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TOUCHPAD

Mathematics

Teacher's Resource Manual

Ver. 1.0



Curriculum-Integrated Series with NCERT Standards

ORANGE

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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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LARGE NUMBERS

LEARNING OBJECTIVES

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

- read and write large numbers in the Indian system
- find the face value and the place value of the digits in a number
- compare and order large numbers
- form numbers using given digits without and with repetition
- round off the numbers to the nearest ten, hundred and thousand

LESSON PLAN

Suggested number of periods: 12

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, pens, pencils, chalks/marker, notebook, paper chits/number cards/flash cards, Newspapers, an empty box, etc.

Keywords: Place value, Face value, Periods, etc.

Pre-requisite knowledge: Students must be familiar with numbers up to lakhs, their number names, the smallest and greatest 5-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: 1–3	**Topics: Knowing large numbers; Indian place value chart; Face value and place value**	**Suggested extra teaching aids: Blackboard or whiteboard, chalks/marker, dice/number cards/flash cards, an empty box, etc.** **Touchpad Mathematics 5 pages: 7–16**

ENGAGE

Choose a student in the class and ask him 'What is the pin code of your area?'. Accept the response and instruct another student to come on the board and read aloud the number and write its number name on the board. E.g., if the area pin code is 243601, then the other student will read and write 'Two lakh forty-three thousand six hundred one'. Repeat the same activity with other students.

Revise the learners' previous knowledge by using "Warm Up" section given in the book and answer the questions under this section.

Now, instruct the students to write their date of birth in the DDMMYY format in their notebook and read aloud the number formed. Also write the number name. Accept the responses.

Ask 'How many digits are in the number formed by writing the date of birth in DDYYMM format?', 'Are these numbers 6-digit numbers?', 'What are the smallest and the greatest 6-digit numbers?', What will you get after adding 1 to the greatest 6-digit number?', etc. Accept the responses and then introduce 7-digit numbers to the class. **[Experiential Learning]**

EXPLORE

Divide the class into groups of 7 students. Give a dice and instruct them to make a 7-digit number by throwing the dice (a student can throw dice and note down the number come on the top face of the dice to build a 7-digit number). Instruct one student of that group to come on the board and write the number built. Choose any student randomly from other group to write the number name of that one. If he/she writes the correct number name of that number, then the related group will get one point. If he/she is unable to write the correct name, give the chance to other group. Repeat this activity till time permit. **[Collaborative Learning]**

EXPLAIN

Explain to the class that if we add 1 to the greatest 6-digit number, we will get the smallest 7-digit number.

	9	9	9	9	9	9	← Greatest 6-digit number
						1	
+	1	0	0	0	0	0	← Smallest 7-digit number

Take the reference to the textbook pages 8 to 10 for explaining more about 7-digit numbers and then extend their learning. Hence explain them how to read and write 6- and 7-digit numbers in Indian place value system.

ELABORATE

Divide the class into pairs and make a place value table up to lakhs places on the board. Spread some flash cards on the table having 6- or 7-digit numbers written on them. Instruct the pairs to choose any card from them and represent the number written on it in the place value table on the board. Ask the questions related to place value or face value to them as, 'Which digit is at hundreds/lakhs/ten lakhs place?'; 'What is the place value and the face value of the digits at tens/thousands/ten lakhs/…, places?', etc.

Repeat this activity with other pairs till time permit.

Also, take the reference of the Examples 1 and 2 on page 11 and examples 1 to 4 on pages 14 to 16 for more explanation about the place value and the face value of a numbers.

Again ask the class how can we express the numbers in their expanded form? Accept the responses. Take the reference of pages 15–16 to elaborate expanded form of a number. Encourage the class to perform the activity given on page 12. **[Experiential Learning]**

EVALUATE

Classwork: Ask to to solve Q1 and 2 of Exercise 1A and Q1 of Exercise 1B.

Homework: Ask to solve the remaining questions of Exercise 1A and Q2 to 5 of Exercise 1B.

ENHANCE

Ask students to watch the following videos related to the topics taught in the periods:

https://www.youtube.com/watch?v=ziVMro-BbnU

https://www.youtube.com/watch?v=2ocKY_TUXFM **[Tech Connect]**

Periods: 4–6	Topics: Forming numbers (without and with repetition of digits), Comparing and ordering numbers,	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, cutouts of newspaper ads of home, pamphlet, number cards etc. Touchpad Mathematics 5 pages 16–21

ENGAGE

Divide the class into 4 or 5 groups. Give each student of groups a number card. Instruct each group, to make different numbers on board by using the digits written on number cards, like: greatest 6-digit number with smallest digit at tens place, smallest 6-digit number with greatest digit at thousand place, etc. The group who forms the number correctly as per instruction will be appreciated. **[Experiential Learning]**

EXPLORE

Show different newspaper ads or pamphlet of buy homes on board and ask students to compare and order prices of houses to decide which is better to buy. Then move to comparing and ordering of large numbers.

EXPLAIN

Explain forming of numbers without repetition and repetition of digits. To form the smallest number without repeating the digits, write the smallest digit other than zero (0) at the leftmost place and then write zero (0) if given, otherwise write other digits in their ascending order. To form the greatest number using the given digits, write the greatest digit at the left-most place and then write other digits in their descending order. When repetition of digits is allowed, then to form the smallest number, repeat the smallest digit and to form the greatest number, repeat the greatest digit at higher places.

Write few numbers upto 2-digit on the board and explain on board that:

- If two numbers have different number of digits, the number with less digits is smaller than the number with more digits.
- If two numbers have the same number of digits, then compare the corresponding digits starting from the left most digit of numbers. Continue till get different digits at the corresponding places. The number with greater digit at such place will be greater.

ELABORATE

Demonstrate formation of numbers without repetition of digits by taking the reference of Examples 1 and 2 and with repetition of digits using the Examples 3 to 5 given on pages 16–17.

Further demonstrate the steps of comparing and ordering of numbers on board by taking the reference of Examples 1 to 5 given on pages 19–20.

[Conceptual Understanding]

EVALUATE

Classwork: Ask to solve Q.6 to 7 of Exercise 1B and Q.1 of Exercise 1C.

Homework: Ask to solve Q.8 to 11 of Exercise 1B adn Q.2 to 4 of Exercise 1C

ENHANCE

Encourage the students of the class to watch the following videos related to the topics taught in the periods:
https://www.youtube.com/watch?v=MhvbDuVkp74
https://www.youtube.com/watch?v=JhKKjNJxpoA

Periods: 7–9	Topic: Rounding off Numbers	Suggested extra teaching aids: Rounding off Numerals charts, board, marker , etc. Touchpad Mathematics 5 pages 21–24

ENGAGE

Begin with a quick mental maths game by asking students to round numbers in the real world (e.g., "If I have 47 apples, how many would I round them to if I wanted to make it easier to count?").

EXPLORE

Show students various numbers and ask them to try rounding them to the nearest ten. Use real-world examples like price tags, distances, or the number of students in different classes.

Divide the class into small groups and ask them to round off a set of numbers on flashcards.

EXPLAIN

Present the rules for rounding off numbers to the nearest ten, hundred, and thousand.

- Rule for Rounding to the Nearest Ten: If the digit in the ones place is 5 or greater, round up. If it is less than 5, round down.
- Rule for Rounding to the Nearest Hundred: If the digit in the tens place is 5 or greater, round up. If it is less than 5, round down.
- Rule for Rounding to the Nearest Thousand: Similar rules apply for rounding to the nearest thousand.

Display examples on the whiteboard and work through them with the class. Use a number line to show how rounding works.

ELABORATE

Provide students with a set of more complex numbers to round off to the nearest ten, hundred, and thousand. Ask students to complete a worksheet with a variety of numbers and different rounding targets.

Allow students to pair up and discuss their reasoning as they work through the problems. Encourage them to explain why they rounded the numbers the way they did

EVALUATE

Classwork: Instruct to solve Q.1 to 4 of Exercise 1D.

Homework: Ask to solve rest of the questions of Exercise 1D.

ENHANCE

- Ask the students to prepare a chart on real life related where you can reflect the concept of rounding off the numbers by using matchsticks. **[Art Integration]**

Periods: 10–12	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 5 pages 25–28

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries and start the revision of the exercise.
- Divide the students into small groups and guide them to do the activity given in 'Fun Activity' section on page 27.
- Start the revision of the chapter, by using 'Learning Logs'.
- If they have any confusion or do any error then explain and correct it.
- Motivate students to solve Mental Maths, Puzzle, HOTS, etc.





MATHEMATICAL OPERATIONS

LEARNING OBJECTIVES

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

- perform all four mathematical operations (addition, subtraction, multiplication and division) on large numbers
- know how to multiply two numbers using different methods
- perform division using different methods
- solve mathematical expressions using the DMAS rule

LESSON PLAN

Suggested number of periods: 11

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, pens, pencils, chalks/markers, notebook, paper chits /number cards/Flash cards, New papers, an empty box, etc.

Keywords: Addition, Addend, Successor, Predecessor, Difference, Subtrahend, Minuend, Multiplicand, Multiplier, Product, Quotient, Divisor, Dividend, Remainder, Estimation, Round up, Round down, DMAS.

Pre-requisite knowledge: Students must be familiar with addition, subtraction, multiplication, division and rounding off a number up to desired place values.

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: Addition of large numbers, Properties of addition**	**Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/ marker, notebook, paper chits** **Touchpad Mathematics 5 pages 29–34**

ENGAGE

Introduce the topic in the classroom with some interesting activities, like asking questions on previously learned topics and then link to addition. Like: What is the sum of the largest 7-digit number and the smallest 8-digit number? Use the "Warm Up" section and questions under this section given on page 29–30 of the book for this purpose. Next, introduce the topic "Addition of Large Numbers".

EXPLORE

Divide the class into groups of 2-3 students. Put some number chits, on which 5, 6 or 7-digit numbers are written, into a box. Invite the groups to choose 2-3 number chits.

The first member will write down the numbers in his/her notebook. Then he/she will shuffle the chits and give them to the second member. He/she will also note down the numbers and pass them to the third member. The third member will also note down the numbers in the notebook. Now, all the members will add the numbers individually without looking the others calculations. After completing the task they will tally their answers and check whether it is same or not.

If any student makes an error, the teacher will help and correct it. Repeat this activity till time permits.

[Collaborative Learning]

EXPLAIN

Explain that the addition of larger numbers is the same as the addition of smaller numbers. First, we write the addends as per their place values. Then add the numbers of each column. Use regrouping if required. Also explain the real-life situations, where of addition is applied.

Further, explain the order property, zero property and grouping property of addition.

ELABORATE

Demonstrate on board the addition of larger numbers of 6, 7 and 8 digits and also demonstrate the use of addition in the real-life situations by discussing the examples 1 to 5 given on pages 31–32.

Further, discuss properties of addition and the topic "Sum of Consecutive Numbers" by using the references given on pages 30–31. **[Conceptual Learning]**

EVALUATE

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

Homework: Ask to solve remaining question Q.3 to 8 of Exercise 2A.

ENHANCE

Visit the web portal to download assignments from www.orangewebsupport.co.in and provide the students to solve.

Periods: 3–4	Topics: Subtraction, Properties of subtractions, Relation between addition and subtraction, Even and odd numbers, Palindromes	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, deck of cards, paper sheet etc. Touchpad Mathematics 5 pages 34–42

ENGAGE

Introduce the topic in the classroom with some interesting activities, like asking the question:

(*a*) Which is the greatest 6-digit number?

(*b*) Which is the smallest 7-digit number?

(*c*) What is the difference between the greatest 6-digit and smallest 7-digit numbers?

Accept the answers, if any queries or any wrong answers then solve them on board.

EXPLORE

Divide the class into 4 or 5 groups, each group having 5 or 6 students. Distribute a paper sheet to each group. Ask each student in the group to pull 2 cards, flip them and make two numbers by using numbers of the cards and write them on their paper sheet. Instruct them to subtract the smaller number from the bigger number.



EXPLAIN

Explain to the class that subtraction of larger numbers is the same as the subtraction of smaller numbers. First write the minuend and subtrahend in columns as per their place values. Start subtraction from the ones column. Regroup the digits if needed, then move to the tens column, and so on. Also explain the real-life situations, where the subtraction is applied.

Further, explain the properties of subtraction and the method of simplification in which both addition and subtraction are used.

ELABORATE

Demonstrate on the board the subtraction of larger numbers by taking the references and examples given on pages 35–36.

Discuss the properties of subtraction by using the references given on page 35. Demonstrate how to perform addition and subtraction operations together.

Next, discuss the real-life situations where we use addition and subtraction together. Refer page 37 for examples and explanation.

Further, explain the concept of palindromes and even and odd number by using the reference given on 39–41.

EVALUATE

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

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

ENHANCE

Ask students to think any five real-life situations where they need to add or subtract the larger numbers for getting the solution.

Periods: 5–6	Topics: Multiplication of numbers, Properties of multiplication	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, etc. Touchpad Mathematics 5 pages 42–50

ENGAGE

After introduction write 1 or 2-digit numbers on the board, and instruct students to multiply the numbers by 10 one by one. Ask them to observe the patterns in their products. Next, introduce the multiplication by 100 and 1000 and multiplication of large numbers.

EXPLORE

The teacher will describe a method called base method of multiplication from Vedic Maths to help in certain cases where traditional multiplication takes a long time to calculate the product.

Find the product of 99994 by 885 by using the following steps:

Step 1: Find the base, if the numbers have different base make them equal as follows:

Since, 99994 is closer to 100000 and 885 is closer to 1000.

Multiply 885 by 100 to make it closer to 100000

So, $885 \times 100 = 88500$

Step 2: Find the difference of both numbers with base.

The difference of 99994 and 100000 is 6.

And, 88500 and 100000 is 11500.

Step 3: Separate the product in two parts LHS and RHS with a straight line as follows:

99994	–	6
88500	–	11500
LHS		RHS

Step 4: Multiply the difference and write it in RHS of product.

99994	–	6
88500	–	11500
LHS		69000

Step 5: Subtract 6 from the second number *i.e.*, 88500 and put it in the LHS of product.

99994	–	6
88500	–	11500
88494		69000

Step 6: Now the complete product is 8849469000.

Step 7: Divide the product 8849469000 by 100 as we have multiplied 885 by 100.

So, the final product is 88494690. **[Vedic Math Learning]**

EXPLAIN

Explain in the classroom, the shortcut method of multiplication by 10, 100 or 1000, …, and multiplication of large numbers. Further explain properties of multiplication.

ELABORATE

Demonstrate on the board that when we multiply any number with 10, 100, 1000, or any number whose first digit is 1 and others are 0, then the product is the number itself with same number of zeros as in the multiplier. Take the reference of examples of multiplication by 10, 100, or 1000, … given on page 48.

Further, demonstrate the multiplication of large numbers by using the examples and explanation given on pages 43 to 45 in details on the board.

Next, discuss the properties of multiplication:

- Numbers can be multiplied in any order.
- When a number is multiplied by 1, the product is the number itself.
- When a number is multiplied by 0, the product is always 0.
- The product of three numbers does not change when the grouping of numbers is changed.
- If a sum or a difference of two numbers is multiplied by another number, they can be multiplied separately and then added or subtracted.

Explain these properties with examples by taking the references given on page 43. **[Conceptual Learning]**

Take the reference to pages 45–47 to explore more about multiplication using. ‘Double and Half’ method, and ‘Lattice Method’, etc.



EVALUATE

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

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

ENHANCE

Download the worksheet of multiplication from the site and practice it:

https://math-drills.com/multiplication2/multiplication_long_no_tseparator_0805_001.php **[Tech Connect]**

Periods: 7–8	Topics: Division of numbers, Properties of division	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, packets of pencils, etc. Touchpad Mathematics 5 pages 50–58

ENGAGE

Invite any six students of the class and announce that I have a packet of 30 pencils which I want to distribute equally among these students. Tell me what I have to do and how many pencils each of them will get. Accept the response. Recall that, for this, we need the process of division. Motivate the class towards lesson of division.

EXPLORE

We can also divide the numbers by using "Paravartya Method of division". The Vedic sutra 'Paravartya Yojayet' means transpose and apply. In this method we divide the dividend into two parts. The RHS will contain as many digits as the number of zeros in the base. The final answer obtained on the LHS is the quotient and on RHS is the remainder.

Base

Divisor

Difference

Dividend

Quotient | Remainder

For example, Divide 3955 by 125.

In this method, we divide by using the following steps:

Step 1: The divisor is related to the base 100 and therefore we split the dividend in such a way that the RHS has two digits.

LHS		RHS	
3	9	5	5

Step 2: Find the difference of base and the divisor. The base is 100 and the difference is –25 (negative).

100
–125
–25

Step 3: Write down the first digit 3 of the dividend as it is.

- Multiply 3 with the difference –25 and write the product as –7 and –5 below the second and third digits of the dividend.

Step 4: Go to the second column of the dividend. Bring down 9 minus 7 is 2.

- Multiply –25 with 2 and write the answer as –5 and –0 below the last two digits of the dividend. Add or subtract the digits of RHS.

Step 5: In the LHS, we have 32 and in the RHS we have –55.

- We cannot have a negative remainder in the final answer. Hence, we reduce the quotient by 1 and subtract the remainder from the divisor.
- Expand –5 5 as per their place values as –50 + 5 = –45
- Subtract –45 from divisor 125: 125 – 45 = 80
- Thus, final quotient is 32 – 1 = 31 and final remainder is 80.

100
–125
–25

3	9	5	5
	–7	–5	
		–5	–0
3	2	–5	+5

[Vedic Maths Learning/India Connects]

EXPLAIN

Explain the shortcut method of division by 10, 100 or 1000, …, and division of large numbers. Further explain the properties of division.

ELABORATE

Demonstrate on the board that when we divide any number by 10, 100, 1000, then the remainders are ones; ones and tens; ones, tens and hundreds digits respectively of the dividend.

Further, demonstrate in detail the division of large numbers on board by taking the references and examples given on pages 50–55.

Next, discuss properties of division:

- When a number is divided by itself, the quotient is 1.
- When a number is divided by 1, the quotient is the number itself.
- When 0 is divided by a non-zero number, the quotient is zero.
- Division by 0 is meaningless. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q.1 to 3 of Exercise 2E.

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

ENHANCE

- Ask students to search the method of "Lattice Division" on internet and discuss it with classmates and teacher. **[Tech Connect]**

Periods: 9-10	Topic: Mixed mathematical operations	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, some chits etc. Touchpad Mathematics 5 pages 58–61

ENGAGE

After the introduction, write some addition, subtraction, multiplication and division problems of numbers up to 4-digits on board. Ask students to solve it. Accept the answers. Introduce estimation in operations by using the same sum.

EXPLORE

Divide the class into small groups. Distribute paper chits having numerical expressions with more than two signs. Instruct the group to solve them to get the result. Accept the response from the class. Based on these explain them about simplification of expressions.

EXPLAIN

Explain simplification of numerical expressions by using the rule of DMAS.

ELABORATE

Demonstrate on the board that when we have to solve an expression which contains more than one operation, it is very important that we should follow a certain order of operation to solve such a problem correctly.



There is a rule for the order of operation to solve a mathematical expression is DMAS.
Explain the DMAS, rule with example on board by taking reference from pages 58–59.

EVALUATE

Classwork: Ask to solve Q.1 to 5 of Exercise 2F.
Homework: Ask to solve the remaining questions of Exercise 2F.

ENHANCE

- Ask to watch the video on simplification on "www.orangewebsupport.co.in".

Periods: 11	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 5 pages 60–63

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries and start the revision of the exercise.
- Guide the students to do the activity given in 'Fun Activity' section on page 63.
- Start the revision of the exercise, by using 'Learning Logs' section. If they have any confusion or do any error then explain and correct it.
- Motivate students to solve Mental Maths and HOTS questions.



MULTIPLES AND FACTORS

LEARNING OBJECTIVES

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

- find the factors and multiples of numbers
- identify the numbers divisible by 2, 3, 5 and 10 without dividing them
- find the common factors and HCF of numbers
- find the common multiples and LCM of numbers
- understand the relation between the HCF and LCM

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, pens, pencils, chalks/marker, notebook, paper chits /number cards/flash cards.

Keywords: Factors, Multiples, Divisibility rule, Prime number, Composite number, Co-primes, Twin primes, Factor tree, Highest common factor, Lowest common multiple.

Pre-requisite knowledge: Students must be familiar with factors and multiples of numbers, Table of number.

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: Multiples and Factors, Divisibility Tests	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, notebook, dice, 4 charts with number grids from 1 to 50. Touchpad Mathematics 5 pages 64–73

ENGAGE

Introduce the topic in the classroom with some interesting activities, like asking questions based on factors and multiples. Suppose you and your friend have to buy toys of ₹140 each, and you have notes of denomination ₹10 while your friend has notes of denomination ₹20 only. How many notes will you each pay to the shopkeeper?

Accept the responses. Introduce factors and multiples. Use the 'Warm Up' and answer the questions under this section to revise the previous knowledge.

EXPLORE

Divide the class into pairs and distribute each group a dice and the number chart with numbers up to 50. Ask one player of each group to choose a number less than 50, and note down it as his/her score. The second player will circle all its factors on the chart by red colour and note down them as his/her score. Now the second player will choose the number and the first one encircle the factors and both of them will note down their scores.

Next, each player will find his/her 1st number by rolling the dice and mark all its multiples on the chart paper using any colour pencil. The sum of the multiples will be their scores.

The player scores more will be the winner. **[Collaborative Learning]**

EXPLAIN

To calculate the factors of large numbers, divide the numbers starting will the smallest number, i.e., 2. If the number is not divisible by 2, move to the number, i.e., 3 and so on. If the number is divisible by any number, then continue checking divisibility by its multiples until the factors are repeated.

Similarly, multiple of a number is obtained by multiplying it with a natural number (except zero).

Further explain the properties of factors and multiples.

Also take the reference of the textbook pages 67–71 to explain about common factors and common multiples.

ELABORATE

Demonstrate on board, the method of finding the factors of any number using the explanation and examples and properties of factors given on page 68.

Further, explain multiples by demonstrating the examples on board by referring pages 66–67 and properties of multiples given on page 67.

Take the reference of the pages 73–74 to discuss about the rules of divisibility of a number by 2, 3, 5 and 10. Also, demonstrate rule of divisibility using the examples. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q.1 to 3, of Exercise 3A, Q1 and 2 of Exercise 3B, and Q.1 of Exercise 3C.

Homework: Ask to solve the remaining questions of Exercise 3A, 3B and 3C.

ENHANCE

Encourage the students to perform the activity given under section 'Fun Activity' given on pages 82.

Periods: 5–7	**Topics: Highest common factor(HCF), Lowest common multiple (LCM), Relationship between HCF and LCM**	**Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, A4 paper sheets, two colour beads/ two types of pulses/ rajma up to 50 Touchpad Mathematics 5 pages 74–79**

ENGAGE

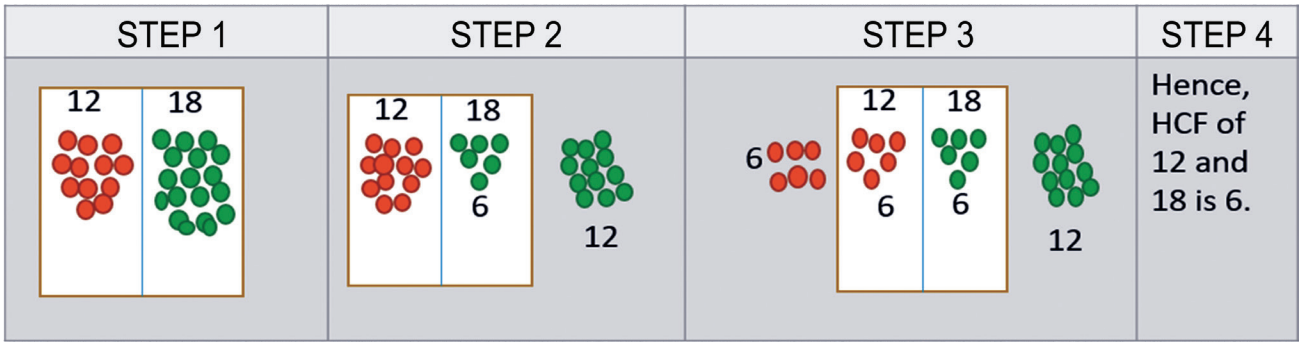
After the introduction, write two numbers on board, and ask about its factors from the class one by one. Then motivate the class towards HCF and LCM.

EXPLORE

The teacher will teach the class to find the HCF of two numbers by using the following activity:

- Instruct to divide paper sheet into 2 parts using ruler and pencil. And write two numbers (say 12 and 28) on board whose HCF is to be found.

- Ask to arrange colour beads/ pulses/ rajma on the top of sheet as per the numbers.
- Ask to eliminate the smaller number from the larger number written on the board.
- Continue the process till both sides have same number.
- The same number of beads on both sides is the HCF of two numbers.



[Art Integration]

EXPLAIN

Explain that the highest common factor(HCF) of two or more numbers is the greatest number that divides each given number exactly. HCF can be found by any of the two methods:

(*i*) Listing factors method

(*ii*) Long division method

In further periods, explain the methods of finding the LCM by using the two above mentioned methods.

Also explain the relationship between HCF and LCM.

ELABORATE

Using examples 1 and 2, first demonstrate on board to find the HCF of two numbers by listing common factor method. Further explain and demonstrate to find the HCF of two or more numbers using long division method by taking the examples 3 and 4 given on pages 75 – 76.

In next period, discuss to find LCM by Listing common multiples method, by taking the references and examples given on pages 77 to 78.

Alternate, demonstrates the relationship between HCF and LCM by taking references and examples given on pages 78–79. **[Conceptual Learning]**

EVALUATE

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

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

ENHANCE

Watch the video given on link https://www.youtube.com/watch?v=Gc4CblnY5zE to enhance the knowledge of LCM and HCF. **[Tech Connect]**



Periods: 8–10	Topic: Revision	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, etc. Touchpad Mathematics 5 pages 80–82

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries and start the revision of the exercise.
- Start the revision of the exercise, by using 'Learning Logs' Exercise.
- If they have any confusion or do any error then explain and correct it.
- Now, Ask the students to answer the "Mental Maths" questions given on page 81.
- Involve the students to do the activity given in 'Fun Activity' section on page 82.
- Motivate the class to solve 'HOTS and Puzzle' given on page 81 and 82 respectively.



FRACTIONS

LEARNING OBJECTIVES

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

- recall the concept of fractions, and have fun with a fraction kit
- know about types of fractions
- convert mixed fractions into improper fractions and vice versa
- find equivalent fractions and reduce a given fraction to its simplest form
- compare and order the fractions
- add and subtract like fractions
- solve word problems based on fractions

LESSON PLAN

Suggested number of periods: 11

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, pens, pencils, chalks/marker, notebook, etc.

Keywords: Fraction, Equivalent fractions, Like fractions, Unlike fractions, Proper fractions, Improper fractions, Mixed fraction, Multiplicative inverse, Reciprocal, etc.

Pre-requisite knowledge: Students must be familiar with fractions, comparison of fractions, ordering of fractions, addition and subtraction of like fractions.

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: Fractions, Equivalent fractions, Reducing fraction to its lowest terms**	**Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, notebook, equivalent fraction cards, etc. Touchpad Mathematics 5 pages 83–97**

ENGAGE

Introduce the topic with a discussion about their previous knowledge of fractions. For this, ask some questions, such as:

- What is fraction?
- What is numerator and denominator?
- What is the difference between like and unlike fractions?
- What are equivalent fractions?



Accept the responses.

Also, use the 'Warm Up' sections to introduce the chapter.

EXPLORE

Teacher can revise the concept of equivalent fractions using the following activity.

- Distribute fraction cards to each student of the class.
- Ask 4–5 students of the class to come in front of class and show their fraction cards to the class.
- Next, teacher will instruct the class, to check their own fraction cards and come forward to stand with the student who have equivalent fraction card. For example, the boy standing in front having fraction card of $\frac{1}{4}$, then the students who have $\frac{3}{12}$, $\frac{2}{8}$, $\frac{4}{16}$, $\frac{5}{20}$ stands with that student and form a group.
- If any student has any confusion teacher will rectify and explain. **[Collaborative Learning]**

EXPLAIN

Revise in the classroom that a fraction represents a part of a whole such as $\frac{1}{5}$, $\frac{3}{4}$, $\frac{7}{9}$, etc. The number above the bar is called numerator and the number below the bar is called the denominator.

Also explain that, when numerator is less than denominator, it is proper fraction, when numerator is greater than or equal to the denominator, it is improper fraction. Fractions having numerator as 1 are called unit fractions. If the fractions having same denominator, they are called like fractions and if they have different denominators, they are unlike fractions.

And the fractions with a combination of a whole number and a proper fraction are called mixed fractions.

ELABORATE

Demonstrate the process of converting an improper fraction to mixed fraction and vice-versa by using the concepts given on pages 85–86. Further, discuss the equivalent fractions and methods of finding the equivalent fractions by taking the examples 1 to 4 given on pages 89–90. Next, discuss how to reduce a fraction to its lowest term using the examples given on page 94. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q.1 to 4 of Exercise 4A and 4B and Q.1 of Exercise 4C.
Homework: Ask to solve remaining questions of Exercise 4A and 4B and Q.2 of Exercise 4C.

ENHANCE

Encourge the students to do activity given on page 104. If the students get stuck at any point, the teacher will help them.

Periods: 4–6	Topic: Comparing and ordering fractions	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, dice, etc. Touchpad Mathematics 5 pages 94–98

ENGAGE

Start the class with an interaction based on revision of some previous learnt topics.

Write some fractions on board: $\frac{1}{5}$, $\frac{3}{15}$, $\frac{11}{7}$, $2\frac{1}{5}$, etc., and ask to identify:

- Unit fraction
- Proper fraction

- Mixed fraction
- Improper fraction
- Like fraction
- Unlike fraction

Also, tell them to give an example of each of these fractions. Accept the responses.

EXPLORE

Introduce the comparison of fractions through an activity: Draw a line on the board with heading "Smaller fraction and Greater fraction". Call students in pairs and give each of them a pair of dice. Each pair will roll their dice and make fractions by taking the smaller number as the numerator and greater number as the denominator. Partners will then determine which fraction is larger and write the fractions in respective columns on the board. If any error occurs, the teacher will explain and rectify it. In the case of unlike fractions, the teacher can hint to use the cross multiplication: $\frac{a}{b} \times \frac{c}{d}$ **[Collaborative Learning]**

Student 1 **Student 2**



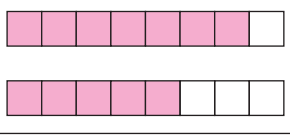
Smaller Fraction	Greater Fraction
$\frac{2}{4}$	$\frac{5}{6}$

EXPLAIN

Explain that in the case of like fractions, the fraction with greater numerator is greater. And in the case of unlike fractions with same numerator the fractions with smaller denominator is greater. Refer textbook pages 94–95 for explanation and examples.

ELABORATE

Demonstrate the comparison of like fractions and unlike fractions on board by making the bar model as follows:

Like Fractions	Unlike Fractions
 $\frac{7}{8}$ $\frac{5}{8}$	 $\frac{8}{9}$  $\frac{8}{11}$
$\frac{7}{8} > \frac{5}{8}$	$\frac{8}{9} > \frac{8}{11}$

Refer textbook pages 94–95 for explanation and examples.

Further, explain the method of arranging the given fractions in ascending and descending order by using the number line and fraction kit refer examples 3, 4 and 5 given on pages 95–96.

EVALUATE

Classwork: Ask to solve Q.3 and 4 of Exercise 4C.

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

ENHANCE

- Ask to watch the video on fraction on "www.orangewebsupport.co.in".

Periods: 7–9	Topic: Operations on Like fractions	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, two colour beads/ two types of pulses/ rajma up to 50, etc. Touchpad Mathematics 5 pages 99–101

ENGAGE

Start the class by discussing a real-life situation. Suppose Riya has 10 candies and she gives 2 candies to each of her two friends Soha and Rohan. Now, answer the following questions:

- What fraction of the candies is with Riya in starting?
- What fraction of the candies does Riya give to Soha?

- What fraction of the candies does Riya give to Rohan?
- What fraction of the candies has she distributed?
- What fraction of the candies are left with her?

EXPLORE

The teacher will demonstrate a very interesting and useful method to quickly add and subtract fractions known as butterfly method on the board and the students will copy the steps in their notebooks.

- Draw the butterfly wings to indicate which two numbers are to be multiplied together.
- Write the result in the respective antenna.
- Multiply the denominators and write the result below the abdomen.
- At the end add/subtract the antennas and write it over the number written in the abdomen to get the result.

Note: In case of subtraction write the larger fraction on the left side and instead of adding the product of antennas, subtract them. **[Art Integration]**

EXPLAIN

Explain that to add or subtract like fractions, add the numerators of given fractions and write this numerator in the place of numerator of the resultant fraction and keep the denominator same. And to add or subtract unlike fractions, first convert them into like fractions and then add or subtract as like fractions. Also explain some real-life situations where addition and subtraction of like or unlike fractions are required.

ELABORATE

First revise on board addition and subtraction of like fractions by considering examples 1 to 4 given on pages 99–100.

EVALUATE

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

Homework: Ask to solve the remaining questions of Exercise 4D.

ENHANCE

Watch the video given on link https://www.youtube.com/watch?v=sVGlyjl71vg and prepare a working model to represent the addition of mixed fractions. **[Tech Connect]**

Periods: 10–11	Topic: Revision	Suggested extra teaching aids: Blackboard or whiteboard, pens, pencils, chalks/marker, etc. Touchpad Mathematics 5 pages 102–104

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries and start the revision of the exercise.
- Start the revision of the exercise by using 'Learning Logs' Exercise.
- Ask to solve Mental Maths given on page 104. If they have any confusion or do any error then explain and correct it.
- Ask to solve "HOTS questions" given on page 103 of the textbook.
- Ask to prepare a working model on fractions to represent addition, subtraction, multiplication and division by using internet. **[Tech Connect]**
- Ask to watch the video on fractions on "www.orangewebsupport.co.in".



GEOMETRY

LEARNING OBJECTIVES

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

- recall simple geometrical concepts
- identify the arms and the vertex of an angle
- measure and draw angles using a protractor
- understand and create shapes using tangrams
- identify different types of polyhedra and their faces, vertices, edges and nets
- learn about turns as angles
- recognise different types of angles
- learn about triangles, quadrilaterals and polygons
- learn and use basic terms related to a circle

LESSON PLAN

Suggested number of periods: 21

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, some real-life objects like: coins, bangles, CD, etc.

Keywords: Point, Line, Ray, Angles, Horizontal line, Vertical line, Slanting line, Line segment, Triangle, Quadrilateral, Rectangle, Square, Pentagon, Hexagon, Heptagon, Octagon, Nonagon, Decagon etc. Circle, Centre, Circumference, etc.

Pre-requisite knowledge: Students must be familiar with plane shapes rectangle, square, triangle, circle, oval, straight line, curved line, drawing a straight line, circle, 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: Angle, Measuring an angle, Drawing an angle, Types of Angles, Turn the Angle, Turn in a Direcetion**	**Suggested extra teaching aids: Ruler, pencils, marker or chalk, protractor, square grid paper, some origami paper, ice-cream sticks, wall clock or table clock, etc. Touchpad Mathematics 5 pages 105–118**

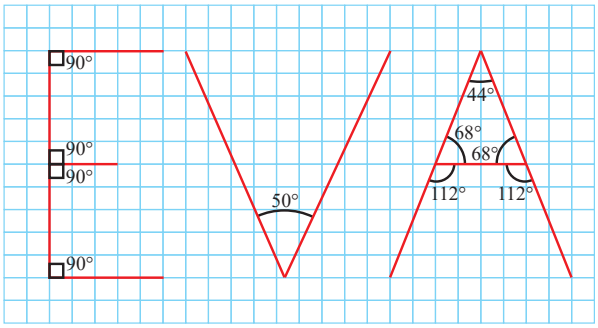
ENGAGE

Take a sharpened lead pencil and mark a dot on a sheet of paper. Ask the class, "Which geometrical shape does it represent?". Accept their responses. Next, instruct the students to mark any two dots on a paper and join them with the help of a ruler. Then ask them to recognise the shape so formed. Accept their responses. Introduce simple geometrical shapes, such as point, line, line segment, ray, etc. Discuss the concepts given in 'Warm Up' on pages 105 and 106.



EXPLORE

Distribute square grid paper in the classroom. Instruct students to write their name with pencil and ruler on the grid paper in capital letters and in big size. Instruct and help them to write each letter squared without any curved edges. Demonstrate by writing his/her own name on board, and measure the angles using a protractor 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, turn of angles and turn in a direction.



[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 method of naming an angle, interior and exterior of an angle.

Extend the concept of measuring the angles by protractor using the references given on pages 108, 109 of the textbook.

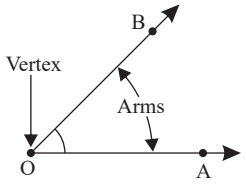
Further, explain the method of drawing an angle with protractor and then discuss about the types of angles.

Also, explain different types of angles by taking the reference of pages 111–112.

Describe different turn of angles and turn in a direction by taking the reference of pages 114 and 116.

ELABORATE

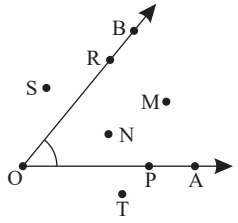
Draw the adjoining figure and demonstrate that the rays $\overrightarrow{OA}$ and $\overrightarrow{OB}$ form an angle at point O. $\overrightarrow{OA}$ and $\overrightarrow{OB}$ are the arms and O is the vertex of this angle.



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

The points lying inside the angle form the interior of the angle, like points M and N.

And the points lying outside the angle form an exterior of the angle, like points S and T. Also use the references and examples given on page 107.



Demonstrate the protactor and the method of measuring an angle by using it.

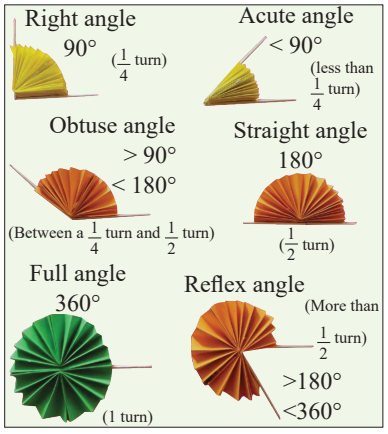
Further, show drawing an angle with protractor by using the methods given on page 110 of the textbook.

Also, demonstrate and explain the types of angle and turn 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 by turning the angle using this.

The teacher will also take the reference of 'Types of Angles' and 'Turn the Angle' given on pages 111–115 of textbook.

Also demonstrate the "Turn in a Direction" by taking the reference of pages 115–116 of the textbook. **[Conceptual and Art Integrated Learning]**



EVALUATE

Classwork: Discuss Q1, 2, 3 of Exercise 5A, Q1 and 2 of Exercise 5B and Q1 and 3 of Exercise 5C and Q.1, 2 and 3 of Exercise 5D in the classroom. If students make any error, teacher will correct them and explain.

Homework: Ask to solve the remaining questions of Exercise 5A, 5B, 5C and 5D.

ENHANCE

- Instruct to do the 'Activity' given on page 117. **[Creative and Experiential Learning]**

Periods: 7–9	Topic: Triangles	Suggested extra teaching aids: Papers, pens, pencils, chalk or marker, duster, geoboard, some rubber bands or threads. Touchpad Mathematics 5 pages 119–122

ENGAGE

Start the class by calling any one student and ask him/her to draw a closed shape using only straight lines with the chalk/marker without lifting it. Appreciate him/her effort and introduce the topic 'Triangles'.

EXPLORE

Divide the class into four groups. Distribute a geoboard, some rubber bands or threads to each group. Ask groups to construct these shapes with help of each other

- A square joining only 16 nails.
- A rectangle joining only 20 nails.
- A triangle joining only 18 nails.
- A quadrilateral using 16 nails.
- A pentagon using 15 nails.

The group who constructs all the shapes correctly on the geoboard will be appreciated.

[Experimental Learning]

EXPLAIN

Explain that a closed figure made up of 3 line segments is called a Triangle. Further explain the types of triangles on the basis of sides and angles.

ELABORATE

Further, demonstrate the triangles and their types:

Based on sides:

- A triangle whose all three sides are of equal length is called an equilateral triangle.
- A triangle whose two sides are of equal length is called an isosceles triangle.
- A triangle whose all three sides are of different lengths is called a scalene triangle.

Based on angles:

- A triangle is called an acute-angled triangle, if all its angles are less than 90°, i.e., acute angles.
- A triangle is called an obtuse-angled triangle, if it has one obtuse angle, i.e., greater than 90°.
- A triangle is called a right-angled triangle, if it has one right angle, i.e., 90°.



Also discuss the properties of a triangle, such that:

- The sum of all three angles of a triangle is 180°.
- The sum of measures of any two sides of a triangle is always greater than the measure of the third side.

For detailed elaboration also use the references given on pages 119 and 120 of the textbook.

[Conceptual Learning]

EVALUATE

Classwork: Encourage students to solve Q.1, 2, 3 and 6 of Exercise 5E. If any student makes any error, the teacher will correct and explain it.

Homework: Ask to solve remaining questions of Exercise 5E as a homework assignment.

ENHANCE

- Ask students to take photos or draw image of different types of triangles they found in their surrounding and identify its types and share in the classroom. **[Experiential Learning]**

Periods: 10–14	**Topics: Quadrilaterals, More about Polygons, Tangram**	**Suggested extra teaching aids: Board, chalk or marker, duster, colour paper sheets, pencils, coloured pens, rulers, etc.** **Touchpad Mathematics 5 pages 122 - 128**

ENGAGE

Start by showing students everyday objects like windows, decorated tiles, or a picture of a beehive. Introduce the Tangram, an ancient Chinese puzzle. Ask, "Can these seven simple shapes really create any animal or geometric figure in the world?" Ask students to identify the shapes they already recognize within the tangram set (triangles, square, and parallelogram).

EXPLORE

Provide students with a 7-piece tangram set. Challenge them to create a square, a rectangle, and a triangle using different numbers of pieces (e.g., a triangle using only 2 pieces vs. 4 pieces).

Encourage students to build "Creative Figures" like a bird, dog, or house using all 7 pieces to develop spatial understanding.

EXPLAIN

Define a quadrilateral as a polygon formed by four line segments, possessing four sides, vertices, and angles.

Use a labelled diagram (ABCD) to explain:

Adjacent vs. Opposite Sides: Sides with common endpoints vs. those without.

Adjacent vs. Opposite Angles: Angles sharing a side vs. those that are non-adjacent.

Diagonals: Line segments joining non-consecutive vertices.

Angle Sum Property: The sum of all interior angles of a quadrilateral is 360°.

ELABORATE

Compare special types of quadrilateral based on sides, angles, and diagonals:

Parallelogram: Opposite sides are parallel and equal; diagonals bisect each other.

Square vs. Rhombus: All sides of a square and a rhombus are equal, and a square must has 90° angles and equal diagonals, where as a rhombus does not necessary have 90° angles.

Trapezium: Identify it by having only one pair of parallel sides.

Polygon Classification: Introduce the broader family of polygons, naming them by their number of sides (e.g., Pentagon, Hexagon, Octagon, etc.).

Also demonstrate regular polygons and irregular polygons by taking reference of page 125 of the textbook.

EVALUATE

Classwork: Discuss and ask to solve Q 1, 2, 3, 5 and 7 of exercise 5F in the classroom.

Homework: Discuss and ask to solve the remaining questions of exercise 5F in homework assignment.

ENHANCE

- Ask students to find one "Regular Polygon" (all sides/angles equal) and one "Irregular Polygon" in their classroom or home.
- Discuss in the classroom that:

  "Why is every square a rectangle, but not every rectangle a square?".

  "How are the diagonals of a rectangle and a rhombus different?".

Periods: 15–16	Topic: Circles	Suggested extra teaching aids: Pen, pencils, chalk/ marker, duster, some real-life circular objects, geometry box, threads, some paper sheets, etc. Touchpad Mathematics 5 pages 128–130

ENGAGE

Recall the concept of polygons by asking some questions, such as:

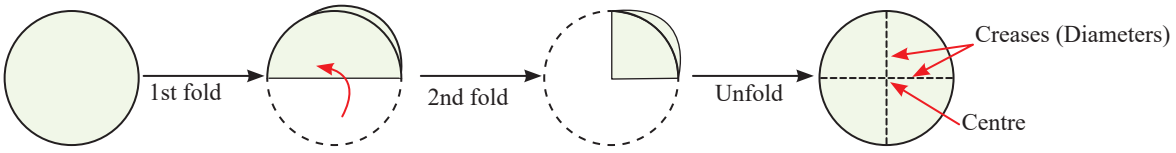
- I am a closed plane figure. I have 3 sides only. Who am I?
- I am a closed plane figure. I have 4 equal sides. Who am I?
- I am a closed plane figure. I have 5 equal sides. Who am I?
- I am a closed plane figure. I have 7 equal sides. Who am I?
- I am a closed plane figure. I have 10 equal sides. Who am I?

Accept their responses, and acknowledge the correct answers. Introduce circle. **[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.



Also show that any other creases that does not passes through the centre represent a chord.

[Experiential Learning]

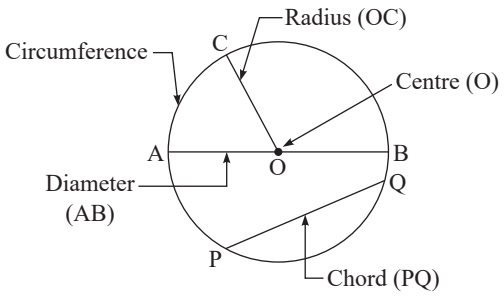
EXPLAIN

Show some circular objects like: coin, bangle or CD and with their help, make a sketch on the board, then explain the circle and its parts. Demonstrate how to draw a circle of given radius/diameters using a ruler and a compass. Discuss the relationship between a diameter and a radius of a circle. Also demonstrate the method of measuring the circumference of these circles using thread.

ELABORATE

Demonstrate on the board that a circle is a simple closed figure made up of a curved line, whose each point is equidistant from a fixed point in it.

Alternatively, a circle is the collection of all those points in a plane which are at an equal distance from a fixed point called centre. Also, represent its parts in detail using the references given on page 128 of the textbook.



Further, discuss that diameter of a circle is twice of its radius or radius is half of the diameter.

Thereafter, demonstrate the construction of a circle with an exact radius using the compass by taking the reference given on pages 129 and 130.

EVALUATE

Classwork: Discuss Q1 and 2 of Exercise 5G in the classroom. If any student makes any error, the teacher will correct and explain it.

Homework: Ask to do Q. 3, 4 and 5 of Exercise 5G as homework assignment.

ENHANCE

- Ask to draw different polygons, inside a circle on a chart paper by taking help of internet.

Periods: 17–19	**Topics: Polyhedron, Cube Connection**	**Suggested extra teaching aids: Board, chalk or marker, duster, cardboard, scissors, glue, some cardboard cubes, etc.** **Touchpad Mathematics 5 pages 131–134**

ENGAGE

Present students with a collection of 3D objects (cube, pyramid, and prism) and ask them to identify common features. Introduce the term Polyhedron—a 3D solid made of flat polygonal faces, straight edges, and vertices.

Ask students to list real-world examples of polyhedra, such as a die (cube) or a cereal box (cuboid).

EXPLORE

Using physical models, ask students to identify the three main parts of a polyhedron:

- **Faces:** The flat surfaces.
- **Edges:** The line segments where faces meet.
- **Vertices:** The points where edges meet.

Provide students with various shapes (Octahedron, Dodecahedron, etc.) and have them count and record the faces, edges, and vertices to recreate the data table.

Divide students into small groups and ask them to create simple models of polyhedra using paper or cardboard by taking the reference of nets of polyhedra given on page 132.

Discuss the difference between regular and irregular polyhedra. Explain that if all faces are identical and the same number of faces meet at each vertex, the solid is a **regular polyhedron**. Examples include the Regular Tetrahedron and Icosahedron

ELABORATE

Introduce the concept of nets of polyhedra: 2D shapes that can be folded to form 3D polyhedra.

Display the nets and demonstrate how each net forms the respective polyhedron.

Display how larger cubes/cuboids are formed by arranging "unit cubes".

Demonstrate the problem of "removed cubes" For example, if a solid originally had 125 cubes and now has 44 cubes, how many cubes were removed? (125 - 44 = 81) by taking the reference of book page 133.

EVALUATE

Classwork: Discuss and ask to solve Q.2 and 3 of Exercise 5H in the classroom.

Homework: Ask to solve Q.1 of Exercise 5H in homework assignment.

ENHANCE

- Discuss Rony's experiment with 27 cubes. Ask students to visualize which cubes would have 3, 2, 1, or 0 faces painted after the outer surface is colored.
- Ask students on the number of faces, edges, and vertices for specific shapes like the Hexagonal Prism

[Tech Connect]

Periods: 20–21	Topic: Revision	Suggested extra teaching aids: Chart paper Touchpad Mathematics 5 pages 135–139

- Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts or queries and start the revision of the exercise.
- Start the revision of the exercise by using, 'Learning Logs', 'Mental Maths', and 'HOTS'.
- Discuss questions of the 'Learning Logs' and accept students' answers. If they have any confusion or they make any error then explain and correct them. Motivate students to solve 'Mental Maths' given on page 137 and 'HOTS' given on page 138.
- Ask students to solve the 'Puzzle' given on page 138.
- Motivate to do the activity given 'Fun Activity' on page 139 of the textbook.

[Experiential Learning]



SYMMETRY AND PATTERNS

LEARNING OBJECTIVES

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

- identify symmetry around us
- understand slides, flips and turns
- explore different types of patterns
- learn about rotational symmetry
- create designs by tracing blocks
- understand the concept of tessellation

LESSON PLAN

Suggested number of periods: 13

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, some pictures of real-life objects or cut-outs like: monuments, human faces, etc.

Keywords: Symmetry, Line of symmetry, Slide, Flip, Turn, Rotational Symmetry, Block Printing, Patterns, Circles, Square Number, Tessellation, etc.

Pre-requisite knowledge: Students must be familiar with symmetry, line of symmetry, patterns in shapes, numbers, and letters.

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	**Topic: Symmetry around us**	**Suggested extra teaching aids: Ruler, pencil, chalk/ marker, duster, some cut-outs of monuments, human faces, etc. some A4 chart paper, crayon or colour pencils, a plane mirror, etc.** **Touchpad Mathematics 5 pages 142–146**

ENGAGE

Distribute some cut-outs of monuments, human faces, or other objects. Instruct the students to fold the cut-outs into two identical equal halves and open them. Ask: Does the crease formed on the cut-out divide the shape into two identical equal halves? Accept the responses. Explain which shapes are symmetrical and which are asymmetrical. Use the section 'Warm Up' for recalling the concept of symmetry and patterns.

EXPLORE

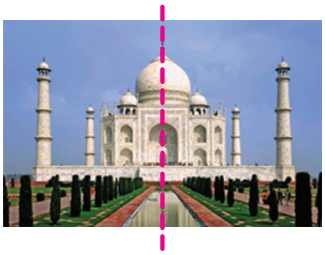
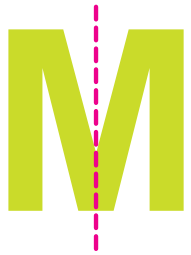
Distribute A4 chart paper in the class and instruct the students to make some closed shapes on it. Ask them to draw a crease line on the shapes wherever they want to divide the shape into two identical, equal halves and ask to observe the shapes about its symmetry.

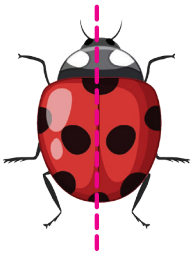
Ask: Which shapes are divided into two identical equal halves by the crease line? If the crease line divides the shapes into two identical equal halves, then what is the line called? If the shape cannot be divided into two identical halves, then what is it called? Accept the responses.

[Art Integration and Collaborative Learning]

EXPLAIN

When a figure or shape can be divided into two equal halves by drawing a line, then they are called symmetrical figures or shapes. The line which divides the figure into two equal halves is called the line of symmetry.



Further, explain that some figures have more than one line of symmetry.

Also, discuss about mirror image and reflection symmetry. Teacher can also use the activity given on page 145.

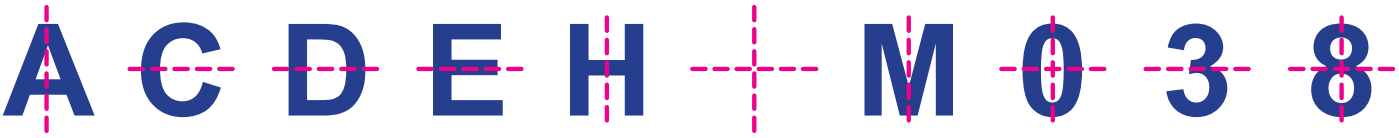
[Experiential Learning]

ELABORATE

Draw some shapes on board and ask to identify which may have more than one creased line or line of symmetry. Accept the class responses.

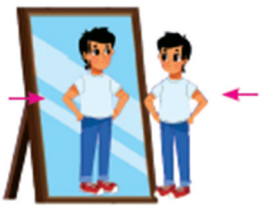
Again, draw some alphabets or some numbers on the board and draw lines of symmetry on them.

Ask: Which alphabets or numbers have one line of symmetry? Which alphabets or numbers have more than one line of symmetry?



Also, refer textbook pages 143–144 for more explanation and examples of line of symmetry.

Further, demonstrate the formation of mirror image by bringing a plane mirror or any plane surface that reflect the image. Call the students randomly in front of the mirror, tell them to observe the difference in their images. Further, draw only half of a figure and show how it looks complete by placing the mirror alongside.



[Experimental and Conceptual Learning]

EVALUATE

Classwork: Discuss Q.1, 2, 4 and 5 of Exercise 6A in the classroom .

Homework: Ask to solve the remaining questions of Exercise 6A as their homework assignment.

ENHANCE

- Ask to do the 'Activity' given on page 145 of the textbook. **[Experiential Learning]**

Periods: 4–7	Topics: Slides, Flips and Turns, Rotational Symmetry	Suggested extra teaching aids: Ruler, pencils, marker or chalk, any real life object, etc. Touchpad Mathematics 5 pages 146–151

ENGAGE

Start the class by taking any object and show its movement by sliding, flipping and turning the object in front of class and ask the students to observe the differences.

EXPLORE

Divide the class into groups and give each student a pattern block or alphabet magnet.

Ask each student to select a shape or letter and trace it on a piece of paper.

Instruct them to trace a slide, turn, and flip for their objects and label each one.

Ask other group members to compare their drawings.

Ask one student from each group to choose an object and ask the other group members to draw a corresponding slide, turn, or flip.

Further ask them to rotate the object, and ask to observe when they will get the exact shape as before.

Afterward, the first student or the teacher can move the object and trace it to show the correct answer and check the group's work.

Encourage students to help each other. **[Collaborative Learning]**

EXPLAIN

Discuss that a shape or a figure can move in various ways: sliding, flipping and turning.

When a shape simply moves from one place to another in one direction, it slides.

When a shape is turned over a straight line to form a mirror image, we call it has flipped. It can be horizontally or vertically.

When a shape is rotated clockwise or anti-clockwise through an angle, it turns.

A turn can be a quarter turn, a half turn, a three-quarter turn and a full turn.

Rotational symmetry of a figure occurs if it appears the same two or more times during a complete rotation of 360° about a fixed point.

ELABORATE

Ask the students to collect in the ground or the teacher can use the physical education period to teach the topic 'slides, flip and turn' of maths.

Divide students into groups.

Ask students to sit or stand in a circle. And one group to lay down at the centre.

Ask them to slide left or right. If there is any confusion, teacher will help them.

Ask another group to flip on the ground, *i.e.*, the students move from their back to their stomach, their stomach to their back, or feet to head. Suggest that they flip on their left side, flip on their right side or both.

Next discuss about the turns, help the student to turn quarter $\left(\frac{1}{4} \text{ or } 90°\right)$, half $\left(\frac{1}{2} \text{ or } 180°\right)$, three-quarters - $\left(\frac{3}{4} \text{ or } 270°\right)$ and a full turn (360°).

The teacher can also take help of references and examples given on pages 146–157 of the textbook.

Further demonstrate the rotational symmetry and angle of rotational symmetry of an object or a shape by taking the references and example given on pages 149–150 of the textbook.

Also demonstrate the shapes that possess rotational symmetry but no line symmetry. **[Holistic Learning]**

EVALUATE

Classwork: Discuss Q1, 2, 3, 5, 6 and 8 of Exercise 6B and Q.1, 3 of Exercise 6C in the classroom and encourage students to solve them. If students make any error, teacher will correct them and explain.

Homework: Ask to solve the remaining questions of Exercise 6B and 6C as homework assignment.

ENHANCE

- Motivate students to do the 'Activity' given on page 150 of the textbook.
- Ask to explore two or more figure or shapes that have rotational symmetry but no line symmetry.

[Creative and Logical Thinking]

Periods: 8–9	Topic: Block Printing	Suggested extra teaching aids: Board, chalk or marker, duster, A4 paper sheets, some wooden block prints, some vegetables (Lemon, Ladyfinger, etc.), colours, knife, tray, etc. Touchpad Mathematics 5 pages 152-154

ENGAGE

Show the students a variety of wooden block prints and their corresponding fabric prints (images from the chapter). Ask them to guess how these designs might be created and what materials could be involved. Introduce the history of block printing, mentioning its origin in Rajasthan, its evolution under Mughal patronage, and the role of artisans in carving designs onto wooden blocks.

EXPLORE

Provide students with various found objects (like different shaped wooden blocks or household items) and have them try to create a simple repeating pattern on paper.

Ask students to observe how one block represents a specific part of a larger pattern. Have students complete an exercise by matching specific wooden blocks to their corresponding prints to understand the relationship between the tool and the result.

EXPLAIN

Discuss the mathematical connections in block printing. Use examples of basket, mat, or saree designs, and explain how these are all interconnected and based on patterns. Talk about symmetry in art and nature. Have the students observe the patterns in the designs they have created and match them to the images in the chapter.

ELABORATE

Move from wooden blocks to accessible materials. Discuss how vegetables like lemons, potatoes, ladyfingers, carrots, and onions can be used as printing blocks.



Ask students to cut vegetables (with supervision) to create their own unique printing blocks. Students must create a "beautiful design" or a specific pattern using their vegetable cut outs (e.g., an onion cut out design).



EVALUATE

Classwork: Ask to do the Q.1 and 2 of Exercise 6D in the classroom under the guidance of the teacher.

Homework: Ask to solve Q.3 and 4 of Exercise 6D as homework assignment.

ENHANCE

- Encourage students to look for patterns in other items like baskets, quilts, and mufflers.
- Have students find a pattern at home, identify the "unit" or "block" that creates it, and explain the mathematical symmetry or repetition involved.

Periods: 9–11	**Topics: Patterns, Playing with Circles, Tessellation**	**Suggested extra teaching aids: Board, chalk or marker, duster, A4 grid paper sheets, pencils, coloured pens, rulers, etc.** **Touchpad Mathematics 5 pages 154 -160**

ENGAGE

Start the class by showing the students images of everyday objects like sweaters, mufflers, baskets, and mats. Ask students to identify repeating designs and discuss whether they see any symmetry.

EXPLORE

Provide students some basic shapes (squares, triangles). Ask them physically rotate the shapes to see what they look like after a half turn, a quarter turn, or a three-fourth turn.

Next, by using a compass and a ruler, ask students to divide a circle into 16 equal parts by drawing 8 equally spaced diameters. Ask students to draw a circle and mark points around it. Demonstrate how to create different patterns by joining points, just like the examples shown in the "Circle Designs" section of the chapter. Let them experiment with joining even-numbered points to create octagons and inscribed designs, as shown in pages 156 – 158 of the textbook. **[Creative Thinking and Art Integration]**

EXPLAIN

Explain that, a figure is symmetrical when a line (line of symmetry) divides it into two identical halves. Patterns can be created by repetition of certain shapes at regular intervals. Circles not only help in learning geometrical concepts or solving problems, but they also make learning mathematics enjoyable. Many different mathematical designs can be created inside and outside a circle. The rangoli and mandala art forms use this idea to form beautiful patterns.

A recurring pattern of symmetrical, interlocking shapes that fit together without any gaps or overlaps is tessellation. Explain why only certain regular polygons (equilateral triangles, squares, and hexagons) can tessellate by themselves. **[Conceptual Learning]**

ELABORATE

Ask students to draw a circle and mark points around it. Demonstrate how to create different patterns by joining points, just like the examples shown in the "Circle Designs" section given on page 156 to 158 of the chapter.

Ask students to complete tessellation patterns using different shapes (e.g., hexagons, triangles). They will draw at least 6 tessellating shapes to observe how they fit together.

EVALUATE

Classwork: Discuss and ask to solve Q. 1, 2, 4 and 5 of Exercise 6E in the classroom.

Homework: Ask to solve the remaining questions of Exercise 6E as homework assignment.

ENHANCE

- Challenge students to create a "Mandala Art" or "Rangoli" design using the circle-division technique learned earlier.
- Ask students to find the order of rotational symmetry for the shapes they have worked with.
- Ask students to research how tessellations are used in architecture (pedestrian paths) or nature (honeycombs), etc.

Period: 12–13	Topic: Revision	Suggested extra teaching aids: Pen, pencils, chalk /marker, duster, etc. Touchpad Mathematics 5 pages 161–164

- Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts or queries and start the revision of the exercise.
- Guide the students to do the activity as suggested in 'Fun Activity' section given on page 164.
- Start the revision of the exercise by using, 'Points to remember', 'Learning Logs', 'Mental Maths' and HOTS.



MEASUREMENT

LEARNING OBJECTIVES

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

- convert bigger units to smaller units of measurement and vice versa
- add, subtract, multiply and divide measurement (length, weight and capacity)

LESSON PLAN

Suggested number of periods: 17

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, some chits on which different measurement are written, bowl, etc.

Keywords: Kilometre, Hectometre, Decametre, Metre, Decimetre, Centimetre, Millimetre, Kilogram, Hectogram, Decagram, Gram, Decigram, Centigram, Milligram, Kilolitre, Hectolitre, Decalitre, Litre, Decilitre, Centilitre, Millilitre, etc.

Pre-requisite knowledge: Students must be familiar with units of measurement, conversion, addition, subtraction, multiplication and division of numbers.

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	Topic: Measurement of Length	Suggested extra teaching aids: Some paper chits, glass bowl, etc. Touchpad Mathematics 5 pages 165–171

ENGAGE

Write two metric measurements for length, weight or capacity in two different metric units on the board.

Instruct: Convert both measurements in same metric units. Accept the responses.

Introduce: Conversion of metric units. The teacher can use 'Warm Up' sections to revise the previous concepts.

EXPLORE

Write some measurements in cm, m, and km on the board such as: 200 cm, 5 m, 3 km, 5000 m, etc. Take a bowl and put some chits having units metres, centimetres, or kilometres written on them. Invite a pair of students randomly.

Instruct: Read aloud the measurement written on the board, pick out a chit, and convert the measurements into the units written on the chit. Accept the responses. Repeat this activity with more pair of students till time permits. **[Experimental Learning]**

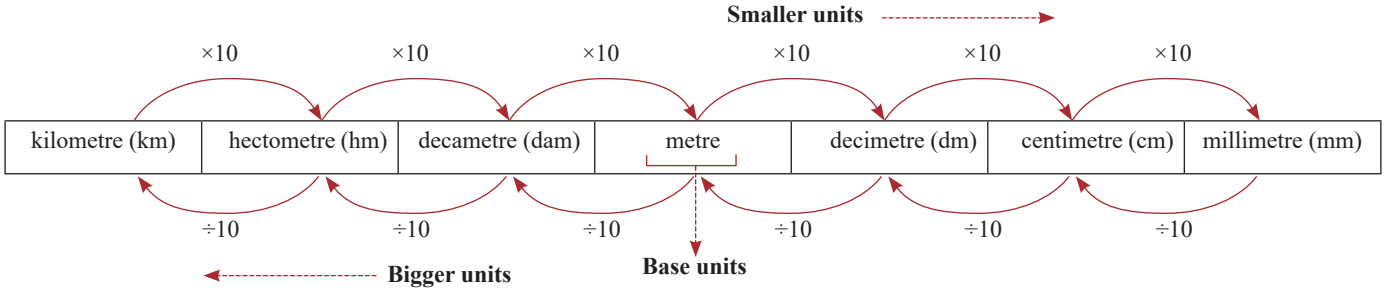
EXPLORE

Divide the class into pairs. Tell them to look around in the class or think of the articles available at their homes and make a list of things that can be measured in cm and those in m and 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.

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

EXPLAIN

Start the class with a recall relationship between different units of length used. 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 pages 167–168 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)

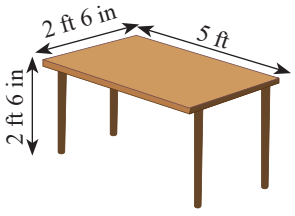
[Conceptual Understanding]

ELABORATE



After understanding about the metric units of length, ask the students if they have heard the terms inch, foot, yard, mile, etc. Reiterate that these are other units commonly used for measuring length. You can show a picture of carpenter measuring the size of door and window in feet and inches.

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 inches on opposite edge. Further, explain how to measure the dimensions of a table or desk using it. Hence, convert the units. Also show the conversion using a double number line.



Hence, motivate students to solve questions Q.4 given on page 170 of the textbook. **[Experiential Learning]**

EVALUATE

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

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

ENHANCE

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

Periods: 4–5	Topic: Operations on lengths	Suggested extra teaching aids: Touchpad Mathematics 5 pages 171–174

ENGAGE

Go to the playground along with the class and have them realise how long a m, dam, hm, km, dm, cm and mm, is by actually measuring the distance between two places/length of an object. You can take the help of physical 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 of 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 it with 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. Further explain the method of multiplication and division. Refer textbook pages 171–172 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			cm	
		(1)	(1)	(1)			
	1	3	9	7	5	3	2
+		5	6	8	8	5	5
	1	9	6	6	3	8	7

Thus, 13 km 975 m 32 cm + 5 km 688 m 55 cm
= 19 km 663 m 87 cm

(*b*)

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

Thus, 18 m 25 cm 9 mm – 9 m 76 cm 4 mm
= 8 m 49 cm 5 mm

Further demonstrate the multiplication and division of a measurement by a whole number by taking the reference and example given on page 172 of the textbook.

EVALUATE

Classwork: Ask to solve Q.1, 2, 3, 4 and 5 of Exercise 7B in the classroom.

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

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 to the students to find how long a string they use to fly a kite or what length is left with them if their kite is cut by someone.

Periods: 6–7	Topic: Measurement of weight (Mass)	Suggested extra teaching aids: Touchpad Mathematics 5 pages 174–177

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 the 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 how heavy your bag is.

- What is your weight? Can you write the answer in grams?
- Who is the 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 to do 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.

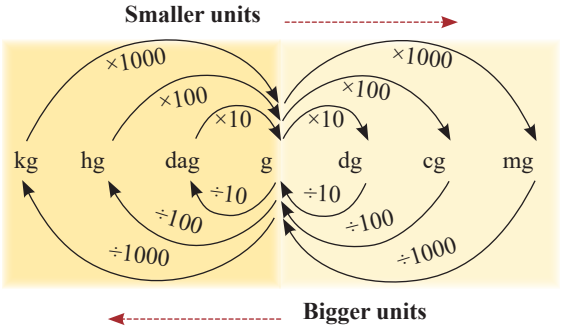
[Experiential Learning]

EXPLAIN

Refer textbook pages 174–176, 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 7 cg 6 mg = (9 × 1000) mg + (8 × 100) mg + (7 × 10) mg + 6 mg

(since 1 g = 1000 mg, 1 dg = 100 mg and 1 cg = 10 mg)

= 9000 mg + 800 mg + 70 mg + 6 mg = 9876 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, ask the students if they have heard the terms quintal, ton, mann, etc.. Reiterate that quintals and tons are other units commonly used for measuring heavy weights. You can show a picture of a truck, tractor, freight train loaded with goods and commodities.

Give some more 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 Q.1, 2, 3 and 4 of Exercise 7C in the classroom.

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

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: 8–10	Topic: Operations on weight (Mass)	Suggested extra teaching aids: Touchpad Mathematics 5 pages 177–179

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 are 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 bakes that is delicious and crispy. Talk about the ingredients used in it and explain how to add or subtract their weights. Further, explain about the multiplication and division of weights by any whole number. Refer textbook pages 177–178 for more explanation and examples.

[Conceptual Understanding]

ELABORATE

Write some questions on the board and demonstrate how to add or subtract the measures 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			mg		
				(9)	(9)	(9)	(11)	
		(15)	(5)	(10)	(10)	(10)	(1)	(10)
	~~1~~	~~5~~	~~6~~	~~0~~	~~0~~	~~0~~	~~2~~	~~0~~
−		6	4	8	6	8	6	5
		9	1	1	3	1	5	5

Thus, 15 kg 600 g 20 mg – 6 kg 486 g 865 mg
= 9 kg 113 g 155 mg

Further demonstrate on board multiplication and division of measurements of weight by a whole number.

EVALUATE

Classwork: Ask to solve few questions of Exercise 7D in the classroom.

Homework: Ask to solve remaining question of Exercise 7D as homework assignment.

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: 11–12	Topic: Measurement of capacity	Suggested extra teaching aids: Touchpad Mathematics 5 pages 179–181

ENGAGE

Students are aware of 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 how much water you have 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 example of measurement activities 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 a recipe at home and help their parents/elders in measuring ingredients. **[Holistic Learning]**

EXPLAIN

Refer textbook pages 179–180 to 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 + 823 L (since 1000 mL = 1 L)

= 8 L 823 mL **[Conceptual Understanding]**

ELABORATE

After understanding the metric units of capacity, talk about some other units, such as a barrel and a gallon which are used in the International trade of crude oil.

[Cross-curricular Learning]

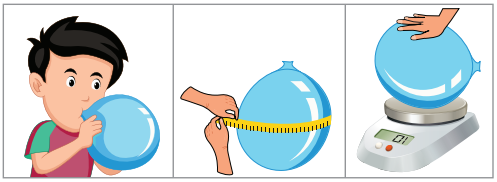
Hence, motivate students to solve questions given in the textbook.

EVALUATE

Classwork: Ask to solve Q2 and 3 of Exercise 7E in the classroom.

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

ENHANCE



Balloons are more than just party decorations; they are tools for measuring weight 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: 13–15	Topic: Operations on Capacity	Suggested extra teaching aids: Touchpad Mathematics 5 pages 181–184

ENGAGE

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

- Why is water necessary in our life?

- What does a doctor do 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 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 you will require for a day, a week, and a month.

Compare your data with your bench partner and check which family consumes 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 181–182, explain how to add, subtract capacities multiply or divide. Let them know that they can perform the operation as they have learnt in case of addition, subtraction multiplication and division of length and weight.

[Conceptual Understanding]

ELABORATE

Write some questions on the board and demonstrate how to add or subtract the measures 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			mL		
				(9)	(9)	(9)	(9)	
	(7)	(15)	(0)	(10)	(10)	(10)	(10)	(10)
	~~8~~	~~5~~	~~1~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~
−	6	8	0	4	5	0	6	5
	1	7	0	5	4	9	3	5

Thus, 85 kL 100 L – 68 kL 45 L 65 mL = 17 kL 54 L 935 mL

Also demonstrate, the multiplication and division of capacities by taking reference of textbook page 182.

EVALUATE

Classwork: Ask to solve Q.1, 2, 3, 4, 5, 9, 10 and 11 of Exercise 7F in the classroom.

Homework: Ask to solve the remaining question of Exercise 7F.

ENHANCE

Ask students to solve the questions given in 'HOTS' on page 186.

Periods: 16–17	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 5 pages 184–186

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts or queries and start the revision of the exercise.
- Start the revision of the exercise by using "Points to remember", "Learning Logs" and "Mental Maths".
- Discuss questions of the 'Learning Logs' and accept student's answer. If they have any confusion or do any error then explain and correct it. Motivate students to solve 'Mental Maths'.
- Involve students to perform the activity discussed in 'Fun Activity' section on page 186.





PERIMETER AND AREA

LEARNING OBJECTIVES

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

- find the perimeter of geometrical shapes (triangle, rectangle, and square)
- find the area of irregular shapes
- find the area of geometrical shapes (triangle, rectangle, and square)

LESSON PLAN

Suggested number of periods: 12

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, measuring tape, some cubical and cuboidal boxes, etc.

Keywords: Boundary, Perimeter, Region, Area, Length, Breadth, Height, etc.

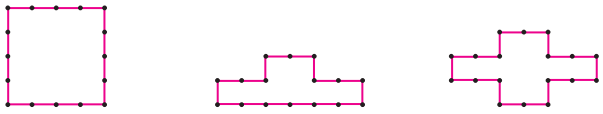
Pre-requisite knowledge: Students must be familiar with finding the area and perimeter of 2D regular shape and irregular shapes, etc.

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: 1–4	Topic: Perimeter	Suggested extra teaching aids: Chalk, marker, duster, measuring tape, etc. Touchpad Mathematics 5 pages 187–193

ENGAGE

Ask the students to construct the following figures using ear buds/ matchsticks and observe the total length of their boundary. The students may be asked to calculate the length of the boundary of these shapes. They may check if the lengths are the same.



Students may be encouraged to construct more shapes, such as triangles, with the same boundary length. This will give them an idea that different shapes can have the same boundary length or perimeter.

Introduce: The concept of perimeter of a rectangle. Discuss the concepts given on "Warm Up" and motivate to solve the question given on page 187 and 188.

EXPLORE

Take the class into the playground. Make a rectangular shape on the playground by standing any four students at four different points of the playground. Instruct: Another student to make lines using sand/ chalk by walking in a line between the two students who stand at two different points.

Again, instruct another student to measure the length of the sides of the rectangular shape formed on the playground by using the measuring tape.

Ask: What is the perimeter of the rectangular shape formed? Accept the responses.

Further, make another shape like square/ triangle and repeat the process till the time permits.

[Collaborative and Experiential Learning]

EXPLAIN

First explain about the perimetre on a square grid, then explain that the perimeter is the sum of the lengths of the sides of any rectilinear figure. So the perimeter of a rectangle is the sum of the lengths of all four sides. Explain the method of deriving the formula 2 (Length + Breadth) as the opposite sides of a rectangle are of same length.

Further, we know that a square is a 4-sided polygon whose all four sides are of equal length.

Hence, perimeter of a square = 4 × side.

Similarly, perimeter of a triangle = sum of its three sides.

ELABORATE

Demonstrate on the board how to find the perimeter of different rectilinear figures like: rectangle, square and types of triangles.

The perimeter of a rectangle with measurements 9 cm and 4 cm = 2 × (length + breadth) = 2 × (9 + 4) cm
= 2 × 13 cm = 26 cm.

The perimeter of a square with side 8 cm = 4 × side = 4 × 8 cm = 32 cm.

The perimeter of a scalene triangle ABC, with measurement AB = 5 cm, BC = 8 cm and AC = 11 cm,
= AB + BC + CA = 5 cm + 8 cm + 11 cm = 24 cm.

The perimeter of an equilateral triangle of side 5 cm = 3 × sides = 3 × 5 cm = 15 cm.

The perimeter of an isosceles triangle in which each of the equal sides is 6 cm and the third side is 5 cm.
= 6 cm + 6 cm + 5 cm = 17 cm.

Also demonstrate on the board the solved examples and examples based on real-life situations where we use the concept of perimeter given on pages 190–192 of the book. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1–9 of Exercise 8A.

Homework: Ask to solve remaining questions of Exercise 8A of the textbook.

ENHANCE

- Ask students to measure the perimeter of their favourite rug or a tabletop at home using a measuring tape and share their findings.
- Discuss how does the perimeter of a map of a country related to its borders.



Periods: 5–10	Topics: Area, Area of a triangle	Suggested extra teaching aids: Chalk, duster, square paper having images, crayons or colour pencils, etc. Touchpad Mathematics 5 pages 194–202

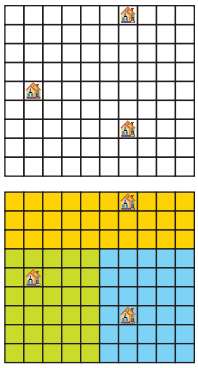
ENGAGE

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

- Which of the following has a larger area a carom board or a chess board?
- If you have 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 chart paper or on a notebook page?

Accept their responses and talk about their logic behind. Introduce the topic Area.

EXPLORE



Divide the class into groups. Distribute the grid paper with an image of three houses to each group.

Now, ask the groups to divide the area equally among three parts, by colouring it with three colours, such that each part contains one image of the house. The group that does it correctly in the minimum time will be the winner. If students have any confusion, teacher will help them and ask them to distribute the area into three equal parts by counting the squares and colour them as shown in the given figure. **[Experiential and Collaborative Learning]**

EXPLAIN

Area is the amount of surface that a plane-closed figure covers. Area of an object which takes more space is larger than an object which takes less space. To measure the area of a closed figure, we count the squares with convenient unit of area. For example, a square whose side is 1 cm, square centimetre or sq. cm is a unit of area.

Explain that, area of a rectangle can also be calculated by using the formula "(Length × Breadth) sq. units". And if area is given, length and breadth can be calculated by using the formula,

$$\text{Length} = \frac{\text{Area of rectangle}}{\text{Breadth}} \quad \text{and} \quad \text{Breadth} = \frac{\text{Area of rectangle}}{\text{Length}}$$

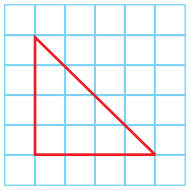
Explain, area of a square = (side × side) sq. units.

Further, to explain area of a triangle, a diagonal divides a square or a rectangle into two halves. Each half is a triangle. Thus, the area of a triangle is half the area of the square or rectangle.

Next, explain how to find the area of rectilinear figures, using the squared paper counting the squares by using the formula given below:

Area of the irregular closed figure = Number of complete squares (m) + Number of squares having more than half parts enclosed (n) + $\frac{1}{2}$ × Number of squares having half parts enclosed (p).

ELABORATE

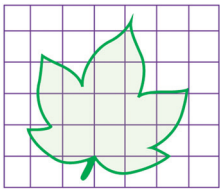


Demonstrate on board the method of finding the area of a rectangle and square, by taking the reference and examples given on pages 194–198.

Further, demonstrate the area of rectilinear figure as shown:



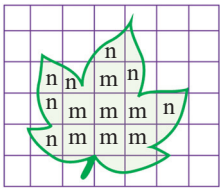
To demonstrate area of irregular or rectilinear shapes, count the squares that are completely covered, half covered and so on. Marked as shown:



Number of complete squares (m) + Number of squares having more than half parts enclosed (n) + Number of squares having half parts enclosed (p).

$m = 7; p = 0; n = 7$

So, area of the given shape = $\left(m + n + \frac{1}{2}p\right)$ = 7 + 7 = 14 sq. units



For detailed explanation of area of irregular shapes, use the references and examples given on pages 194–195.

Further, demonstrate that area of a triangle is half of the area of a square or a rectangle, by taking reference of textbook pages 200 to 201. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q.1, 2, 4, 10 of Exercise 8B and Q.1 and Q.2 of Exercise 8C.

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

ENHANCE

- Ask to create a 'Geometry Robot' whose every part in a polygon.
- The head must have a perimeter of 16 units.
- The torso must have an area of 36 sq. units
- The two legs must be of area 16 sq. units each. **[Logical and Art Integration]**

Periods: 11–12	Topic: (Revision) Learning Logs	Suggested extra teaching aids: Touchpad Mathematics 5 pages 203–204

- Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts or queries and start the revision of the exercise.
- Help them to do the activity given in 'Fun Activity' on page 204 of textbook in the classroom.

[Collaborative Learning]

- Start the revision of the exercise by using "Points to Remember", "Mental Maths", "HOTS" and "Learning Logs".
- Discuss questions of 'Learning Logs' and accept students' answers. If they have any confusion or do any error then explain and correct it. Discuss and motivate students to solve Mental Maths.
- Ask to solve 'HOTS' given on page 204.



MAP AND LOCATION

LEARNING OBJECTIVES

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

- understand what a map is
- understand and draw route maps
- know the components of a map
- find the location of any object on a grid

LESSON PLAN

Suggested number of periods: 9

Suggested Teaching Aids: Touchpad Mathematics 5, blackboard or whiteboard, chalk, duster, compass, isometric paper, etc.

Keywords: Net, Isometric, Map, Title, Scale, keep, directions, etc.

Pre-requisite knowledge: Students must be familiar with map of a location, the four directions 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: 1–5	Topic: Maps	Suggested extra teaching aids: Chart showing maps or route between two locations, etc. Touchpad Mathematics 5 pages 205–210

ENGAGE

Exploring Directions on a Map

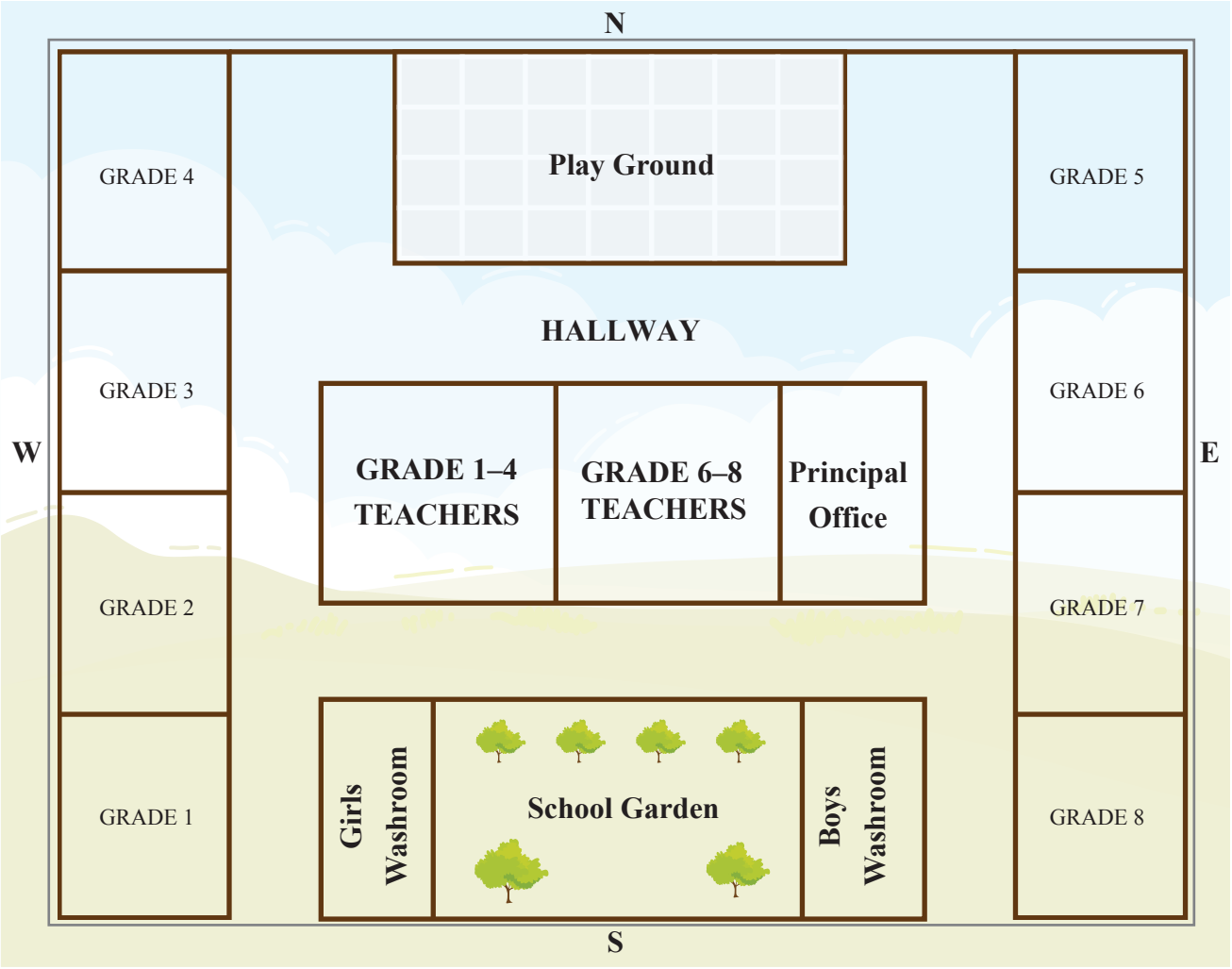
In this activity students will explore different places using a map and understand the value of directions mentioned in it. Ask them to get a Map of their school. They may be asked to look for a compass rose on the map. It's usually a small star or flower-like symbol with arrows pointing in different directions.

This handy tool will guide them as they explore directions. They may be familiarised with the four main directions:

1. North is at the top of the map.
2. South is at the bottom.
3. East is on the right side.
4. West is on the left side.

They may be asked to face a certain direction. They may then use the compass rose to figure out which direction they are facing. It's like using a compass to find their way. Now, allow them to try to locate different places on the map using the directions they have learned. For example, they might find their classroom to the

north of the playground. You may call out a direction, and the student should point to that direction on the map. Introduce the topic maps.



EXPLORE

Divide the class into groups. Distribute plain paper to each group. Ask to draw route map from the classroom to principal room or they can draw the route of school from their home, important landmarks come on the way using keys. Accept the Teacher will help if any group want it. The group whose route map is best and proper is the winner.

[Experiential Learning]

EXPLAIN

A map is simply a drawing or picture or a landscape of a location. It shows the landscape as it would be seen from above (top view). It is also used for guiding directions and to find out distances in a locality.

ELABORATE

Take reference of map given on pages 206–210 to explain the map. Discuss the concepts given on page 209 on the board. Also demonstrate the components of a map: title, scale, keys.

Demonstrate the directions in details by using the compass, and taking the references given on pages 209–210.

EVALUATE

Classwork: Ask to solve Q.1, 2 and 3 of Exercise 9A in the classroom. If any student makes any error, the teacher will correct and explain it.

Homework: Ask to solve Q.4 and 5 of Exercise 9A as homework assignment.

ENHANCE

- Instruct students to take a chart paper and draw a route map from their school to their home by using different keys. **[Experiential Learning]**

Periods: 6–7	Topic: Positioning of things using Gridlines	Suggested extra teaching aids: Board, chalk or marker, duster, A4 grid paper sheets, pencils, coloured pens, rulers, etc. Touchpad Mathematics 5 pages 210 - 211

ENGAGE

Start the class by showing any map on board and ask some question like:

- What information you get from the map?

Accept the response. Introduce the topic 'Positioning of things using gridlines'.

EXPLORE

Further the teacher will demonstrate how to represent objects' positions using grid coordinates. And to explore how grid-based maps are used in real-world scenarios like locating objects in a zoo, city map, or even game levels.

ELABORATE

- Start by showing a basic grid, similar to the one in the image given in textbook page 210, and explain how the grid works with horizontal lines (rows) and vertical lines (columns).
- Explain the concept of an "Ordered Pair" (x, y), where x represents the horizontal position (column) and y represents the vertical position (row). For example, the position of the panda is (1, 1), as it is at the intersection of the first column and first row.
- Ask students to create their own grid on a piece of graph paper.
- Ask students to choose 5 animals (or objects) to place on their grid. These could be zoo animals, sea creatures, or any other theme they enjoy.

For each animal, students should decide on its location on the grid by picking an ordered pair (x, y). For example: Tiger at (2, 7) and Elephant at (7, 4).

- Ask them to draw or place stickers of their chosen animals at the correct coordinates.
- Discuss, if a zookeeper needs to locate a specific animal, how would they navigate the zoo map? Would it be easier or harder if the zoo used a 10 × 10 grid instead of 12 × 12? Why?
- Let students share their grids with the class and describe the position of each animal. Encourage them to explain how they chose each animal's position using coordinates.

Also take the reference given on pages 210-211 of the textbook.

EVALUATE

Classwork: Discuss and ask to solve Q.6 of Exercise 9A in the classroom.

Homework: As a homework assignment, give each student a blank grid and a list of 'Planting Rules' as follows:

- The Carrot must be 3 units East and 2 units North of the starting point (0, 0).
- The Pumpkin must be exactly 5 units away from the Carrot.
- No two plants can be in the same row or column.
- Ask students to exchange their finished maps with a partner, who must then list the coordinates for every item his partner placed.

ENHANCE

Provide the image given on page 210 of the textbook and challenge them to answer the following queries as follows:

A caterpillar starts at the Broccoli (1, 2). It needs to visit three other items to finish its meal, but it can only move along the grid lines.

- **Step 1:** Move 2 units East and 3 units North. What do he eat?
- **Step 2:** From there, move 5 units East and 0 units North. What do he eat?
- **Step 3:** Finally, move 3 units West and 4 units North. Where are the caterpillar now?

What is the shortest "path" (total steps) to get from the watermelon (6, 1) to the the chilli, if there is a chilli at (1, 9)?

Periods: 8–9	Topic: (Revision) Learning Logs	Suggested extra teaching aids: Touchpad Mathematics 5 pages 215–216

- Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts/queries and start the revision of the exercise.
- Start the revision of the exercise by using 'Learning Logs', 'Mental Maths' and 'HOTS' of the chapter.
- Discuss questions of the 'Learning Logs' and accept students answers. If they have any confusion or do any error, then explain and correct it.
- Help them to solve the questions of 'HOTS'.



TIME

LEARNING OBJECTIVES

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

- know about the 24-hour clock and the 12-hour clock format of time and their conversions.
- convert time from one unit to another.
- perform operations (addition, subtraction) on measures of time.

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, wall clock/table clock, thermometers, etc.

Keywords: a.m., p.m., 24-hours clock, Minutes, Seconds, Conversion, etc.

Pre-requisite knowledge: Students must be familiar with a.m., p.m., reading time when minute hand is at half past the hour, quarter the hour, days of the week, days in the year, 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: The 24-hour clock, Conversion of time	Suggested extra teaching aids: Wall clock or table clock and a 24 hours digital clock, etc. Touchpad Mathematics 5 pages 217–227

ENGAGE

Ask the class to pay attention. Show a 12-hour clock and a 24-hour digital clock in the classroom. Instruct: observe and read aloud the displayed time in both of the clock. Ask: Why there is difference in the timing of the clock. Accept the responses. Explain the reason behind it. Discuss the concepts given on "Warm Up" section and draw the clock hands as per the required timing on pages 217 and 218.

EXPLORE

Divide the class into 4 teams, and name them as 12-hours, 24-hours, minutes and seconds team.

Instruct one student from each team to tell the time as per their choice, and the other team will convert the time as per their team name and report the answer.

For example: 12-hours team select the time 7:55 p.m..

Then the 24-hours team convert it to 1955 hours with help of their team member and answer.

Similarly, minutes team will answer 475 minutes.

And seconds team will answer 28500 seconds.

In the same way, seconds team can select 35678 second and the other team convert into the time unit as per their name. Quick and correct responses from any team get rewarded with the score.

[Collaborative Learning]

EXPLAIN

We normally use the 12-hour clock to measure the time. But some organisation like the railways, the airlines, etc. use 24-hours clock. In 24-hours clock, we use four digits to show the time. The first two digits from the left show the hours and the last two digits from the left show the minutes.

A day starts at 12 midnight and is written as 0000 hours or 2400 hours.

12 o'clock at noon is expressed as 1200 hours.

Further, explain the conversion of 24-hour clock time to 12-hours clock time and vice versa by taking the references and examples given on pages 219 and 220.

Next, explain that to convert higher units of time to lower units, we use the multiplication and the relationship between different units of time as follows:

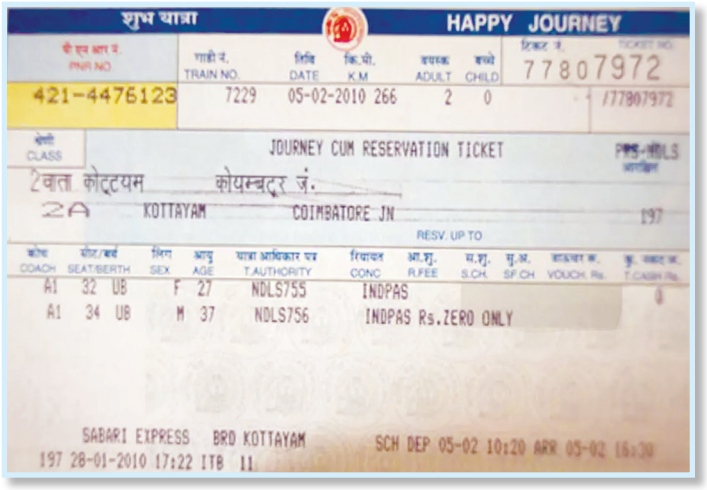
1 minute	=	60 seconds	1 fortnight	=	2 weeks = 14 days
1 hour	=	60 minutes	1 year	=	12 months
1 day	=	24 hours	1 year	=	365 days
1 week	=	7 days	1 leap year	=	366 days

Use the examples given on pages 222–224 for detailed explanation.

Similarly, to convert the lower units to higher units, we divide by using the above mentioned relationships. Demonstrate this concept on board by using the examples given on page 224.

ELABORATE

Bring any train/air ticket in the class to 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 05-02-2010 from Kottayam is 10:20, which means 10:20 a.m..

Here the first two digits show hour 10. It is less than 12, so no need to subtract 12 from 10. The last two digits show 20 minutes, so keep it as it is and suffix am to indicate the time between midnight to noon.

Hence, 10:20 = 10:20 a.m., which indicates morning time.

The arrival time on 05-02-2010 to Coimbatore Junction is 16:30, which means 4:30 p.m..

Here the first two digits show hour 16. It is more than 12, so subtract 12 from 16. 16 – 12 = 4. The last two digits show 30 minutes, so keep it as it is and suffix pm to indicate the time between noon to midnight. Hence, 16:30 = 4:30 p.m., which indicates evening time.

Also discuss the double number lines to represent the conversion and help the students to solve the questions.

[Experimental Learning]

EVALUATE

Classwork: Ask to solve Q.1–2 of Exercise 10A and Q.1 to Q.7 of Exercise 10B.

Homework: Ask to solve the remaining questions of Exercise 10A and 10B, except Q.4 of Exercise 10A.

ENHANCE

- Instruct to solve Q.4 of Exercise 10A, based on Railway time table.
- Further the teacher will give task to prepare a short article on the difference of GMT and IST with help of internet. **[Tech Connect]**

Periods: 4–8	Topic: Addition and Subtraction of Measures of Times	Suggested extra teaching aids: Wall clock or table clock, etc. Touchpad Mathematics 5 pages 227–231

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 p.m. 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 to 6 hours, 46 minutes and 33 seconds".

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.

	h	min	s
	①	①	
	11	15	49
+	6	46	33
	18	02	22

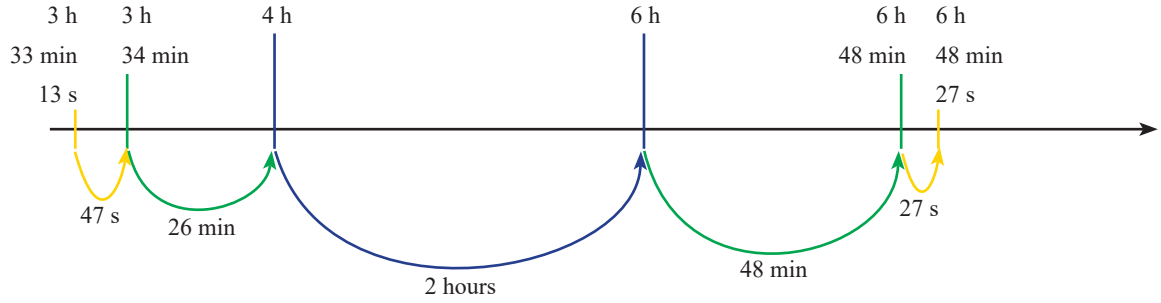


Further, demonstrate the difference between two times measured in hours, minutes and seconds. Find the difference between 6 hours, 48 minutes, and 27 seconds and 3 hours, 33 minutes, and 13 seconds.

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,

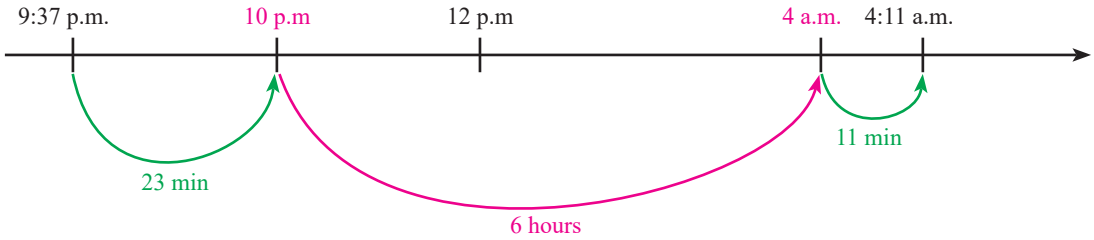
47 s + 26 min + 2 h + 48 min + 27 s = 2 h + 74 min + 74 s = 3 h + 15 min + 14 s (after regrouping)

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 pages 227 – 230. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q.1, 2, 4, 5 of Exercise 10C.

Homework: Ask to solve the remaining questions of Exercise 10C.

ENHANCE

- Watch the video on time on "www.orangehousewebsupport.co.in". **[Tech Connect]**

Periods: 9–10	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 5 pages 231–233

- Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts or queries and start the revision of the exercise.
- Help them to do the activity given in 'Fun Activity' on page 233.

[Cross curricular Learning]

- 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' answers. If they have any confusion or they make any error then explain and correct them. Discuss and motivate students to solve 'Mental Maths'.
- Discuss and motivate to solve 'HOTS' given on page 232.



MONEY

LEARNING OBJECTIVES

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

- understand the exchange of Indian currency with the currencies of some major countries
- recognise the use of money in real life
- exchange money of different denominations
- find the value of given quantities using the unitary method
- understand the concept of billing

LESSON PLAN

Suggested number of periods: 10

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, some dummy notes and coins of different denominations, etc.

Keywords: Money, Currency, Notes, Coins, Amount, Unit prince, Bill, Customer, Seller, etc.

Pre-requisite knowledge: Students must be familiar with different currency of the world as well as addition and subtraction of money, multiplication and division of money, etc.

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

Periods: 1–4	Topic: Application of Money in Real Life	Suggested extra teaching aids: Touchpad Mathematics 5 pages 234–236

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?
- What is the currency of USA?
- What is the currency of Japan?

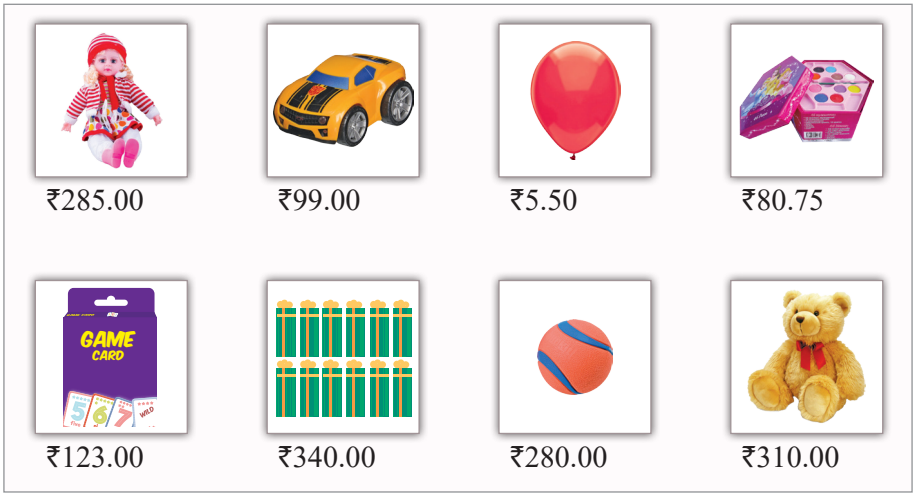
Accept their responses. Then, the teacher will revise the learners' previous knowledge about money with the help of "Warm Up" section of the book. Help students solve the questions given in 'Warm Up' section on pages 234–235 of the textbook. **[Holistic Learning]**



EXPLORE

Divide the class into pairs. Place some dummy notes and coins. Also, keep a catalogue of some articles.

Invite a pair of students one by one. Instruct one student to act as the seller and another as the buyer. Buyer has to select any item(s) and seller will calculate the amount. The seller ask the buyer to pay the amount, and he will deliver the items to the customer's home. The buyer will check the amount and pay using dummy notes/coins. If there is any change, the seller will give it to the buyer.



Monitor the 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 page 235 for explanation and examples of application of money in real life.

[Conceptual Understanding]

ELABORATE

Demonstrate the solution of examples given on page 235 of the textbook on application of money.
Hence, motivate students to solve questions given in the book.

EVALUATE

Classwork: Ask to solve Q.1, 3 of Exercise 11A in the classroom.
Homework: Ask to solve remaining questions of Exercise 11A.

ENHANCE

Ask students to explore which modes of payment people use these days. **[Cross-curricular Learning]**

Periods: 5–6	Topic: Unitary method	Suggested extra teaching aids: Some real-life objects, Touchpad Mathematics 5 pages 236–238

ENGAGE

After the introduction, ask from the class, if cost of 1 pencil is ₹5, then what is cost of 10 such pencils. Accept the answers. Introduce the topic "Unitary method".

EXPLORE

Write a situation on the board.

"I bought 20 bananas and paid ₹100 to the shopkeeper. When I reached home, my mother asked me to bring 10 more bananas. I returned to the market to buy 10 more bananas. How much more money do I have to pay the shopkeeper for 10 bananas?"

And write some questions based it on board. Like:

How much bananas I bought? _____

How much I paid for this? _____

To pay for 10 more bananas what do I need to know? _____

How would I know the rate of bananas? _____

And ask students to answer those questions, with help of each other in their notebook.

At the end teacher will explain the answers and students will match with their own. The student who solve all or the maximum will be appreciated. **[Conceptual Learning]**

EXPLAIN

The method of finding the value of one article, when the value of some articles is given, is called the unitary method. The price of 1 item is called the unit price.

ELABORATE

Demonstrate on board the unitary method and its requirement in real-life by using the examples 1, 2, 3 and 4 given on page 237 of the textbook. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q.1 and Q.2 (*a*) to (*e*) of Exercise 11B in the classwork notebook.

Homework: Ask to solve the remaining questions of Exercise 11B as their homework assignment.

ENHANCE

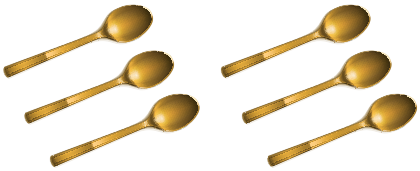
- Ask to download some worksheets based on unitary method from the internet and solve them.

Periods: 7–8	Topics: Billing	Suggested extra teaching aids: Touchpad Mathematics 5 pages 238–240

ENGAGE

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.

[Critical Learning]

EXPLORE

Divide the class in small groups, ask them to perform the activity as suggested in 'Fun Activity' section on page 242.

[Collaborative and Experiential Learning]

EXPLAIN

Explain about the bill by showing a real bill of any purchase, and show how the final or total amount is to be calculated. The teacher can also take the reference of pages 238–239 of the textbook.

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 can 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: Ask to solve Q.1 and 2 of Exercise 11C.

Homework: Ask to solve remaining questions of Exercise 11C.

ENHANCE

Introduce GST and explain its various rate on different items and ask to calculate find billing amount after GST.

Periods: 9–10	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 5 pages 240–242

- Make students comfortable, so that they can ask any question on any previously taught topics. Clarify their doubts and queries and start the revision of the exercise.
- 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 Maths' and 'HOTS' given on page 241.



DATA HANDLING

LEARNING OBJECTIVES

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

- understand the meaning of data handling
- know about collection of information
- read the information displayed through a pictograph, bar graph and circle graph
- represent data through a pictograph, bar graph and circle graph

LESSON PLAN

Suggested number of periods: 8

Suggested Teaching Aids: Textbook Touchpad Mathematics 5, blackboard or whiteboard, some charts, etc.

Keywords: Data, Collection, Key, Bar graph, Circle graph, Pie chart etc.

Pre-requisite knowledge: Students must be familiar with data and its collection together the information, tabular form of data, pictograph, reading bar graph, etc.

NEP feature: The way of teaching provides experimental 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	Topic: Pictograph	Suggested extra teaching aids: Chalk, marker, duster, etc. Touchpad Mathematics 5 pages 243–248

ENGAGE

After introduction, ask some questions based on data handling that they are already learnt in their previous classes. like:

- What is data?
- How can we represent data?
- Why do we organise it?
- Suppose teacher wants to compare the performance of the students of Class V in various subjects, what will he/she do?

Accept the responses. Discuss 'Warm Up' section given on pages 243–244, respectively. Introduce the topic 'Pictograph'.



EXPLORE

Divide the class into groups. Instruct them to collect information about the favourite games of their classmates and draw a pictograph under the guidance of the teacher on the board for the collected data.

Ask question based on pictograph like: How many children like football? Which game do they like least? Which game do they like most? Accept the responses.

EXPLAIN

When we use pictures or symbols to represent information, we call it pictorial representation or pictograph of the given information.

A pictograph helps us to compare information.

Every pictograph must have the following:

- Title: The title tells us what information the pictograph gives.
- Key: The key tells us the meaning and the value of the picture or symbol.

ELABORATE

Demonstrate examples of drawing, reading and interpreting pictographs on board using the references given on pages 244–245.

EVALUATE

Classwork: Ask to do Q.2 and 4 of Exercise 12A. If students make any error, teacher will correct and explain it.

Homework: Ask to solve the remaining questions of Exercise 12A.

ENHANCE

- Ask students to create a pictograph on a topic that interest them. For example, number of hours they spend on their hobbies, favourite TV show, etc.

Periods: 3–4	Topic: Bar graph	Suggested extra teaching aids: Chalk, duster, square grid paper, colour pencils/ crayon, etc. Touchpad Mathematics 5 pages 248–250

ENGAGE

Call two students from the class and ask them to collect the data within the class about favourite fruits of all students. Accept the responses. Introduce how can we represent this data using bar graph.

EXPLORE

Distribute square grid paper in the classroom. Instruct each group to collect the data within the class about favourite fruits, favourite sweets or favourite subjects, etc. of each student. Accept the responses and instruct each group to represent the collected data in bar graph on a paper sheet/board.

Ask: How many children like (fruits name/sweet name/ subject name) the most? Which fruit name/sweet name/subject name do they like least? Accept the responses. **[Experimental and Collaborative Learning]**



EXPLAIN

When the numeric data is represented using rectangular bars of different heights, it is called a bar graph. It is a very effective way of representing data graphically. A bar graph also helps us to compare information. In bar graph we represent data using rectangular bars of equal width. On a bar graph, the bars have equal spaces between them.

Further explain the method of drawing a bar graph to represent the data. Explain that a bar graph has: (*i*) a title (*ii*) horizontal and vertical axes (*iii*) labels on both the axes.

ELABORATE

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 the vertical axes.

(*c*) the labels explaining the meaning of each bar.

(*d*) the scale that is chosen for given data.

Focus on these terms and finding the solution by reading the bar graph through examplse given on pages 248–249 of the textbook.

Further, demonstrate drawing a bar graph for the given data by using the reference given on pages 248–249 of the textbook. **[Conceptual Learning]**

EVALUATE

Classwork: Ask to solve Q1 and 3 of Exercise 12B.
Homework: Ask to solve Q2, 4 and 5 of Exercise 12B.

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. Demonstrate the interpretation of those bar graphs.

[Collaborative Learning]

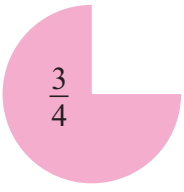
Periods: 5–6	Topic: Circle graphs	Suggested extra teaching aids: Cut-out/drawing of Circular parts, etc. Touchpad Mathematics 5 pages 250–253

ENGAGE

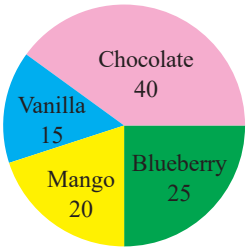
Recall the fraction by showing part of the whole as follows:







And show that if we collect data of 100 students for their favourite flavour of ice-cream as we done earlier, we can also represent this data as shown here, knowing as circle graph or pie graph or chart.





EXPLORE

Write the names of any four fruits (say, apple, banana, mango, orange) on board. Collect information about the favourite fruit among these as a table as follow:

Favourite fruit	Number of students
Apple	
Banana	
Mango	
Orange	

Ask students to find the fraction or each of given fruit in their notbook. After finding the fractions for each of the given fruit in their notebook, ask students to try to divide a circle as per these fraction with the help of each other. **[Experimental and Collaborative Learning]**

EXPLAIN

Circle graph or pie chart is another way to represent data graphically. Circle graphs show different parts of an information putting together in the form of a whole. In a circle graph (pie chart), a circle is divided into sectors (slices). Each sector represents a different part of the data as a fraction of the complete circle. The size of each sector shows, what part of the whole it is.

For constructing a circle graph for given data, first find the fractional part for each in the whole, and then construct the circle graph accordingly.

ELABORATE

Demonstrate on the board, the method of constructing the circle graph in detail by using the methods and examples given on pages 250–252. **[Conceptual Learning]**

EVALUATE

Classwork: Discuss Q.1 of Exercise 12C in the classroom.

Homework: Ask to do Q2 and 3 Exercise 12C as homework assignment.

ENHANCE

- Ask to solve 'HOTS' given on page 255. **[Critical Thinking]**

Periods: 7–8	Topic: Revision	Suggested extra teaching aids: Touchpad Mathematics 5 pages 253–256

- Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Clarify their doubts/queries and start the revision of the exercise.
- Start the revision of the exercise by using 'Points to Remember' and 'Learning Logs'.
- Discuss questions of the 'Learning Logs' and accept students' answers. If they have any confusion or do any error, then explain and correct it.
- Motivate students to solve 'Mental Maths' quickly.