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TOUCHPAD

Mathematics

Teacher's Resource Manual

Ver. 1.0



Curriculum-Integrated Series with NCERT Standards

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ORANGE

Published by:

Orange Education

9, Daryaganj, New Delhi-110002
Phone: 011-43776600 +918588814859
Email: info@orangeeducation.in
Website: www.orangeeducation.in

IE Code: 0511063121

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PREFACE

The Teacher's Resource Manual is specially developed for teachers using **TouchPad Mathematics** Coursebooks. The manual has been designed to provide the teacher with additional materials and support that they may require to effectively teach the coursebook. Each **Teacher's Resource Manual** is completely mapped with its coursebook. The method of teaching/learning suggested in the book is completely based on the Learning-by-doing method which supports guidelines and aids of classroom teaching as per the New Education Policy 2020. The classroom teaching/learning activity helps to allay the fear of Mathematics from the minds of the learners and develops an inherent link for the subject.

Each **Teacher's Resource Manual** has two segments—Chapter-wise detailed **Lesson Plans based on 6E model** and **Practice Materials** in the form of **Worksheets**.

Features of the Teacher's Resource Manual:

Detailed Lesson Plan: It contains Topics to be covered in the chapter, Suggested Allocation of Periods, Teaching Objectives, Learning Objectives and Suggested Teaching Aids.

- **Each lesson plan is based on 6E's:** The 6E lesson plan is based on an instructional model that consists of six phases or steps: Engage, Explore, Explain, Elaborate, Evaluate and Enhance.
- **Engage:** It enhances students' curiosity, interest, and engagement and help them access prior knowledge.
- **Explore:** It provides students with opportunities to construct learning experience through activities.
- **Explain:** students acquire opportunities to explain their learning experiences with the current learning and to conceptualise the topic's main ideas.
- **Elaborate:** Students apply their knowledge to real-world applications.
- **Evaluate:** it allows teachers and students to recognize the learning effect and review and assess what they have learned and how they have learned it.
- **Enhance:** Provides students time to think, plan, investigate, and organize collected information.

Worksheets: This segment has worksheets for each chapter which can be used for practice and evaluation of learners' understanding of the concepts taught. At the end, answers to each worksheet have been given.

A teacher has to use his/her experience and expertise in teaching the subject. This **Teacher's Resource Manual** provides some methodology in this regard but in no way does it limit the scope of the teaching. As per the interest, experience and proficiency of the teaching, you are advised to make suitable additions and modifications to the methodology being discussed.

Suggestions for the improvement of the book by the teacher's community will be gratefully acknowledged by us.

—**Publisher**

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NUMBERS

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- read and write numbers up to 5 digits
- find the face value and the place value of the digits in a number
- compare and order the numbers up to 5 digits
- form numbers by using given digits without and with repetition of digits
- round off the numbers to the nearest tens and hundreds

LESSON PLAN

Suggested number of periods: 13

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like a clock, pen, pencils, number/flash cards, spike abacus, number and place chits, A4 size sheet, newspapers/magazines.

Keywords: Periods, Places, Thousands, Ten thousands, Lakhs, Place value, Face value, Expanded form, Short form, Smallest and greatest numbers, Successor, Predecessor, Rounding up, Rounding down, Hindu-Arabic Numerals.

Pre-requisite knowledge: Students must be familiar with numbers up to 4 digits, their number names, the smallest and greatest 4-digit numbers, etc.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1 – 6	**Topics: 5-digit numbers; Numbers on the number line**	**Suggested extra teaching aids: Abacus, Newspapers Touchpad Mathematics 4 pages 7–13**

ENGAGE

The teacher can start the topic in the classroom in an interactive method. For this, she/he can ask some questions related to the students' real life. For example,

- How many members are there in your family?
- Who is/are earning members in your family? What are their works?

- Can you guess your family's monthly income/expenses?
- How much do you pay school fee every month? and so on.

Acknowledge their responses.

- The teacher will revise the learners' previous knowledge of 4-digit numbers with the help of the "Warm Up" section of the book.

Next, ask some questions related to the topic to build the concept, like:

(*a*) Which is the smallest 4-digit number?

(*b*) Which is the greatest 4-digit number?

EXPLORE

Divide the class into groups of 3–4 students. Provide a newspaper to each group and instruct them to search for any three numbers made up of 3 to 5 digits. They will underline the information and note down the numbers in their notebooks. After 5–10 minutes, tell the students to read the numbers noted aloud and write it on the blackboard/whiteboard. In case of 5-digit numbers, the teacher should assist them in reading. Next, use the 'Card Game' to introduce the place value chart.

Card Game

- Write the places TTh, Th, H, T, O on the board. Or, string the place value cards and fix it on the wall in front of the class.



- Divide the class into groups of five students.
- Give each group a deck of cards from 0 to 9.
- Then ask the students to shuffle the cards and take five cards at random and stand in a row under the places fixed.
- Ask the rest of the students to say the number shown by group and tell the place values of each digit.
- Instruct them to write an addition expression using the place values of all the digits.

Then, introduce the Expanded form of numbers. **[Experiential Learning]**

EXPLAIN

Write on the board 9999 → Greatest 4-digit number and explain as follows:

When we add 1 to 9999, we get 10000, it is the smallest 5-digit number. It is read as 'ten thousand'. Counting ahead, we get 10001, 10002, 10003, …., 10009, 10010, 10011, …., 10099, …., 99999. These all are 5-digit numbers. 99999 is the greatest 5-digit number.

Draw a place value table on the board and write a number in it. Hence describe the term face value and place value considering each digit of the number written. For example:

In 41,975, we can find the face value and place value of each digit as shown on the next page.

TTh	Th	H	T	O
4	1	9	7	5

Face value	×	Value of the place	=	Place value
5	×	1	=	5
7	×	10	=	70
9	×	100	=	900
1	×	1000	=	1000
4	×	10000	=	40000



Next, explain about the short form and expanded form of the number.

$$\left.\begin{aligned} 41{,}975 &= 4 \text{ ten thousands} + 1 \text{ thousand} + 9 \text{ hundreds} + 7 \text{ tens} + 5 \text{ ones} \\ &= 4 \times 10000 + 1 \times 1000 + 9 \times 100 + 7 \times 10 + 5 \times 1 \\ &= 40000 + 1000 + 900 + 70 + 5 \end{aligned}\right\} \text{Expanded form}$$

The number 41,975 is in its short form. For more examples, go through page 10.

[Conceptual Understanding]

ELABORATE

Draw a Place Value chart on the blackboard/whiteboard and demonstrate how to present 5-digit numbers in the table and using it read the numbers as well as write the number names.

Periods →	**Thousands**		**Ones**		
Places →	**Ten Thousands (TTh)**	**Thousands (Th)**	**Hundreds (H)**	**Tens (T)**	**Ones (O)**
Values of Places →	**(10000)**	**(1000)**	**(100)**	**(10)**	**(1)**
(*a*)	2	3	7	5	2
(*b*)	3	8	9	0	5

To write the numbers without using a place value chart, we separate the periods by a comma (,). Thus, we can write and read these numbers as:

(*a*) 23,752— Twenty-three thousand seven hundred fifty-two

(*b*) 38,905 — Thirty-eight thousand nine hundred five

Use paper snake strips to create a reusable math manipulative that reinforces place value concepts and expanded form.

TTh	Th	H	T	O
2	7	9	3	8



Repeat the card game and ask the students to tell the number that comes just before/after the number formed.

Predecessor (Number – 1)	**Number**					**Successor (Number + 1)**
	TTh	**Th**	**H**	**T**	**O**	
58908	5	8	9	0	9	58910

Also, demonstrate ‘Number on the number line by taking reference of the page 12’.

[Experiential Learning]

EVALUATE

Classwork: Ask to solve Q.1 to 5 of Exercise 1A, and Q.1, 2, 3 of Exercise 1B in the classroom.

Homework: Ask to solve the remaining questions of Exercise 1A and 1B as homework work assignment.

ENHANCE

Ask students to write any five 3- or 4-letter words. Hence, replace the letter with their positional value in the English alphabet and write a number. For example, PEN

Positional value of: P → 16, E → 5, N → 14

So, the number → 16514

Then, write the number name, expanded form, predecessor and successor of the number formed.

[Cross-curricular Learning]

Periods: 7 – 9	Topics: Comparing Numbers; Forming Numbers	Suggested extra teaching aids: Number cards, place value chart Touchpad Mathematics 4 pages 13–18

ENGAGE

Divide the class into pairs. Tell each student to write any number using 4–5 digits in their notebook. Instruct the pairs to compare their numbers. The student with greater number will reward a point. Repeat the activity till 5 to 6 rounds.

Next, one student will write a number on the paper. His/her partner has to write any three numbers smaller/greater than that number in sequence. Now they will change their turn and do similar steps.

The teacher will walk around in the class and guide if the students are unable to perform the activity.

[Discussion-based Learning]

EXPLORE

Refer the 'Fun Activity' given at page 18. Divide the class into pairs and involve them in the activity. Instruct them to create clues for a 5-digit "Mystery Number", and find the number. Award one point for each correct answer. Declear the winner. **[Experiential Learning]**

EXPLAIN

Refer Touchpad Mathematics 4, page 13–14 for explanation about the comparison of numbers having different number of digits/same number of digits. After understanding the concept of comparing numbers, move on to explain how to arrange the given numbers in ascending/descending order using a place value table.

Forming greatest and smallest Numbers

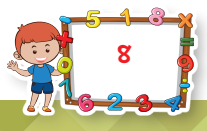
Going through pages 16–17, explain why digits are arranged in descending/ascending order to form the greatest/smallest number. Emphasis on the place of 0 in case of the formation of the smallest number. Focus on the digit that has to be repeated at higher places while repetition of digits is allowed.

[Conceptual Understanding]

ELABORATE

Draw a place value chart on the board. Divide the class into 4–5 teams and invite one student from each team near the board. Instruct each one to write a number in the table.

Team	Numbers					Order of numbers from smallest to greatest
	TTh	Th	H	T	O	
A	5	8	9	0	9	iv
B	2	7	9	1	4	iii
C	6	0	3	9	4	v
D	1	8	7	6	8	ii
E		9	9	9	2	i



Now ask the class to arrange the numbers written on the table in the ascending order. For this, first of all we need to identify the number having least number of digits. Here, it is 9992 with 4 digits. So it is the smallest number. Others have 5 digits, so compare the digits at the highest place, *i.e.*, TTh place.

These are 5, 2, 6 and 1; and $1 < 2 < 5 < 6$. So the numbers are $18768 < 27914 < 58909 < 60394$.

Hence, the numbers in ascending order are: $9992 < 18768 < 27914 < 58909 < 60394$.

Further invite another students and demonstrate how they can arrange the number in descending order.

Team	Numbers					Order of numbers from greatest to smallest
	TTh	Th	H	T	O	
A		8	9	0	9	v
B	7	7	9	1	4	ii
C	4	0	3	9	4	iv
D	4	8	7	6	8	iii
E	9	9	9	9	2	i

Comparing the left most digits, we have 99992 > 77914.

For 40394 and 48768 have 5 digits their left most digits are same. So, comparing the digits at next higher place, we have 48768 > 40394. 8909 has only 4 digits so it is the smallest number.

Hence, the numbers in descending order are: 99992 > 77914 > 48768 > 40394 > 8909.

[Conceptual Learning]

EVALUATE

Classwork: Ask to solve Q.1, 2, 3 of Exercise 1C and Q.1 and 2 of Exercise 1D.

Homework: Ask to solve the renaming questions of Exercise 1C and 1D.

ENHANCE

- Ask students to search internet and list the 5 batsmen who could score above 10000 ODI runs/Test match runs. **[Cross-curricular Learning]**

Periods: 10–11	Topic: Rounding Number	Suggested extra teaching aids: Newspapers/Old magazines Touchpad Mathematics 4 pages 18–20

ENGAGE

Divide the class into 4–5 groups. Provide Newspapers/Old magazines to each group and tell them to underline headings that have numbers written along with the words near, about, around, approximately, etc.

After finding out some numbers, ask what they think about such numbers. Are they showing the exact number of items? **[Discussion-based Learning]**

EXPLORE

Invite 5 students in front of the class. Take five A4 sheets and write a number on each sheet such that two of them are consecutive tens and others are lying between them. Tell the students to pick a sheet and stand in a row showing their numbers to the class. Instruct them to arrange themselves in order and keep the gaps in between according to their numbers.



For example,



Next, instruct the three students who are standing between two tens to move to the nearer tens. Ask the class to say whether they have moved to the right side or not. Repeat the similar steps for two consecutive hundreds by inviting other groups of students. Ask: Discuss what you observe. **[Experiential Learning]**

EXPLAIN

Refer Touchpad Mathematics 4, pages 18–20 for explanation about the rounding off numbers. First, discuss the use of Rounded/estimated numbers by talking about some real life situations.

Then explain how numbers can be rounded off to the nearest tens and hundreds by considering the digits at ones and tens places respectively.

Reinforce the concept of rounding up and rounding down through examples. Using place value chart and number line is helpful.

ELABORATE

Draw a place value chart on the board. Demonstrate some example to explain the rounding off numbers to the nearest tens, hundreds and thousands.

To be rounded off to the	Numbers					Rule	Round up or Round down	Rounded numbers
	TTh	Th	H	T	O			
nearest tens			2	7	3	• If the digit at the ones place is 1, 2, 3, or 4, keep the tens place digit as it is and replace the ones place digit with 0. ← **Round down**	Ones digit is 3, round down	270
		1	9	5	8	• If the digit at the ones place is 5, 6, 7, 8, or 9, increase the tens place digit by 1 and replace the ones place digit with 0. ← **Round up**	Ones digit is 8, round up	1960
nearest hundreds		7	9	1	4	• If the digit at the tens place is 1, 2, 3, or 4, keep the hundreds place digit as it is and replace the tens and ones places digits with 0. ← **Round down**	Tens digit is 1, round down	7900
	2	2	6	5	7	• If the digit at the tens place is 5, 6, 7, 8, or 9, increase the hundreds place digit by 1 and replace the tens and ones places digits with 0. ← **Round up**	Tens digit is 5, round up	22700

[Conceptual Understanding]

Teacher can also demonstrate 'Rounding Numbers' on the number line by taking the reference of pages 19–20 of the textbook.

EVALUATE

Classwork: Ask to practice Q.1 and 3 of Exercise 1E in the classroom.

Homework: Ask to practice Q.2 and 4 as homework assignment.

ENHANCE

- Ask students to estimate (round off) the monthly expenses of their family on different heads by talking about their parents.

Periods: 12–13	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 21–24

- Make students comfortable, so that they can ask any question on any previously taught topics.
- Start the revision by using Points to Remember, Learning Logs, Mental Maths and HOTS.
- Discuss questions of the 'Learning Logs' and accept students answer, if any confusion or error then explain and correct it.
- Discuss HOTS and motivate students to solve Mental Maths.
- Involve the class in 'Fun Activity' given at page 24.



ADDITION AND SUBTRACTION

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- add numbers upto 5-digit with regrouping
- understand the properties of addition
- subtract numbers widh upto 5-digit with regrouping
- understand the properties of subtraction
- estimate sum and difference
- apply the concepts of addition and subtraction to solve real-life problems

LESSON PLAN

Suggested number of periods: 14

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like clock, pen, pencils, number/flash cards, spike abacus, number and place chits, A4 size sheet, newspapers/magazines.

Keywords: Addition, Addends, Sum, Subtraction, Minuend, Subtrahend, Difference, Estimation.

Pre-requisite knowledge: Students must be familiar with addition and subtraction up to 4-digit numbers, solving simple word problems

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–5	Topics: Addition; Estimating the Sum	Suggested extra teaching aids: Abacus, Touchpad Mathematics 4 pages 25–30

ENGAGE

The teacher can start the topic in the classroom through an interactive method. For this, he/she can ask some questions related to the students' real life. For example,

- Can you guess how many men, women and children are there in your colony/village? Find the total population.
- Do you know how much your parents spent on admission, dresses and book/stationery when you were enrolled in this class? If yes, find the total expenses.



By asking the questions he/she can introduce the addition of large numbers.

- The teacher will revise the learners' previous knowledge of addition up to 4-digit numbers with the help of the "Warm Up" sections given in the book.

EXPLORE

Divide the class into pairs. Instruct each student to write a 4/5-digit number in his/her notebook. Next, he/she will ask and note down the number that his/her partner has written. He/she will write it below the first number, and then find their sum. For example,

Student A writes: 25640 and Student B writes: 63125

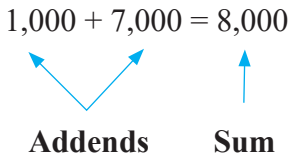
Then, they will add the two numbers as shown here.

Student A finds:	Student B finds:
25640	63125
+ 63125	+ 25640
88765	**88765**

Hence, they will compare their sum and rectify the errors, if any. Repeat the activity for 3–4 rounds.

Monitor students' participation and engagement during the activities. **[Collaborative Learning]**

EXPLAIN



Write the terms associated with "addition" on the board and briefly define each term.

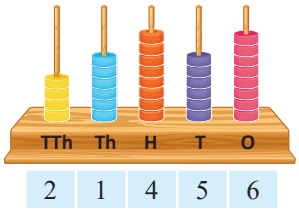
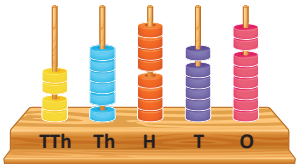
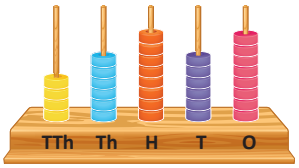
Explain that addition is the process of combining two or more numbers to find the total. Tell them that addition of 5-digit numbers can be done same as addition of 4-digit numbers.

Refer Touchpad Mathematics 4, pages 27–28 and explain addition with regrouping with examples solving on the board.

Further, explain 'Estimating' the sum. **[Conceptual Understanding]**

ELABORATE

Take an abacus and demonstrate how to add 4- and 5-digit numbers. Suppose, we have to find 21456 + 25412.

For this, take a 5-spiked abacus and show the first addend on it using different coloured beads.	Next, put more beads in spikes at different places for the second addend.	Now count all the beads in each spike and write the number as its sum.
		
TTh Th H T O 2 1 4 5 6	TTh Th H T O 2 1 4 5 6 + 2 5 4 1 2	TTh Th H T O 2 1 4 5 6 + 2 5 4 1 2 4 6 8 6 8

Furthermore, demonstrate addition with regrouping. For this, we put a bead to the next higher place if a spike has 10 or more beads. For example, if there are 14 beads in ones spike, we keep only 4 beads at this place and put a beads at the tens place.

Further, on the board, write a sum like 7339 + 8751 and estimate its value to the nearest thousands.

7339 rounded down to the nearest thousand = 7000 (As hundreds digit 3 < 5)

8751 rounded up to the nearest thousand = + 9000 (As hundreds digit 7 > 5)

Estimated sum = **16000**

[Conceptual Understanding]

EVALUATE

Classwork: Ask to solve Q.1, 2, 3 of Exercise 2A and Q.2 of Exercise 2B.

Homework: Ask to solve remaining questions of Exercise 2A and Exercise 2B.

ENHANCE

Ask students to find a palindromic number using continued addition. For example,

Consider a number, say 7325

Reverse the digits and add the new number to the original one.

7325 (original number) + 5237 (Reverse of original number) = 12562

Repeat it until you get a palindrome.

12562 + 26521 = 39083

39083 + 38093 = 77176

77176 + 67177 = 144353

144353 + 353441 = 497794 (Palindrome)

Periods: 6	Topic: Addition word problems	Suggested extra teaching aids: Touchpad Mathematics 4 pages 30–31

ENGAGE

Recall the properties of addition learnt in previous classes by asking some questions.

- Which number is to be added to the greatest 4-digit number to get the smallest 5-digit number?
- There are 1234 girls and 2568 boys in School A and 2568 girls and 1234 boys in School B. Which school has more students?
- When a numbers is added to 258963, the result is 258963. Which number is added?

Tell the students to discuss about the answers with their bench partners. **[Discussion-based Learning]**

EXPLORE

Divide the class into groups of 3 students. Each student will create a short word problem involving a 5-digit number where quantities are added together.

They should follow this pattern:

- Write a situation where two or more quantities are combined.
- Include a clear question asking for the total.

After writing, students exchange their problems within the group and solve each other's questions.

For example: A school collected 54,325 bottles in a recycling drive in January and 27,468 bottles in February. How many bottles were collected in total? **[Collaborative Learning]**



EXPLAIN

Refer textbook pages 30–31 for explanation. Write any simple addition problem on the board and tell the students to find the sum using different strategies. Ask whether they get the same result by following any ways.

Solve few questions of Exercise 2C on the board and explain the concept. **[Experiential Learning]**

ELABORATE

Consider any real life situations based on addition. Encourage students to read and understand what the information is given in the problem and what is being asked to find out.

For example,

The cost of a bicycle is ₹7945, the cost of a tricycle is ₹1680 more than that of a bicycle. What is the cost of the tricycle?

Given: The cost of a bicycle = ₹7945

To find: The cost of the tricycle

Think: What to do?

Also, we have: The cost of a tricycle is ₹1680 **more than** that of a bicycle.

Here, **more than** means **addition**. Therefore,

The cost of a tricycle = The cost of a bicycle + ₹1680

= ₹7945 + ₹1680 = ₹9625

Thus, the cost of a tricycle is ₹9625.

Next, refer examples given on pages 30–31. **[Conceptual Understanding]**

EVALUATE

Classwork: Ask to solve Q.1, 2, 3, 7, of Exercise 2C.

Homework: Ask to solve remaining question of Exercise 2C.

ENHANCE

- Ask students to list 2–3 gadgets/furniture/other items that they see at home. They have to enquiry about their costs from their parents/elders and calculate the total cost of those articles.
- Visit web portal for worksheets/assignments and download from the link "www.orangewebsupport.co.in". **[Holistic Learning]**

Periods: 7–9	Topic: Subtraction Estimating the Difference	Suggested extra teaching aids: Touchpad Mathematics 4 pages 32–35

ENGAGE

Recall the concept of addition-subtraction facts with an example. Write an addition fact on the board and ask the students to write the corresponding two subtraction facts.

For example, 2100 + 35000 = 37100 ← Addition fact

37100 – 2100 = 35000 and 37100 – 35000 = 2100 ← Subtraction facts

Then, tell them to identify the minuend, subtrahend and difference in the subtraction facts written.

Also ask the students to write one more example of addition-subtraction facts themselves and identify the terms. Hence, introduce subtraction of large numbers. **[Experiential Learning]**

EXPLORE

Write some hobbies on the board that class 4 students would like to do in their free time. Also, write their first four letters as codes. For example,

Hobbies	Reading	Drawing	Dancing	Playing	Chatting
Code	READ	DRAW	DANC	PLAY	CHAT

Tell a student to write the code of his/her hobby and transform it into a numeral by putting the order value of each letter in English alphabet if it is a 2-digit number, then add both digits to make it single-digit. Suppose a student like Drawing, then he/she will write DRAW and transform it as D = 4, R = 18 = 1 + 8 = 9, A = 1, W = 23 = 2 + 3 = 5, i.e. 4915.

Next, he/she will use these digits to form the greatest and the smallest 5-digit number (by repeating any one digit is required). Then, he/she will find the difference of his/her number from both greatest and the smallest 5-digit numbers.

Here, the greatest number = 99541, so the difference = 99541 – 4915 = 94626

And the smallest number = 11459, so the difference = 11459 – 4915 = 6544

Further, instruct them to group together who have same hobbies and compare their findings. Discuss if they do not find the same result. **[Discussion-based Learning]**

EXPLAIN

Refer textbook pages 32–34, and explain the subtraction of 5- and 6-digit numbers without and with regrouping on the board. Focus on such example when the minuend has zeros. After understanding the concept of subtraction, move on to the next page and explain how to check it using addition.

[Conceptual Understanding]

ELABORATE

Write 2–3 questions as given below on the board.

- What must be added to 67,284 to get 80,000?
- What must be subtracted from 85,214 to get 45,663?

And discuss which operation would be performed to find the answer. For this, express the problem as an equation and ask them to think about.

1. ____?____ + 67,284 = 80,000

By writing the corresponding subtraction fact, we have _____?_____ = 80,000 – 67,284

2. 85,214 – ____?_____ = 45,663

By using the fact Minuend – Subtrahend = Difference, we have

Minuend = Subtrahend + Difference

Or, Minuend – Difference = Subtrahend

So, ____?_____ = 85,214 – 45,663

Solve few questions on the board and encourage students to practice more questions themselves.

Further, demonstrate estimation of subtraction on board as follows:

Take another problem like 45671 – 2584 and estimate the difference to the nearest hundreds.

45671 rounded to the nearest hundred = 45700 (As tens digit 7 > 5)



2584 rounded to the nearest hundred = – 2600 (As tens digit 8 > 5)

Estimated difference = **43100** **[Conceptual Understanding]**

EVALUATE

Classwork: Ask to solve Q.1, 3 and 4 of Exercise 2D and Q.1 of Exercise 2E.

Homework: Ask to solve the remaining questions of Exercise 2D and 2E.

ENHANCE

- Ask students to search internet and list the top 5 batsmen of Indian cricket team based on their total ODI and Test match runs. Find the difference between their ODI runs and Test match runs.

[Cross-curricular Learning]

Period: 10	Topic: Subtraction word problems	Suggested extra teaching aids: pictures related to real life Touchpad Mathematics 4 pages 35–36

ENGAGE

Recall the properties of subtraction learnt in previous classes by asking some questions.

- Which number is to be subtracted from the smallest 5-digit number to get the greatest 4-digit number?
- When a numbers is subtracted from 28963, the result is 28963. Which number is subtracted?
- What happens when a number is subtracted from itself?

Tell the students to discuss about the answers with their bench partners. **[Discussion-based Learning]**

EXPLORE

Divide the class into pairs. One student will write a word problem involving a 5-digit number where a quantity is reduced or taken away, and the other student will solve it.

For example if student A writes:

"A warehouse had 20,156 boxes. Out of these 8,450 boxes were sold. How many boxes are left?"

Then student B will find the difference 20156 – 8450.

After that, they will switch roles.

Students may also try to frame the same problem in different ways (like remaining quantity, difference between two amounts, decrease).

The teacher should walk around and assist the pairs who need help. **[Experiential Learning]**

EXPLAIN

Refer textbook page 35, and explain the subtraction.

Talk about some real life problems based on subtraction and demonstrate how to solve it. Reinforce the keywords (more/less than, left, remain, increase/decrease, etc.) used in the problems so that the learners can understand which operation they should perform.

ELABORATE

Consider any real life situations based on subtracton. Encourage students to read and understand what the information is given in the problem and what is being asked to find out.

For example,

Aman runs a popular local bakery. On Sunday morning, he baked ₹4,500 worth of fresh pastries and cakes. By the afternoon, he had sold pastries worth ₹2,850.

How much worth of pastries does Aman have left to sell in the evening?

To find the value of the remaining pastries, demonstrate that we need to subtract the value of the sold pastries from the total value of the baked pastries.

Total value of baked pastries: ₹4,500

Value of sold pastries: ₹2,850

So, Value remaining = 4500 – 2850 = ₹1650

Next, refer example given on page 35. **[Conceptual Understanding]**

EVALUATE

Classwork: Ask to solve Q.1, 2, 3, 5 and 6 of Exercise 2F.

Homework: Ask to solve remaining questions of Exercise 2F.

ENHANCE

Show any picture and ask students to write any word problem involving subtraction based on the shown image.



Then they will exchange the sheet/notebook with his/her bench partner and solve the problem. Hence, they will return the sheet/notebook and check the solution. Discuss the answers if any error. **[Holistic Learning]**

Periods: 11–12	Topic: Addition and subtraction together	Suggested extra teaching aids: Touchpad Mathematics 4 pages 36–38

ENGAGE

Tell students to think of two numbers that represent the number of males and females who live in their village or locality. Now, assume the number of people who can vote in the next Panchayat Election.

Hence, ask them to compute the number of people who are not voters. Discuss which operations will they perform for solving such problems.

EXPLORE

Divide the class into small groups and tell them to write at least 3 situations where they need to do both addition and subtraction together. Now divide the class into two teams. One team reads the problem written

and another team has to identify whether the problem involves the operations of + and – or not. For each correct response the team will score 1 point. At the end the team scoring more points will be declared the winner. **[Critical Thinking]**

EXPLAIN

Refer textbook pages 36–37, and explain how to solve the problem involving + and – together. For this, let them know the steps to be followed.

- Add the numbers having +ve sign.
- Add the numbers having –ve sign.
- Subtract the sum obtained in the 2nd step from the sum obtained in 1st step.

Write some examples on the board and demonstrate for better understanding.

ELABORATE

Consider a problem, such as:

A factory produced 7339 bulbs on Monday and 8751 bulbs on Tuesday. Out of these, 9945 bulbs were supplied to the distributors. How many bulbs are left now?

Solve it on the board following the steps involved.

- Express the problem as number sentence. 7339 + 8751 – 9945
- Add the numbers having +ve sign. 7339 + 8751 = 16090
- Subtract 9945 from the sum obtained in the previous step. 16090 – 9945 = 6145

Thus, 6145 bulbs are left in the factory.

Alternative way:

Production of bulbs on Monday = 7339
Production of bulbs on Tuesday = + 8751
Total production in two days = 16090

Number of bulbs supplied to the distributors = 9945

Number of bulbs left in factory = 16090 – 9945 = 6145. **[Conceptual Understanding]**

EVALUATE

Classwork: Ask to solve Q.1 (*d*), (*e*), 2, 5 and 6 of Exercise 2G.

Homework: Ask to solve Q.1 remaining questions of Exercise 2G.

ENHANCE

- Ask students to talk about monthly income and expenses of their family at home and try to calculate savings. **[Holistic Learning]**

Periods: 13–14	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 39–42

- Make students comfortable, so that they can ask any question on any previously taught topics.
- Start the revision by using, 'Point to remember', 'Learning Logs', 'Mental Maths' and 'HOTS'.
- Discuss questions of in the 'Learning Logs' and accept students answer, if any confusion or error then explain and correct it. Motivate students to solve 'mental maths' and 'HOTS'.
- Ask students to do solve the puzzle given on pages 41.
- Motivate students to do the activity given in 'Fun Activity' on page 42.



MULTIPLICATION

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- multiply 4-digit numbers by 1-digit numbers
- multiply 3- and 4-digit numbers by 2-digit numbers
- multiply two 3-digit numbers together
- understand the properties of multiplication
- estimate the product
- multiply the numbers by using Lattice multiplication method
- solve real life problems based on multiplication

LESSON PLAN

Suggested number of periods: 13

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, number/flash cards, spike abacus, number and place chits, A4 size sheet, newspapers/magazines.

Keywords: Multiplicand, Multiplier, Product, Estimation.

Pre-requisite knowledge: Students must be familiar with multiplication up to 3-digit numbers, solving simple word problems involving multiplication.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–4	Topics: Properties of Multiplication; Multiplication by 1-digit numbers	Suggested extra teaching aids: Touchpad Mathematics 4 pages 43–47

ENGAGE

The teacher can start the topic in the classroom through an interactive method. For this, he/she can ask some questions based on real life situations. For example,

- How many members are there in your family?
- Assume your family is planning to go to movie, hometown, or somewhere else. Let a considerable ticket price and find how much you need to pay. Compare the amount calculated with your friend.

  By asking the questions she can introduce the multiplication of bigger numbers.
- The teacher will revise the learners' previous knowledge of multiplication up to 2-digit numbers with the help of "Warm Up" section given in the book.



EXPLORE

Divide the class into pairs. Instruct each pair to choose any 4–5 digits and form two numbers using them. Hence find the product of two numbers. Rearrange the digits and form another pair of numbers and find their product. How many different products can you get? Explore when you obtain the greatest product and when the least one.

Monitor students' participation and engagement during the activities. **[Collaborative Learning]**

EXPLAIN

Start the discussion with properties of multiplication, like when you multiply a number by 1, the product is the number itself. Also discuss the multiplicative property and order property and explain how to multiply a 4 or 5-digit number by a 1-digit number using vertical as well as Box multiplication method.

Refer textbook pages 44–46 for more explanation and examples. **[Conceptual Understanding]**

ELABORATE

Take an example from current scenario, demonstration the process of multiplication on the board using standard algorithm. Suppose a movie based on the national patriotism is released on the occasion of Republic Day. This movie has been run in 5 shows in the first day and every show is houseful. How many people could watch the movie if the theatre has the capacity of 1236 seats?

Capacity of the theatre = 1236

Number of shows run = 5

So, number of total viewers = 1236 × 5

= 6180

	1	2	3	6
×				5
	6	1	8	0

Further, demonstrate the 'Box multiplication Method' by taking the reference of page 46 of the textbook.

[Conceptual Understanding]

EVALUATE

Classwork: Ask to solve Q.1 of Exercise 3A and Q.2 of Exercise 3B.

Homework: Ask to solve Q.2 of Exercise 3A and Q.1 of Exercise 3B.

ENHANCE

Ask students to consider any one-digit number and double it mentally. Double again the number obtained. Continue it until they get a number greater than 1000. Ask: In how many times have they crossed the number 1000? They can also try to get thrice the number and go beyond 10000. They can use paper-pen if unable to do it mentally.

Periods: 5–7	Topics: Multiplication by a 2-digit Number; Multiplication by a 3-digit Number	Suggested extra teaching aids: Touchpad Mathematics 4 pages 47–51

ENGAGE

Divide the class into groups of 3 students each. Provide a sheet having a multiplication problem of 3 or 4-digit number by a 2-digit number to each group. Tell the first student to multiply the multiplicand by the ones digit of the multiplier. The second student will multiply it by the place value of tens digit of the multiplier and the third student will add up the partial products. Then, they will discuss about the answer with their group members. **[Discussion-based Learning]**

EXPLORE

Divide the class into two teams. Write the solution of a multiplication problem with its incorrect calculation on the board. Ask the students to find the errors. For every error finding, they will score a point for the team. Repeat it with at least 5 problems. The team who scored more points will be winner. **[Critical Thinking]**

EXPLAIN

Refer textbook pages 47–49 and explain how to multiply a 3/4-digit number by a 2/3-digit number using standard algorithm. Discuss why we put zero(s) at ones and tens places in the partial products while multiplying the number by tens/hundreds digits of the multiplier.

Solve few questions of Exercise 3C and 3D on the board and explain the concept.

[Experiential Learning]

ELABORATE

Consider an example when multiplier has zero and demonstrate how the students can skip the row of partial product for the multiplication by the 0 ones or tens. Refer examples 1 and 2 discussed on page 50.

[Conceptual Understanding]

EVALUATE

Classwork: Ask to solve Q.1–2 of Exercise 3C, Q.1 and 3 of Exercise 3D.

Homework: Ask to solve the remaining questions of Exercise 3C and 3D as homework assignment.

ENHANCE

Ask to solve some worksheet based on Multiplication from the website 'www.orangewebsupport.co.in'

[Collaborative Learning]

Period: 8–9	Topic: Lattice Multiplication	Suggested extra teaching aids: Touchpad Mathematics 4 pages 52–54

ENGAGE

Write two numbers on the board and tell students to think any other strategy to multiply these numbers. Let them share their strategies and accept the responses.

EXPLORE

Divide the class into pairs. Instruct them to open their book randomly and look at the page numbers. Both of them will write their page numbers on a sheet. They will exchange one number and multiply it with another number by using any convenient way. For example, Student A opens pages 46–47 and Student B opens pages 124–125. If they exchange 46 with 124, then Student A will find 124 × 47 and Student B will find 125 × 46.

Instruct them to compare their answers and discuss. **[Discussion-based Learning]**

EXPLAIN

Refer textbook pages 52–53, and explain how to multiply two numbers using Lattice multiplication method. For this, let them know the steps to be followed.

- Draw the squares in rows and columns as per the number of digits in the two numbers to be multiplied. Then divide each square diagonally into two triangles.

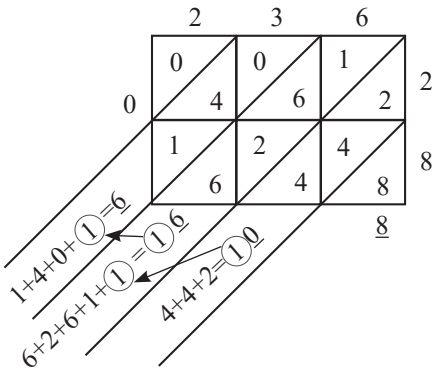


- Write the two numbers on top and right side of the table so formed.
- Multiply each digit of the number written on the top by each digit of the number written on the right side. Write the product in corresponding triangles such that ones digit in lower triangle and tens digit in upper triangle.
- Add the numbers diagonally. Carry over to next place, if any.
- Hence, read the answers from left to right.

Write some examples on the board and demonstrate for better understanding.

Use the lattice multiplication method to find 236 × 28.

Since, we have to multiply a 3-digit number by a 2-digit number, so, we draw a lattice of 3 × 2. Proceed as discussed in the previous example. The product is 6608



Thus, 236 × 28 = 6608. **[Conceptual Understanding]**

ELABORATE

Teacher can consider the Lattice Multiplication method as an activity. Students will enjoy it like a hands-on learning. Instruct the class to take an A4 size sheet and follow the procedure as you demonstrate on the board. It can be started with smaller numbers and extend gradually as dealt in the textbook. Assist the students who feel difficulties. **[Experiential Learning]**

EVALUATE

Classwork: Ask to solve (*a*) to (*f*) Q.1 and (*a*) to (*d*) of Q.2 of Exercise 3E.

Homework: Ask to solve the remaining questions of Exercise 3E.

ENHANCE

- Ask students to recite multiplication tables up to 20.
- Download worksheets from 'www.orangewebsupport.co.in' and provide students for practice.

Periods: 10–11	Topics: Estimating product; Word Problems	Suggested extra teaching aids: Touchpad Mathematics 4 pages 54–56

ENGAGE

Write 4–5 digits on the board. Tell the students to use these digits only once and make any two numbers. Hence find their estimated product as well as actual product. Allow a reliable time and ask about their findings. Note down how many different products have they obtained.

Then discuss about the answers. **[Experiential Learning]**

EXPLORE

Divide the class into pairs. Tell them to plan a birthday party. Think about the menu and number of invitees. Hence, guess how much amount you would require for it.

Suppose, you want to invite 18 friends or relatives, and decide to give each one a cupcake that costs ₹21, a samosa that costs ₹12, a fruity that costs ₹10. Then, you need the amount of money = 18 × (₹21 + ₹12 + ₹10)

Actual amount = ₹18 × 43 = ₹774

By rounding of each number to the nearest tens, we get

Estimated amount = ₹20 × 40 = ₹800, which is close to the actual amount.

The teacher should walk around and assist the pairs who need help. **[Holistic Learning]**

EXPLAIN

Refer textbook page 54, and explain how to estimate the product by rounding of the numbers to the nearest tens/hundreds. Next, encourage students to use it wherever they can apply.

Further, talk about some real life problems based on multiplication and demonstrate how to solve it. For example, ask the price of maths book they have. Then tell the number of students present in the class and ask to find the total cost of all the maths books. **[Conceptual Understanding]**

ELABORATE

Discuss that the numbers should be rounded off to their highest place while estimating product. Write few examples on the board and interact with the students to keep them attentive.

- 27 × 14; here both are two-digit numbers, so they can be rounded off to the nearest tens as 30 × 10 and estimated product = 300.
- 182 × 321; here both are three-digit numbers, so they can be rounded off to the nearest hundreds as 200 × 300 and estimated product = 60000.
- 517 × 86; here the first number has 3 digits and the second number has 2 digits, so they can be rounded off to the nearest hundreds and tens respectively as 500 × 90 and estimated product = 45000.

Furthermore, consider any real life situation based on multiplication. Encourage students to read and understand what the information is given in the problem and what is being asked to find out. Hence, deal few examples in the class and motivate the students to practice themselves. **[Conceptual Understanding]**

Next, refer examples given on page 55.

EVALUATE

Classwork: Ask to solve Q.1 of Exercise 3F and Q1–6 of Exercise 3G.

Homework: Ask to solve remaining question of Exercise 3F and 3G.

ENHANCE

This game is a simple and reinforce multiplication tables! Students can play in pairs.

Shuffle three sets of digit cards and deal them between the two players.

At the same time, each player turns over one of their cards and puts it in the middle.

Race your partner to shout out the answer that you get when you multiply both the numbers together. For example, if you turned over an 8 and your partner turned over a 9, you would have to shout out 72, because 8 × 9 = 92.

The player who shouts out the correct answer first gets to keep both cards.

Keep playing until one player has run out of cards.

The player who collects more cards will be the winner! **[Critical Thinking]**

Periods: 12–13	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 56–59

- Make students comfortable, so that they can ask any question on any previously taught topics.
- Start the revision by using Points to remember, Learning Logs, Mental Maths, HOTS.
- Discuss questions of the 'Learning Logs' and accept students answer, if any confusion or error then explain and correct it.

  Motivate students to solve Mental Maths.
- Encourage students to do the activity given in 'Fun Activity' with help of each other.

[Collaborative and Experiential Learning]



DIVISION

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- divide 2, 3, and 4-digit numbers by a 1-digit number
- divide 2, 3, and 4-digit numbers by a 2-digit number
- use the properties of division
- estimate the quotient
- Solve the problems based on division

LESSON PLAN

Suggested number of periods: 12

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, number/flash cards, number and place chits, A4 size sheet, newspapers/magazines.

Keywords: Dividend, Divisor, Quotient, Remainder, Estimation.

Pre-requisite knowledge: Students must be familiar with division up to 3-digit numbers by a 1-digit number, solving simple word problems

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–2	Topics: Division; Properties of Division; Checking Division	Suggested extra teaching aids: Touchpad Mathematics 4 pages 60–62

ENGAGE

The teacher can start the topic in the classroom in an interactive method. For this, he/she can ask some questions based on real life situations. For example,

- How many members are there in your family? If you have to share a packet of 25 cookies among them equally, how many cookies will each member get? Will any cookie be leftover?
- A packet of 10 pencils is for ₹60. Can you buy a pencil for ₹5? Why or why not?**[Critical Thinking]**

Then teacher will revise the learners' previous knowledge of division up to 2-digit numbers with the help of 'Warm Up' section given in the book.



EXPLORE

Divide the class into groups of 3 students each. Instruct each group to choose any 3-digit number and pick up a number card (from the well-shuffled four sets of 1–10 number cards). Then, one student of each group will divide the number chosen by the number appeared on the number card.

Suppose, he/she has chosen number 458 and card bearing number 7. Then, divide 458 by 7 and find Quotient and Remainder. Another student will check and verify the result.

Further, second student will change the order of digits in the number chosen as 845 and divide by 7. His/her answer will be checked or verified by the third student.

Now, the third student will change the order of digits in the number chosen as 584 and divide by 7. And, this will be verified by the first student.

Monitor students' participation and engagement during the activities. **[Collaborative Learning]**

EXPLAIN

Start the discussion with real life situation where we need process of division. Recall the terms associated with division. Then, explain the properties of division by citing examples on the board.

Refer textbook page 61 for more explanation and examples.

Further, check the division by using the formula: Quotient (Q) × Remainder (R) = Dividend

[Conceptual Understanding]

ELABORATE

As students have learnt the properties of muliplication. Ask the students about it and write some examples on the board. Let them remind that division is the inverse process of multiplication and for every multiplication fact and, they can write two corresponding division facts for each multiplication fact.

Multiplication fact	Division facts	Conclusion as a properties of division.
$12 \times 1 = 12$; $34 \times 1 = 34$	$12 \div 1 = 12$; $34 \div 1 = 34$	• When a number is divided by 1, the quotient is the number itself.
	$12 \div 12 = 1$; $34 \div 34 = 1$	• When a number (other than 0) is divided by itself, the quotient is 1.
$14 \times 0 = 0$; $23 \times 0 = 0$	$0 \div 14 = 0$; $0 \div 23 = 0$	• Zero divided by any non-zero number gives the quotient zero.
	$14 \div 0$ = ---; $23 \div 0$ = ---; $0 \div 0$ = ---	• The division of any number by zero is not defined.

[Conceptual Understanding]

EVALUATE

Classwork: Ask to solve Q.1 and 2 of Exercise 4A.

Homework: Ask to solve remaining questions of Exercise 4A.

ENHANCE

Ask students to consider any three-digit number and find its half mentally. Leave the remainder, if any. Halve the quotient again and ignore the remainder, if any. Continue it until they get the quotient 1. Repeat this activity to get one-third and quarter. They can use paper-pen if unable to do it mentally. Now, look at the remainders and discuss what they observe.

Conclusion: Remainder < Divisor

Periods: 3–4	Topic: Division by a 1-Digit number	Suggested extra teaching aids: Touchpad Mathematics 4 pages 63–65

ENGAGE

Divide the class into pairs. Write few division problems of 4 or 5-digit number by a 1-digit number on the board and ask the students to check whether they need regrouping in the very first step or not.

For example, 5)8745(; 3)12589(; 8)1246(; 7)20691(

Tell the students to perform the division as they have learnt for 3-digit numbers. Then, they will discuss about the answer with their partners. **[Critical Thinking]**

EXPLORE

Division: Why not right to left?

Addition, subtraction, and multiplication are generally performed right to left. But in the case of division, it is not so. Before introducing the traditional "long division" method, the teacher can begin with the "scaffold" (or "pyramid") method, which is one of the methods commonly taught as a preparatory approach.

In division, we estimate parts of the quotient, and subtract corresponding multiples of the divisor to find the remaining value to be divided. If we begin from at the left, we can make more efficient estimates; other approaches are possible but may involve additional steps.

Consider the example of 941 divided by 7. Here is one method of division that is often taught before the standard long-division algorithm.

Here, rather than thinking about individual digits, we think of partial quotients that we will add up to get the final quotient. The process involves subtracting convenient multiples of the divisor (in this case, 700, 210, and 28) until a remainder less than divisor is left. We write each partial quotient at the top, and then add them up at the end.

	1	3	4
			4
		3	0
	1	0	0
7)	9	4	1
–	7	0	0
	2	4	1
–	2	1	0
		3	1
–		2	8
			3

< 7

If we started at the right, we might do this:

	1	3	4
			9
		2	0
	1	0	0
			5
7)	9	4	1
–		3	5
	9	0	6
–	7	0	0
	2	0	6
–	1	4	0
		6	6
–		6	3
			3

< 7

Note that our first step, which gave us 5, was sort of wasted: we ended up changing that digit of the quotient. This will be typical when you work from the right. That wasted step is our point: working from right to left isn't wrong, just inefficient.



EXPLAIN

Refer textbook pages 63–64 and explain how to divide a 4 or 5-digit number by a 1-digit number using standard algorithm. Discuss why we put zero(s) in the quotient when we are unable to divide the partial dividend after bringing down the digit at any step(s). Check, whether the division is correct or not by using the formula.

Solve few questions on the board and explain the concept. **[Conceptual Understanding]**

ELABORATE

Talk about the importance of short division method and discuss few examples in the class. Refer pages 63–64 and encourage students to attempt questions given in Exercise 4B.

Also, consider an example when dividend has zero(s) and demonstrate how the students can skip the step by putting zero in the quotient for the division. Refer examples 4 (*b*) on page 64. **[Experiential Learning]**

EVALUATE

Classwork: Ask to solve Q.1(*a*)–(*d*), Q.2(*a*)–(*h*), Q.3(*a*)–(*d*), Q.4(*a*)–(*b*) of Exercise 4B.

Homework: Ask to solve Q1(*e*)–(*h*), Q.2(*i*)–(*p*), Q.3(*e*)–(*h*), Q.4(*c*)–(*d*) of Exercise 4B.

ENHANCE

Divide the class into small groups and ask them to perform the activity given in 'Fun Activity' section on page 76. Encourage them to explore the idea to verify the result. **[Discussion-based Learning, Collaborative Learning]**

Periods: 5–7	Topics: Division by a 2–Digit divisor; Dividing a 4-digit numbers by 2-digit divisor	Suggested extra teaching aids: Touchpad Mathematics 4 pages 65–69

ENGAGE

Division Race is a fast-paced activity that helps students practice division while also competing against their peers. To play, divide the class into pairs and give each pair a set of division problems. The first player in each pair solves a problem and passes it to their partner, who then solves the next problem. The first pair to correctly solve all their problems wins the race. **[Discussion-based Learning]**

EXPLORE

Division Bingo is another fun activity to help students practice division. To play, create Bingo cards with division problems on them. Students then solve the division problems and mark the answer on their Bingo card. The first player to get five answers in a row (either vertically, horizontally, or diagonally) shouts "Bingo!" and wins the game. **[Experiential Learning]**

EXPLAIN

Dividing by a two-digit number is a lot like single-digit division, but it does take a little longer and some practice. Since most of us haven't memorized the times tables of bigger numbers, this can take a little guesswork, but there's a handy trick you can learn to make it faster.

Refer textbook page 68 and explain how to divide a 4 or 5-digit number by a 2-digit number using standard algorithm. Solve few questions on the board and explain the concept.

Let us consider 3472 ÷ 15.

- Write the problem as a long-division problem. Just like a simpler division problem, you can start by looking at the smaller number, and asking "Does it fit into the first digit of the larger number?"

$15\overline{)3472}$
$15 > 3$ ✗

"Does 15 fit into 3?" Since 15 is definitely larger than 3, the answer is "no," and we move on to the next step.

$15\overline{)3472}$
$15 > 3$ ✗
$15 < 34$ ✓

- Look at the first two digits. Does 15 fit into 34? Yes, it does, so we can start calculating the answer.

Use a little guesswork. Find out exactly how many times the first number fits into the other. You might know the answer already, but if you don't, try making a good guess and checking your answer with multiplication.

We need to solve 34 ÷ 15, or "how many times does 15 go into 34"? You're looking for a number you can multiply with 15 to get a number less than 34, but pretty close to it:

Does 1 work? 15 × 1 = 15, which is less than 34, but keep guessing.

Does 2 work? 15 × 2 = 30. This is still less than 34, so 2 is a better answer than 1.

Does 3 work? 15 × 3 = 45, which is greater than 34. Too high! The answer must be 2.

$\begin{array}{r} 2 \\ 15\overline{)3472} \end{array}$
$15 \times 1 = 15$
$15 \times 2 = 30$
$15 \times 3 = 45$

- Write the answer above the last digit you used. If you set this up like a long division problem, this should feel familiar.

Since you were calculating 34 ÷ 15, write the answer, 2, on the answer line above the "4."

Multiply your answer by the smaller number. Calculate 2 × 15 = 30. Write "30" underneath the "34."

$\begin{array}{r} 2 \\ 15\overline{)3472} \\ -\,30 \\ \hline 4 \end{array}$

Subtract the two numbers. Solve 34 – 30 and write the answer underneath them on a new line. The answer is 4. This 4 is still "left over" after we fit 15 into 34 two times, so we'll need to use it in the next step.

$\begin{array}{r} 2 \\ 15\overline{)3472} \\ -\,30\downarrow \\ \hline 47 \end{array}$

- Bring down the next digit. Leave the 4 where it is and bring down the "7" from "3472" to make 47.
- Solve the next division problem. To get the next digit, just repeat the same steps you did above for the new problem. You can use guesswork again to find the answer.

$\begin{array}{r} 23 \\ 15\overline{)3472} \\ -\,30\downarrow \\ \hline 47 \end{array}$
$15 \times 4 = 60$ ✗
$15 \times 3 = 45$ ✓

We need to solve 47 ÷ 15. 47 is bigger than our last number, so the answer will be higher. Let's try four: 15 × 4 = 60. No, too high!

We'll try three instead: 15 × 3 = 45. Smaller than 47 but close to it. Perfect.

The answer is 3. So, 3 is the next digit of the quotient, and we write it to the right previous digit in the quotient.

3 × 15 = 45, so write "45" underneath the 47.

Solve 47 – 45 = 2. Write "2" underneath the 45.

$\begin{array}{r} 23 \\ 15\overline{)3472} \\ -\,30\downarrow \\ \hline 47 \\ -\,45 \\ \hline 2 \end{array}$

- Find the last digit. As before, we bring down the next digit from the original problem so we can solve the next division problem. Repeat the steps above until you find every digit in the answer.

Bring down a digit to make 22 ÷ 15.

$\begin{array}{r} 23 \\ 15\overline{)3472} \\ -\,30 \\ \hline 47 \\ -\,45\downarrow \\ \hline 22 \end{array}$
$15 \times 1 = 15$ ✓
$15 \times 2 = 30$ ✗



15 goes into 22 one time, so we write "1" at the end of the answer line. Our answer is now 231.

1 × 15 = 15, so write 15 underneath the 22. Calculate 22 – 15 = 7.

We have no more digits to bring down, so instead of more division we just write "remainder 7" or "R7" at the end of our answer.

The final answer: 3472 ÷ 15 = 231 remainder 7

- Don't forget to check your answer.

Checking: Quotient × Divisor + Remainder = 231 × 15 + 7 = 3465 + 7 = 3472 = Dividend

```
   231
15)3472
 – 30
   47
 – 45
    22
 – 15
     7
 R = 7
```

[Experiential Learning]

ELABORATE

Take an example from current scenario, demonstrate the process of division on the board using standard algorithm. For example, there are 1035 soldiers in an army camp. They have to go to the border and a van can accommodate only 45 soldiers. How many vans are required to transport all of them?

Capacity of a van = 45

Number of soldiers = 1035

So, number of vans required = 1035 ÷ 45 = 23

```
15)1035(23
 – 90
   135
 – 135
     0
```

[Conceptual learning]

EVALUATE

Classwork: Ask to solve Q.1 and 2 of Exercise 4C, and Q.2 of Exercise 4D.

Homework: Ask to solve remaining questions of 4C and 4D.

ENHANCE

'Division War' is a fun and interactive way to help students practise division. To play, divide the class into two teams and give each team a set of cards with numbers on them. One player from each team draws a card and races to divide the number on their card by a 2-digit number written on the board. The first player to correctly solve the division problem wins a point for their team. The game continues until all the cards have been played, and the team with the most points at the end wins. **[Collaborative Learning]**

Periods: 8–9	Topics: Division by 10, 100 and 1000; Estimating the Quotient	Suggested extra teaching aids: Touchpad Mathematics 4 pages 69–72

ENGAGE

Tell the students to check how many pages are there in textbooks of main subjects such as Maths, EVS, English, Hindi, etc. and note down in their notebooks. Then ask them to divide it by 10 and 100. Observe the quotient and remainder. Discuss about the result with bench partner.

Next, write few 4 or 5-digit numbers on the board and ask the students to divide it by 1000. Then talk about their findings. **[Experiential Learning]**

EXPLORE

Divide the class into two teams. Put some slips, on which a division problem is written, upside down on the table. For example, 243 ÷ 10 ; 4238 ÷ 100 ; 4263 ÷ 100; 852 ÷ 10; 9514 ÷ 1000; 75394 ÷ 100; 465 ÷ 10 ; 78 ÷ 10; 75141 ÷ 100, etc. Invite one player from each team and ask them to pick a slip and speak aloud the answer. The player who speaks the correct answer will score a point for his/her team. Repeat the process with another pairs of players. After the participation of all players, the team with more points will be declared as the winner! **[Collaborative Learning]**

EXPLAIN

Refer textbook pages 69–70, and explain the division of a number by 10, 100 and 1000 along with counter examples. After understanding this concept, discuss how to estimate the quotient.

Round to the nearest ten. It's not always easy to see how many times a two-digit number goes into a larger one. One useful trick is to round to the nearest multiple of 10 to make guessing easier. This comes in handy for smaller division problems, or for parts of a long division problem.

For example, let's say we're solving 146 ÷ 27, but we don't have a good guess at how many times 27 goes into 146.

Let's pretend we're solving 150 ÷ 30 instead.

27)146(

30) 150 (5
− 150
0

For more explanation, refer textbook page 71. **[Conceptual Understanding]**

ELABORATE

Obtaining a result near the accurate or actual outcome is referred to as estimation. It means coming to certain conclusions or rounding a figure to the closest ones, tens, hundreds, and so on.

Estimation may be necessary for a variety of reasons. It is useful when there is insufficient information to determine a precise number. When calculating transaction amounts, accountants make estimations. We round the payout to the closest tens, hundreds, or thousands to calculate the quotient.

There are different ways to calculate the quotient. The teacher can demonstrate these ways.

Estimating Quotient Using a Compatible Number

Compatible numbers are easily divided. Such numbers are closer to the actual value of the numbers, making estimation and problem-solving easier. We can round the complex number to the nearest tens, hundreds, thousands, ten thousands, and so on to make them compatible. For example, 825 can be rounded off as 800, and 55804 can be rounded off as 56000 to make them compatible.

Estimates	Quotient
55804 ÷ 825	
↓	
56000 ÷ 800	
↓	
560 ÷ 8	
= 70	

Estimating Quotient Using Rounding Off to the highest places

Refer textbook page 71

Hence, motivate the students to practice the given problems.

EVALUATE

Classwork: Ask to solve Q.1 and 2 of Exercise 4E and Q.1 of Exercise 4F.

Homework: Ask to solve remaining questions of Exercise 4E and 4F.

ENHANCE

The teacher can tell the students to write their height in cm. Then, express it in m and cm if 100 cm = 1 m.

Period: 10	Topic: Word Problems	Suggested extra teaching aids: Touchpad Mathematics 4 pages 72–73

ENGAGE

Tell the students to think about any five real life situation where they need to divide something. Next, write few problems on the board and ask them to identify the operation needed to solve them. For example,

6 printing machines together can print 222 pages in a minute. How many pages can each machine print per hour? **[Critical Thinking]**



EXPLORE

Ask students to write at least three word problems based on division on a sheet of paper. Collect the sheets and shuffle them.

Then distribute among the students and tell them to identify the operation that they will use to solve the problem. Accept their responses and discuss their logic. **[Holistic Learning]**

EXPLAIN

Refer textbook page 72, and explain how to solve the given word problems based on division.

Further, talk about some real life problems based on Division and tell them to focus on the key words used so that they can easily solve the problem. Solve some questions from outside or from textbook Exercise to clear the concept. Teacher can encourage the students to attempt some questions in the class for better understanding. **[Conceptual Understanding]**

ELABORATE

Explain the problem on the board as follows:

Given 6 printing machines together print 222 pages. To know the number of pages printed by each machine, we must divide. Clearly, $222 \div 6 = 37$ pages per minute

Now, 37 pages are printed by a machine in 1 minute. So, to know the number of pages printed in one hour, i.e., 60 minutes, we need to multiply. Clearly, $35 \times 60 = 2100$ pages.

Thus, each machine will print 2100 page per hour. **[Conceptual Understanding]**

EVALUATE

Classwork: Ask to solve Q1, 3, 5 and 10 of Exercise 4G; Think and Answer given on page 81.

Homework: Ask to solve remaining questions of Exercise 4G.

ENHANCE

Write some division problems on the board. Randomly call out some students one by one and ask them to frame a word problem based on that. Ask the rest of the class to verify if the word problem is correct.

Periods: 11–12	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 73–76

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their concept before starting the revision.
- Start the revision by using Points to remember, Learning Logs, Mental Maths and HOTS.
- Discuss questions of 'Learning Logs' and accept students answer, if any confusion or error then explain and correct it. Motivate students to solve 'Mental Maths' and 'HOTS'
- Discus the facts given in 'Fun Fact' on pages 77–78 of the textbook.



MULTIPLES AND FACTORS

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- find multiples and common multiples of given numbers
- find factors and common factors of given numbers

LESSON PLAN

Suggested number of periods: 8

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, number/flash cards, number chart, multiplication table, A4 size sheet, square grid paper.

Keywords: Multiples, Common multiples, Factors, common factors , Factorisation, Division method

Pre-requisite knowledge: Students must be familiar with multiplication and division facts, etc.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	Topics: Multiples; Common Multiples	Suggested extra teaching aids: Number Charts, Square grid paper Touchpad Mathematics 4 pages 80–84

ENGAGE

Start the class by taking the reference of 'Warm Up' given on pages 79–80.

Further, divide the class into pairs.

On the board, make a 3 × 3 grid and write the numbers 21, 24, 40, 60, 288 and 378 as shown below.

Then, ask the students to write the numbers 1–9 in the squares such that the numbers in each row, when multiplied together, they will give the product written next to that row.

Also, keep in mind that the numbers in each column multiplied together will give the product under that column.

Tell the students to recall the multiplication tables and try to fill in the numbers. After giving sufficient time, discuss the answers by completing the grid as shown here.

			24
			40
			378
60	21	288	



2	3	4	24
5	1	8	40
6	7	9	378
60	21	288	

Hence, introduce the term multiple as the product of two or more numbers. For example, 24 is the product of 2, 3 and 4, so 24 is a multiple of each one, *i.e.*, 2, 3 and 4. Similarly, 40 is a multiple of 5, 1 and 8 and so on. **[Critical Thinking]**

EXPLORE

Students will work in pairs. Each pair will take a 100-number chart and two coloured pencils.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Student A will choose any number less than 10 on the grid and ring all those numbers which come in the multiplication table of that number. Then he/she will list them in his/her notebook.

Similarly, Student B will choose any number less than 10 and ring all those numbers which come in the multiplication table of that number. Also, he/she will list them in his/her notebook.

Instruct them to find the numbers which are present in both lists. Have them introduce these numbers as the common multiples of the numbers chosen.

Tell them to repeat the procedure and find the common multiples of other numbers. **[Experiential Learning]**

EXPLAIN

Start the discussion with an interaction based on any real life situations. Refer textbook pages 80–84 for explanation and examples. Explain the term multiples with examples. Then discuss how to find multiples of a number by multiplying it with counting numbers. Also, explain how to check whether a number is a multiple of the given number.

Next, talk about properties of multiples finding multiples of a number and common multiples. Solve few questions on the board and explain the concept. **[Conceptual Understanding]**

ELABORATE

After understanding the concept of multiples well, ask students to write the multiplication table of any number. Then ask few questions like:

- Which is the first multiple of that number?
- Is there any multiple smaller than that number?
- Up to which number can they write the multiples of that number?
- How many multiples can any number have?
- Is 1 a multiple of every number?
- Is every number a multiple of 1?

Accept the responses and discuss about the properties of multiples. Next, demonstrate on board, finding multiples of a number and finding the 'Common Multiples' by using the number line by taking the reference of pages 83–84 of the textbook. **[Experiential Learning]**

EVALUATE

Classwork: Ask to solve Q.2, 4, 6, 7 and 8 of Exercise 5A and Q.1 of Exercise 5B.

Homework: Ask to solve remaining questions of Exercise 5A and 5B.

ENHANCE

Divide the class into small groups and ask them to perform the activity given in 'Fun Activity' section on page 91. **[Discussion-based Learning, Collaborative Learning]**

Periods: 4–6	Topics: Factors; Common Factors	Suggested extra teaching aids: Concrete items, multiplication table Touchpad Mathematics 4 pages 84–88

ENGAGE

The teacher can start the topic in the classroom through active participation of students. For this, he/she can call a group of students and ask them to stand in rows and columns. Ask rest of the students to write a multiplication/division fact for the arrangement. Hence, introduce the number of rows and columns as the factors of the number representing total students. Next, invite same number of another students and tell them to stand in different way compared to the previous one. Again, the students will tell the factors of that number. **[Collaborative Learning]**

EXPLORE

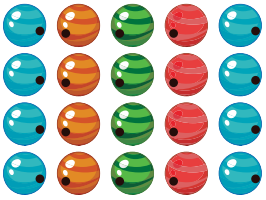
Divide the class into groups of 3 students each. Provide each group some beads, seeds, squared paper, etc. and ask them to make rectangles to show a particular number, say 20.



$1 \times 20 = 20$



$2 \times 10 = 20$



$4 \times 5 = 20$

Let them know that when we multiply two numbers to get a product, the numbers being multiplied are called factors.

Thus, 1, 2, 4, 5, 10 and 20 are the factors of 20.

Then, ask how many factors have they explored for that number. Also, discuss why 3, 6, 7, etc. are not factors of 20. For this, let them arrange the items in these numbers of rows and check whether each row has same number of items.

Monitor students' participation and engagement during the activities. **[Collaborative Learning]**

EXPLAIN

Start the discussion with an interaction based on any real life situations.

For example, suppose you invite 36 guests on your next birthday. You want to arrange some items for them. Let a packet contain 12 cookies, or box holds 6 fruity packs, or tray has 9 cupcakes. How many sets of each item you take so that each person can get 1 item of each kind?

Accept the responses and explain the term factors. Then discuss how to find factors of a number using multiplication and division. Also, explain how to check whether a number is a factor of the given number. Next, talk about properties of factors and common factor of numbers.

Refer textbook pages 84–88 for more explanation and examples. **[Conceptual Understanding]**

ELABORATE

Bring a multiplication table in the class or display soft copy on projector.

×	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
7	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140
8	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160
9	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180
10	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
11	11	22	33	44	55	66	77	88	99	110	111	132	143	154	165	176	187	198	209	220
12	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
13	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260
14	14	28	42	56	70	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280
15	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300
16	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320
17	17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340
18	18	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360
19	19	38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	323	342	361	380
20	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400

With the help of this table, find out the factors of two or more numbers. First talk about factor properties and then demonstarte what factors are common to them. Discuss about common factors referring textbook pages 87–88. Hence, write few numbers on the board and give them opportunity to find out their common factors.

[Conceptual Understanding]

EVALUATE

Classwork: Ask to solve Q.1 and 4 of Exercise 5C and Q.1 of Exercise 5D.

Homework: Ask to solve remaining questions of Exercise 5C and 5D.

ENHANCE

Students can play this game in pairs.

For this, they will take a 1–100 number chart and two coloured pencils.

Procedure

Player A will choose any number on the grid and note it as his/her score. Player B will cross out all its proper factors, except the number itself and list them on his/her notebook and add. The sum of the proper factors will be the score of player B.

Now, player B will choose any number and add it his/her score. Player A will list the proper factors and get the sum as his/her score. Note that the selected number must have atleast one proper factor on the board.

Repeat the procedure up to 10–15 rounds. The player with more points will be winner.

Periods: 7–8	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 89–91

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries before starting the revision.
- Start the revision by using ‘Points to remembers’, ‘Learning Logs’, ‘Mental Maths’ and HOTS.
- Discuss questions of the ‘Learning Logs’ and accept students answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve ‘Mental Maths’ given on page 90.
- Motivate the students to solve ‘HOTS’ and ‘Puzzle’.
- Encourage students to do the activity given in ‘Fun Activity’ section at page 91.



FRACTIONS

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- understand the concept of fractions; identify the numerator and denominator
- find the fraction of a collection of objects or numbers
- check equal fractions; write the equivalent fractions of a given fraction
- identify different types of fractions (unit, like and unlike fractions)
- compare and order like fractions
- add and subtract like fractions; solve word problems based on like fractions

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, number/flash cards, paper strips, circular/rectangular/square paper cutouts, crayons/colour pencils.

Keywords: Fractions, Numerator, Denominator, Like and Unlike fractions, Equal fractions, Equivalent fractions, Addition and subtraction of like fractions.

Pre-requisite knowledge: Students must be familiar with parts of a whole or a collection as a fraction.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	Topics: Understanding Fractions; Numerator and Donominator; Fraction of a Collection/Number	Suggested extra teaching aids: Touchpad Mathematics 4 pages 92–97

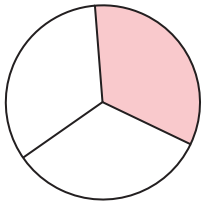
ENGAGE

Draw a few shapes, like a rectangle, a square, a circle, etc. on the board and divide them equally into different number of parts. Shade a few parts using chalk and instruct students to write the fractions for the shaded parts with respect to the total number of equal parts. Teacher can also use the 'Warm Up' section of the textbook, given on page 92 and 93.

Recall the numerator and the denominator of a fraction. For example,

In the given figure, total number of parts = 3

Number of shaded part = 1



Hence, we represent it in fraction as $\frac{1}{3}$, where numerator = 1 and denominator = 3

[Experiential Learning]

EXPLORE

Divide the class into groups 3–4 students. Distribute paper strips to each group and tell the group members to divide the strip into 6, 7 or 8 equal parts, but each member of a group should have equal divisions. Then ask them to shade few parts as per their choice. Now they will note down the fraction for the shaded parts and observe the numerators and denominators of the fractions. Their fractions will have same denominator but different numerators (within a group). Let them know that such kind of fractions are called like fractions. Further, provide another set of strips and let them divide and shade as per their choice. Hence, write the fractions for the shaded portions. These are unlike fractions as their denominators are different.

Monitor students' participation and engagement during the activities. **[Experiential Learning]**

EXPLAIN

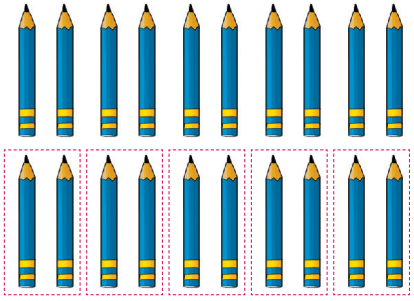
A fraction is a part of a whole when divided into equal parts. A whole can be a region or a collection. The parts of a whole of the same size are called equal parts. Explain halves, one-third, one-fourth. Show on board how to write fractions using two numbers, i.e., numerator and denominator. Explain what are numerator and denominator. Refer textbook pages 93–94 for explanation and examples. **[Conceptual Understanding]**

ELABORATE

Write on board $\left(\frac{1}{5}\right)$ of a collection.

Take some real-life objects, like 10 pencils. Distribute it in five equal parts. Ask students to observe that each group has 2 pencils. And each part represents one-fifth $\left(\frac{1}{5}\right)$ of the collection.

So, $\left(\frac{1}{5}\right)$ of 10 = 2 or 10 ÷ 5 = 2, *i.e.*, one-fifth of 10 pencils is 2.



Similarly, demonstrate $\frac{2}{5}$, $\frac{3}{5}$, ... of collection.

Demonstrate that a group has 2 pencils and so, two groups have 4 pencils. And 3 groups has 6 pencils.

So, $\frac{2}{5}$ of 10 pencils = 4 pencils, and $\frac{3}{5}$ of 10 pencils = 6 pencils, and so on.

[Cross-curricular Learning]

EVALUATE

Classwork: Ask to solve Q.1, 3, 6 and 7 of Exercise 6A and Q.2 and 3 of Exercise 6B.

Homework: Ask to solve remaining questions of Exercise 6A and 6B.

Periods: 4–6	Topics: Equal Fractions; Equivalent Fractions	Suggested extra teaching aids: Touchpad Mathematics 4 pages 98–101

ENGAGE

Start the class by a story telling. You can consider a story similar to the story given below.

Story

Ram and Gopal, two friends, contributed some amount and bought a box of apples. After bringing the box at home, they decided to share them equally.

Ask: Can you say what part of it will each of them get? _____

They opened the box and counted the apples. They found 44 apples in all, so each one took $\frac{44}{2}$ apples.

Ask: Can you think how many apples this fraction represents?

They used the trick of repeated subtraction, picked up pair of apples 22 times and both of them took one-one every time.

Having an interaction, introduce: $\frac{1}{2}$ (box of apples) or, $\frac{22}{44} = \frac{1}{2}$ where numerator 1 < denominator 2 are equal fractions. **[Holistic Learning]**

EXPLORE

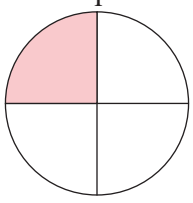
Distribute every student three identical strips of rectangular paper, and instruct them as follows:

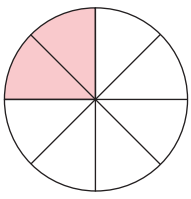
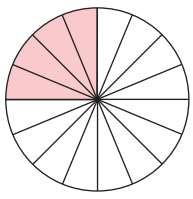
- **Strip 1:** Fold it exactly in half. Color one part. Label it as $\frac{1}{2}$.
- **Strip 2:** Fold it in half, and then in half again. Open it up. You have 4 equal parts. Colour two parts. Label each part it as $\frac{1}{4}$
- **Strip 3:** Fold it into 8 equal parts. Colour four parts. Label each part as $\frac{1}{8}$.

Ask the students to place the strips one below the other. They will visually see that the coloured area is exactly the same size in all three strips. **[Experiential Learning]**

EXPLAIN

After dealing the concept about Fractions, talk about any real-life situation connecting with equivalent fractions. For example, parts of a pie/pizza. Consider the circular cut-outs as a pizza and divide them into different parts. Then, highlight a particular section in each one and write the fractions representing them. Ask what they observe. Clearly, they show same amount of the pizza, their values are equal. We also say the fractions are equivalent.



$\frac{1}{4}$ =  $\frac{2}{8}$ =  $\frac{4}{16}$

You can also use activity given in 'Fun Activity' section on page 109.

Next, explain how to find the fractions equivalent to a given fraction using multiplication/division. Also, demonstrate how to check whether the two given fractions are equivalent or not. Refer textbook pages 98–100 for more explanation and examples. **[Conceptual Understanding]**

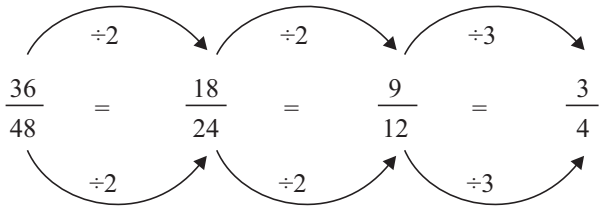
ELABORATE

Write a few sets of fractions on the board. Ask the students to identify the equivalent fractions among them. Try if they can write their own for any given fraction. After the students' responses, demonstrate how to get equivalent fractions for any given fraction demonstrate that by multiplying or dividing the numerator and denominator by the same number, we get the equivalent fractions.

Explain that fractions are said to be in the simplest form or lowest term if the numerator and denominator have only 1 as the common factor. Also, reiterate that a fraction is simplified to its lowest term by dividing the numerator and denominator with common factors until only 1 is left as a common factor.

For Example,

$$\frac{36}{48}=\frac{36\div 2}{48\div 2}=\frac{18\div 2}{24\div 2}=\frac{9\div 3}{12\div 3}=\frac{3}{4}$$



Thus, $\frac{3}{4}$ is the equivalent fraction and the lowest term of $\frac{36}{48}$.

Refer textbook pages 98–100 for more explanation and examples.

Further, demonstrate the equivalency of two fractions by taking the reference of pages 99–100.

Hence, motivate students to solve questions. **[Conceptual Understanding**

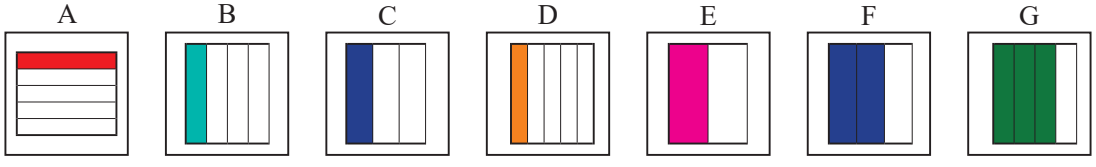
EVALUATE

Classwork: Ask to solve Q.1 to Q.6 of Exercise 6C.

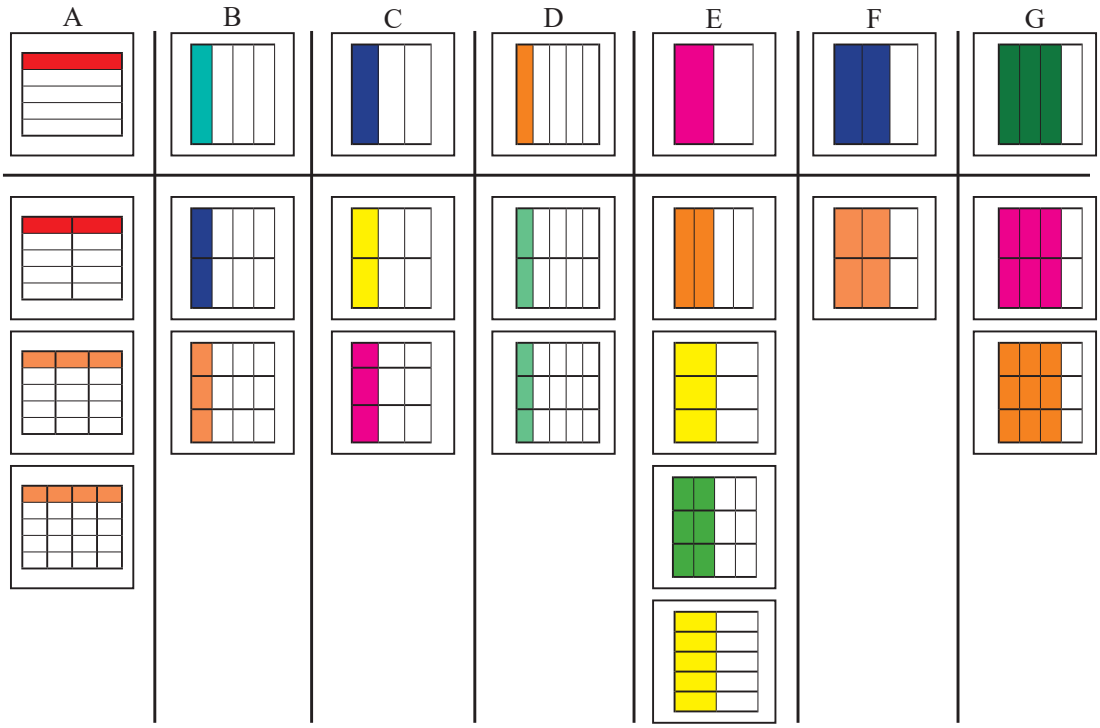
Homework: Ask to solve remaining questions of Exercise 6C.

ENHANCE

Divide the class into 4–5 teams. Ask each team to choose their team leader. Call the team leaders and provide each of them a paper piece. Ask them to make any shape, divide it as per their choice and shade some parts. Note that they should show different fractions. Then instruct them to fix their chits on the display board on the top row. For example,



Now provide a paper piece to each of the remaining students and instruct them to make similar design showing the fractions equivalent to their team leader. They all will fix their chits under their leader's chit.



- Ask students to prepare colourful charts on fractions, with help of friends, teachers and parents.
- Instruct to watch the video on 'www.orangewebsupport.co.in'

The team showing maximum number of correct equivalent fractions will be the winner.

Periods: 7–8	Topics: Types of Fractions; Comparing and Ordering Fractions	Suggested extra teaching aids: Touchpad Mathematics 4 pages 101–104

ENGAGE

Discuss 'Types of Fractions' by taking the reference of page 101 of the textbook.

Further, divide the class into groups of 6, invite any groups in front of the class and tell them to express what fraction of the group is boys and what fraction is girls. Write the fractions on the board and ask the class to identify which one is greater/smaller. Suppose there are 2 boys and 4 girls in Group A. Then,

Fraction of boys = $\frac{2}{6}$ and Fraction of girls = $\frac{4}{6}$; Clearly, $\frac{2}{6} < \frac{4}{6}$ or $\frac{4}{6} > \frac{2}{6}$

Further call another group and instruct them to do the same work. Now compare the fractions of boys or girls in the two groups. Suppose there are 3 boys and 3 girls in Group B. Then,

Fraction of boys = $\frac{3}{6}$ and Fraction of girls = $\frac{3}{6}$;

Now, comparing the fraction of boys in two groups, we see $\frac{2}{6} < \frac{3}{6}$

And comparing the fraction of girls in two groups, we see $\frac{4}{6} > \frac{3}{6}$

With the extension, they can observe $\frac{4}{6} > \frac{3}{6} > \frac{2}{6}$

Next, instruct one of the girls from the Group A to go back on her seat. Then, ask the group to express the number of remaining girls as a fraction. Certainly, it will be $\frac{3}{5}$.

Now compare it with the fraction of girls present in the Group B, *i.e.*, $\frac{3}{6}$.

Clearly, $\frac{3}{5} > \frac{3}{6}$. If the students couldn't understand (how?), you can ask them to let both groups share 30 candies among themselves. Then which group member will get more candies? **[Experiential Learning]**

EXPLORE

Divide the class into pairs. Ask them to count the number of books and notebooks kept in their bags. Express them as fractions and compare the two fractions. Further, they can count the number of pencils, crayons, erasers, etc. and compare their fractions. If they get unlike fractions, instruct them to compare only the fractions with the same numerator. For this, they have to keep same number of a particular item in the groups but the total numbers will be different. **[Discussion-based and Collaborative Learning]**

EXPLAIN

Refer textbook pages 101–103 and explain how to compare like and unlike fractions with same numerator.

When the fractions are like then compare their numerators. The like fraction with greater numerator will be greater, and the fraction with smaller numerator will be smaller, and if both the numerators of like fractions are same then those fractions will be equal fractions.

When the fractions are unlike but their numerators are same then compare their denominators. The fraction with greater denominator will be smaller, and the fraction with smaller denominator will be greater.

Also, explain the ordering of fractions having same numerator/denominator. Demonstrate some examples on the board. **[Conceptual Understanding]**

ELABORATE

Interact with students and strengthen their concept connecting with other subjects. Write any word related to moral value or a quotation on the board. For example,

OBEY YOUR PARENTS! BE OBEDIENT!

Ask any two students randomly to stand up and tell the fractions for the consonants and vowels present in the word/quote. Hence, compare the two fractions.

Also, ask one student to write a word/quote and another to write the fractions and compare.

Suppose students A writes RESPECT. Then, student B will observe 5 consonants, viz. R, S, P, C, T and its fraction = $\frac{5}{7}$; and 2 vowels, viz. E, E and its fraction = $\frac{2}{7}$. Clearly, $\frac{5}{7} > \frac{2}{7}$.

[Cross-curricular Learning]

EVALUATE

Classwork: Ask to solve Q.1, 2, 4, 5 and 6 of Exercise 6D.

Homework: Ask to solve the remaining questions of 6D.

ENHANCE

Ask students to complete the 'Activity' given on page 102.



Periods: 9–10	Topic: Addition and Subtraction of Like Fractions	Suggested extra teaching aids: Touchpad Mathematics 4 pages 104–106

ENGAGE

Start the discussion by connecting the students with real life. For this, ask some questions such as:
About how much water in litre can your bottle hold? What part of the water is left in the bottle? Think what part of water have you consumed.
Suman got a chocolate bar in the morning. It had 10 slabs. She gave 4 slabs to her friend Ria and 3 slabs to her brother Parth. Can you say what part of chocolates did she give in all? What part of chocolate is left with her?
Accept their responses, and introduce the concept of addition and subtraction of like fractions.

[Experiential Learning]

EXPLORE

Divide the class into pairs. Give two paper strips to each of the pairs. Instruct them to mark equal number of divisions on the strips, shade the divisions as much as they can and then keep both the strips together. Ask them to count the total number of shaded parts in both strips together out to total divisions. Now, write the fractions for the shaded parts and find the sum of the fractions. Also, find the difference of the fractions. Accept the responses.

[Collaborative Learning]

EXPLAIN

Write some real-life problems based on addition and subtraction of fractions on the board. For example, Alisa drank $\frac{4}{8}$ of a cup of milk at breakfast and $\frac{6}{8}$ of a cup of milk at lunch. How much more milk did she drink at lunch than at breakfast?
Instruct the students to read aloud the problem and think how to solve them.
Let them understand the problem and devise a plan to solve it. Then workout the solution and explain the concept. At last check the solution.

Refer textbook pages 104–106 for more explanation and examples.

[Conceptual Understanding]

ELABORATE

Write some like fractions in pairs on the board but pairs should not be together. For example, have a look at the fractions given below.

$\frac{5}{10}$	$\frac{4}{11}$	$\frac{1}{8}$	$1\frac{2}{3}$	$\frac{8}{12}$
$\frac{5}{8}$	$\frac{9}{15}$	$\frac{7}{11}$	$\frac{1}{4}$	
$\frac{3}{4}$	$\frac{11}{12}$	$\frac{5}{15}$	$\frac{2}{10}$	$\frac{1}{3}$

Ask students to find the pairs of like fractions and add and subtract in their notebooks. After allowing sufficient time, show the working on the board and let them make corrections if they have not done correctly.

To add fractions with the same denominators:

$$\frac{5}{10} + \frac{2}{10} = \frac{\square}{\square}$$

$\square$ ← Add the numerators

$\square$ ← Use the same denominator

To subtract fractions with the same denominators:

$\frac{11}{12} - \frac{8}{12} = \frac{\square}{\square}$ ← Subtract the numerators
← Use the same denominator

Hence, motivate the students to practise the problems given in the book.

EVALUATE

Classwork: Ask to solve Q1(*a*), (*d*), (*h*); 2 (*b*), (*f*), (g) and 3(*a*), (*c*) of Exercise 6E.
Homework: Ask to solve remaining questions of Exercise 6E.

ENHANCE

Ask students to explore the use of fractions in daily life and list at least five situations. Apply the operation if they use to solve them. Refer the interactive exercise given on the portal "www.orangewebsupport.co.in".

Periods: 9–10	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 107–109

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify the doubts and rectify the errors.
- Start the revision by using 'Point to remember', 'Learning Logs', 'HOTS' and 'Mental Maths'.
- Discuss questions of the 'Learning Logs' and accept students answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve Mental Maths and 'HOTS'.



GEOMETRY

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- know more about solids, make solids using nets
- know the relation between edges, vertices, and faces
- recall basic geometrical shapes
- understand angles and right angles
- identify and draw a circle and its parts
- measure and draw a line segment
- describe polygons and their types

LESSON PLAN

Suggested number of periods: 12

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, flash cards, geometry box, paper cut-outs of different shapes, solid objects etc.

Keywords: Geometry, Solid Shapes, Cube and Cuboid, Sphere, Hemisphere, Cylinder, Cone, Nets of Solids, Prisms, Pyramids, Point, Line, Ray, Line Segment, Angle, Acute, Obtuse Right Angles, Open and Closed Figures, Polygons, Triangle, Quadrilateral, Square, Rectangle, Pentagon, Circles.

Pre-requisite knowledge: Students must be familiar with plane and solid shapes.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	Topics: Solid Shapes; Nets of Solid	Suggested extra teaching aids: Touchpad Mathematics 4 pages 112–116

ENGAGE

Start the class by using the 'Warm Up' secction of the book given on pages 112 and 113.

Students are familiar with the solid shapes, such as cube, cuboid, sphere, cylinder, cone. Write few questions on the board and ask them to write its answer in their notebooks.

- Give two examples of each type of solid shape.
- Why solids are called 3-dimensional (3D) shapes?
- Draw the sketch of five basic 3D shape and write their names.

Accept their responses, and reinforce the concept by writing the answers on the board.

[Experiential Learning]

EXPLORE

Divide the class into small groups. Provide them the wooden/plastic blocks of basic solid shapes. Instruct them to explore about the nature of surfaces each solid has. Then count the number of faces, edges and vertices and hence list them in a table. Hence, compare the table made by other group and discuss if any differences occur.

[Collaborative Learning]

EXPLAIN

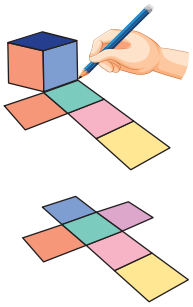
Bring some objects in the class and explain about their shapes. Introduce the term, face, edge and vertex visualising it in any object. Talk about the number of faces, edges and vertices of different types of 3d shapes.

Explain about combination of blocks by taking the reference of page 114 of the textbook.

Hence, deal the term 'net of a solid' by opening a shoebox or any carton. Further, show them how to make solid shape by folding the net of a cube and cuboid.

Refer textbook pages 114–115 for more explanation and examples. **[Conceptual Understanding]**

ELABORATE



Take a cubical block or a big die, trace its all faces on a paper. Note that you should turn face and keep it adjacent to the previous outline so that you can get its net.

Hence, demonstrate to fold the net obtained and make a cube. Next, remove its one face and show formation of an open cube and then a cube without top and bottom faces by removing one more face.

Similarly, use cardboard or paper cuts outs to demonstrate nets of cone and cylinder.

EVALUATE

Classwork: Discuss Q.1 and 2 and ask to solve Q.3 and 5 of Exercise 7A.

Homework: Ask to solve remaining questions of Exercise 7A.

ENHANCE

- Ask students to explore the nets of cubes and cuboid. They can bring the nets of small boxes used to pack sweets, cake, etc. and practise to make the box by proper folding and fixing its flaps.
- Instruct to make the Prisms and Pyramids by using the nets given.

Periods: 4–5	Topic: Basics of Geometry	Suggested extra teaching aids: Touchpad Mathematics 4 pages 117–119

ENGAGE

Divide the class into pairs. Distribute the paper sheets to the pairs. Ask each student to make a dot using her/his sharpened pencil and identify what it represents. Let them understand it as a point. Next, ask how they will distinguish the two points marked by pair of students. Accept the responses and have them understand that we name them using capital letters, such as A, B, C, … to distinguish between them.

[Experiential Learning]

EXPLORE

Divide the class into pairs. Instruct them to take a paper sheet and fold it to get a crease on it. Then, open the sheet and draw a line over the crease so formed. Mark arrowheads at the both end to show its extension in both directions. Tell them to identify the figure and name it by putting any two points on it. For example,



It is a line AB, denoted as $\overleftrightarrow{AB}$.

Make another crease and put arrowhead at only one end to show its extension in one direction only. Identify this figure also and name it by putting any two points on it as shown here.



It is a ray AB, denoted as $\overrightarrow{AB}$.

Similarly, make third crease and label its both ends without showing its extension in any direction. Identify this figure as shown here.



It is a line segment AB, denoted as $\overline{AB}$.

Monitor students' participation and engagement during the activities. **[Experiential Learning]**

EXPLAIN

Explain the straight line from a point extended in one direction is called a ray and the straight line extended on both sides is called a line. Demonstrate the diagrams of a ray and a line along with their names on the board. Have them understand well that a ray AB is different from a ray BA as they have different initial points.

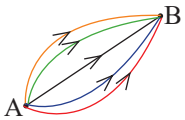


$\overrightarrow{AB}$ means the ray starts from A and goes towards B.



$\overrightarrow{BA}$ means the ray starts from B and goes towards A.

Next, mark Point A and Point B on the board. Sketch different paths from A to B. Discuss that the shortest way from A to B is known as a line segment. Hence, ask the students to identify it in the figure.



Further discuss how to measure and draw a line segment using a ruler. Refer textbook pages 117–118 for more explanation and examples. **[Conceptual Understanding]**

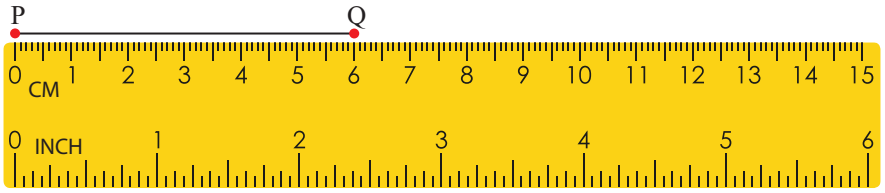
ELABORATE

A line segment is a part of a line that goes from one point to another. Invite the students in small groups and demonstrate the procedure of measuring and drawing a line segment.

- Measuring the length of a line segment using a ruler

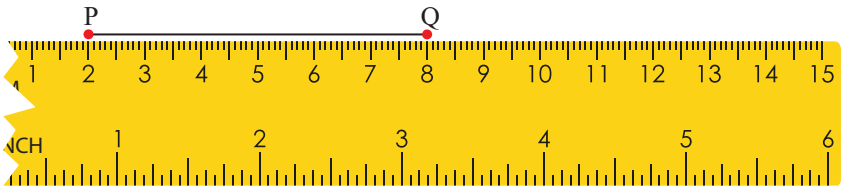


When measuring the length of a line segment, say PQ, place the end point P of the segment on the zero mark on the ruler, then see where its other end Q aligns with the markings on the ruler.



Here, Q aligns with marking 6, the length of PQ = 6 cm.

Also, demonstrate how they can measure the line segment if some part of ruler from zero end is damaged.



We can see here point P aligns with 2 cm and Q aligns with 8 cm. In this case, the length of PQ = 8 – 2 = 6 cm, which is same as above.

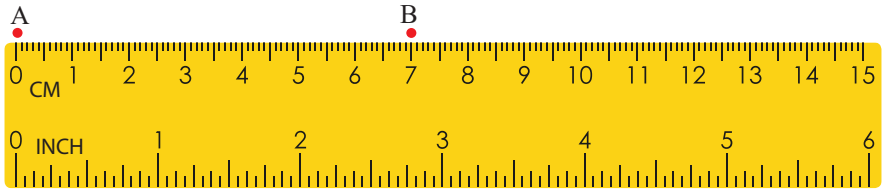
- Drawing a line segment of length 7 cm using a ruler

We are going to draw a line segment of length 7 cm using a ruler with the following steps:

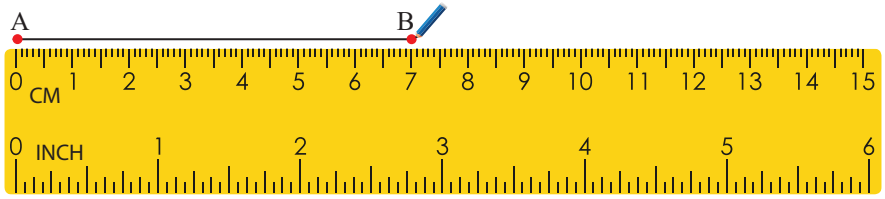
Step 1: Mark a point A on a plain paper.

Step 2: Place the '0' point of the ruler at point A.

Step 3: Now, mark a point B on the paper at 7 cm of the ruler.



Step 4: Now draw a line from point A to B.



Here, AB is the required line segment. 

[Conceptual Understanding]

EVALUATE

Classwork: Ask to solve Q.1, 2 and 5 of Exercise 7B.

Homework: Ask to solve remaining questions of Exercise 7B.

ENHANCE

Ask students to write the similarity and differences, among a line, a ray and a line segment.

Periods: 6–8	Topics: Angle, Polygons	Suggested extra teaching aids: Touchpad Mathematics 4 pages 119-124

ENGAGE

Start the class by calling one student and telling him/her to write his/her name on the board in capital letters and in big size. Ask the class to find angles within the letters in the name one by one. Accept the responses. Introduce the topic 'Angles'.

EXPLORE

Distribute square grid papers in the classroom. Instruct students to write their name with pencil and ruler on the grid paper in capital letters and in big size.

Demonstrate by writing his/her own name on board, and ask to identify the angles within the letters. Instruct students to follow the teacher to mark angles within the letters of their name. As an extension, teacher can also discuss about the type of angles. **[Experiential and Collaborative Learning]**

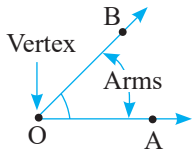
EXPLAIN

Explain that two rays having a common end point form an angle, and the rays are called the arms of the angle and the common end point is the vertex of the angle. Further, explain the different method of naming an angle. Also, explain the different types of angle based on their size.

Next explain 'Polygons', and types of polygons by taking the reference of the textbook pages 121-123.

ELABORATE

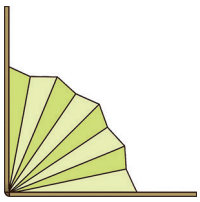
Draw the adjoining figure and demonstrate that the rays $\overrightarrow{OA}$ and $\overrightarrow{OB}$ form an angle at point O. $\overrightarrow{OA}$ and $\overrightarrow{OB}$ are the arms and O is the vertex of this angle.



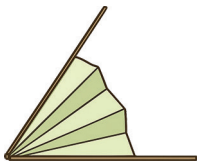
Further, demonstrate that three letters are used to show an angle, the letter showing the vertex is always written in the middle like ∠AOB.

Also, demonstrate and explain the types of angles by using an activity as follows:

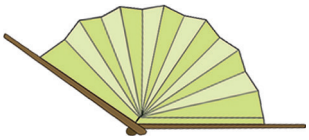
- Take two colour origami paper and fold them as a paper fan. Paste two ice-cream sticks to the fan.
- Then show different types of angles by using this.



Right angle



Acute angle



Obtuse angle

Also take the reference of textbook page 120 to identify the different types of angles.

Next, divide the class into small groups. Provide each group a geoboard and some rubber bands. Ask them to perform the Maths activity given in 'Fun Activity' section on page 131.

EVALUATE

Classwork: Discuss Q 1, 2 and 3 of Exercise 7C and Q 1, 2, 3 and 6 of 7D and ask to solve in their notebook.

Homework: Ask to solve the remaining questions of exercise 7C and 7D.

ENHANCE

Ask students to make different types of polygons using matchsticks/toothpicks/broomsticks and recognise its sides and angles.

Periods: 9–10	Topic: Circles	Suggested extra teaching aids: Touchpad Mathematics 4 pages 124–128

ENGAGE

Recall the concept of 2D shapes by asking some questions, such as:

- I am a plane shape. I have 4 sides and my opposite sides are equal in length. Who am I?
- I am a plane shape. I have 3 sides and 3 corners. Who am I?
- I am a plane shape. I have no sides and corners. Who am I?
- I am a plane shape. I have 4 sides which are equal in length. Who am I?
- I am a plane shape. I have no sides and corners. I can slide but not roll. Who am I?

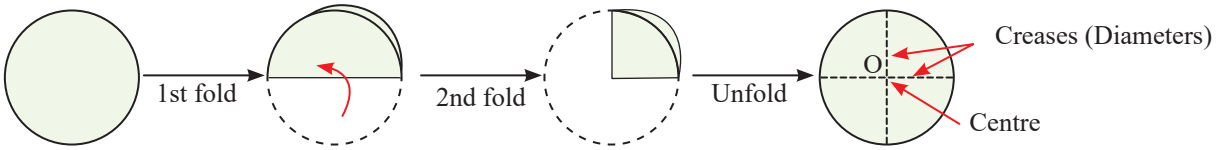
Accept their responses, and acknowledge the correct answers. **[Critical Thinking]**

EXPLORE

Students are aware about circular objects. They can trace the circle on a sheet of paper using any circular objects, such as bangle, bottle top, plate, can etc. and cut the circle using a pair of scissors.

Tell the students in advance to bring cut-outs of circles. Instruct the students to take a circle and fold it into halves. Fold it once more into halves and press to make creases. Now unfold the paper and mark the point

where two creases intersect as centre O. Introduce the crease passing through the centre as the diameter of the circle, and the distance from the centre of the circle to the boundary of the circle, *i.e.*, half of the crease as a radius of the circle.



[Experiential Learning]

EXPLAIN

With the help of circular cut-out or making a sketch on the board, explain the circle and its parts. Demonstrate how to draw a circle of given radius/diameters using a ruler and a compass. Also, discuss the relation between a diameter and a radius of a circle.

Refer textbook pages 124–127 for more explanation and examples. **[Conceptual Understanding]**

ELABORATE

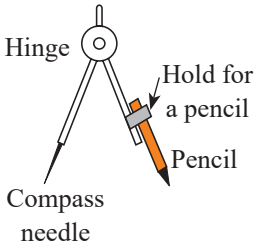
Discuss about the compass, a tool that can be used to draw a circle of exact radius.

What is Meant by a Compass?

The word compass literally means "encircle" which in other words is also called "to go around". A compass is an instrument that is usually a metal or plastic V-shaped drawing tool. It majorly consists of two movable arms, which are hinged together. It is used to draw circles or the parts of circles called arcs. A compass is also called a pair of compasses.

Parts of a Compass

As a compass has two arms, one arm holds a pencil while the other arm has a pointed end. A compass is designed for the users to grip it between their thumb and pointer finger. Keeping the same in mind, the handle length of the drawing compass is about 1.25 cm.



Arms: The space between the compass arms is adjustable. If we keep the arms of the compass apart, it is easier to construct a circle or arc with a given radius. There is a clamp on one end to hold a pencil whereas, on the other end, there is a sharp point that keeps the tool steady on the drawing surface while the pencil moves.

Hinge: It is the handle of a compass. We hold it between our forefinger and thumb. Normally only one hand is used to draw a circle. The compass is turned by twisting between the forefinger and thumb.

Compass Needle: It is the point that is placed at the centre of the circle. The pencil tip is turned around this point. The gap between the compass needle and the pencil tip is the radius of the circle. It is set using a ruler. The gap can be changed by changing the angle between the arms of the compass.

Hold for a Pencil: A sharp pencil is clamped tightly at this place. The tip of the pencil is aligned to the compass needle by bringing the tip of the pencil and compass needle closer. Once, their tips have matched, the compass can be used to construct circles.

Drawing with a Compass

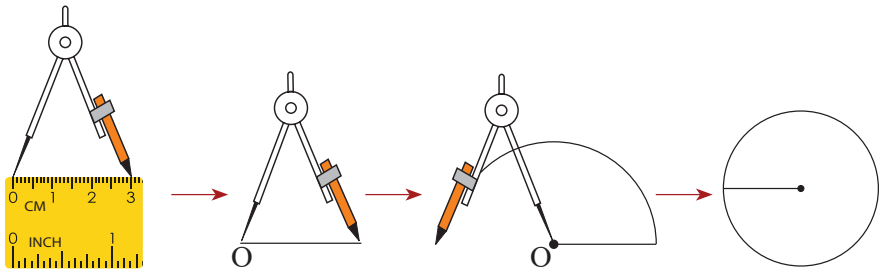
It is possible to construct circles, arcs, bisect lines, angle bisectors and determine mid-points using a compass. The steps to draw a circle using a compass are:

Step 1: Open the arms as per the measurement of radius for the circle to be drawn.

Step 2: We place the sharp point of the compass at the centre of the intended circle.

Step 3: Press down the needle, turn the knob at the top of the compass to draw a circle, and drag the pencil around the centre to draw the curve.

Step 4: A circle is drawn. You can mark its centre point, radius, or diameter if required.



Step 1 **Step 2** **Step 3** **Step 4**

Tips to Remember

- Just make sure that the hinge at the top of the compass is tightened so that it does not slip.
- Do not apply any pressure to the pencil but tighten the hold for the pencil else the width of the circle will get changed.
- It should be taken care that the pencil lead is aligned with the compass's needle.
- A drawing compass can draw circles on any specific material (wood, metal, plastic, etc.). All you have to do is, put the needle on the surface/ page, on which the circle has to be drawn, fix it and rotate the other arm around while keeping the same angle on the hinge.
  Hence, motivate the students to practise themselves.

EVALUATE

Classwork: Ask to solve Q1, 4 and 6 of Exercise 7E.

Homework: Ask to solve remaining questions of Exercise 7E.

ENHANCE

Ask students to explore about the paths followed by planets to go around the Sun in solar system.

[Cross-curricular Learning]

Periods: 11–12	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 128–131

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify the doubts or queries, if any they have.
- Start the revision of the exercise by using 'Points to Remember', 'Learning Logs', 'Mental Maths' and 'HOTS'.
- Discuss questions of the 'Learning Logs' and accept students answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve 'Mental Math' and 'HOTS' given on pages 130–131.
- Encourage students to do the activity given in "Fun Activity" section on page 131.



SYMMETRY AND PATTERNS

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- recognise the line(s) of symmetry in the objects around us and in various geometrical figures
- recognise the mirror image or reflection
- understand and create patterns of figures and numbers
- understand the concept of tessellation
- Understand number patterns

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, some symmetrical/asymmetrical cut–outs, square/ isometic dotted paper, mirror, colours, scissors, A4 size sheet, glue.

Keywords: Symmetry, asymmetry, line of symmetry, Mirror Image (reflection), Patterns, Tessellations (tiling), etc.

Pre-requisite knowledge: Students must be familiar with symmetry and pattern of shapes and colours.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–4	Topics: Symmetry; Reflection	Suggested extra teaching aids: Picture of monuments Touchpad Mathematics 4 pages 132–137

ENGAGE

Start the class with discussion about the beauty of some monuments. Talk about their constructions. Ask some questions, such as:

Why they look so beautiful?

Would you like to be an architect in future?

What will an architect do? and so on.

Accept the responses and introduce the term ‘Symmetry’.

Then introduce the topic ‘Symmetry’ by using the activity given in ‘Warm Up’ and discussing the solution of questions given with it. **[Cross-curricular Learning]**



EXPLORE

Divide the class into pairs. Distribute each group a sheet of paper. Tell one member to draw the figure of any item that he/she can divide into halves for sharing it equally with his/her partner. Instruct another member to draw an item which cannot be shared equally between the two members.

Monitor students' participation and engagement during the activities. After some time, invite the groups one by one to show their drawings and explain about it to the whole class. **[Holistic Learning]**

EXPLAIN

Start the class with an interaction regarding presence of symmetry in nature and surrounding. Explain the symmetry and asymmetry with respect to the sketches made by students in above activity. Then, draw some symmetrical shapes/figures/letters on the board and show their line or axis of symmetry. Also discuss if any figure has more than one line of symmetry.

You can conduct an activity by paper folding as explained on the page 133. Further explain line of symmetry of different shapes and Alphabets.

Further discuss about reflection. Refer textbook page 136 for more explanation and examples.

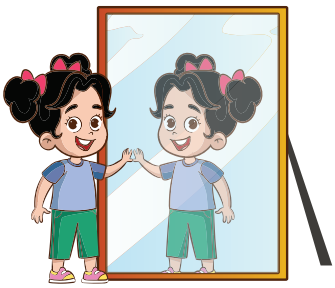
[Conceptual Understanding]

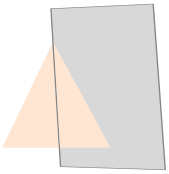
ELABORATE

Motivate students to do the activity given on page 134 in the class room.

Next, bring a plane mirror in the class demonstrate the image formation of an object. Invite the students randomly in front of the mirror, tell them to do any movement of their hands and observe the difference in their images. Hence explain about the lateral inversion in image formation, by taking the reference of page 136.

Further, draw only half of a figure and show how it looks complete by placing the mirror alongside.





[Experiential and Collaborative Learning]

EVALUATE

Classwork: Discuss Q.1 and 2 and ask to solve Q.4 of Exercise 8A and Q.2, 3 and 4 of Exercise 8B.

Homework: Ask to practice remaining questions of Exercise 8A and 8B.

ENHANCE

Ask students to write a message using reflection of letters, then show it to your friend and ask him/her to read the message. If unable, ask him/her to use a mirror for reading it correctly.



Periods: 5–8	Topic: Patterns	Suggested extra teaching aids: Touchpad Mathematics 4 pages 137-143

ENGAGE

Show some pictures having different kind of patterns on the projector or fix a large poster on bulletin board and ask the students to differentiate between two or identify each one. For example, feathers of a peacock, body of a zebra/dear/snake, fabrics, etc. Also, ask them to look around and find if any pattern is there on window grill, floor, gate, boundary, fencing of garden, etc. Accept their responses.

[Experiential Learning]

EXPLORE

Divide the class into groups of 4–5 students. Tell them to open a drawing sheet and choose any shape/design and colour as per their choices. Draw their figures in order to make a pattern. Create at least three different patterns. Walk around the class and interact with students during activity.

You can also tell them to write few steps of any number/letter pattern on a sheet and exchange with other member. Hence, other one will try to write next steps to continue it.

10, 20, 30, 40, _____, _____, _____, _____

3, 5, 8, 12, 17, _____, _____, _____, _____

10, 20, 35, 55, 80, _____, _____, _____, _____

2, 2, 3, 3, 4, 4, 5, 5, _____, _____, _____, _____

1, 3, 6, 8, 11, 13, 16, _____, _____, _____, _____

[Creative Thinking and Art Integration]

EXPLAIN

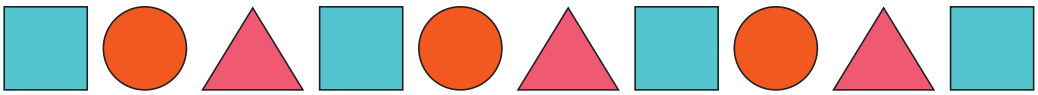
The pattern is formed when different shapes are drawn repeatedly. Different colours can be used to create different patterns with the same shapes. Patterns can also create by moving shapes.

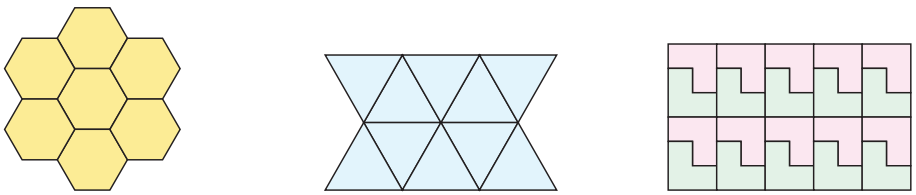
Also discuss about the tiling pattern, tessellations that shapes which can form tessellation patterns are called tessellating shapes.

Next, explain about number patterns, patterns in addition, multiplication, division, and patterns in numbers arranged in a shape, by taking the reference of pages 140-142.

ELABORATE

Demonstrate the shape pattern on board or in prepared chart paper.

Shape patterns: 

Tessellations: 

Number patterns: 4 8 16 32 64 128 256 512

Demonstrate that pattern can also be made by moving shapes.

Further, demonstrate the pattern in mathematical operations.

Patterns in addition

Addition of two consecutive numbers: 1 + 2 = 3,

2 + 3 = 5, … Sums are consecutive odd numbers starting from 3.

Addition of three consecutive numbers: 1 + 2 + 3 = 6,

2 + 3 + 4 = 9, …Sum are the multiples of 3. Also, the sum is thrice the middle term.

Addition of four consecutive numbers: 1 + 2 + 3 + 4 = 10,

2 + 3 + 4 + 5 = 14, …Sum increases by 4 at each step. Also, the sum in each case is twice the sum of the two middle terms.

Addition of five consecutive numbers: 1 + 2 + 3 + 4 + 5 = 15,

2 + 3 + 4 + 5 + 6 = 20, … sums are multiples of 5. Also, the sum is five times the middle term.

Also demonstrate the patterns in multiplication, division, by taking the reference given on page 141.

Further, discuss about to finding the missing numbers by observing the patterns in number arranged in a shape.

EVALUATE

Classwork: Discuss Q 2, and ask to solve Q 1 of Exercise 8C and Q 1, 2, 3 of 8D.

Homework: Ask to solve the remaining questions of Exercise 8C and 8D.

ENHANCE

Ask students to make a rangoli pattern at home, click it using their parents' mobile phone and share with friends/media groups on social sites.

Periods: 9–10	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 143–146

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries.
- Start the revision by using 'Points to Remember', 'Learning Logs', 'Mental Maths' and 'HOTS'.
- Discuss questions of the 'Learning Logs' and accept students answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve 'Mental Maths' and 'HOTS' on page 145.
- Motivate students to do the activity given in 'Fun Activity' on page 146.



MEASUREMENT

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- recall the concept of measurement
- understand the metric system of measuring units for length, mass, and capacity
- measure length using standard metric units such as millimetres (mm), centimetres (cm), metres (m), and kilometres (km)
- convert bigger units of length, mass, and capacity into smaller units and vice versa
- perform addition and subtraction of lengths accurately
- measure mass using standard metric units such as grams (g) and kilograms (kg)
- perform addition and subtraction of masses
- measure capacity using standard metric units such as millilitres (mL) and litres (L)
- perform addition and subtraction of capacities
- apply measurement skills to solve real-life problems and practical situations

LESSON PLAN

Suggested number of periods: 18

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, ruler/metre rod/ measuring tape, weighing machine, weights and balance, measuring jars/cylinders, etc.

Keywords: Metric System, Length, Weight (mass), Capacity, Volume, Units of Measurement–Metre, Centimetre, Kilometre, Kilogram, Gram, Litre, Millilitre, Conversion.

Pre-requisite knowledge: Students must be familiar with standard units of measuring length, weight (mass) and capacity; conversion of units; addition and subtraction of simple measurements.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–5	Topics: Measurement; Metric System; Measuring Length	Suggested extra teaching aids: Touchpad Mathematics 4 pages 147–153

ENGAGE

Start the topic with 'why do we need to measure something?'. Before explaining it, ask some questions, such as:



What are the sizes of your shoes, shirt, pant, and so on? Can your elders or parents wear it?

Can you bring your lunch in a cooking pot or in a spoon? Why?

Why do you not bring drinking water in a bucket or a tub?

Acknowledge them that without measurement we cannot imagine our life. Suppose you are ill and doctor advises to take medicine. Think what will happen if you drink a whole bottle of medicine at a time. After having the students understand the importance of measurement, introduce metric system. **[Holistic Learning]**

Then teacher will revise the learners' previous knowledge of measurement with the help of "Warm up" section given on page 147-148.

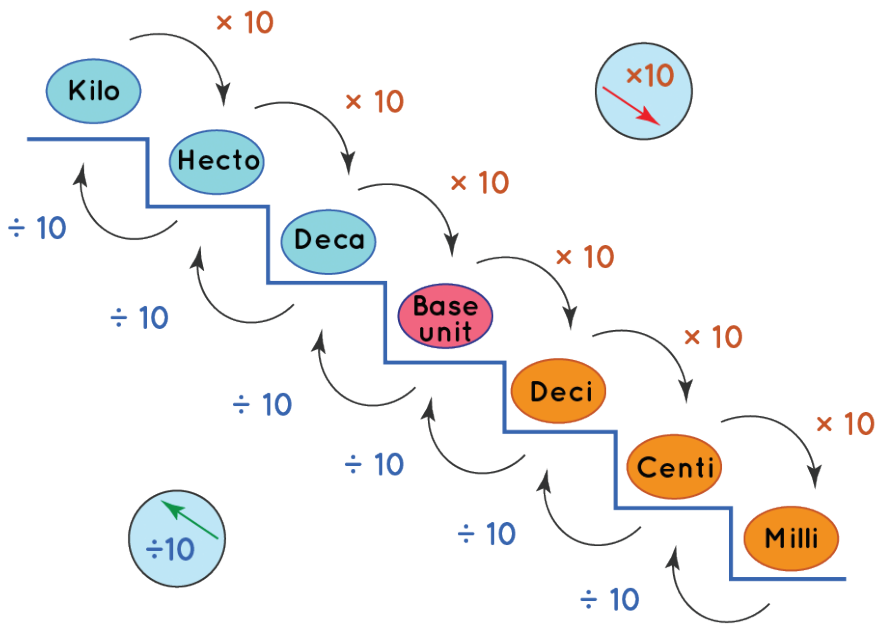
EXPLORE

Divide the class into pairs. Tell them to look around in the class or remind the articles available at their homes and make a list of things those can be measured in cm and those in m. Also, instruct them to guess their sizes and write it. After sometime, call a group, give a tailor's tape or measuring rod and ask them to verify the measurement of the things present in the classroom. Similarly, invite other groups and give the chance one by one. Also take the reference of page 148-149 of the textbook.

Monitor students' participation and engagement during the activities. **[Experiential Learning]**

EXPLAIN

Start the class with a recall of base (standard) units m, g and L used for measuring length, weight (mass) and capacity (volume) respectively. Then explain about the derived units by putting the prefixes, such as kilo-, hecto-, deca-, deci-, centi- and milli- which are used alongwith the base unit.



Thereafter, refer textbook page 151 to have them learn more about the measurement of length. Further, discuss about the inter-conversion of different units of length dealing with some examples on the board. Let them understand that:

- To convert a bigger unit into a smaller unit, we need to multiply the bigger unit.

For example, 7 m = 7 × 100 cm = 700 cm (since, 1 m = 100 cm)

14 km 185 m = 14 km + 185 m = (14 × 1000) m + 185 m (since, 1 km = 1000 m)

= 14000 m + 185 m = 14185 m

- To convert a smaller unit into a bigger unit, we need to divide the smaller unit.

For example, 3000 m = (3000 ÷ 1000) km = 3 km (since, 1000 m = 1 km)

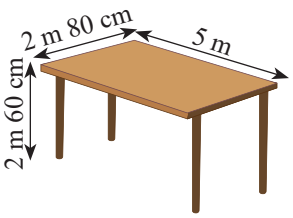
65 mm = 60 mm + 5 mm = (60 ÷ 10) cm + 5 mm = 6 cm 5 mm (since, 10 mm = 1 cm)

[Conceptual Understanding]

ELABORATE

After understanding about the metric units of length give some more real life examples and then demonstrate how to convert the units of given measurement. Take a 15 cm or 30 cm ruler and show the marking of metre on opposite edge. Further, explain how to measure the dimensions of a table or desk using it. Hence, convert the units.





Hence, motivate students to remember the units and its corresponding larger and smaller units *i.e.* conversion of units. **[Experiential Learning]**

Demonstrate, the conversion of units on board, by taking reference of examples given page 151-152.

EVALUATE

Classwork: Ask to solve few questions of Exercise 9A and 9B.

Homework: Ask to solve remaining questions of Exercise 9A and 9B.

ENHANCE

Ask students to grow a plant in a pot or kitchen garden. Care it regularly and keep the record of its growth for 1 week, 2 weeks, 1 month, 2 months, etc. Also, visit your neighbours' or friends' garden and compare your plant's growth to theirs. **[Holistic Learning]**

Periods: 6–7	Topic: Addition and Subtraction of Length	Suggested extra teaching aids: Touchpad Mathematics 4 pages 153–156

ENGAGE

Go to the playground along with the class and have them realise how long a m, dam, hm or km as well as dm, cm and mm by measuring the distance between two places/length of an object actually. You can take the help of physical education teacher. Instruct some students to stand at the corner of basketball/tennis/badminton court, or at the boundary of football/hockey/cricket field or somewhere else and ask other students to guess the distance between any two students. Hence, verify it by measuring. Find the difference between actual and estimated length. Accept their responses. You can also organise a 100-m race among them, or throwing a ball as far as possible, and so on. **[Cross-curricular and Holistic Learning]**

EXPLORE

Tell the students in advance to bring ribbons, with their vibrant colours and varying lengths. Divide the class in small groups, ask them to arrange their ribbons from the shortest to the longest. Once arranged, they will use a ruler or tape to measure and determine the exact length of each ribbon. Hence instruct them to calculate the total length of their ribbons, and then compare from other groups and find how much longer or shorter their total length is. Accept their responses. **[Collaborative and Experiential Learning]**

EXPLAIN

Start the class with an interaction based on a real-life situation, such as a journey or travel. Ask where they have gone and which modes of transport they have used. Assume the distances they travelled and explain how to add or subtract them. Refer textbook pages 154–155 for more explanation and examples.

[Conceptual Understanding]

ELABORATE

Write some questions on the board and demonstrate how to add or subtract the measurements of length. For example,

(*a*)

	km		m		
		1	1	1	
	1	3	9	7	5
+		5	6	8	8
	1	9	6	6	3

Thus, 13 km 975 m + 5 km 688 m
= 19 km 663 m

(*b*)

	m		cm	
		17	11	
		~~7~~	~~1~~	15
	~~1~~	~~8~~	~~2~~	~~5~~
–		9	7	6
		8	4	9

Thus, 18 m 25 cm – 9 m 76 cm
= 8 m 49 cm

EVALUATE

Classwork: Ask to solve Q1, 2, 3, 6 and 7 of Exercise 9C.

Homework: Ask to solve the remaining questions of Exercise 9C.

ENHANCE

Ask students to check the measurement of length marked on the pack when they buy a cello-tape, wrapping foil, or string/thread. What length of it is left after its use first time. Also, it can be asked the students to find how long string they use to fly a kite or what length is left with them if their kite is cut by someone.

Periods: 8–9	Topic: Measuring Mass (Weight)	Suggested extra teaching aids: Touchpad Mathematics 4 pages 156–158

ENGAGE

Students are aware with the units, such as gram (g) and kilogram (kg) which are used to measure the weight (mass) of objects. Ask students to look around and list some objects which can be measured in g and kg. Write some questions on the board and instruct the students to write their answers.

Guess about how much heavy is your bag.

What is your weight? Can you write the answer in grams?

Who is heaviest in your family?

Name the heaviest animal found on land, and on earth. **[Logical Thinking]**

EXPLORE

Is bigger thing always heavier than the smaller thing? To explore the answer of this question, students can be given an opportunity for doing an experiment.

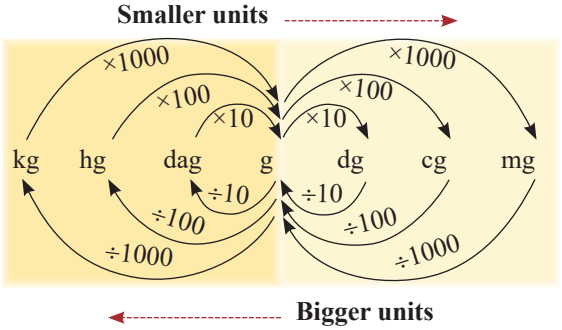


Divide the class into small groups. Put a digital weighing machine, string, measuring tape and objects of different kind and sizes. In this activity, groups are given strings to wrap around various objects, such as an apple, a ball, a balloon, an eraser, a water bottle, etc. Once wrapped, they can compare and measure the lengths of these strings. Next, they will measure their weights and compare. It's a tactile way of understanding how different objects have different sizes and weights.

Monitor students' participation and engagement during the activities. Guide them if they need help.

[Experiential Learning]

EXPLAIN



Refer textbook pages 156–157, explain about the derived units of weight by putting the prefixes, kilo-, hecto-, deca-, deci-, centi- and milli- alongwith the base unit gram (g).

Further, discuss about the inter-conversion of different units of weight dealing with some examples on the board. Let them understand that:

- To convert a bigger unit into a smaller unit, we need to multiply the bigger unit.

For example, Let us convert 9 g 8 dg 7 cg 6 mg into mg.

9 g 8 dg = (9 × 1000) mg + (8 × 100) mg (since, 1 g = 1000 mg, 1 dg = 100 mg)

= 9000 mg + 800 mg = 9800 mg

- To convert a smaller unit into a bigger unit, we need to divide the smaller unit.

For example, 8238 g = 8000 g + 238 g = (8000 ÷ 1000) kg + 238 g = 8 kg 238 g (since, 1000 g = 1 kg)

[Conceptual Understanding]

ELABORATE



After understanding about the metric units of weight. You can show a picture of a truck, tractor, freight train loaded with goods and commodities to give some real life examples and then demonstrate how to convert the units of given measurement.

Hence, motivate students to solve questions given in the book. **[Experiential Learning]**

EVALUATE

Classwork: Ask to solve Q1 and 4 of Exercise 9D and Q2 and 4 of Exercise 9E.

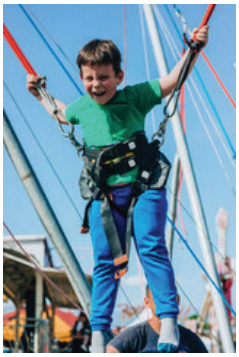
Homework: Ask to solve remaining questions of Exercise 9D and 9E.

ENHANCE

Ask students to go for shopping with their elders or parents. Look how seller weighs fruits, vegetables and other household items. Help their parents/elders in carrying the things. **[Holistic Learning]**

Periods: 10–11	Topic: Addition and Subtraction of Mass	Suggested extra teaching aids: Touchpad Mathematics 4 pages 159–161

ENGAGE



Talk about any real life situation where the persons having a particular range of weight are allowed. For example, this bungee trampoline allows the children only when they have their weights above 30 kg but not more than 40 kg.

Ask who is eligible to enjoy on it. Check their weights on a weighing machine and categorise in three groups–Students who are less than 30 kg, between 30 kg and 40 kg and above 40 kg. Further, ask the students of first and third groups to find how much lighter/heavier they are from the given range. **[Collaborative and Experiential Learning]**

EXPLORE

Write the name of some sports on the board and ask the students to choose the one which they like most. Then, write the weight/mass of the sports items which are used to play. For example,

Cricket ball: 160–163 g | Cricket bat: 1 kg 200 g–1 kg 400 g

Tennis ball: 56–60 g | Tennis racket: 280–310 g

Hockey ball: 156–163 g | Hockey stick: less than 735 g

Next tell them to find total weight of any two–three items, or difference between the weights of two items. Accept their responses. **[Cross-curricular and Holistic Learning]**

EXPLAIN

Start the class with an interaction based on a real-life situation, such as a home-made recipe. Ask which item their mother bake the delicious and crispy. Talk about the ingredients used in it and explain how to add or subtract their weights. Refer textbook pages 159–160 for more explanation and examples.

[Conceptual Understanding]

ELABORATE

Write some questions on the board and demonstrate how to add or subtract the measurements of weight. For example,

(*a*)

	kg		g		
	(1)	(1)	(1)	(1)	
	3	8	2	7	8
+	5	6	7	8	3
	9	5	0	6	1

Thus, 38 kg 278 g + 56 kg 783 g = 95 kg 61 g

(*b*)

	kg		g		
				(9)	
		(15)	(5)	~~(10)~~	(10)
	~~1~~	~~5~~	~~0~~	~~0~~	~~0~~
–		6	4	8	6
		9	1	1	4

Thus, 15 kg 600 g – 6 kg 486 g = 9 kg 114 g

EVALUATE

Classwork: Ask to solve Q1, 2, and 5 of Exercise 9F.

Homework: Ask to solve remaining questions of Exercise 9F.

ENHANCE

Ask students to check the weight marked on the pack of biscuits, cheese, chips, etc. when they buy it. Weigh them on a weighing machine and assure the product has right weight.

Periods: 12–13	Topic: Measuring Capacity (Volume)	Suggested extra teaching aids: Touchpad Mathematics 4 pages 161-163

ENGAGE

Students are aware with the units, such as Litre (L) and Millilitre (mL) which are used to measure the Capacity (Volume) of a container. Ask the students to make a list of some containers whose capacity can be measured in L and mL. Write some questions on the board and instruct the students to write their answers.

What is the capacity of your water bottle?

Guess about how much water have you drunk today from your bottle.

What amount of water did you use for having bath this morning?

How much milk is consumed in your family daily?

Do you know which unit is used to express the capacity of a tanker or an overhead water storage tank?

Name the largest water bodies found on the earth.

Accept their responses and interact if the students have any doubt or query. **[Critical Thinking]**

EXPLORE

Measuring Ingredients



One of the best measurement activities examples in daily life is cooking. When kids get involved in baking or cooking, they naturally engage with measurements. By using measuring cups and spoons, they learn about volume and quantity. It's a delicious way to understand measurements and enjoy the results!

Ask students to learn about a recipe at home and help parents/elders in measuring ingredients. **[Holistic Learning]**

EXPLAIN

Refer textbook pages 161–163, explain about the derived units of capacity by putting the prefixes, kilo-, hecto-, deca-, deci-, centi- and milli- alongwith the base unit litre (L).

Further discuss about the inter-conversion of different units of capacity dealing with some examples on the board. Let them understand that:

- To convert a bigger unit into a smaller unit, we need to multiply the bigger unit.

For example, 3 kL 650 L = 3 kL + 650 L = (3 × 1000) L + 650 L (since, 1 kL = 1000 L)

= 3000 L + 650 L = 3650 L

- To convert a smaller unit into a bigger unit, we need to divide the smaller unit.

For example, 8823 mL = 8000 mL + 823 mL = (8000 ÷ 1000) L + 238 L (since, 1000 mL = 1 L)

= 8 L 238 mL **[Conceptual Understanding]**

ELABORATE

After understanding about the metric units of capacity, demonstrate examples of conversion on board by taking reference of textbook pages 161-163.

[Cross-curricular Learning]

Hence, motivate students to solve questions given in the book.

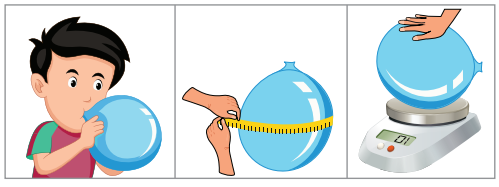
EVALUATE

Classwork: Ask to solve Q2, 3 and 5 of Exercise 9G.

Homework: Ask to solve remaining questions of Exercise 9G.

ENHANCE

Balloons are more than just party decorations; they're tools for measuring activities. By inflating balloons to various sizes, students can measure their circumferences. This helps them understand how much air each balloon holds and how air capacity relates to the size and stretch of the balloon's material.



[Experiential Learning]

Periods: 14–15	Topic: Addition and Subtraction of Capacities	Suggested extra teaching aids: Touchpad Mathematics 4 pages 163-165

ENGAGE

Talk about the importance of water and liquid in our diet. During the interaction, ask some questions, such as:

Why is water necessary for our life?

What a doctor does when a patient is suffering from dehydration?

When would you like to intake more water, in summer or in winter? Why?

A camel can drink as much as 100 litres of water at a time. If the camel gets only 45 L 500 mL of water, how much more water does he need?

Accept the responses and discuss about the correct answers. **[Cross-curricular and Holistic Learning]**

EXPLORE

Tell the students to explore the water consumption in different activities of their family. For this, make table for activities, such as cooking, brushing, flushing, bathing, washing clothes and utensils, cleaning home, vehicles, watering plants. Think how much water will you require for a day, a week, and a month.

Compare your data with your bench partner and check which family consume less water and by how much. Accept their responses. **[Collaborative and Experiential Learning]**

EXPLAIN

Start the class with an interaction based on a real life situation. Refer textbook pages 163–164, explain how to add or subtract capacities. Let them know that they can perform the operation as they have learnt in case of addition and subtraction of length and weight. **[Conceptual Understanding]**

ELABORATE

Write some questions on the board and demonstrate how to add or subtract the measurements of capacity. For example,

(*a*)

	L			mL		
	(1)	(1)			(1)	
	1	6	5	2	4	0
	1	0	6	3	2	5
+	2	6	8	0	1	5
	5	3	9	5	8	0

Thus, 165 L 240 mL + 106 L 325 mL + 268 L 15 mL = 539 L 580 mL

(*b*)

	kL		L		
				(9)	
	(7)	(15)	(0)	(10)	(10)
	~~8~~	~~5~~	~~1~~	~~0~~	~~0~~
–	6	8	0	4	5
	1	7	0	5	5

Thus, 85 kL 100 L – 68 kL 45 L = 17 kL 55 L

EVALUATE

Classwork: Ask to solve Q1, 2, 3, 4 and 5 of Exercise 9H.

Homework: Ask to solve the remaining questions of Exercise 9H.

ENHANCE

Ask students to do the 'project' given on page 168 of the text book. **[Holistic Learning]**

Periods: 16–18	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics pages 165-168

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries.
- Start the revision by using 'Points to remember', 'Learning Logs', 'Mental Maths' and 'HOTS'.
- Discuss questions of in the 'Learning Logs' and accept students answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve 'Mental Maths' and 'HOTS'.
- Involve students to perform the activity given in 'Fun Activity' on page 168.



PERIMETER AND AREA

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- understand what perimeter means
- find the perimeter of polygons
- find the perimeter of shapes drawn on square grid paper
- understand what area means
- find the area using square grid paper
- measure area with the help of geo dotted paper

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, A4 size sheet, square grid paper, Geo-dotted paper, ruler, string, rubber bands and geo-board.

Keywords: Perimeter, Plane closed figure, Polygon, Triangle, Rectangle, Square, Irregular Shape, Area, Geo-dotted Paper and Geo-board

Pre-requisite knowledge: Students must be familiar with standard units of measuring length and plane shapes.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–4	Topic: Perimeter	Suggested extra teaching aids: Touchpad Mathematics 4 pages 169–173

ENGAGE

Start the topic with a recall of measuring length and polygons. Draw 2–3 polygons on the board and instruct the students to sketch the similar figures in their notebooks. Then, measure the length of each sides and add them.

Ask: What is called the sum of sides of the plane figure?

Accept the responses. Hence, introduce perimeter of a closed plane figure. **[Experiential Learning]**

EXPLORE

The teacher can interact with the students referring 'Warm up' section given in the book and help them understand where we need to find perimeter.

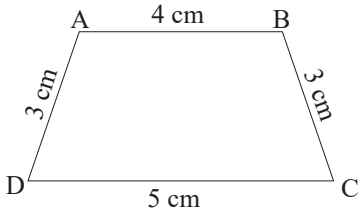
Divide the class into pairs. Tell them to look around the articles available and using a tailor's tape or measuring rod find the perimeter. For example, they can find the perimeter of their desk, teacher's table top, cover page of a book/notebook, floor tile, etc. Further, instruct them to compare their findings with other groups and discuss.

Monitor students' participation and engagement during the activities. You can also conduct the activity as suggested in 'Fun Activity' section on page 179. **[Collaborative Learning]**

EXPLAIN

Explain that the perimeter of a closed figure is the sum of lengths of all its sides. Tell that unit of perimeter is same as unit of length of sides. So, its units can be expressed in cm, m, km, etc.

Thereafter, refer textbook pages 170–171 to have them learn about the perimeter of different polygons, such as a triangle, quadrilateral, rectangle square and other shpapes. For example, consider the quadrilateral ABCD.



The sum of all its sides is AB + BC + CD + DA = 4 cm + 3 cm + 5 cm + 3 cm = 15 cm

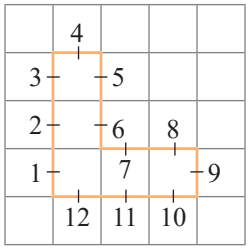
The perimeter of the quadrilateral shown here is 15 cm.

Solve some questions on the board and encourage the students to solve questions given in the book for self-understanding. **[Conceptual Understanding]**

ELABORATE

After understanding that the perimeter is the length of boundary of a closed figure, demonstrate how to find the perimeter of any rectilinear figure on a square grid paper.

Consider the shape given here.



Perimeter = 12 units

If the sides of a rectilinear figure lie on the grids of the square paper the of the sides of the figure can be found simply by counting the number of square. Each square on the grid is of 1 unit length. **[Experiential Learning]**

EVALUATE

Classwork: Ask to solve Q1, 2, 4 and 5 of Exercise 10A.

Homework: Ask to solve remaining questions of Exercise 10A.

ENHANCE

Ask students to find how much fencing they will need for their kitchen garden, or length of coloured strip for decorating the project file or wood required for making a photo-frame for their family photograph.

[Holistic Learning]



Periods: 5–8	Topic: Area	Suggested extra teaching aids: Touchpad Mathematics 4 pages 173-176

ENGAGE

Refer some real-life objects and ask questions based on area. For example,

For which you need more space – to keep a Carom board or a Ludo board?

If you are asked to clean a door or a window pan, for which one will you take less time?

On which sheet can you draw a bigger smiley – on a drawing sheet or on a notebook page?

Accept their responses and talk about their logic behind. Thereafter, introduce the term Area.

[Logical Thinking]

EXPLORE

Divide the class into pairs. Tell the pairs to take a square grid paper and instruct each partner to draw a rectilinear figure for any real-life object like eraser, sharpener, pencil. Then, they will find the perimeter of the figures drawn and count how many squares are there inside the figures. Compare the result for the two figures.

[Collaborative and Experiential Learning]

EXPLAIN

Start the class with an interaction based on a real life situation, such as buying bedsheets or blankets for a single bed and a double bed. Ask about the difference between their sizes. For better understanding, invite two groups of students with their notebook. Tell one group to lay their notebooks without overlapping or leaving gap on a table. Similarly, instruct another group to lay the notebooks on a desk. Count the number of notebooks and find which one has larger area – a table top or a desk top.

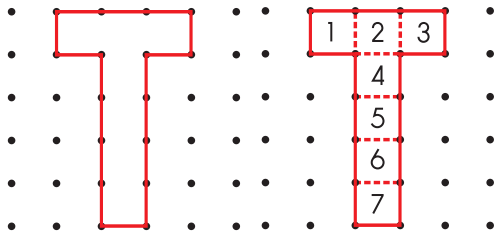
Now explain the concept of area and its unit. Refer textbook pages 173-174 for more explanation and examples. Further explain to find the area using Geo dotted paper.

[Conceptual Understanding]

ELABORATE

Demonstrate an board to find the area of any rectilinear figure by taking the reference of pages 173-174 of the text book. Further, demonstrate the method of finding the area by using Geo dotted paper as follows:

For example: Find the area of the adjacent shape.



Area = 7 sq. cm

Here, each unit on the geo dotted paper measures 1 cm. So each square on it has a side of 1 cm and has an area of 1 sq. cm. So the area of the given shape is 7 sq. cm.

EVALUATE

Classwork: Ask to solve Q1, 2, 3, 5 of Exercise 10B.

Homework: Ask to solve remaining questions of Exercise 10B.

ENHANCE

Ask students to do 'Activity' as suggested on page 175.

Periods: 9–10	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 177-179

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify the doubts or queries.
- Start the revision by using 'Points to remember' 'Learning Logs', 'Mental Maths' and 'HOTS'.
- Discuss questions of the 'Learning Logs' and accept students answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve 'Mental Maths' and 'HOTS'.
- Involve students to perform an activity as discussed under 'Fun Activity' given on page 179.



TIME

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- read and write time in hours, minutes and seconds
- convert 12-hour format to 24-hour format and vice-versa
- find time duration between two events
- calculate the number of days between two events
- convert units of times
- convert days, months, years to each other
- add and subtract measures of time

LESSON PLAN

Suggested number of periods: 12

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, clocks/dummy clocks, calender, A4 size sheet.

Keywords: Time, Hours, Minutes, Seconds, 12-hour format, 24-hour format, Conversion, Time Duration, Days, Months, Years, etc.

Pre-requisite knowledge: Students must be familiar reading time in clocks at 5 minutes interval. Also, they should be aware about a calendar.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–3	Topics: Reading, Time to the Exact Minute, AM and PM	Suggested extra teaching aids: Touchpad Mathematics 4 pages 180-184

ENGAGE

On chart paper, write "READING TIME" in the middle and encourage students to brainstorm what they know about telling time and clocks and write down what they come up with.

ASK: "What is time?", "How do you tell time?", "How many hours are there in a day?", "What types of clocks are there?", "What is the difference between the short-hand and long hand?"

Accept their answers. Then teacher will revise the learners' previous knowledge of Reading time with the help of "Warm up" section given in the book. Further discuss about AM and PM. **[Holistic Learning]**

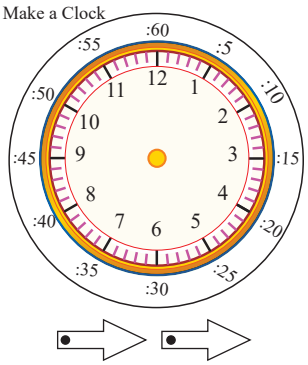
EXPLORE

Provide each student a "Make a Clock" template and a fastener pin. Students will create their own analog clock. Have them put together the clock.

Teacher will say a time (example: 5 o'clock) and the students will have to make that time on their analog clock. Once everyone has their clock set, ask a volunteer to show that time in front of the class on the whiteboard to see if they are correct (do this 10–20 times with different times).

Monitor students' participation and engagement during the activities.

[Experiential Learning]



EXPLAIN

Start the class with a quick recall of analog clock terminology (example: clock face). Explain that the short-hand is the hour and the long-hand is the minute. Tell the different ways how they say what time it is and show those times on a manipulative/interactive clock (example: you SAY "it is 5 o'clock" or "it is 8:15" or "it is half past 3"). Have them understand how they can write the time down (example: 5:00, 8:15, 3:30).

Thereafter, refer textbook pages 181-182 to explain how to tell time in hours and exact number of minutes. Make an analog clock either on the whiteboard or a have digital version up in front of the classroom. Set the hands of clocks at different times and reiterate the reading time. Further, explain 'AM and PM'.

[Conceptual Understanding]

ELABORATE

Write the time on the chart paper and instruct students to visualize the time during discussion. Make sure that the students can set an analog clock to a specific time, and determine what time it is by reading the clock.

Further, demonstrate on board that a day has 24 hours, so the hour hands must go round the clock twice in a day. Explain the difference between AM and PM by taking the reference of page 183 of the textbook.

Hence, motivate students to solve questions given in the book. **[Experiential Learning]**

EVALUATE

Classwork: Ask to solve Q1, 2 of Exercise 11A and Q1, 2, 4 and 5 of Exercise 11B.
Homework: Ask to solve the remaining questions 11A and 11B.

ENHANCE

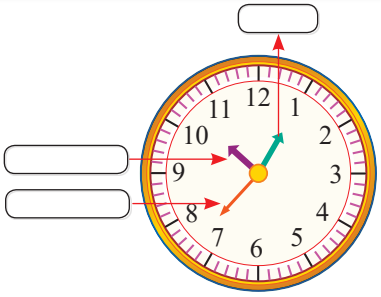
Ask students to explore which types of clocks the early people use to read time.

[Cross-curricular Learning]

Periods: 4–5	Topic: 24-Hour Clock	Suggested extra teaching aids: Touchpad Mathematics 4 pages 184-185

ENGAGE

Draw an analog clock on the board or show the picture using projector.
Ask some questions about the clock and time.
Identify the hands of the clock.
How many numbers are there on the face of the clock?
Into how many parts is the dial divided?
Name the hand that moves the fastest on the dial.





Name the hand that moves the slowest on the dial.

How many times does the minute hand move around the clock face in a day?

How many times does the thinnest hand move around the clock face in 1 hour?

Accept the students' responses and introduce the second hand. **[Critical Learning]**

EXPLORE

Divide the class in small groups, ask them to list some activities and think about the time that those activities take to complete. Accept their responses. **[Collaborative and Experiential Learning]**

EXPLAIN

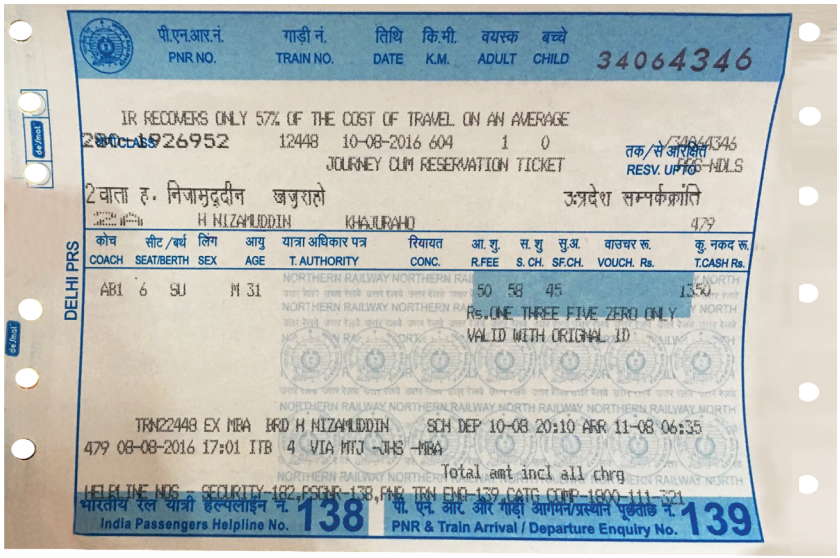
Start the class with an interaction based on a real life situation, such as a journey or travel. Ask where they have gone and how long they spend there. Discuss the time of departure from home and arrival at the destination. Thereafter, explain the duration of a day equals to 24 hours, 1 hour = 60 minutes and 1 minute = 60 seconds. Have them realise the period of a minute and a second by digital/analog clock in the class.

Furthermore, discuss why we use 24-hour format and how to express a 12-hour clock time into a 24-hour clock time and vice versa. Refer textbook pages 184-185 for more explanation and examples.

[Conceptual Understanding]

ELABORATE

Bring any train/air ticket in the class and show the time of journey. Demonstrate the conversion of 12-hour clock time and 24-hour clock time. For example, have a look at the ticket shown here.



It has mentioned: The departure time on 10-08-2016 from H Nizamuddin is 20:10, which means 8:10 p.m.

Explanation: Here the first two digits show hour 20. It is more than 12, so subtract 12 from 20. 20 – 12 = 8. The last two digits show 10 minutes, so keep it as it is and suffix p.m. to indicate the time between noon to midnight. Hence, 20:10 hours = 8:10 p.m., which indicates evening time.

The arrival time on 11-08-2016 to Khajuraho is 06:35, which means 6:35 a.m.

Explanation: Here the first two digits show hour 06. It is less than 12, so no need to subtract 12 from 6. The last two digits show 35 minutes, so keep it as it is and suffix a.m. to indicate the time between midnight to noon. Hence, 06:35 hours = 6:35 a.m., which indicates morning time.

Next have them understand how to express the time in hours if given in a.m./p.m.

12-hour clock	Method to convert	Examples
12 midnight to 12:59 a.m.	Subtract 12 hours and write the time without a.m.	12:05 a.m. ⟶ 00:05 hours 12:55 a.m. ⟶ 00:55 hours
1:00 a.m. to 12:59 p.m.	Write the same time without a.m. or p.m.	2:45 a.m. ⟶ 02:45 hours 11:38 a.m. ⟶ 11:38 hours 12:28 p.m. ⟶ 12:28 hours
1:00 p.m. to 11:59 p.m.	Add 12 hours and write the time without p.m.	1:40 p.m. ⟶ 13:40 hours 4:23 p.m. ⟶ 16:23 hours 10:15 p.m. ⟶ 22:15 hours

The teacher can also take the reference of pages 184-185 of the textbook to explain the 12-hour and 24-hour format.

EVALUATE

Classwork: Ask to solve Q1, and 3 of Exercise 11C.
Homework: Ask to solve Q2 of Exercise 11C.

ENHANCE

Ask students to prepare a short essay of different time zones of the world.

Periods: 6–7	Topic: Time Duration	Suggested extra teaching aids: Touchpad Mathematics 4 pages 186-187

ENGAGE

Talk about their daily routine work. Ask how much time they spend in doing different kind of works, such as:

How much time do you take in completing homework? How long do you do self-study?

Find the total time spent on the study at home.

Do you study longer/shorter in school than at home? How much?

Teacher can also ask about some other activities, such as when they go to bed and when get up. Find the sleeping hours. Then instruct them to compare their responses with the bench partner.

[Collaborative and Experiential Learning]

EXPLORE

Tell the students to check how many seconds they can hold their breath. For this, they can use stopwatch in the mobile phone of their parents. They can also check the same of their family members. Hence find the difference between the longest and the shortest duration of breath holding time.

Ensure that the activity is done under adult supervision. No one hold their breath beyond their comfort level.

Also, they can be told to explore about the time required for making their favourite dish. They are ask their mothers and note down how much time it takes in preparation of materials and how long it takes in cooking. Hence, they will find the total time required.

Next tell them to find the finishing time of making if they start the preparation at 10:00 a.m. Accept their responses. **[Cross-curricular and Holistic Learning]**

Refer textbook pages 186-187 for explanation and examples. Have the students understand the concept and then tell them to solve some questions of Exercise 11D. Thereafter, deal the topics 'Time Duration' and 'To find the Finishing Time' along with real life examples. **[Conceptual Understanding]**



ELABORATE

Demonstrate calculation of time duration with examples on board as follows:

A T20 cricket match started at 3:48 p.m. and got over at 8:19 p.m. How long did the match last?

Duration from 3:48 p.m. to 4 p.m. = 12 minutes

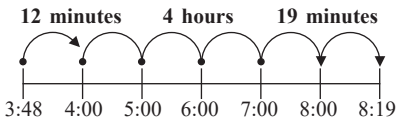
Duration from 4 p.m. to 8 p.m. = 4 hours

Duration from 8 p.m. to 8:19 p.m. = 19 minutes

So, total duration of match = 12 minutes + 4 hours + 19 minutes = 4 hours 31 minutes

Using number line: To calculate the duration of time, we draw a line with the start time at one end and the end time at the other.

Here, the start time is not directly on the hour, so add up the minutes to the next greatest hour. Do the same with the end time but to the next smallest hour. Add up the hours in between. Then, add the minutes as shown below.



12 minutes + 19 minutes = 31 minutes

4 hours and 31 minutes

Next, show how to find finishing time using addition of elapsed time. Demonstrate it with examples.

Ashi started her journey at 5:00 am and reached her destination in 7 hours. At what time did she reach her destination?

Given, start time = 5:00 a.m. and journey duration = 7 hours

So, Ashi reach her destination at 5 a.m. + 7 hours = 12 noon.

Hence, Ashi reached her destination at 12 noon.

Encourage the students to practice the questions given in the book.

EVALUATE

Classwork: Ask to solve Q3 of Exercise 11D.

Homework: Ask to solve remaining question of Exercise 11D.

ENHANCE

Ask students to note down the time spent in different activities on weekend or on a holiday.

Hence, order the activities according to longest to the shortest periods of time. Also, find the sum and difference of the longest and the shortest duration.

Periods: 8–9	Topics: Calendar; Conversion of One Unit of Time into another	Suggested extra teaching aids: Touchpad Mathematics 4 pages 188-192

ENGAGE

Students are aware with the Calendar. Bring a current year calendar in the class and gather the students in small groups to talk about. Ask to find the day and date of some festivals or any important events.

You can also ask them to count the number of days between any two dates or identify the date for a particular day such as 3rd Saturday of June, 2nd Sunday of October, etc.

Accept their responses and interact if the students have any doubt or query. **[Discussion-based Learning]**

EXPLORE

Divide the class into pairs of students. Provide each group a calendar. Ask them to mark the birth date and find how many days are away from today or how many days have passed to till date. They can also find the number of days between the birthdates of two partners. **[Experiential Learning]**

EXPLAIN

Refer textbook pages 188-190, explain about the use of a calendar. Have the students learn how many days are there in different months of a year. To remember the number of days they can learn the trick of using knuckles as explained in Tips section on page 189. Also, deal the concept of a leap year as explained on page 189.
Deal the concept of finding the number of days between two dates, or finding the starting/closing date when the closing/starting date along with number of days for any event are given. Solve some examples in the class and encourage the students to attempt the questions given in the book.
Amrit Udyan, New Delhi is opening for public on Feb 2nd, 2024 to March 31st, 2024. How many days would the Amirit Udayan be open for the Udyan Utsav?
Number of days from 2nd February to 29th February = 28 days. (Since, 2024 is a leap year)
Number of days fron 1st March to 31st March = 31 days
So, the Amirit Udayan would be open for 28 + 31 = 59 days in 2024. **[Conceptual Understanding]**

ELABORATE

Students are familiar with smaller units of time, such as hours, minutes and seconds; and also have learnt about their inter-conversion. Now, write the relation among bigger units of time, such as days, week, months and year.
1 week = 7 days
1 month = 30 days or 4 weeks
1 year = 365 days or 12 months
Demonstrate how to change them from one to another on the board.

(*a*) How many months are there in 5 years 4 months?
5 years 4 months = 5 × 12 months + 4 months = 60 months + 4 months = 64 months

(*b*) How many weeks are there in a leap year?
We know that a leap year has 366 days and 7 days are there in a week.
To know the equivalent time of 366 days into weeks and days, we divide 366 by 7.
We get 52 complete weeks and 2 days leftover.

```
7 )366(52 → weeks
 −35
  16
 −14
   2 → days
```

[Cross-curricular Learning]

Further, reiterate conversion of hour into minutes and minutes into second by referring examples given on page 192.
Hence, motivate students to solve questions given in the book.

EVALUATE

Classwork: Ask to solve Q1, 3 and 4 of Exercise 11E and some questions of Exercise 11F.
Homework: Ask to solve remaining questions of Exercise 11E and 11F.

ENHANCE

Ask the students to express their sleeping time in minutes and seconds. **[Life Skills]**

Periods: 10–11	Topic: Addition and Subtraction of time	Suggested extra teaching aids: Wall clock or table clock, etc. Touchpad Mathematics 4 pages 193-194

ENGAGE

Start the class, by asking some questions like:

- When do you reach home after school?
- At what time do you start the studying?
- If you start your homework at 4 pm and it takes 1 hour and 30 minutes to complete, then at what time do you complete it?

Accept the responses. Introduce operations on time units.

EXPLORE

Divide the class into pairs.

Assign one student the role of supervisor and provide him a stopwatch.

Call each pair one by one, and ask them to do different activities one by one, like standing on one leg.

The supervisor will record and note the timing of each one on board.

Ask the class to calculate the timing of standing on one leg by each pair by adding the times.

Also, who stands longer and how much by subtracting the times. **[Collaborative Learning]**

EXPLAIN

We can perform operations on time units as we did for length, weight and capacity.

To perform addition or subtraction of time, we arrange the same units of time in same columns and then add or subtract. Also, explain the method of calculating the elapsed time.

Further, explain the method of multiplication and division of units of time.

ELABORATE

Demonstrate on board "Add 11 hours 15 minutes and 49 seconds and 6 hours, 46 minutes and 33 seconds".

	h	min	s
	①	①	
	11	15	49
+	6	46	33
	18	02	22

Step 1: Add seconds: 49 + 33 = 82 seconds, as it is more than 60 seconds, so we regroup it as 60 s (1 min) + 22 s.

Step 2: Add minutes: 1 + 15 + 46 = 62 mins. Regroup it as 60 min (1 h) + 2 min.

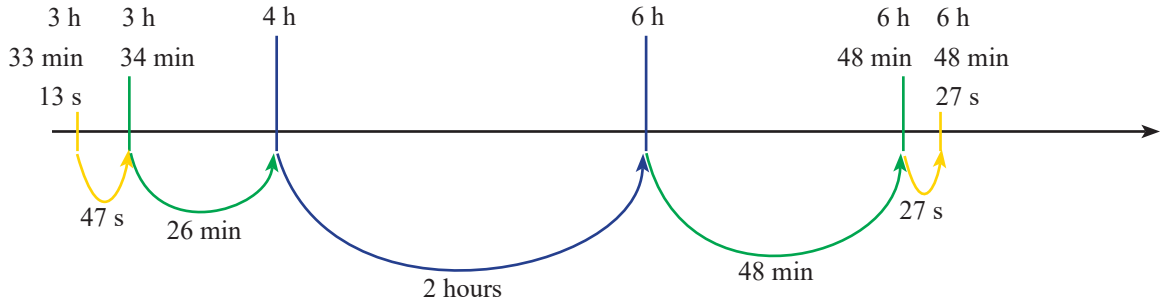
Step 3: Finally, add the hours: 1 + 11 + 6 = 18 hours.

Further, demonstrate the difference between two times measured in hours, minutes and seconds. Find the difference between 6 hours, 48 minutes, and 27 seconds and 3 hours, 33 minutes, and 13 seconds.

To find the difference between the two given times, we can place them on a time line.

Step 1: Take the next minute after the smaller time, that is, 3 hours and 34 minutes and 13 seconds and take the next hour: 4 hours.

Step 2: Place the last minute before the larger time: 6 hours, 48 minutes and 27 sec and take the previous hour: 6 hours.



Step 3: Count the number of seconds between 3 hours 33 minutes 13 seconds and 3 hours 34 minutes, *i.e.*, the number of seconds required 13 s to get 60 s, i.e., 47 s. Then, count the time difference between 3 hours 34 minutes and 4 hours *i.e.*, 26 minutes. Check that time between 4 hours and 6 hours is 2 hours, that between 6 hours and 6 hours 48 minutes is 48 minutes, and, finally, that between 6 hours 48 minutes and 6 hours 48 minutes 27 seconds is 27 seconds.

Step 4: Add all the in-between times,

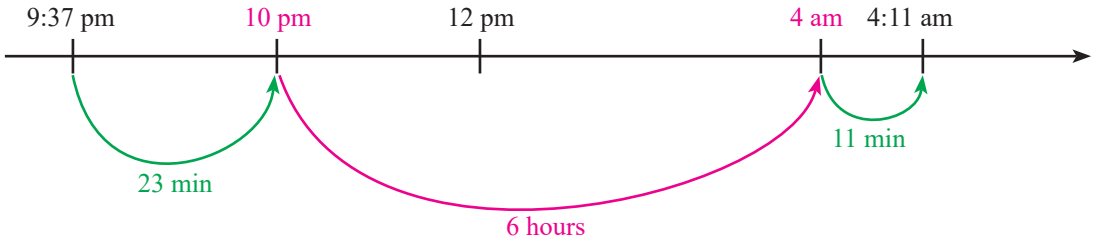
47 s + 26 min + 2 h + 48 min + 27 s = 2 h + 74 min + 74 s = 3 h + 15 min + 14 s (after regrouping)

Next, explain that we can also find the time duration by using the time line as follow:

To find the elapsed time from 9:37 p.m. to 4:11 a.m.

Step 1: On the time line mark the earlier time 9:37 p.m., then mark 10 p.m. next mark then complete hour before the later time 4:11 a.m., *i.e.*, 4 a.m.

Step 2: Mark the difference between 9:37 and 10 p.m. that is 23 min 10 p.m. and 4 a.m. that is 6 hours and 4 a.m. and 4:11 a.m. that is 11 min.



Step 3: Add the in-between time together.

23 min + 6 hours + 11 min = 6 hours 34 min.

Also, discuss the references and examples given on page 193. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1, 4, 5 of Exercise 11G.

Homework: Ask to solve the remaining questions of Exercise 11G.

ENHANCE

Watch the video on time on "www.orangewebsupport.co.in". **[Tech Connect]**

Periods: 12–13	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 Pages 194-197

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries.
- Start the revision by using 'Points to remember', 'Learning Logs', 'Mental Maths' and 'HOTS'.
- Discuss questions of the 'Learning Logs' and accept students answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve 'Mental Maths' and 'HOTS' given on pages 196-197.
- Involve students to perform the activity as discussed in 'Fun Activity' section on page 197.



MONEY

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- compute the total amount of money given
- add and subtract the amount of money
- multiply and divide the given amount by any number
- understand and prepare a bill for a purchase

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, dummy notes and coins, stickers and chits of some items, A4 size sheet.

Keywords: Money, Currency, Notes, Coins, Amount, Bills, Customer, Seller, etc.

Pre-requisite knowledge: Students must be familiar with Indian currency. Also, they should aware about counting the amount of money.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–5	Topics: Coins and Notes; Operations on Money	Suggested extra teaching aids: Touchpad Mathematics 4 pages 198-203

ENGAGE

Interact with students and ask some questions to recall the previous knowledge of money.

What is money? What are its uses?

Which Indian currency are in circulation?

How much pocket allowance do you receive?

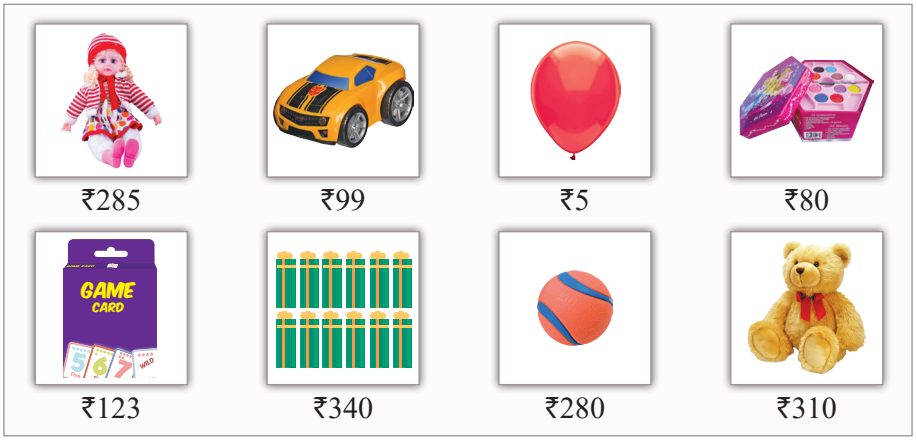
Would you like to save pocket money? Why?

Accept their responses. Then teacher will revise the learners' previous knowledge about Money with the help of "Warm up" section given on pages 198-199 of the textbook. **[Holistic Learning]**

EXPLORE

Divide the class into pairs. Put some dummy notes and coins. Also, keep a catalogue of some articles.

Invite the pair of students one by one. Tell one student to act as a seller and another as a buyer. Buyer has to select any item(s) and seller will calculate the amount to take. He asks the buyer to pay the amount and he will deliver the items at the customer's home. Buyer will check the amount and pay using dummy notes/coins. He will get back, if any from seller.



Monitor students' participation and engagement during the activities.

[Experiential Learning]

EXPLAIN

Start the class with an interaction regarding any real life situation. Ask the students for what price they have bought something like their shoes, school uniform, bag, etc. You can also share your expenses on different things purchased last weekend. Then explain how to calculate the total payment and the balance amount.

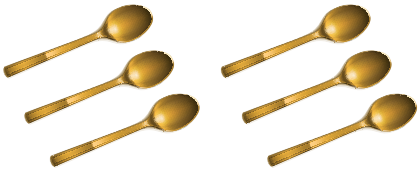
Refer textbook pages 201-202 for explanation and examples. To check their understanding, reinforce them to solve some questions given in Exercise 12B.

[Conceptual Understanding]

ELABORATE

Start the class with a talk about the shopping. Ask students to share their experience if they have gone to the market or a nearby shop. Instruct them to tell how they select which item is better/cheaper. Then draw a table as shown below and ask the students to complete it.

1.		
	1 shuttlecock for ₹35	4 shuttlecocks for ₹_____
2.		
	1 pack of birthday return gift is for ₹_____	12 packs of birthday return gift is for ₹348

3.	Set A 	Set B 
	Set of 3 spoons is for ₹180	Set of 6 spoons is for ₹300
	Which set is cheaper? _____	

Accept the students' responses and introduce the operation of multiplication and division of money.
Further, demonstrate on board, 'Multiplication and Division of money by using the references and examples given on page 202 of the text book.

[Critical Learning].

EVALUATE

Classwork: Ask to solve Q.1, 2, 3 and 6 of Exercise 12A and Q.1 to 8 of Exercise 12B.
Homework: Ask to solve remaining questions of Exercise 12A and 12B.

ENHANCE

Ask students to do the activity given on page 200 of the textbook. **[Cross-curricular Learning]**

Periods: 6–8	Topic: Bills	Suggested extra teaching aids: Touchpad Mathematics 4 pages 203-205

ENGAGE

Ask students, "When they go to market for shopping, what do they experience?" Accept the responses. Introduce the topic bills.

EXPLORE

Divide the class into groups.

Distribute chart paper having images and price of some kid's items to each group. Ask to prepare a bill for items they want. Teacher will help the students in preparing the bill. **[Experiential Learning]**

EXPLAIN

We go to market to buy various items like fruits, vegetables, clothes, toys, etc. in different quantity. The shopkeeper gives us articles and we make the payment to him for the total cost of these articles. The slip of paper on which the shopkeeper notes down or prints the requirements of customers or buyer and calculates the total cost of items purchased is called a BILL. In our daily life, we receive a variety of bills, for example telephone bill, cooking gas bill, water bill etc.

ELABORATE

Divide the class into groups of 3–4 students. Assign a task to each group. Ask them to make a list of items and their quantities they need for the celebration of Teacher's Day, Children's Day, Republic Day, Diwali, Christmas, etc. Write the unit price of the items listed on the board and instruct the class to make a bill for their purchase. For instance, make a bill in the class so that they could learn how to prepare it.

Bill No. 0718	Name and Address: Maya, F-6, Punjabi Bagh, Delhi		All-in-One Shop Paschim Vihar, Delhi Phone: 011-xxxxxxxxxx Date: 14/10/20xx

S.No.	Items	Quantity	Rate ₹	Amount ₹
1.	Tricolour Balloons	3 packets	₹50 per packet	150
2.	Flags	4 dozen	₹120 per dozen	480
3.	Sweets	2 kg	₹360 per kg	720
4.	Flowers	500 g	₹240 per kg	120
			Grand Total =	**1470**

EVALUATE

Classwork: Discuss and solve question given in 12D in the classroom. If any student makes any error, the teacher will correct and explain.

Homework: Ask to do the activity given in 'Fun Activity' on page 207 as a homework assignment.

ENHANCE

- Ask students to collect all bills for all of their expenses for 1 week and discuss with their parents to control the unnecessary expenses and calculate how much money they can save weekly.

[Social Emotional Learning]

Periods: 9–10	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 205-207

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts.
- Start the revision by using 'Points to remember', 'Learning Logs', 'Mental Maths', and 'HOTS'.
- Discuss questions of the 'Learning Logs' and accept students answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve 'Mental Maths' given on page 206 and 'HOTS' given on page 207.



DATA HANDLING

LEARNING OBJECTIVES

After studying this chapter, students will be able to...

- represent data using pictographs
- read and interpret pictographs
- represent data using bar graphs
- read and interpret bar graphs

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Book: Touchpad Mathematics 4, notebook, chalk, blackboard or whiteboard, projector, smartboard, some real-life objects like eraser, pen, pencil, some stickers or real objects, A-4 size sheet.

Keywords: Data, Tally Chart, Pictograph, Bar graph

Pre-requisite knowledge: Students must be familiar with data as a numerical information.

NEP feature: The way of teaching provides experiential learning opportunities to the students and allows them to work with the support of each other which helps in their holistic development.

Periods: 1–4	Topic: Representing Data	Suggested extra teaching aids: Touchpad Mathematics 4 pages 208-212

ENGAGE

Interact with students and ask what are their favourite subjects. Make a table as shown below and instruct the students to put a bar (|) in the corresponding row of the subject.

Subject	Tally marks	No. of students
English		
Hindi		
Mathematics		
EVS		
GK		

Have them understand that we draw four vertical lines up to four observations and the fifth observation is represented by a line runs diagonally over the previous vertical four lines, such as 𝍸

After taking their responses, ask some questions based on the data collected.

Which subject is liked the most?

How many students like EVS the most?

How many more/less students like Mathematics than English?

Then teacher will revise the learners' previous knowledge about Data Handling with the help of "Warm up" section given in the book. **[Holistic and Experiential Learning]**

EXPLORE

Divide the class into groups of 4–5 students. Assign a task to each group for collecting data, such as number of students present/absent in different classes/sections of a class, students having any pet, modes of transport they use to come school, and so on. After tabulation of data, instruct them to show them pictorially and describe what it represents.

Monitor students' participation and engagement during the activities.

[Collaborative and Experiential Learning]

EXPLAIN

Start the class with an interaction regarding any real life situation. Consider any data and demonstrate how to represent it pictorially using symbols and pictures. Further, display any pictograph on the projector and explain how to interpret it. Refer textbook pages 209-210 for explanation and examples.

[Conceptual Understanding]

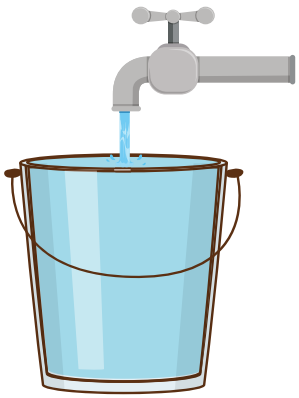
ELABORATE

Display a pictograph on the screen or on the board. Tell the students to observe it and explain what they think about.

The graph given below shows the number of buckets filled in 30 minutes by different taps.

Taps	Bucket
Tap A	
Tap B	
Tap C	
Tap D	
Tap E	
Tap F	

= 1 full bucket = half bucket



For interpretation the graph, ask some questions, such as:
In which tap water flows the fastest?
How many buckets can be filled in 1 hour by the tap in which water flows the slowest?
How many buckets can be filled by tap A in 2 hours?
If a full bucket holds 20 L of water, how much water flows from tap B in 30 minutes?
Arrange the taps in order showing lowest to fastest running water.
Discuss the answers of these questions. Hence, motivate students to solve questions given in the book.

[Experiential Learning]

EVALUATE

Classwork: Ask to solve Q.1, 3, 5 and 6 of Exercise 13A.
Homework: Ask to solve remaining questions of Exercise 13A.

ENHANCE

Ask students to do the activity given in 'Fun Activity' section given on page 217.

[Cross-curricular Learning]

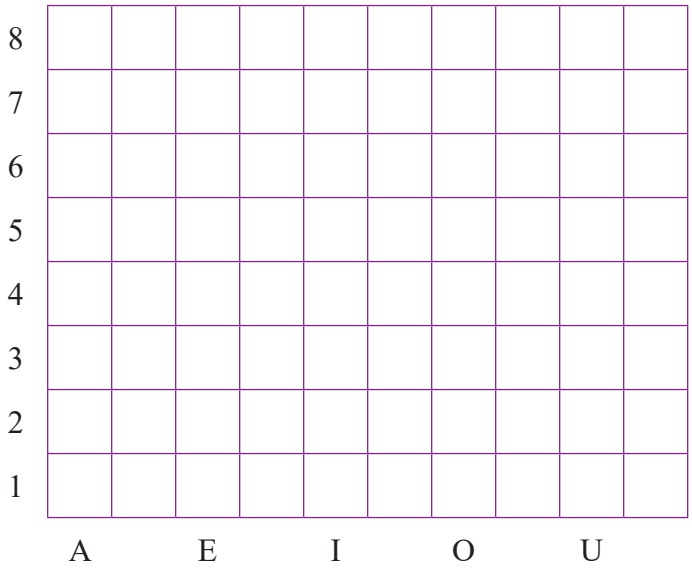
Periods: 5–8	Topic: Bar Graph	Suggested extra teaching aids: Touchpad Mathematics 4 pages 212-215

ENGAGE

Start the class with a hands-on activity. Ask students to write 5 lines about their favourite cartoon character. Instruct them to count the number of different vowels appear in their writing. **[Critical Learning]**

EXPLORE

Tell the students to take a square grid paper. Write the five alphabets at the bottom of the sheet, leaving a gap of one box as shown below. Then colour the number of boxes as the number of vowels they have noted down earlier.



Have them understand that they have made a bar graph. Instruct them to compare their graphs with their bench partner and discuss. **[Collaborative and Experiential Learning]**

EXPLAIN

Refer textbook pages 212-214, explain that bar graph is another way of representation of data. Demonstrate how to represent data through a bar graph and how to read the information from a given bar graph. Every bar graph has:

(*a*) a title explaining the information given in the graph.
(*b*) the horizontal and vertical axes.
(*c*) the labels explaining the meaning of each bar.
(*d*) the scale that is chosen for given data.

Focus on these terms through an example.

The bar graph drawn alongside represents marks obtained by Riya in the unit tests.

In this bar graph, we observe that:

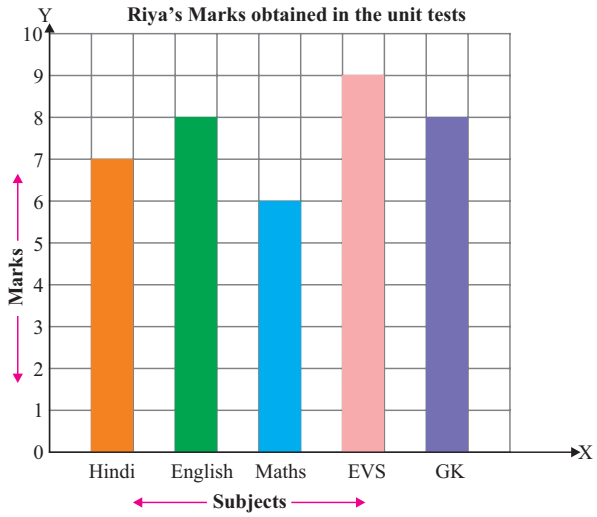
(*a*) **Title:** Riya's marks obtained in unit tests.

(*b*) **Axes:** Horizontal axis ⟶ X-axis.
Vertical axis ⟶ Y-axis.

(*c*) **Labels:** Subjects are labelled on X-axis and marks on Y-axis.

(*d*) **Scale:** On vertical axis, 1 unit length = 1 mark.

[Conceptual Understanding]



ELABORATE

Demonstrate on board to draw vertical and horizontal bar graph, by taking reference and examples given on pages 212-214.

EVALUATE

Classwork: Ask to solve Q1 and 3 of Exercise 13B.

Homework: Ask to solve remaining questions of Exercise 13B.

ENHANCE

Motivate the class to collect more information on various things within the class. By using those data draw more bar graphs on the board.

Periods: 9–10	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 4 pages 215-217

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify the doubts or queries.
- Start the revision by using 'Point to remember', 'Learning Logs', 'Mental Maths' and 'HOTS'.
- Discuss questions of the 'Learning Logs' and accept students answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve 'Mental Maths' and 'HOTS' given on pages 216-217.