlapping angles are formed at that point?

List the name of sports where acute, right and obtuse angles can be observed.

Analysis

Real life Connect

Understanding expected

Guided Practice: Page 101-103

Content Book Reference: Page 128, 129
### Learning Objective
- To identify open figures and closed figures
- To get an idea of polygons
- To identify regular polygons and irregular polygons

### Material Required
Dot paper

### Stress Words
Regular and Irregular Polygons

### Activity
- Provide a dot paper to each student.
- Ask them to draw some basic geometrical shapes they know, i.e. a triangle, a square, a rectangle, a circle, a closed figure made of 5 sides (pentagon) etc.
- Let students draw some common geometrical shapes based on their previous learning. The drawing of shapes may vary from student to student. e.g. say a student draws shapes as shown below:

![Shapes Diagram](image)

- Ask them “Do all the drawn shapes are closed figures?”
- Ask them to join two dots by a curved line from one side only (as shown below) and repeat the same question “Is it a closed figure?”

![Curved Line Shapes](image)

- Review the meaning of open figures and closed figures and define the term “Polygons” for simple closed figure made of three or more line segments only, i.e. no curved part.
- Refer to the same dot paper and ask them to measure the sides of drawn shapes.
- Ask further “does any shape have all sides equal?”
- Let students measure the sides of all drawn shapes and come up with a result that it is only a square, whose all sides are of equal measure.
• Use this to define regular and irregular polygons, i.e. a closed figure having all sides of equal measure is a regular polygon and if sides are not of equal measures then it is called an irregular polygon.

• Ask students to draw a polygon on the same dot paper, having least number of sides. Let students come up with a result that three sides/dots are required to make a simple closed figure and three sides form a triangle.

• Ask students to draw a closed figure having 1 more side than a triangle and name that as a quadrilateral (a four sided closed figure). Share with them that square and rectangle are quadrilaterals as they both have four sides.

• Conclude that a polygon is a simple closed figure made of three or more line segments only and therefore a circle is not a polygon (although a circle is a closed figure). Triangles, quadrilaterals are name of polygons having 3 and 4 sides respectively.

Angles, Basic geometrical shapes, drawing shapes on dot paper

2 D and 3 D shapes

• Identify the closed figure among following:

(i)  
(ii)  
(iii)  
(iv)  

• Identify the polygons among following:

(i)  
(ii)  
(iii)  
(iv)  
(iv)

A 6 sided regular polygon is called ________________.

• Find the total number of polygons that can be observed in the given figure.

• How many diagonals do a 5-sided polygon has?

Identify objects in your surrounding as similar to basic geometrical shapes and list them.

Content Book Reference: Page 130-132  
Guided Practice: Page 104-105
Lesson Plan - 4

Grade - 4

Learning Objective
- To identify the six elements of a triangle

Material Required
- Square sheet, ruler, rectangular sheet.

Stress Words
- Diagonals

Activity
- Get students to work in pairs.
- Provide a square sheet to each pair, draw a square on the board and instruct them to name the square as ABCD (as shown below).

![Square Diagram]

- Ask them to measure the sides of given square using a ruler. Ask them to identify the vertices of the square, i.e. A, B, C and D.
- Ask them to join the opposite corners, i.e. A and C. Lead students to observe that by joining A and C they split a square into two triangles.
- Show a square sheet and fold it diagonally once. Help students to visualize the obtained triangle and observe its elements, i.e. Three sides, three vertices and three angles. Open the fold and lead students to understand that folding the sheet diagonally is same as joining the opposite corners (as they did earlier).
- Share with students that three sides and three angles together form six elements of a triangle, i.e. a triangle is identified using these features.
- Introduce the symbol “Δ” for triangle and its naming.

Understanding expected
- Angles, Measuring Length segment using ruler

Associated concepts
- 2 D and 3 D shapes

Application
- Identify the triangles among the following shapes.

(i) (ii) (iii)

![Shapes Diagram]
• A triangle is a most “rigid” shape in geometry. Explain the meaning of this statement. (Ans: A triangular structure does not get altered by applying any force; therefore it is called a most rigid shape.)

Thinking Skills

• Find the number of triangles in the given figure and name them.

Real life Connect

• Identify some items/objects of triangular shape and measure their sides.
### Learning Objective
- To classify quadrilaterals as parallelograms and trapezium
- To know the attributes of a square and a rectangle.

### Material Required
Sets of Match sticks of two distinct sizes, cut outs of square, rectangle, rhombus, and a trapezoid, ruler, protractor

### Activity
- Divide the class into groups of 4 students in each
- Provide sets of match sticks of two distinct sizes to each group.
- Ask each group to make quadrilaterals using those match sticks such that the quadrilateral of each student of the group does not match with any of his/ her team mate
- Ask them to make different quadrilaterals using distinct match sticks and changing the angle/position of match sticks and then paste those on a paper.
- Let them attempt to perform the explained task.
- Ask them “Does each shape have four sides only?”
- Ask them to identify a square and a rectangle among those shapes (if any)
- Discuss the approach used to identify the square and a rectangle.
- Use this to review the attributes of square and rectangle and lead them to understand that the opposite sides are equal and parallel in both square and a rectangle. A square has all sides equal.
- Introduce the name “parallelogram” for such quadrilaterals whose two pairs of opposite sides are equal and parallel.
- Ask them to identify a quadrilateral whose only one of the pair of opposite side is parallel. If they are not able to identify such quadrilateral in the shapes drawn by them, show the cut out of a trapezoid, also draw the same on the board and repeat the same question.
- Ask further “Does the pair of parallel sides is equal also?” Take responses of students and name that quadrilateral as trapezoid and illustrate that only one pair of opposite sides is parallel but not equal.
- Show a cut out of a rhombus and lead them to identify a rhombus in their drawn shapes. Share the fact that a rhombus is a parallelogram and its all sides are equal.
- Provide a cut out of a square and a rectangle to each pair of students and ask them to measure the sides (using ruler) and angles (using protractor) and observe the difference and similarities.
• Summarize that a square and a rectangle both are parallelogram and each angle of both shapes measures 90°, a square and a rectangle both have two pairs of opposite sides parallel. The difference in a square and a rectangle is that all four sides are of equal measure in a square while a rectangle has opposite sides of equal measure.

Join the dots to convert these shapes into rectangle:

Which of the following is a correct statement?
- Every square full fill a criteria to be called a rectangle.
- Every rectangle does not full fill the criteria to be called a square.

How many quadrilaterals are shown in the given figure? (Count all overlapping quadrilaterals also)

Identify the shape of following objects, a window pane, a note book, a black board, a class room, playground, floor tiles, doors, laptop, computers, key board, rides in playground etc.
Learning Objective
- To locate the centre of a circle
- To identify the relation between radius and diameter of a circle
- To know the various parts of a circle
- To draw a circle using compass

Material Required
Cut outs of circles of 2 cm, 3 cm and 4 cm, compass, pencils, string/thread, ruler

Stress Words
Circumference, chord

Activity
- Divide the class into groups of three students in each.
- Provide cut outs of circles of radii 2 cm, 3 cm and 4 cm respectively to each group, without sharing the measure of radii to them.
- Ask them to fold the sheet into halves, open the fold, draw the line on the crease, name that as AB and measure the length of line segment.
- Ask them to use the same cut outs and fold them into halves in another way such that the fold yields another crease, open the fold, draw line on the crease, name that as CD and measure the length of the line segment.
- Ask them to mark the point where the two folded lines meet and name that as O.
- Tell students that the point where two creases meet is called the centre of a circle.
- Share the facts about the centre of a circle, i.e. a circle has only one centre point and all points lying on the circle are equidistance from this point and this distance is known as radius of a circle.
- Tell them to measure all the line segments OA, OB, OC and OD and verify the statement that the distance from the centre of the circle to any point on the circle is same.
- Tell students to measure and compare the line segments AB and CD and realize that both measures same.
- Use this to introduce the diameter of the circle.
- Lead them to realize that radius is half of diameter or diameter is twice of radius.
- Ask students to use the same cut outs and fold the circle in such a way that folded line pass through centre of the circle, open the fold, draw line on the crease, name it EF and measure it.
- Refer to line segment EF and define the term “Chord “of a circle, i.e. a line segment which may or may not pass through the centre of a circle and whose end points lie on circle is called a chord of a circle.
Name some 3D objects whose base is of circular shape.

Real life Connect

Application

Draw the circle of diameter 9 cm.

Refer the given figure and name the following: radius, diameter, centre, and chord.

Raju and Sonu both walks around two different gardens having circular shape. The circumferences of those gardens are 44 m and 88 m respectively. If Raju takes 3 rounds and Sonu takes 2 rounds of respective gardens in the same time, who walks at faster speed?

Thinking Skills

Name the longest chord of a circle.

Conclude that it is necessary to place the point of needle of compass at a point (centre of the circle) to draw a circle.

Understanding expected

Point, Line segments, boundary of a closed shape

Associated concepts

2 D and 3 D shapes

Analysis

Draw the circle of diameter 9 cm.

Refer the given figure and name the following: radius, diameter, centre, and chord.

Name the longest chord of a circle.

Raju and Sonu both walks around two different gardens having circular shape. The circumferences of those gardens are 44 m and 88 m respectively. If Raju takes 3 rounds and Sonu takes 2 rounds of respective gardens in the same time, who walks at faster speed?

Name some 3D objects whose base is of circular shape.

Content Book Reference: Page 132-135

Guided Practice: Page 106-108
### PATTERNS AND NETS

| Learning Objective | • To extend and apply the previous understanding of patterns  
 |                      | • To identify the rules of given patterns and extend them  
 |                      | • To create figure patterns and letter patterns  

| Material Required     | A-4 white sheet, scissor, colours  

| Activity              | • Divide the class into groups of 3 students.  
 |                      | • Provide a A-4 white sheet to each group and ask them to fold the paper into halves and repeat the process for four more times.  
 |                      | • Instruct them to draw any shape /design on the folded sheet, cut the shape using scissor and get multiple cut outs of same shape /design.  
 |                      | • Tell them to use those cut outs and make either a growing pattern, or a repetitive pattern or a decreasing pattern.  
 |                      | • Tell them to use colours, make a rule and then form a pattern.  
 |                      | • Let students to show their work and share the rule of the pattern in turn.  
 |                      | • Review the idea of pattern, i.e. a pattern is a set of shapes/objects/letters/numbers arranged in a certain order by following a specified rule.  
 |                      | • Share with students that patterns can be categorized as visual patterns, number patterns and letter patterns.  
 |                      | • Lead them to realize that the patterns created by them are the visual patterns. Provide a few toothpicks/matchsticks to each group. Instruct them to create a pattern using given tool. Let them play with the given tool and come up with a pattern (pattern may vary from group to group).  
 |                      | • Write following number pattern on the board and help students to realize that a number pattern is a chain of numbers that follows the rule. Ask students to identify the rule of the given pattern  
 |                      | • 6, 12 , 18, 24, 30, 36, 42,…  
 |                      | • Guide students to observe the connection/link between two consecutive terms and find the rule, i.e. next term is 6 more than the previous term.  
 |                      | • Show following multiplication pattern and lead students realize the rule of patterns and extend that, i.e. each next term is twice of previous term  
 |                      | • 2, 4, 8, 16, 32, 64, 128,…  
 |                      | • Demonstrate following number tower on the board and discuss the rule of it, i.e. starting from the bottom layer, the sum of number of two bottom boxes equals the number in box just above those boxes.  

![Number Tower Image](image-url)
• Ask students to write English alphabet from A – Z and assign numbers from 1-26 to them, in order of their occurrence in English alphabets, in their note book.
• Get students to work in pairs and ask each of them to write a secret message using the corresponding numbers for that on a chit and exchange the chit with their partner. The partner has to decode the message and find the corresponding word/message for that e.g. if the message is “13 1 4 1 13”, then on decoding, we get MADAM.
• Conclude that a pattern is a set of shapes, figures, numbers, and letters with a defined rule. It can be categorized as repeating, growing, decreasing pattern.

Patterns using shapes

Symmetry

• The missing number in the given number tower is _______. (64)

```
8
8
2 4 2
1 2 2 1
```

• Extend the pattern for next two terms:
  2, 6, 18, 54, ______, ______ (162, 486)

```
  △ △ △
  ◊ ◊ ◊
```

How many triangles will be there in the next term?

```
△ △ △
```

Observe the patterns in grills, tiles, in nature, in buildings etc.
Lesson Plan - 2

Grade - 4

Learning Objective

- To identify whether a given shape/design is symmetrical or not!
- To find line of symmetry in symmetrical objects.
- To draw the mirror images of given images.

Material Required

Square sheets, rectangular sheet, circular sheet, scissors

Stress Words

Mirror image

Activity

- Ask students to work in pairs.
- Provide a square sheet to each pair of student. Ask them, to fold the sheet into two equal parts.
- Ask further, how we can check whether the fold yields the two equal parts or not! Help students to realize that if two parts overlap each other exactly, i.e. if we cut them and place one over other and if two parts cover each other exactly, then they are identical in size and shape.
- Instruct them to draw the line on the folded crease and also try to find the other ways to get two equal parts of a square (by paper folding).
- Let students attempt themselves and show their result. Demonstrate all possible ways to get two equal parts of a square and introduce the concept of symmetry, i.e. a figure is symmetrical if one part exactly fits over the other part.
- Share with learners that the folded line is called the line of symmetry.
- Ask the students to find the line of symmetry of a square. Seek responses i.e. a square shape has 4 lines of symmetry.
- Provide a rectangular sheet and a circular sheet and repeat the same steps. Help students to visualize that a rectangle has only two lines of symmetry and a circle can have many lines of symmetry.
- Ask learners to again take the square sheet, fold it into halves. Draw a part of shape (a leaf, a butter fly etc.) on one side of a fold, such that if it is cut and unfolded that shape looks complete, lead learners to understand that this way they have built a symmetrical shape and the other part is called the mirror image of the part of the shape drawn on one fold.
- Help students to visualize that the mirror image of a given image is of same shape and size but laterally inverted of that image.
- Conclude that symmetrical objects can have more than one line of symmetry and the parts along the line of symmetry are called mirror image of each other.

Understanding of patterns
How many lines of symmetry do a regular polygon of \( n \) sides have?

Identify the symmetrical objects in your surroundings. List out them and also find the lines of symmetry in that.
Activity

- Ask students to work in pairs.
- Provide a dot paper to each pair. Ask them to join the dots and form a basic shape. Instruct them to choose a basic shape such that when it is repeated again and again (rotation is permitted) there is no gap and no overlap between two consecutive shapes. Let students attempt to perform the required task and show their work in turn.
- Use this to review the term tessellation or tilling, i.e. a repeated pattern which covers a flat surface and are made with one basic shape without any gap and overlaps. Show some images of tessellation pattern, or draw some patterns on the board e.g.

```
  +---+---+---+
  |   |   |   |
  +---+---+---+
  |   |   |   |
  +---+---+---+
```

- Take students to visit the school premises and show a few tessellation patterns. Tell students that to extend a tessellation pattern it is necessary to identify the basic unit involved in pattern as well as the rule of the pattern.
- Now refer to the same dot paper and same tessellation pattern drawn earlier and ask students to use various colours to create a beautiful pattern. Emphasize here that tessellation is a repeated pattern of shapes; therefore they must follow a rule for using colour full tiles. Help students to realize that using the same unit/shape/block, many tessellation patterns can be created using either colour combination of tiles or changing the position of tiles e.g.

```
  +---+---+---+
  |   |   |   |
  +---+---+---+
  |   |   |   |
  +---+---+---+
```

- Instruct them to use common basic shapes (circle, triangle, square, rectangle etc.) and explore tessellation patterns. Let them come up with result that all shapes alone are not suitable for tessellation. Tell them that combination of shapes can also be used for tessellation or tilling a floor.
- Show some tessellation patterns that involve combination of shapes, e.g.
• Conclude that a tessellation is a repeated pattern created using only one or combination of shapes by predefined rule.

Basic Shapes

Identify the basic unit and extend the tessellation pattern in following:

Application

• Identify the rule of given tessellation patterns:

(A triangle and an inverted triangle of same size, at alternate positions)

• Can tessellation pattern be created using curved shapes?

Thinking Skills

Identify the basic unit of following tessellation pattern and find whether the pattern is symmetrical or not. If yes, draw the line of symmetry.

Real Life Connect

Observe the tessellation pattern in floors at your home, in your society, in your relative’s home etc and try to draw the same pattern in your notebook.

Content Book Reference: Page 142, 143
Guided Practice: Page 114
Learning Objective
To identify and draw nets of solids

Material Required
Open box (unfolded net of a cuboid), ruler, net of a cube, rectangular sheet, nets of cone with open and closed base.

Activity
- Ask students to work in pairs.
- Provide an open or unfolded box (or a net of a cuboid, without informing students) to each pair. Ask students “Is the given unfolded box is a 2-D or 3-D figure?”
- Review the meaning of 2-D and 3-D shapes and let students come up with a result that it is a 2-D shape.
- Ask further “Can we make a 3D object using it?” Let students attempt to get a 3D solid, by folding the given unfolded sheet. Ask them to measure the sides of faces of folded solid and identify the shape of faces and as well as name of solid. Lead students to observe that there are six rectangular faces that are folded to form a particular solid.
- Demonstrate the folding of open box into a cuboid and tell students that the open shape (for given unfolded box) is basically a net of a cuboid.
- Instruct them to observe the opposite faces of given net of cuboid. Let them come up with results that opposite faces are identical in the net of a cuboid.
- Repeat the activity for the net of a cube. Share with students that a cube can have more than one net. It can be folded in different ways, i.e. in 11 distinct ways. Allow them to discuss 11 such distinct ways to form a cube.
- Provide a rectangular sheet to each pair and ask them to fold the sheet to make a cylinder. Ask students, “Does the formed cylinder have close ends or open ends?”
- Let students participate in the discussion and visualize the net of an open ended cylinder (e.g. foil paper roll). In the same way show a cylindrical jar and help students to draw the net of a cylindrical jar. Repeat the same steps for a juice can or cylinder whose both ends are closed (e.g. a roller).
- Let students visualize the difference in nets of three different cases of cylinders.
- Provide two nets of cone (open end and a cone with closed end) to each pair and ask them to attempt to fold the nets. Ask students “Which solid did you get?”
- Let students come up with results, i.e. a cone with open base and a cone with closed base.
- Draw the nets of cube, cuboid, cylinder and cone on the board collectively and ask students to identify the respective nets of solids.
- Conclude that net of a solid is a 2-D representation of a 3-D solid. The net of a particular solid must have same features as the solid has, i.e. a cube must have 6 faces, 8 vertices and 12 edges etc.
3 D shapes

- Draw the net of given die and write numbers on each face such that sum of numbers on opposite faces is equal to 7.

![Net of a die with numbers](image)

- Identify the net of cylinder among following nets.

a) ![Net a) with cylinders](image)  b) ![Net b) with cylinders](image)  c) ![Net c) with cylinders](image)  d) ![Net d) with cylinders](image)

Which of the following net cannot be folded to make a cube?

a) ![Net a) cannot be folded](image)  b) ![Net b) cannot be folded](image)  c) ![Net c) cannot be folded](image)  d) ![Net d) cannot be folded](image)  e) ![Net e) cannot be folded](image)

- Draw the die, for the given net such that 3 dots appear on the top face.

![Net for die with 3 dots](image)  (one of the possible solution)

- Which of the following net will make a cube with no lid and no base?

a) ![Net a) for cube with no lid and no base](image)  b) ![Net b) for cube with no lid and no base](image)  c) ![Net c) for cube with no lid and no base](image)  d) ![Net d) for cube with no lid and no base](image)

- Identify the shape of solids e.g. a pencil, a black board, a water bottle, a match box etc. and draw their nets.
Learning Objective
To form various shapes using tangram pieces.

Material Required
5 piece tangram, 7 piece tangram (1 set for each pair)

Activity
- Show five pieces of a tangram in front of the entire class (without forming them that it is a tangram) and ask them to recognize the shapes and the name of the set of those shapes, i.e. 5 piece tangram. Help students to recollect the shapes involved in 5 piece tangram.
- Ask students to work in pairs.
- Provide five pieces of tangram to each pair and ask them to arrange them in a square shape.
- Ask them to make a few designs/shapes using those pieces. Let them attempt to perform the given task. Check work of students and provide guidance.
- Now, show seven pieces of a tangram in front of the entire class and ask them to identify the shapes. Make assure that students identify that there are 5 triangles (out of them 2 sets are identical) and 2 quadrilaterals (a square and a parallelogram)
- Provide seven pieces of a tangram to each pair of students and ask them to name them as 1, 2, 3, 4, 5, 6 and 7.
- Raise a question “Can these shapes be arranged to form a square?”
- Let them play with the given pieces and attempt to make a square shape.
- Let them try themselves and then show the correct arrangement of pieces in a square. Introduce the seven pieces as 7-piece tangram.
- Now instruct them to make a few shapes/designs using those 7- pieces of tangrams (tell them they may create a shape of rabbit, dog, horse etc.) e.g.

![rabbit](image1)
![dog](image2)
![horse](image3)

- Let them play with pieces of tangram and show their result in turn.
- Conclude that a tangram may consist either 5 or 7 pieces, all are cut from a square and using those shapes various designs can be created.

Understanding
Expected
Knowledge of 2D shapes
Thinking Skills

How can we make a rectangle and a triangle using 7-piece tangram?

Analysis

What are the difference in 5 pieces tangram and 7-pieces tangram, when pieces of both tangrams can be obtained from a square?

Real Life Connect

Observe the designs/shapes made of using more than one shape in your surroundings, e.g. go downs, dome of buildings, various structures, etc.

Application

Form an arrow, a bird and a sail boat using 7-piece tangram.
Lesson Plan - 1

Grad - 4

Chapter 10

Measurement

Learning Objective
- To define metric system of measurement
- To know the relation between various metric units of a quantity

Material Required
Objects: A pouch of milk, a can of juice, a packet of sugar, a packet of biscuits, a packet of wafers, a water bottle, a ruler, a nail, Name cards of metric units of length, weight and capacity

Activity
- Show a collection of following objects in front of entire class.
- A pouch of milk, a can of juice, a packet of sugar, a packet of biscuits, a packet of wafers, a water bottle, a ruler, a nail etc.
- Get students to work in pairs and ask them to list out the name of the items and find the most appropriate unit of their measurement, e.g.

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A milk pouch</td>
<td>Litres or millilitres</td>
</tr>
<tr>
<td>A can of juice</td>
<td>millilitres</td>
</tr>
<tr>
<td>A packet of sugar</td>
<td>g or kg</td>
</tr>
<tr>
<td>A packet of biscuits</td>
<td>g or kg</td>
</tr>
</tbody>
</table>

- Check work of students and review the standard units of measuring length, weight and capacity.
- Define the term metric measures and tell learners that metric system of measurement consist various units that are formed by affixing the prefixes to basic units, e.g. kilo, hecto, deca, centi, deci and milli.
- Exemplify all the units of metric measures for length, e.g. kilometre, hectometre, decametre, metre, decimetre, centimetre and millimetre.
- Similarly show all the metric units of weight and capacity by affixing the prefixes to the standard units, i.e. grams and litres on the board. Also tell them about the abbreviation used for those units.
- Show the ascending order of these units of length, weight and capacity and ask students to identify the position of the standard unit among those units. Let students come up with a result that standard unit lie exactly in middle of those units.
- With reference to standard units define smaller units and higher units, e.g. kilo, hecto and deca are higher units of a standard unit while deci, centi and milli are smaller units of a quantity measurement.
- Explain the relation between two consecutive units, e.g. 1 km = 10 hm, 1 hm = 10 dam, 1 dam = 10 m, 1 m = 10 dm, 1 dm = 10 cm, 1 cm = 10 mm
- Lead students to understand that to convert higher to lower unit, we use multiplication operation. Tell students that to convert smaller unit
to higher unit, we use division operation, e.g. 1 mm = 0.1 cm, 1 cm = 0.1 dm, 1 dm = 0.1 m, 1 m = 0.1 dam, 1 dam = 0.1 hm, 1 hm = 0.1 km

- Get students to work in groups of seven. Provide a set of jumbled cards of a quantity to each group such that two adjacent groups have cards of distinct quantities.
- Instruct some of the groups to arrange the cards in descending order while some groups to arrange cards in ascending order and compare the units with decimal place value system of Indian numeration.
- Let them realise that the standard unit matches with ones, deca with tens, hecto with hundreds and kilo with thousands while deci with tenths, centi with hundredths and milli with thousandths.
- Conclude the session by summarizing various units of length, weight and capacity measurement by placing appropriate prefixes and suffixes for each quantity, i.e. for length it is km, hm, dam, m, dm, cm, mm. For weight the suffix is gram (g) kg, hg, dag, g, dg, cg and mg. For capacity the suffix is Litre (L) kL, hL, dal, L, dL, cL, mL. Also summarize the fact that each unit is equal to 10 times of the next smaller unit.

Standard Units of Measurement

Identify the appropriate unit for measuring following items:
A table spoon of medicine, A sack of rice, Amount of water in a glass, Height of a room, Distance between Bombay and Delhi, weight of an ant (ml, kg, ml, m, km, mg)

- Which is more 120 g or 12 dag?
- Which is more 10 cm or 10 hm?
- Renu had a 7 m rope. She cut it into 3 pieces. By using these pieces she could measure 1m, 2m, 3m, 4m, 5m, 6m and 7 m. How did she cut the 7 m rope such that she just had to add the length of pieces (if required) to measure given length of pieces?
- A bottle can hold \( \frac{1}{4} \) L of water. How much centilitres can it hold?

Visit a departmental store and prepare three different list of the items measured in kg and g, L and ml, m and cm.
Lesson Plan - 2

Grade - 4

Learning Objective
To apply arithmetic operations to interconvert units of metric measure.

Material Required
Slips on which distinct quantities are written for length, weight and capacity including larger unit and smaller unit, 2 boxes/bowls for each quantity, blank slips

Activity
- Write following problem on the board:
  Manju bought 1234 g of potatoes while Pinki bought 1 kg 200 g of potatoes. Who bought more potatoes?
- Instruct students to solve the problem. Let them attempt to solve the problem and realise that both quantities are of same type but not in the same units. Explain them to compare the quantities, any one had to be expressed similar to other or we need to convert interconvert units of metric measure, i.e. either we may convert 1234 g into kg and g or we may convert 1 kg 200 g into g.
- In order to explain the conversion of units, divide students to work in pairs.
- Tell students that there are 2 labeled boxes kept for each quantity on the table, e.g. 2 boxes for length, 2 for weight and 2 for capacity.
- Invite them to come forward and pick up two slips from the boxes belonging to same quantity. E.g. A pair may pick two slips either from two boxes of length, or two boxes of weight or two boxes of capacity, but not one from length and another from weight or capacity.

- Ask them to write the measure of picked quantity by combining two units, e.g. 4 m 5 cm, 6 kg 30 g, 5 L 30 dL etc.
- Now, ask them to convert the mixed unit into smaller unit by converting the larger unit into smaller unit and then adding the product with existing smaller unit, e.g. 4 m 5 cm = 400 cm + 5 cm = 405 cm
- Provide a blank slip to each pair and tell them to write the sum on the given blank slip. Check work of students and let those slips be with students.
- Explain the conversion of larger unit to smaller unit and vice versa, i.e. for larger to smaller, use multiplication operation and for smaller to larger use division operation. E.g. 2 kg 234 g = 2 x 1000 g + 234 g = 2234 g and 4435 cm = 4400 cm + 35 cm = 44 m + 35 cm = 44 m 35 cm, as 1 m = 100 cm and 4400 ÷100 = 44 m
- Now ask students to exchange the measurement written on blank slips by them with adjacent pair of students and convert that into mixed units
such that the larger unit is the standard unit of that quantity, e.g. 1234 mg = 1 g 234 mg

- Conclude the session by summarizing the rules for inter conversion of units, i.e. from larger to smaller, multiplication operation and in inverse case, use division operation.

**Multiplication and Division by 10, 100 and 1000**

- Juhi added 34 cg 5 mg of Baking soda in a recipe while Pooja added 3 dg and 10 mg of soda in same recipe. Who has added more soda?
- Jatin walked 3 km 4 dam while Manish walked 40 hm. Who has walked lesser distance?
- How many decigrams equal 2 hg?
- How many centilitres equal 50 ml?
- How many metres are there in the sum of 50 hm and 462 dam and 30 dm?
- How many millilitres equal sum of five thousandths litre and forty-five hundredths litre?

**Real Life Connect**

Take some wrappers of food items and observe the units of measurement mentioned there.
Learning Objective
To know the other units of length measurement and weight measurement.

Material Required
Measuring tape, ruler

Activity
- Get students to work in pairs. Ask them to measure the length of a pencil with the help of a ruler. Let them come up with a result that length of a pencil is ____ cm.
- Ask them to observe the other side of a ruler. Ask them “What do these marks indicate?” and “What is the unit of measurement for those marks?”
- Let students attempt to answer the posed questions and identify the other unit of length measurement mentioned there, i.e. inches.
- Ask them to measure the length of a pencil in that unit and share their result in turn. Ask them to observe the relation between cm and inches on the ruler itself and share the fact that 1 inch = 2.5 cm.
- Tell students about the abbreviation used for inches, i.e. in
- Now show a measuring tape and ask students about the utility of it. Invite a pair of students to come forward and measure their height using that tape in turn. Ask them to observe the units carefully and then measure their heights.
- Let them measure the height and meanwhile provide a few measuring tape to groups of four students and ask them to observe the units marked on that.
- Take observation from those students who were measuring the height and write down the data on the board. If data is in m and cm, ask them to name the other unit marked on the tape. Let students observe the other unit as Feet.
- Share with students that “Foot” is the other unit of length measurement and plural of it, is feet. Write the relation between foot and inches on the board, i.e. 1 foot = 12 inches
- Invite another pair of students and ask them to measure their height in feet and inches and explain the conversion from foot to inches and vice versa.
- Now, ask a few questions about weight of heavy objects/animals, e.g. weight of an elephant, weight of a truck, helicopter etc.
- Share with students that an elephant weighs up to 4000 kg, a truck may weigh up to 44567 kg depending upon the size etc. Tell them that to measure such heavy loads, we need larger units than kg. Therefore it was required to find other units of measurement of weight.
- Tell students about the other units of measurement of weight, i.e. quintal and tons and write the relation between them and relation of each with standard unit of weight measurement.
Standard units of Length and Weight Measurements

- Conclude that 1 foot = 12 inches, 1 inch = 2.5 cm and 1 foot = 30 cm. Similarly, summarize for other units of weight measurement, i.e. tons and quintals and 1 ton = 10 quintal, 1 quintal = 100 kg and 1 ton = 1000 kg.

Understanding

Expected

Application

Analysis

Thinking Skills

Real Life Connect

- A building is 84 feet high. Find the height of building in inches.
- The length of a garden is 246 inches. Express the length in feet and inches.
- Manu bought 5 sacks of rice and 4 sacks of wheat. Altogether the weight was 5 quintal and 40 kg. What is weight of each sack, if each weighed same?
- Which is more 120 quintal or 10 tons?
- If weight of a loaded truck is 5 ton 23 quintal and the weight of load is 46 quintal and 60 kg. What is the weight of empty truck(in kg)?
- Measure the length and width of classroom and black board using measuring tape in feet and inches.
- Find out the permissible limit of load carrying capacity of a light commercial vehicle.
Lesson Plan - 4

Grade - 4

Learning Objective
- To add and subtract measurement units.
- To solve word problems

Material Required
Number slips

Pair Activity

Activity
- Write following problem on the board:
  Rahul walked 5 km 167 m in the morning and 3 km 23 m in afternoon and 456 m in evening. In all how much distance does he cover in a day?
- Get students to work in pairs and ask them to analyse the given problem and find the operation used to solve it. Let them realise that addition operation has to be used to get the total distance covered by Rahul in a day. Ask them to solve the given problem. Let them realise that the measurement is given in mixed units and attempt to solve that themselves.
- In order to explain addition of mixed units, ask them to observe the units involved in given measurement and draw separate columns for each unit involved in the problem and write the name of units at top of the column, e.g. 2 columns here, 1 for km and other for m.
- Also tell them to leave some space between two units in order to avoid misreading of result.
- Tell them to note down the given measurement in their notebook one below the other such that the numeric for same unit are in the respective columns.
- Help them to understand that as 1000 m = 1 km, it is ideal to keep three places in m column and this will be helping to avoid any error.
- Share with them that the number of maximum places in smaller unit depends on relation between two units involved. E.g. if units are m and cm, then in cm, at most 2 places can be possible as 100 cm = 1 m
- Tell them to place 0 in the vacant places.
- Then instruct them to start adding the numbers from ones digit of the smaller unit and continue addition towards right digit of the same unit as we simply add two numbers. Ask them to extend the process for greater unit and use regrouping rules (where ever required). Then write the sum with respective units of addends.
- Exemplify the addition of 5 km 167 m + 3 km 23 m + 456 m on the board as follows:

<table>
<thead>
<tr>
<th></th>
<th>km</th>
<th>m</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>+</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

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101
Repeat the same steps for adding two quantities of weight measurement and capacity measurement.

Demonstrate subtraction of two quantities for following problem:

- 49 kg 56 g – 36 kg 123 g

Help students to visualise that the number of columns to be drawn is 2, one for kg and other for g. As, 1000 g = 1 kg, use three places to write grams and place 0 on vacant places.

\[
\begin{array}{c|c}
\text{kg} & \text{g} \\
49 & 56 \\
-36 & 123 \\
\end{array}
\]

Then ask them to start subtraction from ones place of smaller unit, i.e. subtract as usually we subtract two numbers and follow regrouping rules wherever needed.

Tell them to continue the subtraction process for greater unit as well and write the result with respective units of given quantities.

Refer to the same subtraction problems and illustrate that as 56 g < 123 g, it is required to regroup kg and g. On regrouping kg and g, we get 1000 + 56 = 1056 g. Also emphasize to subtract 1 kg from given kg, i.e. 49 – 1 = 48 kg.

Discuss following word problem: Anita filled 2 L 200 ml of juice in a jar. She served 1 L 452 ml of juice to some guests. How much juice is left in the jar?

Explain the model method of solving such problems, i.e. Understanding the problem is the first step, then draw a model for given situation and visualize the thing to be find out and the required operation to compute that.

Refer to the problem and explain that here some part of juice is taken from the jar and left out part has to be determined. So subtraction operation has to be used. On subtracting, we get 2 L 200 ml – 1 L 452 ml = 748 ml. The solution can be checked if sum of 1 L 452 ml and 748 equals 2 L 200 ml or not!

Conclude that while adding or subtracting quantities expressed in mixed units, add/subtract individual unit and use regrouping rules based on the relation between two units of a quantity.
Addition and Subtraction of Whole numbers

Perimeter, Measurement

- Sunil had to climb a 2,345 m high peak. After climbing 1 km 30 m, how much distance was left for him to reach the top?
- A water tank has 45 L 67 ml water in a morning. If 36 L 200 ml of water is filled in the tank in the evening and there was no water discharge during the day, how much water was there in the tank by the end of the day?
- By how much is 52 kg more than 41.2 kg?
- 5 hm 6 cm – 12 m 5 mm
- Juhi put 2 kg 400 g of vegetable on one pan of balance and two weights of 250 g and three weights of 500 g on other pan. What should she do to balance the pan, if she has 2 weights of 50 g each more with her?
- A recipe requires 2 L 300 ml of milk and an amount of cream which is 1 L 100 ml less than the milk, as well as an amount of Curd which is 500 ml more than cream. Find the total weight of ingredients used to make the recipe?

- Find out the consumption of staple food in your family in a year.
- Find out the daily consumption of water by your family.
PERIMETER AND AREA

Learning Objective
To find the perimeter of plane figures and composite figures

Material Required
Cut outs of an equilateral triangle, a square and a rectangle (2 for each pair), thick sheet of paper, glue/pin

Stress Words
Tracing, composite shapes

Activity
- Divide the class into pair of students. Provide each pair cut outs of an equilateral triangle whose each side measures 4 cm, a square of 4 cm a rectangle of 5 cm x 4 cm.
- Ask them to identify the shapes and measure the sides of given cut outs of shapes.
- Instruct them to place the cut out of a shape on a thick sheet of paper, stick that with either glue or a pin. Trace the boundary of shapes by starting from any vertex and return back to that vertex. Ask students to find the total distance travelled for tracing the shapes. Let students perform the explained task and show their work in turn.
- Ask students “Does the total distance travelled for tracing a shape is same as sum of length of its boundary?”
- Explain that total length of the boundary of a shape is called perimeter. Draw a square, a rectangle and an equilateral triangle on the board and lead students to visualise that perimeter of a square equals four times of its sides, perimeter of a rectangle equals twice of sum of length and breadth and for an equilateral triangle it is three times of its sides.
- Also draw an isosceles triangle and a scalene triangle on the board and generalize the method to find the perimeter of a triangle.
- Now again refer to the same cut outs of a triangle and ask students to place the triangle above the square or a rectangle such that the base of triangle coincide with any side of a square or a rectangle. Ask them to stick the shapes on a thick paper sheet and introduce the name “Composite shapes” for such shapes.
- Instruct them to trace the boundary of composite shape thus obtained and find the sum of length of boundaries of composite shape.
- Let them perform the explained task and help them to visualise that perimeter of a composite shape is the sum of all its sides and not the sum of length of all shapes which form the composite shapes.
- Conclude that perimeter is the sum of length of the boundary of plane or composite figures and its unit is same as of length.
Thinking Skills

**If perimeter of a rectangular ground is 150 m and the length of garden is twice of its breadth. Find the dimensions of ground.**

**How to find the perimeter of an irregular figure having curved lines?**

Real Life Connect

**Observe the gardens and play ground in your surrounding and find the perimeter of those gardens and grounds respectively.**

**Find out the length of wooden frame is used in windows at your home.**

### Length Measurement

- A square shape garden has to be fenced. If side of a square is 5 m 20 cm, find the length of the fence.
- A chart paper which is a triangular shape having three sides 40 cm, 50 cm and 60 cm. Find the lace required to decorate the triangular chart paper.

Analysis

- Rajan has a square filed whose side is 40 m long while Mohan has a rectangular field whose length is 50 m and breadth is 20 m. Find, whose field has longer boundary?
- Priya takes 3 rounds of a square ground in the morning. If side of a square measures 12 m, how much distance does she cover every morning?

- If perimeter of a rectangular ground is 150 m and the length of garden is twice of its breadth. Find the dimensions of ground.
- How to find the perimeter of an irregular figure having curved lines?

- Observe the gardens and play ground in your surrounding and find the perimeter of those gardens and grounds respectively.
- Find out the length of wooden frame is used in windows at your home.
Lesson Plan - 2

Grade - 4

Learning Objective
To compute the area of plane figures using grid paper

Material Required
Grid papers, cut outs of square (4 cm x 4 cm), rectangles (5 cm x 4 cm), equilateral triangles (side of 5 cm) of distinct colour sheets

Activity
- Get students to work in pairs.
- Provide cut outs of a square of 4 cm x 4 cm and a rectangle of 5 cm by 4 cm to each pair. Use different colour sheets for those cut outs.
- Ask them to identify the figures and find the larger figure for the given cut outs. Explain here the meaning of larger figure, which covers more surfaces. Let them attempt to answer the posed question and ask them to share the approach used by them to compare the two figures.
- Help struggling students to visualise the larger figure using overlapping method, i.e. tell them to place one figure above the other such that both figures are observable.

- Tell students the shape lying under the shape at top, is larger as it covers exactly the shape at top and still some additional part of it is visible. Lead students to realise that here the given rectangle covers extra surface than the given square and hence rectangle is larger than the square.
- Define the term Area as measure of surface covered by a figure and introduce the units used to express area of a figure.
- Provide a grid paper to each pair and tell them to trace the given square and rectangle on that and count the number of squares bounded by the boundary. Tell them to place the shapes such that it lies exactly to a vertex of one of the small square on the grid paper and not in the middle of side of a small square.

- Ask students to measure the side of a small square and let them come up with a result that it measure 1 unit or 1 cm. Tell students such square is called unit square. Now, explain that surface covered by 1 unit square equals; 1 square unit (1 unit x 1 unit) and introduce the unit of area measurement as square unit.
- Explain the measurement of area of plane figures using grid paper by taking an example, say a square covers 4 small or unit squares, then it is expressed as 4 square units or 4 square cm.

- Now provide a cut out of an equilateral triangle to each pair and repeat the same steps, i.e. trace the shape on the grid paper and let students realise that it does not cover small squares completely or covers half of squares. Explain them to consider half of small squares as half and count the number of half squares. Tell them that a pair of half squares make a whole and in this way they can compute the area of a triangle using grid paper (Adding number of complete squares and pair of half squares)

- Conclude that area is a measure of region/surface enclosed by a plane figure and it is measured in square units.

Plane figures

Find the area of following figure by counting squares

- Area of Raju’s field is 64 square unit while area of Kishan’s field is 8 square units more than Raju’s filed. Find the area of Kishan’s field.

- If the perimeter of a square is 144 cm. What is its area?

- Mohit divides his rectangular field whose width is 6 cm less than length, into two equal rectangles such that with of each rectangle is same. If total area of his field is 112 square cm, find the area of each part and also the dimension of each part.

- If breadth of a rectangle is 11 cm and its length is 3 times of breadth. What is the area of the rectangle?

- Find the area of your house/your class room/ black board

- Find the surface covered by cupboards, refrigerator and other furniture at your home.
Lesson Plan - 3

Grade - 4

Learning Objective
To compute the approximate area of irregular figures using grid paper

Material Required
Grid papers, coins of ₹5 and ₹10

Pair Activity

Activity

- Get students to work in pairs.
- Provide a grid paper to each pair of students and a coin (provide some pairs coins of ₹5 and some pairs coins of ₹10) to them.
- Ask them to trace the coin on the grid paper and find the area of drawn circle.
- Ask them to count the number of small squares covered by the circle. Let students realise that drawn circle does not cover exact halves.
- Explain them that in such a case an approximated area can be computed in following manner:
  - If a shape covers squares which are less than half of a square, ignore them and if the shape covers more than half of a square, consider it is a complete square and then count the total number of squares as similar to finding area of regular shapes.
- Ask students to follow the explained method and compute the area of drawn circle on the grid paper and share their result in turn.
- Ask students to draw a scalene triangle or an irregular pentagon on the grid paper and find the area of drawn shape. When their work gets finished ask them whether they have computed the actual area or approximated area of shapes. Check work of students and provide help where ever required.
- Conclude that for irregular shapes or shapes which do not cover exact number of halves of squares on a grid paper, approximated area can be computed.

Understanding
Expected

Application

Find the approximated area of following

- [Diagram of a scalene triangle]
- [Diagram of a semi-circle]
Thinking Skills

Vijay draws an irregular figure and computes its approximated area as 46 cm$^2$. Then he takes a copy of the same figure of half size and another copy of the same figure having double size. What is the sum of the area of both copied figures?

Mahi draws an irregular figure and computes its approximated area as 24 square units. Somehow, she forgot to add 4 squares which cover more than half of a square, 6 squares which cover less than half of a square, and 2 exact half squares. Find the difference between the correct area and the area calculated by Mahi?

Real Life Connect

Name the largest and smallest states of our country.

Trace your palm and a leaf on a grid paper and compute their area.

Analysis

- Anu draws a circle of radius 4 cm while Pooja draws a circle whose diameter is 6 cm. Whose circle is larger?
- Can formulae be used for computing area of a square and a rectangle? If yes, frame them.
- Is there any standard method to find the area of a circle other than using grid paper? (Using formula: $\pi r^2$)
- Vijay draws an irregular figure and computes its approximated area as 46 cm$^2$. Then he takes a copy of the same figure of half size and another copy of the same figure having double size. What is the sum of the area of both copied figures?
- Mahi draws an irregular figure and computes its approximated area as 24 square units. Somehow, she forgot to add 4 squares which cover more than half of a square, 6 squares which cover less than half of a square, and 2 exact half squares. Find the difference between the correct area and the area calculated by Mahi?
Lesson Plan - 4

Grade - 4

Learning Objective
To visualise that plane figures having same area, may have different perimeter and vice versa.

Material Required
Grid papers, colours, ruler, cut outs of a triangle, a rectangle and a square each having same perimeter of 16 cm

Activity
- Get students to work in groups of three.
- Provide a grid paper to each group.
- Ask them to draw three different shapes such that area of each shape equals 12 squares units and shade each shape with distinct colour.
- Now ask them to compute the perimeter of those shapes. Ask further “Do all shapes having same area, have same perimeter too?
- Let them come up with a result that all shapes do not have same perimeter.
- Now provide another grid and cut outs of a triangle, a rectangle and a square each having same perimeter of 16 cm paper to each group. Ask them to trace the cut outs on the grid paper and find the perimeter of those shapes. Let them come up with a result that all have same perimeter.
- Now ask them to find the area of those shapes and share their result.
- Let them come up with a result that all shapes do not have same area.
- Explain that although shapes were distinct, but still they have same perimeter. But it does not mean that they have same area also and this is true for similar shapes of a particular shape too.
- Provide another grid paper to each group and ask them to draw three such rectangles whose perimeter are 24 cm and find the area of each shape by counting the number of squares bounded by each rectangle.
- Let them verify that this time again all shapes do not have same area.
- Conclude that figures having same perimeter may have different area and vice versa.

Area and Perimeter Measurement

Find the perimeter and area of following figures made of unit squares and identify whether two figures have same perimeter or area.

»   »   »
Real Life Connect

- Find the perimeter of your desk and teacher’s desk in the class room and compare them.
- Find the perimeter of a fifty rupee note and a 100 rupee note, trace them on a grid paper and compare their area.

Analysis

- Anup draws a rectangle and a square. Find the larger shape, if perimeter of each is 16 cm.
- Vimal draws two rectangles. The dimension of first rectangle are 6 cm x 4 cm and for second rectangle it is 8 cm x 3 cm. Which rectangle has more perimeter?

Thinking Skills

- A circle is inscribed in a square. If the radius of the circle is 4 cm, what is the perimeter of the square?

![Circle inscribed in a square]

- A square and a rectangle have same perimeter. If rectangle’s dimension are 25 cm x 15 cm, find the side of the square?

- Find the perimeter of your desk and teacher’s desk in the class room and compare them.

- Find the perimeter of a fifty rupee note and a 100 rupee note, trace them on a grid paper and compare their area.
Learning Objective
To read and write exact time in hours, minutes and seconds

Material Required
Analogue clocks having two hands and three hands respectively

Activity

- Show a clock displaying 3:15 and ask students to read the time in hours and minutes. Let them identify hour hand, minute hand and read time as quarter past three and write as 3:15.
- Now display a clock having three hands and introduce the third, thinner hand as second hand and state the fact that 1 minute = 60 second. Illustrate the fact that second is the smaller unit of time than minute.
- Display an analogue clock having three hands and show the exact time for present time, say 11:20:00. Ask students to observe the position of minute hand when second hand moves from 12 to 12, i.e. it completes a rotation. Let students visualise that when second hand completes a full rotation, the minute hand moves through just one division that shows that 1 minute equals 60 seconds.
- Explain that reading seconds is similar to reading minutes. Each small divisions on a clock show 1 second. Ask them to count the total number of divisions between 12 and 1. Let them share that there are 5 divisions (5th on 1 itself). Explain it means, when second hand point to 1, it shows 5 seconds and similarly, at 2, 10 seconds, at 3; 15 seconds and so on.
- Explain the short trick to read seconds, i.e. Multiply the number pointed by second hand with 5, e.g. if at 6, it is 6 x 5 = 30 seconds, if at 10, it is 10 x 5 = 50 seconds.
- Explain that if second hand points to 3 divisions ahead than 4, then it shows 23 seconds (4 x 5 = 20, 20 +3 = 23 seconds).
- Show a clock displaying 5:25:35 on the board. Explain reading this in words and writing using numerics, i.e.5 hours, 25 minutes 35 seconds and 5:25:35. In numeric, hours, minutes and seconds are separated using colons.
- To strengthen the concept, divide the class into groups of 12 students in each.
- Display a clock showing 3:15:00 on board. Instruct students of first group to start reading time in hours, minutes and seconds in turn for respective movement of second hand from 1 to 11 only (and not for each division) i.e. 3 hours 15 minutes 5 seconds, 3 hours 15 minutes 10 seconds,... 3 hours 15 minutes 55 seconds (for 3:15:05, 3:15:10, 3:15:15,... 3:15:55 respectively).
Thinking Skills

What is the time in a clock, if the hour hand points in between 5 and 6, while minute hand points 2 divisions ahead than 7 and second hand points 3 divisions ahead than 10?

Real Life Connect

- List the tasks that can be performed in 1 seconds.
- List the events that require time measurement in seconds.

Analysis

- Meeta takes 20 seconds to write a sentence while Juhi took 30 seconds to write same sentence. Who writes faster?
- How many times does a second hand go round the dial in an hour?

Application

- A TV advertisement begins when second hand points to 2, minute hand points to 6 and hour hand lies in between 2 and 3. At what time the advertisement begins?
- Anita took 3 min 30 sec to compete a race while Payal took 3 min 20 sec. Who was the winner?
- How many times does a second hand go round the dial in an hour?

Content Book Reference: Page 173-175
Guided Practice: Page 134, 135
Lesson Plan - 2

Grade - 4

Learning Objective
To convert hours into minutes and minutes into seconds or vice versa.

Material Required
Three boxes, slips, cards

Activity
- Write following problem on the board:
- Nita study for 1 hour 20 minutes while Suman study for 140 min. Who study longer?
- Ask students to solve the given problem and answer that. Let students realise that both measurement are not in same units. Pose a question: How to compare such measurements?
- Let students brainstorm the posed question. Share with students that for such comparison, measurements must be in same units. For that we may either convert 1 hour 20 minutes into minutes or 140 minutes as hour and minutes.
- In order to explain the conversion, divide the class into pair of students.
- Display two boxes and inform students that one of the boxes contains slips having hours and other having minutes.
- Invite each pair to come forward and pick a slip from each box kept on the table and write time using hours and minutes respectively, e.g. 2 hours 20 minutes
- Ask them to convert the formed unit into smaller unit, i.e. in minutes. Guide them to convert the mixed unit into single unit by using the fact that 1 hr equals 60 min. Let students perform the task.
- Randomly check and explain to convert hour into minute, i.e. use multiplication operation to convert hours into minutes and then add given minutes, e.g. $2 \times 60 = 120 \text{ min}$, $2\text{h 20 min} = 120 + 20 = 140 \text{ min}$
- Display two boxes for minutes and seconds and repeat the same activity for conversion of minutes and seconds into seconds.
- Randomly distribute time cards to each student. Instruct students to stand up turn wise and read the time given in their card, e.g. 240 sec, 4 min, 2 hr etc.
- Ask rest of the students to be attentive and check their card for corresponding time said by their class mate.
- Inform them that they have to find their partner, who has corresponding time in other unit, e.g. if a student speaks up 120 sec, the student who has 2 min to clap/raise his hand and show his card to entire class.
- Instruct such pair of students to sit together and continue the activity with other students, till each student get his/her partner.
• Explain the conversion of seconds to minutes and minutes to hour, i.e.
use division operation, divide given seconds by 60 and given minutes by
60 to convert them into minutes and hours respectively, e.g. 300 minutes
= 300 ÷ 60 = 5 hours, 420 seconds = 420 ÷ 60 = 7 minutes
• Conclude that to convert larger to smaller unit use multiplication
operation and in inverse case use division operation.

• Multiplication and Division
• Time Facts: 1 hour = 60 minutes and 1 minute = 60 seconds

• Convert 5 hr 25 minutes into minutes.
• Convert 2 hr 40 minutes and 20 seconds into seconds.
• Find the multiplying factor to convert an hour into seconds.
• How many seconds make half of a day?

• Ruchi conducted an experiment. If she took 420 seconds more than 6
minutes and 42 minutes less than 120 minutes, find how much time did
she take for experiment.
• My watch loses 2 minutes every day. How many seconds does it loose in
1 hour?
• Find, for how many minutes does your favourite Movie end?
• Find, for how many minutes do a Football and a basketball match end?
Learning Objective
To add and subtract given time units.

Material Required
Slips

Activity
• Get students to work in pairs. Provide a time slip to each pair on which time is written in hours and minutes, e.g. 4 h 40 minutes.
• Ask each pair to draw a clock and show the time given on the slip in the drawn clock.
• Then ask them to find the time after 2 hours of that time and show the same in another clock.
• Discuss about the approach used by them for getting the time after 2 hours of given time.
• Now ask them to find the time which is 3 hours 10 minutes later than the given time.
• Let students analyses the problem and attempt to get answer of that, e.g. Say given time is 4 h 40 min then the time 3 h 10 minutes later will be 7 hr 50 min.
• Explain the column method of addition of time for following problem:
  4 h 40 min + 5 h 50 min

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<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>4</td>
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<td>-</td>
<td>5</td>
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• Demonstrate to draw two columns, one for hour and other for minutes and arrange the data in respective columns.
• First add minutes, i.e. 40 min +50 = 90 min.
• Explain here that as sum of minutes exceeds 60 min, it is required to express it as hours and minute, i.e. 90 min = 60 min + 30 min = 1 h +30 min.
• Explain to carry forward this 1 hr (obtained by regrouping minutes) into hour column and add the hours. Thus the sum of hours equals: 4 +5 +1 = 10 hours. And the sum of given time unit is 10 h 30 min
• Write following problem on the board:
• A clock displays 5 h 20 min. What was the time 2 hours ago than time shown in the clock?
• Ask students to analyse the problem and attempt to solve that. Let students realise the use of subtraction operation for solving the given problem and share their answers in turn, i.e. 3 h 20 min
• Explain column method of subtraction for subtracting 4 h 30 min from 6 h 20 min.

<table>
<thead>
<tr>
<th></th>
<th>h</th>
<th>min</th>
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</thead>
<tbody>
<tr>
<td>6</td>
<td>2</td>
<td>0</td>
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<tr>
<td>-</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

• Let learners realise that 30 min cannot be subtracted from 20 min (as 30 min > 20 min) and therefore regrouping is required. Explain borrowing 1 hr means...
Addition and Subtraction of Numbers

Students will be able to perform addition and Subtraction of time units

Understanding

Rohit went to Gym at quarter past seven in the morning. He stayed there 25 minutes to 10 and spent 30 minutes on travelling. How much time in all he spent on fitness and travel?

- 2 h 20 min + 2 h 30 min
- 1 h 50 min + 1 h 25 min

Application

Anup’s office begins at 10 o’clock in the morning and ends at 5 o’clock in evening. Find the time he spends in office.

Sandeep played tennis for 56 minutes and Cricket for 1 hour 31 minutes. For how long did he play?

Reduction of hours and minutes

- 3 h + 2 h 45 min
- 5 h – 2 h 35 min

Analysis

- Conclude that addition and subtraction of time can be done using column method by considering following regrouping rules, 1 h = 60 min and 1 min = 60 sec

Thinking Skills

- Discuss a few problems that involve time in seconds, e.g. 4 min 30 sec + 12 min 12 sec = 16 min 42 sec

Real Life Connect

- Addition and Subtraction of Numbers
- Students will be able to perform addition and Subtraction of time units

- Add following:
  » 3 h + 2 h 45 min
  » 5 h – 2 h 35 min

- Subtract following:
  » 6 h 5 min + 1 h 25 min
  » 9 h 15 min – 6 h 50 min

Content Book Reference: Page 176, 177
Lesson Plan - 4

Grade - 4

Learning Objective
- To read and write time in 12 hour clock and 24 hour clock
- To convert time in 12 hour clock to 24 hour clock and vice versa

Material Required
- Cards (on some cards time is written in 12 hour clock and on other cards corresponding time is written in 24 hour clock), railway time table of local station

Activity
- Get students to work in groups of four.
- Provide four cards to each group of students, e.g. 5:30 am, 7:15 pm, 12 noon, 4:00 pm.
- Ask students to observe the cards and arrange them in ascending order of their occurrence in a day, e.g. the given card to be arranged as 5:30 am, 12 noon, 4:00 pm, 7:15 pm.
- Let students perform the explained task and show their work in turn,
- Review students’ work and recap the idea of representing time using 12 hour clock, i.e. using am and pm.
- Explain the meaning of am as ante meridiem and pm as post meridiem and illustrate that for 12:00 midnight to 12:00 mid-day, am is used while for rest of the day pm is used.
- Show a railway time table to entire class and introduce the concept of 24 hour clock.
- Explain the relation/conversion between 12 hour clock and 24 hour clock time, i.e. for midnight to mid-day the time is read same just in place of am, hours is used. E.g. 9:00 a.m. is read as 9:00 hours in 24 hour clock.
- Further explain that from mid-day (12 noon) to midnight (for next half of the day) add 12 hours in time expressed in 12 hour clock format and replace pm by hours. E.g. 5:00 p.m. will be written as 5 + 12 = 1700 hours.
- Explain in inverse case, i.e. for converting time from 24 hour clock to 12 hour clock, read same time from mid-night to noon, just place a.m. in place of hours and from noon to midnight time, subtract 12 hours from 24 hour clock time and place p.m. in place of hours. E.g. 400 hours = 4:00 a.m., 1600 hours = 16 – 12 = 4:00 p.m., 20 hours 30 minutes = 20 – 12 = 8 hours, thus time in 12 hour clock is 8:30 p.m.
- Explain that it is only hours which need to be converted from one system to other, the minutes remain same in both the systems, e.g. 10:40 am = 10 40 hours or 1040 hours and 9:15 p.m. = 21:15 hours or 2115 hours.
- Divide the class into two teams. Provide both teams various cards such that one team gets cards on which time is written in 12 hour clock format and other team gets cards on which time is written in 24 hour clock format.

Learning Objective

Material Required

Activity
Students will be able to convert 12 hour clock time into 24 hour clock time and vice versa.

A train leaves a station at 12:05 pm. At what time will it reach next station, if journey took 1 hour 32 minutes?

A man started his work at 20:00 hours on Tuesday. He took 8 hours 30 minutes more than the half of day to complete the task. At what time did he finish the task? Express the result in 12 hour clock form.

What time does 23:45 hours denote in 12 hour clock?

What time is it 2 hours before midnight in 12 hour clock and in 24 hour clock time?

A train leaves a station at 12:05 pm. At what time will it reach next station, if journey took 1 hour 32 minutes?

A man started his work at 20:00 hours on Tuesday. He took 8 hours 30 minutes more than the half of day to complete the task. At what time did he finish the task? Express the result in 12 hour clock form.

Find about India’s time zone and Indian Standard time.

Also find out the total number of time zones into which Countries all over world is divided?

Express your every day schedule on a time line.
Lesson Plan - 5

Grade - 4

Learning Objective
- To know inter conversion of years, months, weeks and days.
- To write dates in dd/mm/yyyy format

Material Required
Cards (on which years, months, weeks, days and hours are written)

Activity
- Get students to work in groups of five.
- Randomly provide five cards to each group.
- Ask them to observe the cards and arrange the units of time written on those cards in ascending order, i.e. hours, day, weeks, months, years.
- Review work of students and recapitulate the associated facts, i.e. 12 months make a year, 30 or 31 days make a month, 7 days make a week and 24 hours make a day.
- Now ask students to work in pairs and think for two 1-digit numbers.
- Then ask them to frame a mixed unit of time using those two 1-digit numbers and any two consecutive units of time from years, month, weeks, days in an order, e.g. 4 yrs 3 months, 5 months 2 weeks, 3 weeks 1 day etc.
- Ask them to express the formed mixed unit into smaller unit using the time facts between those units. Review students work and explain the conversion on the board e.g. 4 yrs 3 months = 4 x 12 + 3 = 51 months, 5 months 2 weeks = 5 x 4 + 2 = 22 weeks, 3 weeks 1 day = 3 x 7 + 1 = 22 days
- Discuss the inverse case also, i.e. conversion of days into weeks, months into years etc. E.g. to convert 42 days into weeks use division operation, 42 ÷ 7 = 6 weeks, convert 15 months into years, 15 ÷ 7 = 1 year and 3 months
- Explain here that in case of dividing the number of days by 7, the quotient shows the number of weeks and remainder shows remaining days, if any. Similarly dividing the number of months by 12, the quotient shows number of years and remainder shows remaining months.
- Ask students about the date of present day.
- Let students speak the date, with corresponding month and year.
- Say a student replies 14th of December, 2016. Ask them to write the date using numerics in their notebook. Explain the numeric used to represent various months from January to December, i.e. 1,2,3,4,5...12 for Jan, Feb., March, April, May, ... Dec
- Explain notation of date in correct format, i.e. dd/mm/yyyy. E.g. 14/12/2016
- Conclude that to convert larger unit to smaller, use multiplication operation and for inverse case use division operation. Also summaries the correct format for writing a date as dd/mm/yyyy, where d stands for date, m for month and y for year.
• Students will be able to interconvert various time units including years, months, weeks and days and write dates for particular day of months in a specified format

**Calendar**

Convert the following:
- 2 years 4 months into months
- 6 months 2 weeks into weeks
- 5 weeks 4 days into days
- 6 days 2 hours into hours
- 96 months into years

Write the date for following events in current year and arrange them in ascending order of their occurrence in a year.
- Children’s day, Labour day, Women day, Independence day, Christmas.

• Jaya took 3 months, 11 weeks, 23 days to lose 10 kg weight while Manu took 187 days to lose same weight as Jaya did. Who took less time to lose same weight?

• Mady took 2 months 3 weeks 5 days to complete a task while Suraj took 24 fewer days than Mady to do same task. Find in what time Suraj completed the task?

• Find the difference in Indian calendar and Hindu calendar
• Write the date for your birth date and your family member’s birth date.
Learning Objective
- To compute the duration of an event
- To find the start/end time when duration of an event and end/start time is given.

Material Required
- Slips (on some slips time is written in 12 hour clock format while on others time in 24 hour clock format)

Activity
- Ask students about their school timings, i.e. what is start time and when does it get over? Ask a few more questions, e.g. For how long do they play every day? For how long do they sleep every day, How much time do they spend in school etc.
- Let students participate in the interaction and share their result in turn. Lead them to realise that to find the time spent on certain activities, they need to find the duration of that event/activity and for that they need to know start time and end time.
- Write the start time and end time of the period on the board and ask students to find the duration of the period.
- Let students realise the use of subtraction operation to find the duration of period and attempt to solve the given problem. E.g. If time are expressed in 24 hour clock form, i.e. start time 9:30 hours and end time 10:10 hours, then duration of period: 10:10 – 9:30 = 40 minutes
- Discuss if time are expressed in 12 hour clock form, i.e. start time 9:30 a.m. and end time is 10:10 a.m. Then duration of period: 10:10 – 9:30 = 40 minutes
- Explain to find the duration of an event, it is required to observe the time units carefully. Consider a problem where both time measurements are given either in a.m. or p.m. E.g. A function began at 8:20 p.m. and finished at 11:45 p.m. Find how long did the function last? Explain here that end time is 11:45 p.m. and start time is 8:20 p.m. then duration of event: 11:45 – 8:20 = 3 : 25 hours
- Discuss another problem, e.g. A live concert started at 10:30 a.m. and ended at 1:20 p.m. Find how long was the concert last? Explain here that start time is, 10:30 a.m. and finish time is, 1:20 p.m. Ask students to observe the time form and let them realise that both time are expressed in 12 hour clock format.
- Explain here that to find the duration of an event, when one time is given in a.m. and other as in p.m., subtraction is done in two steps, i.e. First we find the duration of event, from start time, which is 10:30 a.m. here, to 12 noon and also from 12 noon to end time which is 1:20 p.m. here.
- Show the following diagram and help students to visualise the problem and its solution.
Exemplify the method on the board:
12:00 – 10:30 = 1:30 and 1:20 – 12:00 = 1:20

Explain that total duration of event is sum of both durations, i.e. 1:30 + 1:20 = 2:50 hours

Also discuss some problems which include duration of an event and start time/end time. E.g. A dance show begins at 6:00 p.m. and last for next two hours 30 minutes. Find the end time of show.

Explain the solution as, end time = Duration + Start time, i.e. 2:30 + 6:00 = 8:30. Hence the end time is 8:30 p.m.

Similarly, discuss following problem:
A movie ends at 5:30 p.m. If duration of movie was 3 hours 20 min find the start time of movie.
Explain the solution as start time = End time – duration = 5:30 – 3:20 = 2:10. Hence the movie begins at 2:10 p.m.

Get students to work in pairs. Provide two slips to each pair and ask students to observe the time written on those slips. Let students realise that on one slip time is in 12 hour clock format while on other it is in 24 hour clock format. E.g. 8:30 a.m. and 12 noon

Ask them to convert both time as 24 hour clock format and find which one occurs first in a day. E.g. 8:30 hours and 12:00 hours.

Instruct them to consider the time which occurs first in a day as start time and the other time as end time and subtract start time from end time to find the duration of event. E.g. 12:00 – 8:30 = 3:30 hours

Write following problem on the board:
Nisha’s vacation begins from 15th May and ends till 3rd July. How long was her vacation?

Explain students to find the number of days of vacation, we use calendar facts, i.e. number of days in may month = 31 – 15 = 16 days, number of days in June month = 30 days and number of days in July month = 3 days, thus total number of days = 16 + 30 + 3 = 49 days.

Explain here that to find the duration of an event when start date and finish dates are given, we include only any one of the date, i.e. either start or end date, but do not consider both dates in total duration of event.

Conclude that duration of an event can be found out by subtracting the start time from end time. Also summaries that the start time /end time can be found out using following expressions:
End time = Start time + Duration
Start time = End time – Duration
Students will be able to compute the duration of an event and find the start time/end time when other information is provided.

- Janavi attended a seminar which begins at 9:45 a.m. and finishes at 11:40 a.m. What was the duration of the seminar?
- An examination begins at 11:40 hours and runs for 1 hr 50 minutes. Find the end time of lecture.
- Calculate the time duration from 9:15 a.m. to 11:45 a.m. on next day.
- Juli started an experiment at 18:50 hours on Monday. The experiment lasted for next two days four hours 20 minutes. At what time and what date the experiment lasted?
- Payal went out of station at 11:30 a.m. on Tuesday and returned back after 4 days 5 hours 20 minutes at home. When did she come back?
- Neha was born on 16 June 1981. She got married on 1st October 2006. Find her age at the time of her marriage.

Note down the time you leave for school and the time when you come back from school. For how long you stay away from home? Also find out for how long do you stay at home?
Activity

- Write following problem on the board:
  Geet bought a drink for ₹60 and a plate of sliced fruits for ₹50. How much amount did he pay?
- Ask students to solve the given problem.
- Draw the model to visualise the problem as given below and lead them to realise that to find the total amount to be paid, one has to add cost of each item.

\[
\begin{array}{c}
\text{₹60} \\
\text{₹50}
\end{array}
\]

- Ask further, If Geet gave ₹200, how much amount will he get back in return?
- Draw the model to clearly visualise the operation used to solve the problem and help students to realise that to find the amount to be returned, one has to subtract total cost of items from ₹200.

\[
\begin{array}{c}
\text{₹110} \\
\text{₹200}
\end{array}
\]

- Discuss a few other instances and help students to realise the need of addition and subtraction of money in various shopping experiences.
- Ask students to work in pairs.
- Display following items in class, along with their price tags:
  - A toothbrush costing ₹45.30, a soap costing ₹67.80, a bat costing ₹145.50
- Ask students to choose any two items and find the cost of buying those items. Let them attempt themselves first.
- Explain the column method of addition of money in following way:
  » Arrange the amounts in columns such that paise and rupees lie in respective columns and decimal point lies exactly in same column

\[
\begin{array}{c|c|c|c|c}
\text{₹} & 4 & 5 & . & 3 & 0 \\
+ & 6 & 7 & . & 8 & 0
\end{array}
\]
Then add them similar to addition of numbers and regroup paisa and rupee, (if required as we do in numbers).

Place decimal point in answer in same column. E.g. ₹45.30 + ₹67.80

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>₹</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>+</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>=</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

Now ask them to consider a situation where they have a note of ₹500 with them and after paying the amount of their shopping, they have to find the change for purchased items. Draw the model for better visualisation and lead students to write subtraction statement /expression i.e. ₹500 – ₹113.10.

Ask them to use the column method of subtraction and solve the problem themselves.

Explain here that ₹500 is same as ₹500.00, thus problem become ₹500.00 – ₹113.10.

Explain as 10 paisa cannot be subtracted from 00 paisa, therefore, it is required to regroup rupees and paisa or paisa will borrow from rupees. On borrowing 1 rupee or 100 paisa, makes the amount as ₹499.100. Now subtracting paisa we get, 100 -10 = 90 paisa and on subtracting rupees, we get 499 – 113 = 386, Thus the left amount is ₹386.90

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>₹</td>
<td>4</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>+</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>=</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Conclude that addition and subtraction of money is performed in similar way as for numbers, just we need to be careful while placing decimals. It should be in same columns as addends in addition problem and as subtrahend and in minuend in subtraction.

Students will be able to perform addition and subtraction of money (in decimal form).

Solve the following: Payal bought a water bottle for ₹145.25, a dress for ₹236.75 and a hair band for ₹13.10 from a shopping mall. Find how much amount did she pay for all bought items.
Aasim bought a notebook for ₹15.00 and a pen for ₹18.20. He gave ₹50 to the shopkeeper. How much money should he get back?

Aasim bought a notebook for ₹15.00 and a pen for ₹18.20. He gave ₹50 to the shopkeeper. How much money should he get back?

Real Life Connect
Observe the instances where your parents get change in return while doing money transaction, e.g. buying articles, paying ticket charges, paying fees etc.

Analysis

Sita had ₹350 with her. She wanted to buy a sari priced ₹415.80. How much more money does she require to buy that sari?

Meena bought some items for ₹1050.75. If she paid ₹1500, how much change will she get?

- Jayant borrowed ₹585.65 form his friend. After some time he returned ₹400.75 to his friend. Find how much debt is left to return back?
  - Jayant borrowed ₹585.65 form his friend. After some time he returned ₹400.75 to his friend. Find how much debt is left to return back?

Content Book Reference: Page 187-189
Guided Practice: Page 147-149
Lesson Plan - 2

Grade - 4

Learning Objective
To perform multiplication and division operations on money and solve practical problems.

Material Required
A dictionary with price tag of ₹112.30

Activity

- Write following problem on the board:
  A vendor sells potatoes at ₹20 per kg. If Ritu bought 3 kg potatoes, how much amount did she pay?
- Ask learners to solve the given problem.
- Draw model for given problem to visualise the problem and let them realise the use of multiplication operation to solve the given problem and come up with a result that 3 kg potatoes will cost ₹20 x 3 = ₹60.

```
?  
₹20
```

- Display a dictionary costing ₹112.30 in front of entire class.
- Ask students to find the cost of 2 such dictionaries. Let them realise that to find the total cost of 2 such dictionaries they need to multiply the cost of dictionary with 2.
- Explain multiplication of money with a whole number in following way:
  » Arrange amount, i.e. a multiplicand in columns
  » Multiply the paise by whole number (the multiplier) and regroup paise (if required).
  » Then multiply rupees with whole number.
  » Place decimal in same column in answer as it was in multiplicand in such a way that the product and multiplicand have same number of decimal places.
- Show the multiplication on board as follows:

```
   1 1 2 . 3 0
× 2

2 2 4 . 6 0
```
- Thus cost of 2 such dictionaries: 2 x 112.30 = ₹224.60
- Now, write another problem on board:
- Shilpa bought 4 kg tomatoes for ₹100. Find how much 1 kg tomatoes cost?
- Ask students to solve the given problem.
- Draw model for given problem and let students realise the application of division operation to find the unit cost, i.e. cost of 1 kg tomatoes and come up with a result that 1 kg tomatoes cost ₹25.

```
?  
₹100
```
- Now explain division method for following problem: 452.25 ÷ 5
  » Start division by dividing rupees and place the respective quotient at appropriate places.
Students will be able to multiply and divide money (in decimals) by a whole numbers.

**Understanding**

Expected

Application

Analysis

Thinking Skills

Real Life Connect

**Content Book Reference:** Page 190, 191  
**Guided Practice:** Page 150, 151

» If some rupees are left, regroup rupees and paise and then divide them otherwise divide only paise and place the decimal point in quotient as soon as rupees get divided. Write the quotient obtained on dividing paise at respective places.

» In last, add the quotients obtained by dividing rupees and paise separately.

- Show entire division on board and explain that on dividing 452 by 5, we get ₹90 as quotient and ₹2 as remainder. Now regrouping remaining amount with paise, we get $2 = 200 p, 200 + 25 = 225 p$, now dividing 225 p by 5, we get 45 paise as quotient. Hence the quotient is ₹90.45.

```
  9 0 . 4 5
5 | 4 5 2 . 2 5
  - 4 5
  0 0 2 . 2
  - 2 0
  2 5
  - 2 5
  0 0
```

- Conclude that multiplication and division on money can be done in same way as for numbers; just we need to be careful while placing decimals in results.

Students will be able to multiply and divide money (in decimals) by a whole numbers

- If cost of 10 books is ₹225.50. Find the cost of 1 book.
- If cost of 1 shirt is ₹456.25, find the cost of 5 such shirts.
- Anju bought 2 kg potatoes and 3 kg onions. Find how much amount she needs to pay if 1 kg potatoes cost ₹12.50 and 1 kg onion costs ₹8.50.
- Mahima bought 3 copies of a notebook, each costing ₹23.40. Find the total amount paid by Mahima.
- Pooja bought 2 colour boxes and paid ₹56 while Sheetal bought three colour boxes of same type for ₹84. Whose deal was expensive?
- Aakansha went for shopping with ₹200. She had to buy two items either of same kind or distinct such that some amount is left with her. She chose a purse and a belt, each costing ₹90 and 110 respectively. Which two items can she buy with given condition?

- Find the monthly expenditures on milk and vegetables in your family.
- Find the monthly income of your family and then compute weekly earnings from same source of income.
**Learning Objective**

To apply unitary method to find the cost of one item and then cost of multiple items

**Activity**

- Write following problem on the board:
  - The ticket price of 12 persons is ₹96. What is the ticket price of one person?
- Ask students to solve the given problem. Ask them about the operation used to solve the given problem. Ask them to draw a model for given problem and solve the given problem.
- Draw the model on the board and let students come up with a result that cost of 1 ticket is ₹8
- Explain that 12 units = 96, 1 unit = 96 ÷ 12 = 8.

\[
\text{Cost of 1 ticket} = \frac{96}{12} = 8
\]

- Now ask them to find the cost of 5 tickets. Let them attempt themselves and find the required cost. Ask them about the operation used to find the cost of ticket of 5 persons. Let them realise the application of multiplication operation to find the cost of 5 tickets.
- Explain that 1 unit = 8, 5 units = 5 \times 1 = 5 \times 8 = 40
- Lead them to visualise both the problems collectively, i.e. first they compute the cost of 1 ticket and then they compute the cost of multiple tickets (more than 1) and for that they first used division operation followed by multiplication operation. Draw the following model in support.

\[
\begin{array}{cccccc}
\text{96} \\
\hline
\text{?} \\
\text{?} \\
\end{array}
\]

- Introduce the method to compute the cost of one quantity and then cost of many quantities as unitary method.
- Emphasis students to draw a model of given problem to visualise the problem and then use appropriate operation to find the required value. E.g. The cost of twenty cups of same ice-cream is ₹225.60. Find the cost of 12 such cups of ice-creams.
- Explain the solution by drawing the model of given problem which requires to find cost of 12 such cups of ice-cream.
Multiplication and Division of Money, Apply unitary method to find the cost of one item and multiple items.

- If cost of 14 chairs is ₹14918.40. Find the cost of 6 chairs.
- If cost of 22 bags is ₹4408.80, find the cost of 15 such bags.
- Cost of 14 m string is ₹168. Find the cost of 8 m string.
- A rail journey of 75 km costs ₹215. How much will a journey of 130 km will cost?
- A truck covers 540 km and consumes 36 L of diesel. How many kilometres will it cover, if there are 24 L of diesel in fuel tank?
- If 15 oranges cost ₹75, find the cost of 12 more oranges.
- Visit a grocery shop and find the unit rate of various items, e.g. a packet of biscuits, 1 kg rice, 1 kg refined oil etc.
- Find the currency of USA, Australia, and England. Also find the equivalent value of currency of those countries in Indian currency.

To find cost of 12 such cups, first we need to find the cost of 1 cup of ice-cream, which is ₹225.60. \( \frac{225.60}{20} = ₹11.28 \). Now cost of 12 such cups = \( 12 \times ₹11.28 = ₹135.36 \)

Conclude that unit means one and therefore unitary method is based on finding value/cost of 1 quantity using division operation and then using multiplication operation finding value of many/multiple quantities.

Content Book Reference: Page 192
Guided Practice: Page 152
### Lesson Plan - 4

#### Grade - 4

**Learning Objective**
To observe given bills, identify specifications given there and form a bill for selected items.

**Material Required**
Few bills of shopping, A packet of Juice, A packet of biscuits, A packet of corn flakes, A Water bottle, A lunch box, A few games, e.g. chess, bat ball set, rackets (All items with their price tags)

<table>
<thead>
<tr>
<th>Activity</th>
</tr>
</thead>
</table>
| • Write following case on the board: Manish went for shopping and bought 2 trousers, each costing ₹500, 3 shirts each costing ₹400. How much amount did he pay for shopping?  
• Ask students to solve the given problem and interact with them about their shopping experience. Ask following questions in support:  
  » How does a shopkeeper compute the total amount to be paid by a customer?  
  » Does he give a receipt for the same?  
  » What does that receipt called?  
  » What kinds of specifications are mentioned on that receipt?  
• Discuss responses and introduce the name of that receipt as a bill, which shows all the details of bought items from a store along with total amount to be paid for selected items.  
• Show a few bills to entire class and explain its specifications, i.e. it shows name of items, number of quantities, unit rate of that item and corresponding to bought quantity, total cost for a particular item. Also emphasis that it shows total amount to be paid for all bought items.  
• Display following items with their price tags on a table. A packet of Juice, A packet of biscuits, A packet of corn flakes, A Water bottle, A lunch box, A few games, e.g. chess, bat ball set, rackets etc.  
• Get students to work in pairs. Instruct them to choose at least 5 items and make a bill of those items by considering the condition that they have to buy at least 2 quantities of each. Inform them they may choose more than 5 items and more than 2 quantities too.  
• Ask them to make 5 columns, name them as Sr. No., Item, Rate, quantity and total cost and then fill the details of their selected items.  
• Instruct them to use multiplication operation to find the cost of multiple quantities of an item. In last ask them to add total cost of each item to find the total amount to be paid for selected items. E.g. A student choose 2 packets of juices, 3 packets of biscuits, 2 packets of corn flakes, 3 water bottles, 2 lunch boxes. Let rates of a packet of juice be ₹30, a packet of biscuits be ₹20, a packet of corn flakes ₹120, a water bottle be ₹40 and a lunch box be ₹50. Then his bill will be: |
Students will be able to read a bill and make a bill of chosen/ordered items.

- Manjeet went to buy some grocery items. He bought $\frac{1}{2}$ kg rice, 1.5 kg pulses, 2.5 kg sugar. Find how much amount did he pay if rate list was as shown below:
  - Rice: ₹80/kg,
  - Pulses: ₹200/kg,
  - Sugar: ₹50/kg

- Sovan checked the given bill and find it corrects. Check and find whether Sovan is correct or not! If not why not!

### Analysis

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Rate</th>
<th>Quantity</th>
<th>Total cost (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Juice</td>
<td>₹30.00</td>
<td>2</td>
<td>30 x 2 = 60.00</td>
</tr>
<tr>
<td>2</td>
<td>Biscuits</td>
<td>₹20.00</td>
<td>3</td>
<td>20 x 3 = 60.00</td>
</tr>
<tr>
<td>3</td>
<td>Corn flakes</td>
<td>₹120.00</td>
<td>2</td>
<td>120 x 2 = 240.00</td>
</tr>
<tr>
<td>4</td>
<td>Water Bottles</td>
<td>₹40.00</td>
<td>3</td>
<td>40 x 3 = 120.00</td>
</tr>
<tr>
<td>5</td>
<td>Lunch box</td>
<td>₹50.00</td>
<td>2</td>
<td>50 x 2 = 100.00</td>
</tr>
</tbody>
</table>

Total Amount ₹580.00

- Conclude that a bill is a written statement of various bought items along with their respective rates, quantities and total cost that helps to find the total amount to be paid for selected bought items.

### Application

- Juhi went for a shopping and she bought a school bag for ₹300, a pair of shoes for ₹423. 50, two pairs of socks for ₹120, two pairs of school uniform each for ₹600. Find how much amount did she pay for shopping?

- Atul bought 5 notebooks at ₹14 per notebook, 2 pens at ₹13 per pen, 4 pencils at ₹5 per pencil. Find how much amount did he pay?

### Thinking Skills

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Item</th>
<th>Rate</th>
<th>Quantity</th>
<th>Total cost (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cake</td>
<td>₹300.00</td>
<td>__________</td>
<td>600.00</td>
</tr>
<tr>
<td>2</td>
<td>Ice - cream</td>
<td>__________</td>
<td>3</td>
<td>60.00</td>
</tr>
<tr>
<td>3</td>
<td>Packets of Cheese</td>
<td>₹120.00</td>
<td>__________</td>
<td>360.00</td>
</tr>
<tr>
<td>4</td>
<td>Packet of Cookies</td>
<td>₹80.00</td>
<td>5</td>
<td>__________</td>
</tr>
</tbody>
</table>

Total Amount ₹_______

- Observe various shopping bills and find the details mentioned there.

Content Book Reference: Page 193, 194
Guided Practice: Page 153-155
Lesson Plan - 1

Grade - 4

CHAPTER 14

DATA HANDLING

Learning Objective
- To read and interpret a pictograph.
- To draw pictograph for given data

Material Required
Copies of pictographs

Class/Pair Activity

Activity
- Write number of beads collected by a few students on the board. e.g. Anu: 45, Tavi: 60, Sonu: 70, Manish: 80, Neena: 56
- Tell students that the collection of facts or figures is called data and the given information, i.e. marks of students are data.
- Now ask students about the least and most marks of students among given data.
- Tell students that by organising these data in the form of a table or chart, we can easily answer the posed questions.
- To explain pictorial presentation of data, write following data on the board:

<table>
<thead>
<tr>
<th>Name of Plant</th>
<th>Ashok</th>
<th>Neem</th>
<th>Banyan</th>
<th>Sal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of trees</td>
<td>80</td>
<td>70</td>
<td>70</td>
<td>90</td>
</tr>
</tbody>
</table>

- Tell students that the given table shows numbers of a particular kind of trees planted in a society.
- Draw following pictograph on the board for given data (or show it in front of entire class) and lead students to understand that pictograph is a pictorial presentation of data in which pictures/symbols are used to represent data in place of numbers (as in tables)
- Ask students to read that graph and observe the information given in it:

<table>
<thead>
<tr>
<th>Name of plant</th>
<th>Number of trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashok</td>
<td>🌳🌳🌳</td>
</tr>
<tr>
<td>Neem</td>
<td>🌳🌳</td>
</tr>
<tr>
<td>Banyan</td>
<td>🌳🌳</td>
</tr>
<tr>
<td>Sal</td>
<td>🌳</td>
</tr>
</tbody>
</table>

= 20 trees
= 10 trees

- Lead students to observe the key used in the pictograph and what does each key represent. Help them to understand the number of keys/symbols drawn to represent a particular number, i.e. as a key equals 20 trees, to show 80 trees, $80 \div 20 = 4$ keys/symbols need to draw.
- To represent 70 trees, two keys are used. A key represent 20 trees, so 3 such keys will show 60 trees ($20 \times 3 = 60$) and the other key will show 10 remaining trees.
• Now erase the table drawn in the beginning from the board and ask students to answer the following questions
  » How many Banyan trees are planted?
  » How many Sal trees are there?
  » Name the plant having most trees.
• Discuss answers and help students to understand answers of posed questions.
• Get students to work in pairs. Provide a copy of following pictograph to each pair of students and tell them that given pictograph shows number of various objects Rahul have.
• Ask them to frame 4-5 questions based on the given pictograph.

<table>
<thead>
<tr>
<th>Name of objects</th>
<th>Number of objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pencils</td>
<td>🟩🟩🟩🟩</td>
</tr>
<tr>
<td>Rubbers</td>
<td>🟩🟩</td>
</tr>
<tr>
<td>Scales</td>
<td>🟩🟩</td>
</tr>
<tr>
<td>Crayons</td>
<td>🟩🟩</td>
</tr>
<tr>
<td></td>
<td>🟩 = 4</td>
</tr>
</tbody>
</table>

• Then ask them to exchange the sheet with their adjacent pair and find answers of questions framed by each other.
• Write following data on the board:

<table>
<thead>
<tr>
<th>Favourite Sport</th>
<th>Cricket</th>
<th>Hockey</th>
<th>Football</th>
<th>Basket ball</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students</td>
<td>16</td>
<td>8</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

• Tell students that the given data shows favourite sport of some of the students of a class.
• Ask students to choose a suitable key and draw the pictograph for given data. Instruct them to choose a key such that all data can be represented using that. Here, a key may be chosen to represent 4 students (choose a key which is highest common factor of all data).
• Tell them that till now they have observed parameters represent horizontally (like in above shown pictographs)
• Explain them that parameters can also be shown vertically e.g.:

| 🚁 | 🚁 | 🚁 | 🚁 |
| 🚁 | 🚁 | 🚁 | 🚁 |
| 🚁 | 🚁 | 🚁 | 🚁 |
| 🚁 | 🚁 | 🚁 | 🚁 |

<table>
<thead>
<tr>
<th>Cricket</th>
<th>Hockey</th>
<th>Football</th>
<th>Basket ball</th>
</tr>
</thead>
<tbody>
<tr>
<td>🚁</td>
<td>🚁</td>
<td>🚁</td>
<td>🚁</td>
</tr>
<tr>
<td>🚁</td>
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<td>🚁</td>
<td>🚁</td>
</tr>
</tbody>
</table>

| 🚁 = 4 students |

• Conclude that a pictograph is a graph in which information is presented in the form of a picture. A pictograph makes information easy to understand.
• Students will be able to read and interpret a pictograph
• Draw the pictograph for following data:

<table>
<thead>
<tr>
<th>Class</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students</td>
<td>10</td>
<td>20</td>
<td>10</td>
<td>25</td>
</tr>
</tbody>
</table>

• Look at the given pictograph and answer the following questions:

<table>
<thead>
<tr>
<th>Violin</th>
<th>Guitar</th>
<th>Drum</th>
<th>Piano</th>
</tr>
</thead>
<tbody>
<tr>
<td>😊 = 10 students</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

» Which musical instrument is most liked by students?
» How many more or fewer students like Drum than violin?

• The given pictograph shows amount of money spent by Ravi on various day. Look at the pictograph and answer the following question:

» Did Ravi spend same amount of money on any two days?
» On which day Ravi spent the least amount and how much?

<table>
<thead>
<tr>
<th>Day</th>
<th>Amount of money spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>🎪 🎪 🎪 🎪</td>
</tr>
<tr>
<td>Tuesday</td>
<td>🎪 🎪 🎪</td>
</tr>
<tr>
<td>Wednesday</td>
<td>🎪 🎪 🎪 🎪 🎪 🎪 🎪</td>
</tr>
<tr>
<td>Thursday</td>
<td>🎪 🎪 🎪</td>
</tr>
</tbody>
</table>

Look at the given pictograph. The given pictograph shows birth months of various students of a class. What does the key represent if total numbers of students are 2 tens more than 50 ones?

<table>
<thead>
<tr>
<th>Name of months</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>△△△△</td>
</tr>
<tr>
<td>February</td>
<td>△△△</td>
</tr>
<tr>
<td>March</td>
<td>△△△△</td>
</tr>
<tr>
<td>April</td>
<td>△△△</td>
</tr>
</tbody>
</table>

Observe the pictographs in newspapers and school magazines. Find the information gathered through those pictographs.
Lesson Plan - 2

Grade - 4

Learning Objective
- To read and interpret a given bar graph.
- To draw a bar graph for given data.

Material Required
Bar graphs

Class/Pair Activity

Activity

- Write following data on the board and tell students that the data shows number of textbooks sold for a particular subject by a publishing house.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Number of text books</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td>250</td>
</tr>
<tr>
<td>English</td>
<td>280</td>
</tr>
<tr>
<td>Hindi</td>
<td>200</td>
</tr>
<tr>
<td>Science</td>
<td>220</td>
</tr>
<tr>
<td>Computer</td>
<td>330</td>
</tr>
</tbody>
</table>

- Ask students about the different ways of data presentation. (their answer may include using tables, using tally marks and using pictographs)
- Review the data presentation using pictograph and ask students to work in pairs, select a key and draw the pictograph for the given data.
- Lead them to realise that it is tedious to represent large data using a pictograph and therefore we need another type of a graph to represent large data.
- Show/draw following bar graph for given data on board and introduce the name of such graph as bar graph. Tell students that a bar graph is another way of data representation. Tell students that a bar graph has bars of different heights.

- Help students to read the given bar graph and visualise both the axis of graph, i.e. a horizontal and a vertical axis.
- Lead students to visualise that subjects are shown on horizontal axis while number of notebooks sold are shown on vertical axis and labelled accordingly.
- Help them to understand the scale of vertical axis, i.e. 1 unit = 50 books. Explain them that using the scale (50 books = 1 unit) the corresponding height of bars are drawn to represent the given data. E.g. to show 250 notebooks of Math, draw a bar aligning to 250, to show 280 books of
English, draw a bar aligning to 280, which is in between 250 and 300 and so on.

- Tell students that in given graph, each bar represents the number of notebooks sold for a particular subject. Lead them to interpret the given bar graph, i.e. maximum number of books were sold for computer subject.

- Write following data on the board and tell students that the data shows weekly salary of five friends.

<table>
<thead>
<tr>
<th>Name</th>
<th>Aman</th>
<th>Vimal</th>
<th>Kamal</th>
<th>Manan</th>
<th>Rajat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary (in ₹)</td>
<td>2000</td>
<td>3000</td>
<td>2500</td>
<td>1500</td>
<td>2000</td>
</tr>
</tbody>
</table>

- Get students to work in pairs. Provide a graph paper to each pair of students and ask them to follow the given steps to draw the graph for given data.
  » Observe the given data carefully.
  » Draw and label vertical axis.
  » Start at 0. Draw and label the horizontal axis.
  » List the name of each item, i.e. name of persons here on horizontal axis.
  » Choose a scale of vertical axis such that all data can be represented on the given graph paper. Say choose ₹500 = 1 unit here.
  » Then using the scale of vertical axis, draw bars to represent salary of five friends.
  » Keep the width of bar and the gap between two bars uniform.
  » Give the title of the graph.

- Draw the bar graph as shown below on the board and help students to visualise that Vimal’ earns most among five friends, while Aman and Rajat earns same amount in a week. Manan earns the least amount in a week.

- Conclude that a bar graph is another way of data representation in which bars of uniform width are drawn to represent data. Also tell students that bar graphs are useful in comparisons.

Students will be able to interpret a bar graph and draw a bar graph for given data.
Thinking Skills

Bharat collected the data for number of participants in a concert.

» There were half of 120 participants in dance and 20 fewer participants in singing than dancing.

» In aerobics the numbers of participants were equal to half of number of participants in singing and 40 participants were in other category.

» There were total 190 participants in all categories of concert but lost data for the number of participants in drama.

Find the number of participants in drama and draw a bar graph for recorded data:

Real Life Connect

Find the weekly expenditures of your family on the grocery items over a month and draw a bar graph for that.

Application

The given bar graph shows height of Sumit when he was 8 years old to 13 years old. Look at the given bar graph and answer the following questions:

> What was the height of Sumit when he was 8 years old?
> Find the growth in Sumit’s height from 8 to 10 years.
> In which year there was no growth as compared to last year?
> What was his height when he was 13 years old?

The given bar graph shows number of students enrolled in various academic years in a school. Look at the given bar graph and answer the following questions:

> In which year the least number of students got enrolled?
> In which year the maximum number of students got enrolled?
> In which years the numbers of enrolled students were same?

Analysis

Bharat collected the data for number of participants in a concert.

> There were half of 120 participants in dance and 20 fewer participants in singing than dancing.

> In aerobics the numbers of participants were equal to half of number of participants in singing and 40 participants were in other category.

> There were total 190 participants in all categories of concert but lost data for the number of participants in drama.

Find the number of participants in drama and draw a bar graph for recorded data:

Content Book Reference: Page 199-201  Guided Practice: Page 159-163