

3

# MATH GENIUS

Think Smart, Solve Fast

Ver. 2.0 >



## Lesson Plan

Experience the Joy of Learning Mathematical Skills



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# PREFACE

The Teacher's Resource Manual is specially developed for teachers using **Math Genius!** 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 teachers' community will be gratefully acknowledged by us.

—Publisher



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# Numbers up to 9999

## Learning Objectives

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

- ◆ build, read and write 4-digit numbers
- ◆ represent 4-digit numbers on an abacus
- ◆ tell the place value and face value of a digit in 4-digit numbers
- ◆ write expanded form and standard (short) form of numbers
- ◆ round off the numbers to the nearest tens
- ◆ compare and order 4-digit numbers
- ◆ form the greatest and smallest numbers
- ◆ read and write roman numerals

## LESSON PLAN

**Suggested number of periods:** 20

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, dienes blocks up to 9999, some real-life objects like clock, pen, pencils, etc.

**Keywords:** Smallest and greatest 3-digit numbers, smallest and greatest 4-digit numbers, successor, predecessor, even and odd numbers, rounding up, rounding down, Roman numerals, Hindu-Arabic numerals.

**Pre-requisite knowledge:** Students must be familiar with numbers up to 999, their number names, the smallest and greatest 3-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.

**Materials required:** Number/Flash Cards, Spike abacus, number and Place value chits, A-4 size sheet.

**Periods:** 1–2

**Topics:** 4-digit numbers and counting by thousands

**Suggested extra teaching aids:** dienes blocks, Math Genius 3 pages 8–9

### ENGAGE

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

- Who tells me which year is going on?
- How many digits are in the year?

You can also use the “Get ready” and “Let’s recall” sections of the book for this purpose.

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

- Which is the smallest 3-digit number?
- Which is the greatest 3-digit number?

## EXPLORE

- The teacher will revise the learners' previous knowledge of 3-digit numbers with the help of the following game.
- Divide the class into 2 teams. Ask 3 children from Team A to step forward in the front of the class.
- The 3 children will consult among themselves and decide how to present a number, say, 207.
- The first child from Team A will clap twice, the second child will not clap, and the third child will clap seven times.
- The members of team B will have to guess the number.
- Then the teacher will ask some questions from members of Team B like—the number name of the number formed; the place/face value of each digit.
- For every correct answer they will be awarded a point.
- The teacher can change the role of teams.

[Collaborative Learning]

## EXPLAIN

Write on the board 999 → Greatest 3-digit number.

Explain to the class that the combination of 9 flats (Plates), 9 rods and 9 small cubes represents the number 999.

When we add 1 more small cube, *i.e.*, number 1 to 999, we get 1000, it is the smallest 4-digit number.

$$\begin{array}{r} 999 \rightarrow \text{greatest 3-digit number} \\ + \quad 1 \\ \hline 1000 \rightarrow \text{smallest 4-digit number} \end{array}$$

Explain that, as 10 small cubes make 1 rod, 10 rods make a flat (Plate) and 10 flats make a large cube, so we use a large cube to represent 1000.

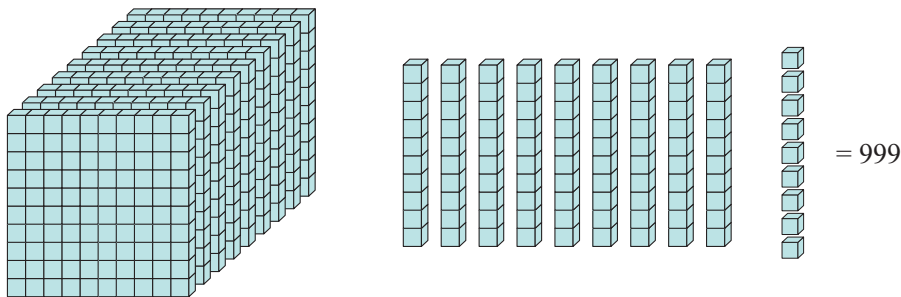
Also, tell them that a 4-digit number starts from the thousands place in the place value chart.

Next, introduce the topic, counting by thousands:

Represent 1000, 2000, 3000, ..., 9000 by large dienes cubes. Explain use of comma to separate the thousands digit from the other digits and the number names of each.

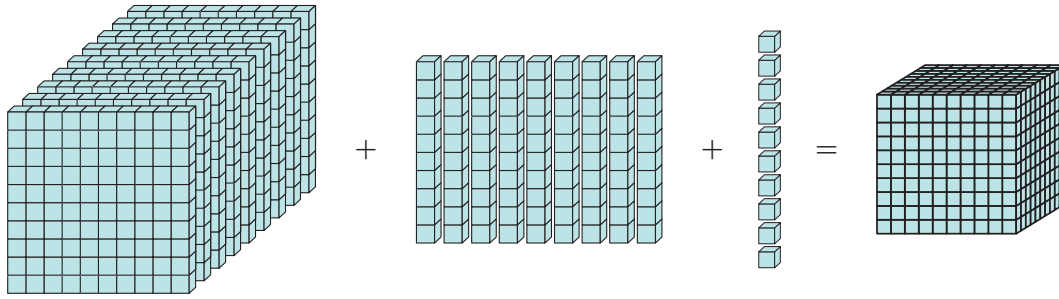
## ELABORATE

Represent the number 999 on the table using the dienes block.



Now, put one more ones cube in the combination and let the class try to identify the number shown by the combination.





Tell the class that the number represented by the combination is now 1000.

The number 1000 is represented by a large cube of dienes blocks.

And a new period, the thousands period appears in the place value chart with the introduction of 4th place called thousands place starting from right.

Thousands Period	Ones Period		
Thousands	Hundreds	Tens	Ones
1	0	0	0

Put a thousand cube on the table alongside the previous one and ask the students, about the number of cubes. And explain to them, by writing on the board, that it represents 2000.

Keep adding thousands-cube on the table and writing the corresponding numbers on the board till 9000.

Once this has been introduced to the students using concrete experience, introduce use of comma for thousands period then read the number names of each.

[Experiential Learning]

## EVALUATE

- Which is the smallest 1-digit number?
- Which is the greatest 1-digit number?
- Which is the smallest 2-digit number?
- Which is the greatest 2-digit number?

## ENHANCE

Ask students to watch the video on [www.orangehousewebsupport.co.in](http://www.orangehousewebsupport.co.in), [https://www.youtube.com/watch?v=jgtLtk\\_P\\_BY](https://www.youtube.com/watch?v=jgtLtk_P_BY)

Periods: 3–6	Topics: Building, reading, and writing 4-digit numbers and their representation on the Abacus	Suggested extra teaching aids: abacus set, dienes blocks, number cards, Math Genius 3 pages 10–13
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## ENGAGE

CG-1 C-1.1

First, ask some questions based on the previous concepts.

Like: Show 3 or 5 large dienes cubes on the table and ask the students, which number it shows, and instruct them to write the number on the board using comma, also the number names.

### Introduce the topics:

- the building of 4-digit numbers.
- reading and writing of 4-digit numbers.
- 4-digit numbers on the abacus.

Show an abacus with four spikes to the class.

## EXPLORE

- Three children will be lined up each holding a number card 9. The teacher will ask the students to state the number name. Next, a student holding the number card 1 will be asked to stand next to 9 in the ones place. The teacher will demonstrate how adding 1 to the greatest 3-digit number results in the smallest 4-digit number. Thus, with the help of digit flash cards and the blackboard work, 4-digit numbers will be introduced.
- Using the explanation given on Page 8, the teacher will explain how numbers progress from 2-digit to 3-digit and from 3-digit to 4-digit. With this, the new place called the ‘Thousands’ place will be introduced to the students. Further digit cards will be used to show different 4-digit numbers. The spike abacus will be used to physically show how we get the smallest 4-digit number by adding 1 to the greatest 3-digit number. Refer to Page 11 for the same.
- Explain the position of thousands place in the place value chart.

### Reading, Writing and Representing 4-Digit Numbers

- The teacher will write a few 4-digit numbers on the blackboard and encourage students to read and write the number name. She will use the 4 spikes on the abacus to show some numbers and encourage the students to tell the numeral formed. Focus on numbers with zeros in them.
- Refer to Pgs. 10-11 to further clarify the concepts.

## EXPLAIN

Explain to the class that groups of ones, tens, hundreds and thousands are used to build a 4-digit number.

Next, explain to the class about building of 4-digit numbers with an example. By taking the blocks of 4 thousands, 3 hundreds, 2 tens and 6 ones i.e.,  $4000 + 300 + 20 + 6$ , we form the number 4326.

Give some examples of 4-digit numbers, and ask the students to practise writing them on the place value chart and also their number names.

Explain to the class that while reading the 4-digit numbers first read the thousands and hundreds digits separately with their place name and then the tens and ones digits together normally.

Use different examples to explain the method of reading 4-digit numbers.

Explain that an abacus with four spikes is used for representing a 4-digit number.

## ELABORATE

Draw a place value chart on the board.

- Write a 4-digit number in it, say 4326 and ask a student to identify the ones, tens, hundreds and thousands in it.
- Use 4 thousands–cubes, 3 hundreds–flats, 2 tens–rods and 6 ones–cubes to represent the number 4326.
- Also show the expanded form as:  $4000 + 300 + 20 + 6 = 4326$ .
- Guide them to write the 4-digit numbers in the place value chart.
- Also, write the number 4326 in words on the board and get the class to read them aloud.
- Repeat the above for some other 4-digit numbers. **[Conceptual Understanding]**

Write some more 4-digit numbers in the place value chart.

Now, read the numbers one by one in the chart pointing its digits and ask the class to repeat them aloud after you.



Write a 4-digit number, say 5308 on the board.

Take an abacus with four spikes and keep it on the table. Now make the number 5308 by using the beads on the abacus.

Next represent some more 4-digit numbers on the abacus and ask the class to read them aloud.



[Experiential Learning]

## EVALUATE

**Classwork:** Ask to solve Q.1 and 2 of Practice Time 1A.

**Homework:** Ask to solve Q.3, 4 and 5 of Practice Time 1A.

## ENHANCE

- Ask the students to watch the video on the given topics on “www.orangehousesupport.co.in”.
- Motivate the students to solve the “Think Tank” given on this topic on page no. 11.

**Periods:** 7–8

**Topics:** Face value and Place value,  
Expanded and Standard form of a 4-digit  
number

**Suggested extra teaching aids:**  
newspaper, dienes blocks,  
Math Genius 3 pages 13–15

## ENGAGE

**CG-1 C-1.1**

After asking some questions based on the previous concepts, recall the concept of face value and place value of digits in a number.

- **Introduce the topic:** expanded form and standard (short) form.

## EXPLORE

Take some paper slips and write a different 4-digit number on each slip.

Put these number slips in a bowl.

Divide the class into groups of 3-4 students and call a group near the bowl. Ask the students of a group to choose a slip from the bowl and read the number aloud.

Then ask them to split the number into thousands, hundreds, tens and ones.

Let them read out the place value of each digit in the number.

[Experiential Learning]

- **Newspaper activity:** Place value–Students will be asked to bring 2 cut-outs each of 3-digit and 4-digit numbers from old newspapers and magazines and paste them in the notebook. They will be asked to write their number names and their expanded forms.

## EXPLAIN

After recalling the concept of face value and place value of a digit in a number, explain that the face value of a digit does not depend upon its position in the number, while the place value of a digit in a number depends upon its position. Make them understand the place value of zero in a number is always zero even if it is written at any place.

Recall that when a number is written as the sum of the place values of its digits, the number is said to be in its expanded form and when we write a number without showing the place value of its digits, the number is said to be in standard form or short form. Like:

$$\begin{array}{ccc} 7584 = 7000 + 500 + 80 + 4 \\ \downarrow \qquad \qquad \downarrow \\ \text{Standard} & \text{Expanded} \\ \text{(Short) form} & \text{form} \end{array}$$

## ELABORATE

The face value of a digit is the value of the digit itself.

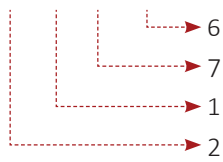
The place value of a digit in a number is the value of the digit by its place.



It is obtained by finding the product of the face value of the digit and the value of its corresponding place in the number.

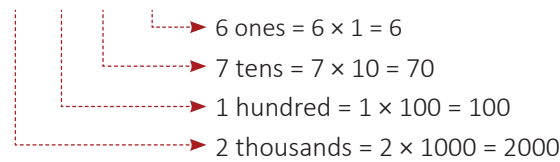
### Face Value

Th	H	T	O
2	1	7	6



### Place Value

Th	H	T	O
2	1	7	6



**[Conceptual Learning]**

Divide the class into groups and give more practice of expanded form and short form of numbers using arrow cards.

- Encourage the students to find the expanded form of different numbers.
- Help them to find the place, place value and face value of each digit of the number and then express the number in its expanded form as well as short form.

## EVALUATE

**Classwork:** Ask the students to solve Q.1 of Practice Time 1B.

**Homework:** Ask to solve Q.2, 3, 4 and 5 of Practice Time 1B.

## ENHANCE

Ask to watch the video on the given sub-topics on “[www.orangehousewebsitesupport.co.in](http://www.orangehousewebsitesupport.co.in)”.

**Periods: 9–10**

**Topics: Comparing numbers, greatest and smallest numbers**

**Suggested extra teaching aids:  
Math Genius 3 pages 15–17**

## ENGAGE

**CG-1 C-1.1**

Before introducing comparison of numbers. Review comparison of numbers up to 999.

- **Next introduce the topic:** greatest and smallest numbers.

## EXPLORE

- The teacher will explain that the word compare means to note the similarity or dissimilarity between two things. She will use examples from real life and ask the students to compare. For example, whether the maths or the English book is heavier, whether the almanac or their Hindi book is longer, who is taller—their mother or father? etc.
- Once the students understand the term comparison, using the explanation given in Book Pgs. 15 to 17, they will be explained how numbers are compared. Revise the rules of comparison.

## EXPLAIN

Recall the students how they can compare the numbers with the help of the symbols ( $>$ ,  $<$  and  $=$ ). Then explain the rules for comparing larger numbers. Tell them that larger numbers can also be compared in the same way as smaller numbers.

First, explain when the numbers have different numbers of digits.

Then, explain the comparison of numbers having the same number of digits.

Explain to the class the method of finding the greatest or the smallest number in a group of three or more numbers.

## ELABORATE

- Begin with numbers with different numbers of digits, for example,  $6412 > 986$ .



- Next, introduce comparison of 4-digit numbers having the same number of digits, for example, 6585 and 7120, telling the class that here, the thousands place digits are different.

Since 6 thousands  $<$  7 thousands, so  $6585 < 7120$ .

Now, introduce the comparison of 4-digit numbers where thousands digits are the same but the hundreds digits are different, for example, 6855 and 6321.

Since 8 hundreds  $>$  3 hundreds, so  $6855 > 6321$ .

Next, introduce the comparison of 4-digit numbers where thousands and hundreds digits are the same, for example, 4729  $>$  4716.

In the same way, introduce the comparison of 4-digit numbers where digits at thousands, hundreds and tens places are the same only the ones digits are different.

Use different coloured chalks to highlight the different places.

[Experiential Learning]

Play a simple game of guessing the biggest number as follows:

Write three different numbers, for example, 7839, 999 and 5326 in the place value chart on the board.

Ask the class “which one is the smallest number?” and accept the correct answer and cross the number on board.

Next, ask them to find the bigger of two numbers, by comparing them as discussed above. Accept the correct answer.

Tell the students that the number 7839 is the greatest and 999 is the smallest number in the given group.

Repeat the same for the other group of numbers.

[Experiential Learning]

## EVALUATE

**Homework:** Ask to solve Q.1 and 2 of Practice Time 1C.

## ENHANCE

Ask to watch the video on the given subtopics on “[www.orangehousewebsitesupport.co.in](http://www.orangehousewebsitesupport.co.in)”.

Period: 11

Topic: Ordering of numbers

Suggested extra teaching aids:  
number chits and bowl  
Math Genius 3 pages 17–18

## ENGAGE

CG-1 C-1.1

After the introduction, recall the meaning of ascending order and descending order of numbers with some examples.

- **Introductory Activity:** 5-6 students will be asked to step out. Then the teacher will call a child and instruct her/him to line them up in the increasing/decreasing order of their height.
- The teacher will then help the students to recall the terms ascending and descending order. She can draw the students’ attention to the letter ‘d’ which is common for both descending and decreasing order. This will work as an aid so that they do not get confused between ascending and descending order.
- Refer to Pgs. 17-18 to explain ascending and descending order for 3/4-digit numbers.

## EXPLORE

Prepare five number chits with a different 4-digit number on each and put them in a bowl. Put the bowl on the table and call a group of five students near the table. Ask each student in the group to choose a number chit. At the start signal, ask the students in the group to arrange themselves in a straight line according to the ascending order of their numbers. Ask them to do this for arranging numbers in descending order.

Repeat the activity for different groups.

[Collaborative and Experiential Learning]

## EXPLAIN

Explain how to write numbers from the smallest to the greatest for arranging numbers in ascending order and from the greatest to the smallest for arranging numbers in descending order.

## ELABORATE

Write four numbers on the board: for example, 2,937, 6,543, 1,359 and 5,023.

Looking at the thousands place digits, 2, 6, 1 and 5; we find that  $1 < 2 < 5 < 6$ .

Thus, the four numbers in ascending order will be arranged as:

$$1,359 < 2,937 < 5,023 < 6,543$$

Th	H	T	O
2	9	3	7
6	5	4	3
1	3	5	9
5	0	2	3

→ Greatest  
→ Smallest

↓  
All digits are different

## EVALUATE

**Homework:** Ask to solve Q.3 and 4 of Practice Time 1C.

## ENHANCE

Ask the students to search internet and list ODI runs scored by the top 5 Indian batsmen.

**Periods:** 12–13

**Topic:** Forming the greatest and smallest numbers

**Suggested extra teaching aids:**  
pencil of different lengths.  
Math Genius 3 pages 19–20.

## ENGAGE

**CG-1 C-1.1**

Brief some previously taught topics and ask some questions based on them like ascending order and descending order, etc. Next, introduce forming the greatest and smallest number by using given digits.

## EXPLORE

- The students will be asked to work in pairs. The teacher will instruct each pair to take at least 5 pencils/ colour pencils of varying sizes. Since the students are already familiar with the concept of ascending/ descending order, they will first be instructed to line up the pencils, for example, in ascending order.
- The teacher will then draw their attention to the fact that to line up pencils in ascending order, we need to arrange pencils in increasing order w.r.t. their lengths. Thus, we place the smallest pencil first and then the next longer pencil and so on. The last pencil to be placed is the longest among all the 5 pencils. Using, this analogy, the teacher will explain that to form the smallest number we begin with the smallest number among the given set of numbers. The opposite of this will be done when explaining formation of the greatest number.

## EXPLAIN

- Refer to the explanation given on page 19 for formation of the greatest/the smallest numbers using the given set of digits.
- Highlight the fact that to build the greatest number, write the digits in decreasing order. To build the smallest number, write the digits in increasing order.
- Emphasise on the fact that they must never begin the smallest number with a '0' from the given digits. The '0' occupies the second place from the left.
- Next, explain how to form the greatest/the smallest numbers by repeating the digits.
- Draw their attention to the fact that while forming numbers, commas are not put after every digit. The commas are placed according to the periods.

## ELABORATE

Write four digits, say 1, 9, 8 and 2 on the board, and ask the students to arrange them in descending order. After accepting their answers, write on the board: the greatest 4-digit number using digits 1, 9, 8, and 2 is 9821.

Similarly, ask the students about the ascending order of the same given digits and write on the board: the smallest 4-digit number using the digits 1, 9, 8, and 2 is 1289. Ask students to copy the digits and their ascending order, descending order and the greatest and smallest number on their notebook.

Also, explain them while forming numbers, if one of the given digits is a zero (0) then, to form the greatest number, we simply arrange the given digit in descending order

To form the smallest number, we place '0' at the second highest place from the left and arrange the remaining digits in ascending order. Like with digits 7, 9, 0 and 3:

The greatest 4-digit number is 9,730.

The smallest 4-digit number is 3,079.

[Conceptual Understanding]

## EVALUATE

**Homework:** Ask to solve Q.1 and 2 of Practice Time 1D.

## ENHANCE

Ask the students to solve the questions given in “Think Tank” on page 19.

Period: 14

Topic: Successor and Predecessor

Suggested extra teaching aids:  
pens, pencils, etc.  
Math Genius 3 pages 20–21

## ENGAGE

CG-1 C-1.1

After the introduction, give some real-life examples of the concept “before and after” and then link this to the successor and predecessor.

## EXPLORE

Divide the class into two groups.

- Call two students from each group at a time to perform the activity.
- The first student reads out a number and the other student gives its successor and predecessor.
- Now, it is the turn of the second student. The second student also reads out a number and the first student gives the successor and predecessor of it.
- If the student gives the responses correctly, he/she will score 2 points for the team in that round.
- Repeat the same for other students also.

[Collaborative Learning]

## EXPLAIN

Explain to the class that the successor of a number is 1 more than the number and the predecessor of a number is 1 less than the number.

## ELABORATE

The number that comes just after the given number is called its successor. To find the successor of any number, add 1 to that number.

For example, the successor of 709 is  $709 + 1 = 710$ . Similarly, the predecessor of 709 is  $709 - 1 = 708$ . Explain, the successor and predecessor of some more three and four-digit numbers by referring page 20.



## EVALUATE

**Classwork:** Ask to solve “Think Tank” given on page 21.

**Homework:** Ask to solve Q 1 of Practice Time 1E.

## ENHANCE

Ask the students to write 2-3 questions based on predecessor/successor in their notebook. For example,

- (a) Which number has 1111 as its successor?
- (b) Is the predecessor of every 4-digit number always a 4-digit number?
- (c) Tell the predecessor and successor of the smallest/greatest number that can be formed using digits 3, 0, 4, 1 and so on.

Divide the class in pairs and tell them to ask the questions to each other.

**Period: 15**

**Topic: Even and Odd Numbers**

**Suggested extra teaching aids:  
concrete items—pencil, erasers, etc.  
Math Genius 3 pages 21–22**

## ENGAGE

After the introduction, put some real-life objects like pencils or erasers and ask from students to count them. Then link this to even and odd numbers.

## EXPLORE

Tell the students to write some information like Roll Number, Marks obtained in last exam, number of favourite cartoon channels, house number, etc. in their notebooks. Instruct them to decide whether the numbers listed are odd or even.

## EXPLAIN

Explain that the numbers which can be put into pairs are called **even numbers** and which cannot be put into pairs are called **odd numbers**.

## ELABORATE

- Begin with some countable objects, for example, 9 pencils. Put these pencils into pairs and explain to the class that since with 9 pencils only four pairs are formed and one pencil is left unpaired, 9 is an odd number.
- Again, take 12 erasers and put them into pairs. Explain the class since with 12 erasers, 6 pairs are formed and no erasers are left unpaired, so, 12 is an even number.

Thus, we can say that all numbers ending with 0, 2, 4, 6 or 8 are even numbers and all numbers ending with 1, 3, 5, 7 or 9 are odd numbers.

**[Experiential Learning]**

## EVALUATE

**Classwork:** Ask the students to write examples of even and odd numbers on the board for 2-digit, 3-digit and 4-digit numbers.

**Homework:** Ask students to solve Q. 2, 3 and 4 of Practice Time 1E.

## ENHANCE

Ask the students to check whether the vehicle numbers their parents have are even or odd. If ‘Odd/Even Formula’ is adopted to control traffic in their city, on which dates can their vehicles run on the road?



**ENGAGE****CG-1 C-1.1**

Begin with a discussion about real-life situations where rounded numbers are used. For example, about 1500 people came for the annual day function.

- Approximately, 250 athletes participated in the marathon.
- The approximate cost of a toy car is ₹100.

**EXPLORE****Rounding-off Numbers**

- The teacher should draw the attention of the children quoting examples from real life where we use rounded off numbers. For example, the headline in the newspaper says “20,000 people watched the India-Australia cricket match”. Here, 20,000 is not an exact figure but a figure that is close to the exact figure.

**Rounding off to the nearest 10**

- To round off a number to the nearest 10, we use the nearest multiples of 10. We should look at the two tens between which the given number lies.
- Refer to Pgs. 22-23 to further clarify the topic.

**Newspaper Activity:** Children will be asked to bring the headlines from the newspaper having rounded off numbers and paste the same in their notebook.

Beyond the classroom: Value of reading newspapers will be emphasized with the help of newspaper activity.

**EXPLAIN**

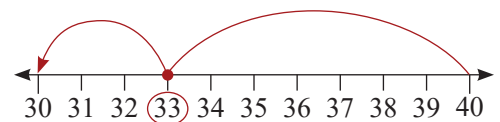
Begin with a discussion about real-life situations where rounded numbers are used. For example, there are about 40 students in class III, there are about 60 teachers in a school, etc. Emphasize the word ‘about’ and explain its meaning. Discuss the method of rounding off the numbers to the nearest 10.

- Explain the difference between ‘rounding up’ and ‘rounding down’.

**ELABORATE**

Draw a number line on the board.

Teach the rules of rounding up and rounding down to the nearest by pointing out a number on the number line.



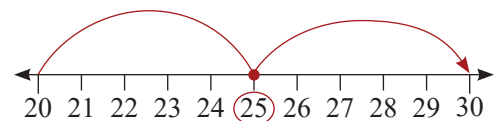
Identify the two tens between which 33 falls. The two tens are 30 and 40. Draw a number line showing the numbers from 30 to 40.

We observe that 33 is closer to 30 than 40.

So, 33 is rounded to 30. It is called rounding down as 33 is rounded down to 30.

Again give examples of numbers like 36, 38 where we require rounding up.

Next, discuss about the numbers like 25, which falls exactly in the middle of the two tens.



Draw a number line showing the numbers from 20 to 30.

Looking at the number line, it is clear that 25 is exactly midway between 20 and 30.

So, 25 is rounded up to 30.



Ask the children to observe the digits in the ones place of some more numbers and round off these numbers to the nearest 10. [Experiential Learning]

## EVALUATE

**Classwork:** Ask the students to solve Q.1 of Practice Time 1F.

**Homework:** Ask the students to solve Q.2, 3 and 4 of Practice Time 1F.

## ENHANCE

Ask the students to read, understand and remember the content given on page 23 under the tag “Math Insight”.

<b>Period: 18</b>	<b>Topic: Roman Numerals</b>	<b>Suggested extra teaching aids: clocks, books, matchsticks, etc. Math Genius 3 pages 23–25</b>
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## ENGAGE

**CG-1 C-1.1**

Begin with a discussion about real-life objects, where we use Roman numerals. Like the dial of the clock, etc.

## EXPLORE

Roman numerals will be introduced. Children will be briefly told about the history of Roman numerals.

The numeric system represented by Roman Numerals originated in ancient Rome and remained the usual way of writing numbers throughout Europe for many years. This numeric system utilizes a series or combination of alpha-characters, or letters, which represent numeric values. These letters, when arranged in the correct order, are designed to represent a sophisticated counting system. These were used in the Roman Empire for trading and commerce.

## EXPLAIN

Have discussion with students about the Roman Numerals’ rules of forming Roman numerals.

- Rules for writing Roman Numerals is discussed on Pg. 24.

## ELABORATE

Show the chart of Roman numerals in the classroom.

The symbols that we use today to write numbers are called Hindu-Arabic Numerals.

However, a long time ago, there was another system of representing numbers called the Roman Numerals. This system started in ancient Rome.

In this system, seven letters of the alphabet are used as basic symbols. In this class, we consider only four symbols as given below:

<b>Roman numerals</b>	I	V	X	L
<b>Hindu-Arabic numerals</b>	1	5	10	50

A combination of these letters, when arranged in the correct order, represents a counting system in Roman numeral.

**Some rules to represent the Roman numerals are as follows:**

**Rule 1:** If a symbol is repeated, its value is added as many times as it occurs.

For example, II = 1 + 1 = 2, XX = 10 + 10 = 20.

**Rule 2:** If the smaller numeral is to the left of the bigger numeral, subtract it from the bigger numeral.

For example, IV = 5 – 1 = 4, XL = 50 – 10 = 40.

**Rule 3:** If the smaller numeral is to the right of the bigger numeral, add the two numerals.

For example, XI = 10 + 1 = 11.

**Rule 4:** If the smaller numeral is in between two numerals of greater value, subtract the smaller numeral from the greater numeral to the right. For example,

XIV = 10 + (5 - 1) = 10 + 4 = 14.

[Conceptual Learning]

## EVALUATE

**Classwork:** Ask the students to note down Roman numerals to their notebooks.

Discuss in the classroom and ask to solve the question given in “Think Tank” on page 24.

**Homework:** Ask to solve Q.1, 2, 3 of Practice Time 1G.

## ENHANCE

- Ask the students that only I, X, C and M can be repeated maximum three times to write Roman numerals.
- Ask the students to prepare a beautiful chart on Roman numerals up to 30 by using matchsticks.

[Art Integration]

Periods: 19–20

Topic: (Revision)  
Chapter assessment

Suggested extra teaching aids:  
Math Genius 3 pages 25–28

## ENGAGE

Make students comfortable, so that they can ask any question on any previously taught topics. And start the revision of the exercise.

## EXPLAIN

Start the revision of the exercise by using ‘Mind Map’, ‘Chapter Assessment’, ‘Challenge Question’, ‘Mental Maths’ and ‘MATHS FUN’. Also guide them to perform the activity given in the ‘Gamified Learning’ in the classroom.

## ELABORATE

Discuss questions 1 to 5 of the ‘chapter assessment’ and accept students’ answer. If there is any confusion or error, then explain and correct it. Discuss ‘Challenge Question’ and motivate students to solve ‘mental maths’. At last guide the students to do the activity of ‘Gamified Learning’ given on page 28.

## EVALUATE

**Classwork:** Discuss the questions 1 to 5 of ‘Chapter Assessment’ in classroom.

Do the activity of ‘Gamified Learning’ given on page 28.

**Homework:** Ask to solve Q.6 to 11 of ‘Chapter Assessment’ given on page no. 27.



# Addition

## Learning Objectives

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

- ◆ add numbers using expanded form
- ◆ add 3-digit numbers with regrouping
- ◆ add 4-digit numbers without and with regrouping
- ◆ understand addition properties
- ◆ evaluate and estimate the sum
- ◆ solve word problems based on addition

## LESSON PLAN

**Suggested number of periods:** 16

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, dienes block up to 9999, some real-life objects like sketch pens, pens, pencils, number arrow cards etc.

**Keywords:** Smallest and greatest 3-digit numbers, addends, sum, rounded up, rounded down, estimation.

**Pre-requisite knowledge:** Students must be familiar with addition up to 3-digit numbers without regrouping. Solve word problems based on 1, 2 and 3 digits.

**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.

<b>Periods: 1–2</b>	<b>Topic: Addition by expanding the addends</b>	<b>Suggested extra teaching aids: arrow cards Math Genius 3 pages 29–31</b>
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### 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 2-digit number and the smallest 3-digit number? Use the “Get ready” and “Let’s recall” given on page 29 and 30 of the book for this purpose. Next, introduce the topic “addition by expanding the addends”.

### EXPLORE

The teacher will revise the learners’ previous knowledge of the addition of 2-digit numbers with the help of the following game.

- Divide the class into 2 teams. Distribute 10 arrow cards in which a digit is written.
- Ask 3 children from team A to step forward in the front of the class.
- The teacher will ask one child to form a 2-digit number by using the arrow cards, say 35, and the other child will be asked to make a number by interchanging the digits, 53 and the third child will write the numbers on the board.

- Then the teacher will ask team B to find the sum of both numbers.
- Next, the teacher changes the roles of teams.

[Collaborative Learning]

## EXPLAIN

Revise the addition of 2- and 3-digit numbers by using the vertical method. Let the students recall what the addends are. Next, introduce the method of “addition by expanding the addends”, the way to understand the addition easy. In this method, we expand the addends as per their place values and then add them accordingly.

## ELABORATE

Write on the board, two 3-digit numbers in place value columns. Ask the sum of digits at ones, tens and hundreds places one by one and write the sum on the board.

Next, discuss with the students that we can make this addition easy by expanding its addends into hundreds, tens and ones as follows:

$$342 \longrightarrow 300 + 40 + 2$$

$$456 \longrightarrow 400 + 50 + 6$$

Start by adding ones, then tens and at last hundreds.

**Add:**  $700 + 90 + 8 = 798$ .

H	T	O	
3	4	2	}
4	5	6	
7	9	8	→

Addends (numbers that are added)

Sum (answer of addition)

H	T	O
300	40	2
+ 400	50	6
700	90	8

## EVALUATE

**Classwork:** Ask to solve Q.1 of Practice Time 2A.

**Homework:** Ask to solve Q.2 of Practice Time 2A.

## ENHANCE

Ask students to watch the video on addition on “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)”.

**Periods:** 3-8

**Topics:** Addition of 3-digit numbers with regrouping, Addition of three 3-digit numbers

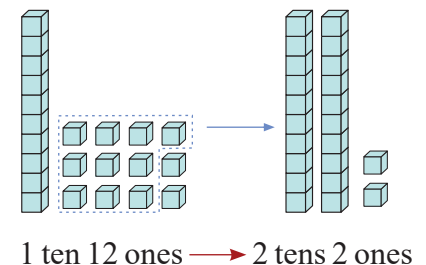
**Suggested extra teaching aids:** Math Genius 3 pages 31–36, dienes blocks

## ENGAGE

First, ask some questions to recall the previous concepts of addition based on regrouping.

Like: Put 1 ten rod and 12 ones cubes on the table, and ask the students, how many cubes are in a rod?

Next show them that, if we combine 10 cubes then we get 1 more ten rod from the given cubes. Introduce them using this method in addition.



## EXPLORE

Divide the class into two groups. Distribute a set of flash cards having numbers 0-9 to each group. Call one group and instruct to make 3-digit numbers as many as they can.

Also, make addition problems of two 3-digit numbers, and find the sum of those problems. Next call the other group. The group who will make more addition problems and give the correct answers will win the game. Also, ask which addition problems are based on without or with regrouping. Accept the responses.



## EXPLAIN

Explain to the class that when we have more than 9 ones, say 12 ones, we can regroup 12 ones into 1 ten and 2 ones and so on. We use this method of regrouping in addition. Use dienes blocks to demonstrate the addition visually. Similarly, explain addition of 3-digit numbers by regrouping tens into tens and ones, and hundreds into hundreds and tens.

## ELABORATE

Solve some questions on the board and demonstrate how to add the two 3-digit numbers by regrouping.

Refer textbook explanation and examples given on pages 31 to 34. After understanding this concept, demonstrate addition of three 3-digit numbers using the example given on page 35. **[Conceptual Learning]**

## EVALUATE

**Classwork:** Ask the students to solve Q.1, 2 (a), (b), (c) and 3. (d), (e), (f) of Practice Time 2B, ‘Think Tank’ given on page 35. If the students make any error while solving the addition sum, the teacher will rectify it and explain.

**Homework:** Ask the students to solve remaining questions of Practice Time 2B.

## ENHANCE

Download worksheets on addition with regrouping from the internet and practise them.

<b>Periods: 9-11</b>	<b>Topics: Addition of 4-digit numbers, Checking addition</b>	<b>Suggested extra teaching aids: number wheel/spinner Math Genius 3 pages 36–41</b>
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## ENGAGE

Divide the class into pairs. Tell the students to think of a 3-digit number and write it in their notebook. Then instruct them to rearrange the digits and make the smallest/greatest 3-digit number. Ask the students to write it below the number considered and add.

For example,

	H	T	O	
	4	3	0	← Number thought of
+	3	0	4	← Smallest 3-digit number
	7	3	4	

Now, tell them to exchange the notebooks and check the working of each other. Discuss, if any error occurs.

## EXPLORE

- Divide the class into 4 groups.
  - The teacher will call one group, and ask three of them to move the wheel one by one to get the addend 1, 2 and 3.
  - Then perform the addition on board with the help of other members of groups. Students of other groups will watch the process. If there is any error, then rectify it.
  - The same process will continue with the other groups.
  - The group that do all correct addition in the minimum time is the winner.
- [Experiential Learning]**



## EXPLAIN

First, discuss with the children, if they have any queries regarding 3-digit addition or regrouping. After the discussion, start the topic “addition of 4-digit numbers”.

In this topic first discuss addition without regrouping, then with grouping.

Explain to the students as we add 3-digit numbers, in the same way we add the given 4-digit numbers.

Further explain that when we add the numbers of any column, once from the top and once from the bottom, we observe that the answer remains the same. [Collaborative learning]

## ELABORATE

Start with writing on the board “**Find the sum of 6043 and 2954**”.

Arrange the numbers in vertical columns and start adding, as follows:

- **Add the ones:**  $3 + 4 = 7$  ones. Write 7 in the ones column.
- **Add the tens:**  $4 + 5 = 9$  tens. Write 9 in the tens column.
- **Add the hundreds:**  $0 + 9 = 9$  hundreds. Write 9 in the hundreds column.
- **Add the thousands:**  $6 + 2 = 8$ . Write 8 in the thousands column.

Th	H	T	O	
6	0	4	3	
+	2	9	5	4
	8	9	9	7

Thus, the sum of 6043 and 2954 is 8997.

In the same way demonstrate addition of three 4-digit numbers, by taking reference of example given on page 37. For checking their understanding, encourage the students to solve some questions given in Practice Time 2C.

Next, demonstrate the addition of 4-digit numbers which requires regrouping.

Write on board “**Find the sum of 3506 and 1225**”.

After arranging the numbers in place value columns instruct to add as follows:

- **Add the ones:**  $6 + 5 = 11$  ones. Regroup 11 ones as 1 ten and 1 one. Write 1 in the ones column and carry over 1 ten in the tens column.
- **Add the tens:**  $1$  (carried over)  $+ 0 + 2 = 3$  tens. Write 3 in the tens column.
- **Add the hundreds:**  $5 + 2 = 7$  hundreds. Write 7 in the hundreds column.
- **Add the thousands:**  $3 + 1 = 4$  thousands. Write 4 in the thousands column.

Th	H	T	O	
		1		
3	5	0	6	
+	1	2	2	5
	4	7	3	1

Thus, the sum of  $3506 + 1225 = 4731$ .

Also, explain other examples given on pages 38 and 39 of Math Genius 3. Hence, motivate the students to attempt the question given in ‘Think Tank’ on page 39.

Further, demonstrate on board ‘**Checking addition**’.

Refer textbook page 40 for explanation and examples.

[Conceptual Learning]

## EVALUATE

**Classwork:** Ask the students to solve Q.1 (a), (b), (c) and (d) of Practice Time 2C and Q.1 of Practice Time 2D, and 2E.

**Homework:** Ask the students to solve the remaining questions of Practice Time 2C, 2D and 2E, depending upon the topic they learned on that particular day.

## ENHANCE

Ask the students to work in pairs. Each one will write a 4-digit number one below the other on a sheet. Next, one student will add the numbers from top to bottom and other student will check it by adding from bottom to top.

## ENGAGE

Start the class with an interaction. Ask some questions based on real life situations, like:

- An ice-cream seller earns ₹585 on Saturday. One Sunday, he could not go for selling ice creams. How much is his total earning in two days?
- On Monday, he earns ₹1 more than that on Saturday. How much does he earn on Monday?
- On Tuesday, he earns ₹10 more than on Monday and on Wednesday he earns ₹100 more than that on Monday. So his earnings on Tuesday = \_\_\_\_\_, and on Wednesday = \_\_\_\_\_.

Accept their responses.

Then, introduce addition properties by giving answers of these questions.

- When we add 0 to a number, what do we get?
- When we add 1 to a number, what do we get?

## EXPLORE

To motivate students towards the topic estimation and revise ‘round off’, the teacher can organize a game in the classroom as follows:

- Put a transparent jar on the teacher’s table.
- Make some number chits (up to 3 digits) and put it in the jar.
- Ask each student to pick numbers from the jar, then round off the numbers to nearest ten, and write their answer on same paper chit with their name and submit to teacher.
- At last the teacher will match the answer and commend students who give correct answers, motivate and elucidate those who give wrong answers. **[Experiential Learning]**

## EXPLAIN

Explain to the students, what is the result, when we add 0, 1, 10, 100, 1000 to a number. Next, demonstrate estimation of sum i.e., addition of 2- and 3-digits number by using rounding off. Refer textbook pages 41–44 for explanation and examples.

Thereafter, discuss some real-life situations, where we use addition.

## ELABORATE

Before explaining the methods to solve a word problem or story sum, ask them to read, understand, decide the strategy, and then solve the problem. Emphasise checking the solution so that they solve the problem correctly.

Demonstrate on board, the solution and explanation by taking reference of examples given on page 45 under the section ‘word problems’.

**[Conceptual Learning]**

## EVALUATE

**Classwork:** Ask the students to solve Q.1, 2 and 3 of Practice Time 2F, Q.1, 3 and 5 of Practice Time 2G, and Q.1, 2, 3 of Practice Time 2H. If the students make any error while solving the sum, the teacher will correct it and explain.

**Homework:** Ask the students to solve the remaining questions of Practice Time 2F, 2G and 2H.

## ENHANCE

- Ask the students to solve ‘MATHS FUN’ given on page 43.
- Ask the students to watch the video on addition on “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)”.

**Period: 16**

**Topic: (Revision) Chapter Assessment**

**Suggested extra teaching aids:  
Math Genius 3 pages 46–48**

## ENGAGE

Provide a comfortable learning environment so that students feel free to ask any questions about any previously taught topic that they are unsure of. Proceed with the revision of the exercise.

## EXPLAIN

Start the revision of the exercise by using ‘Mind Map’, ‘Chapter Assessment’, ‘Challenge Question’, and ‘Mental Maths’. Also guide them to perform the activity given in ‘Gamified Learning’ section on page 48.

## ELABORATE

Discuss questions 1 to 3 in the ‘chapter assessment’ and accept students answer. If there is any confusion or error, then explain and correct it. Discuss ‘Challenge Question’ and motivate students to solve ‘Mental Maths’. At last guide the students to do the activity given on page 48.

## EVALUATE

**Classwork:** Discuss questions 1 to 3 of the ‘chapter assessment’ in classroom.

**Homework:** Ask to solve Q.4 and 5 of ‘chapter assessment’ as homework assignment.

## ENHANCE

Find a process of addition other than discussed in the book, with the use of the internet or with the help of friends, teachers and parents.





# Subtraction

## Learning Objectives

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

- ◆ subtract 3-digit numbers without and with regrouping
- ◆ check subtraction with addition
- ◆ understand subtraction properties
- ◆ perform addition and subtraction together
- ◆ solve word problems involving subtraction
- ◆ subtract 4-digit numbers without and with regrouping
- ◆ evaluate and estimate the difference

## LESSON PLAN

**Suggested number of periods:** 18

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, dienes block up to 9999, some real-life objects like sketch pens, pens, pencils, number arrow cards etc.

**Keywords:** Difference, minuend, subtrahend, rounded up, rounded down, estimation.

**Pre-requisite knowledge:** Students must be familiar with subtracting up to 3-digit numbers without regrouping. Solve subtraction stories based on numbers up to 3 digits.

**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.

<b>Periods: 1–4</b>	<b>Topic: Subtraction of 3-digit numbers</b>	<b>Suggested extra teaching aids: dienes blocks Math Genius 3 pages 49–54</b>
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## ENGAGE

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

- (a) Which is the greatest 2-digit number?
- (b) Which is the smallest 3-digit number?
- (c) What is the difference between the greatest 2-digit and 3-digit numbers?

Represent the numbers with dienes blocks.

After accepting the answers of students, if there is any query or any wrong answer then solve them on board.

Use the dienes blocks to show the subtraction.

## EXPLORE

The teacher will revise the learners' previous knowledge of subtraction of 2-digit numbers with the help of the following game.

- Divide the class into 2 teams. Distribute 10 arrow cards in which a digit is written on each card.
- Ask 3 children from team A to step forward in the front of the class.
- The teacher will ask one child to form a 2-digit number by using the arrow cards, say 35, and the other child will be asked to make a number by interchanging the digits, 53 and the third child will write the numbers on the board.
- Then the teacher will ask team B to find the difference of both numbers.
- Next, the teacher changes the roles of teams.

[Collaborative Learning]

## EXPLAIN

After revising the subtraction of 2-digit numbers by using the vertical method, explain subtraction of 3-digit numbers without regrouping and with regrouping. For this, ask 3–4 students randomly to speak any 3-digit numbers. Write these numbers on the board. Then ask the class to choose two numbers which they want to subtract. Accordingly, show the operation and explain the steps involved.

## ELABORATE

Talk about any real life situation where we need to subtract two numbers. For example, a school invited 865 parents/guests for the Annual Day celebration. But 640 guests/parents could attend the function. How many did not come?

	H	T	O	
	8	6	5	← No. of guests/parents invited
–	6	4	0	← No. of guests/parents attended
	2	2	5	

Then demonstrate how to solve the problem using subtraction.

## EVALUATE

**Classwork:** Ask the students to solve Q.1 of Practice Time 3A. If the students make any error while solving the subtraction sum, the teacher will correct it and explain.

**Homework:** Ask the students to solve Q. 2 of Practice Time 3A.

## ENHANCE

Download worksheets on subtraction with regrouping from the internet and practice them.

Periods: 5–8

Topic: Subtraction of 4-digit numbers

Suggested extra teaching aids:  
Math Genius 3 pages 54–57

## ENGAGE

After the introduction, discuss with the children, if they have any queries regarding 3-digit subtraction or regrouping. After the discussion, start the topic “subtraction of 4-digit numbers”.

In this topic first discuss subtraction without regrouping, then with grouping.

## EXPLORE

Before starting 4-digit subtraction, let us explore “Treviso method of subtraction”, which is also known as European algorithm.

For example:  $782 - 297$

- Starting from the right side, because 7 is larger than 2, we make 7 into 10. The number needed is 3.



- Add 3 to minuend 2 to get 5. Write down 5 at ones place of the difference.
- Decrease 8 in the tens column by 1.
- Again, as 9 in subtrahend is larger than 7, we need 1 to make 9 into 10.  
Add 1 to 7 and write 8 in the tens place of difference.
- Decrease 7 in the hundreds column by 1.
- As  $2 < 6$ , simply subtract 2 from 6.

	H	T	O
	7	8	2
–	2	9	7
	4	8	5

## EXPLAIN

First, explain the subtraction of 4-digit numbers without regrouping, then with regrouping.

Explain to the students as we subtract 3–digit numbers, in the same way we subtract the given 4–digit numbers.

## ELABORATE

Start with writing on the board “subtract 6578 from 9999”.

Arrange the numbers in vertical columns and start subtracting, as follows:

$$\begin{aligned}
 9 \text{ ones} - 8 \text{ ones} &= 1 \text{ one} \\
 9 \text{ tens} - 7 \text{ tens} &= 2 \text{ tens} \\
 9 \text{ hundreds} - 5 \text{ hundreds} &= 4 \text{ hundreds} \\
 9 \text{ thousands} - 6 \text{ thousands} &= 3 \text{ thousands}
 \end{aligned}$$

Thus,  $9999 - 6578 = 3421$ .

Next, demonstrate the subtraction of 4–digit numbers which requires regrouping, like “Find the difference of 3952 and 2189”.

After arranging the given numbers in vertical columns and subtracting the subtrahend by regrouping ones, tens and hundreds, we find the difference of  $3952 - 2189 = 1763$ .

Also, explain other questions given on pages 55 and 56 of Math Genius 3.

	Th	H	T	O
	9	9	9	9
–	6	5	7	8
	3	4	2	1

	Th	H	T	O
			14	
		8	<del>4</del>	12
	3	<del>9</del>	<del>5</del>	<del>2</del>
–	2	1	8	9
	1	7	6	3

## EVALUATE

**Classwork:** Ask the students to solve Q.1 (a), (b), (d) and (e) of Practice Time 3B. If the students make any error while solving the subtraction sum, the teacher will correct it and explain.

**Homework:** Ask the students to solve Q1. (c), (f), (g), (h) of Practice Time 3B.

## ENHANCE

Ask students to further solve Q.2 in their notebooks.

Periods: 9–13

Topics: Subtraction properties, Subtracting 10, 100 and 1000, Estimating difference

Suggested extra teaching aids:  
Two spin wheels with numbers on each,  
Math Genius 3 pages 57–59

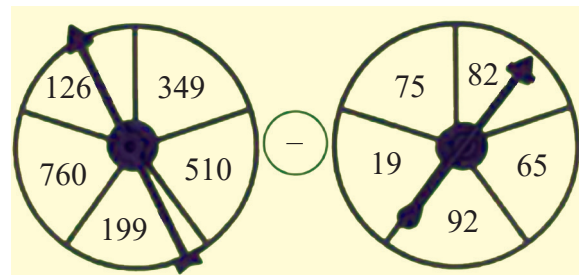
## ENGAGE

Interact with the students to recall the previous concept. For this, ask questions based on ‘Addition Properties’ and introduce the topic ‘Subtraction Properties’. Like

- When we add 1 to a number, what do we get?
- When we subtract 1 from a number, what do we get?

## EXPLORE

- The teacher will revise the subtraction of 3-digit numbers, by using the spin wheel.
- Divide the class into 4 groups.
- The teacher will call one group, and ask them to move the first wheel to get the minuend and move the second wheel to get the subtrahend.
- Then perform the subtraction on board with the help of other members of groups. Other students will watch the process, if there is any error, then rectify it.
- The same process will continue with the other groups.
- The group that does all correct subtraction in minimum time is the winner.



## EXPLAIN

First explain what happens when we subtract 0, 1, 10, 100, 1000 and the number itself from any number.

Refer textbook pages 57–58 and demonstrate on the board that:

- When zero is subtracted from any number, the difference is the number itself.  
For example,  $45 - 0 = 45$ .
- When 1 is subtracted from any (non-zero) number, the difference is the number just before (the predecessor of) the given number.  
For example,  $128 - 1 = 127$
- When we subtract 10 from a given number, we subtract 1 from the digit at the tens place and ones digit remains the same.  
For example,  $1619 - 10 = 1609$
- When we subtract 100 from a given number, we subtract 1 from the digit at the hundreds place and tens and ones digits remain the same.  
For example,  $2499 - 100 = 2399$
- When we subtract 1000 from a given number, we subtract 1 from the digit at the thousands place and hundreds, tens and ones digits remain the same.  
For example,  $2499 - 1000 = 1499$
- When a number is subtracted from itself, we get 0 as the difference.  
For example,  $2499 - 2499 = 0$

Motivate the students to solve Q.1 of Practice Time 3C and Think Tank on page 58. Then move on to the next topic “Estimating Difference”.

## ELABORATE

Consider any real-life situation where we need to estimate the difference. Suppose Vrinda saves ₹88 in her piggy bank. On the Mother’s Day, she buys a gift to present her mother. If she spends ₹52, estimate how much money is left with her?

Here, we need to estimate the difference between 88 and 52 by rounding off to the nearest 10.

Arrange the numbers in vertical columns and first round off the numbers to their nearest tens.

In 88,  $8 > 5$ , so 88 is rounded up to 90.

In 52,  $2 < 5$ , so 52 is rounded down to 50.

Then estimated difference is 40, while the actual difference is 36.

Refer page 59 to think about another real-life situation based on subtraction.

Actual difference			Estimated difference	
T	O		T	O
8	8	rounded up	9	0
5	2	rounded down	5	0
3	6		4	0

## EVALUATE

**Classwork:** Ask the students to solve Q.1, of Practice Time 3C and Q.1, 4 of Practice Time 3D. If the students make any error while solving the subtraction sum or rounding off, the teacher will correct it and explain.

**Homework:** Ask the students to solve remaining questions of Practice Time 3C and 3D.

## ENHANCE

Ask students to think two real-life examples, where they can use regrouping to nearest 100 and 1000 to estimate the difference.

<b>Periods:</b> 14–16	<b>Topics:</b> Addition and subtraction together, Checking subtraction with addition and word problems	<b>Suggested extra teaching aids:</b> Math Genius 3 pages 60–64.
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## ENGAGE

Begin the discussion with some real-life examples, where addition and subtraction both are required to get the answer. Discuss a situation like: Somil's father gave him ₹ 200 as pocket money. From the money Somil bought a toy of ₹ 150 for his sister. After a few days, Somil's aunty gave him ₹ 100. Now how much money does Somil have? Ask students to raise their hands to answer. Discuss and rectify if any student gives the wrong answer.

## EXPLORE

**Reverse Method (Indian Algorithm):** It is one of the earliest and most popular subtraction algorithms from India. This is called the reverse method and it has some similarities to our traditional algorithm. It involves borrowing. For example:  $982 - 395$

**Begin from left:**  $9 - 3 = 6$

**In middle column:**  $8 - 9$ . Since we cannot subtract and obtain a positive number, we cross out the 6 of the difference and change it to 5. Place 1 in front of 8 to make 18.  $18 - 9$ . Write down 9 in difference.

**Last column:**  $2 - 5$ . Since we cannot subtract and obtain a positive number, we cross out the 9 of the difference and change it to 8. And change the 2 to 12 in the last column.  $12 - 5 = 7$ . Thus,  $982 - 395 = 587$ .

	18	12
9	<del>8</del>	<del>2</del>
3	9	5
<del>6</del>	<del>9</del>	7
5	8	

## EXPLAIN

Explain to the students, that sometimes we have to do both addition and subtraction in a single sum, in this case either we follow the sequence of operations from left to right or we solve the sum by using the following steps:

**Step 1:** Add the numbers having '+' sign or no sign.



**Step 2:** Add the numbers having ‘-’ sign.

**Step 3:** Subtract the sum obtained in step 2 from the sum obtained in step 1.

After this discuss the topic “checking subtraction with addition”.

To check subtraction, add the difference to the smaller number (subtrahend). If the sum is equal to the bigger number that is minuend, then the subtraction is correct. At last, discuss some real-life examples, where we use subtraction or addition and subtraction both. Refer textbook pages 60–63 for more explanation and examples. Encourage the students to solve ‘Think Tank’ given on page 61.

## ELABORATE

Teacher can consider any example or take questions from Practice Time and demonstrate how to solve it on the board. Suppose 8570 people visited the National Museum on the last Sunday. Out of them, 2565 were men, 3186 women and remaining were children. How many children visited the museum that day?

To know the number of children we have to subtract the number of adults, (*i.e.*, total men and women) from total people.

That is,  $8570 - (2565 + 3186)$

First Add			
Th	H	T	O
	1	1	
2	5	6	5
+ 3	1	8	6
5	7	5	1

Now, subtract			
Th	H	T	O
7	15	6	10
<del>8</del>	<del>5</del>	<del>7</del>	<del>0</del>
- 5	7	5	1
2	8	1	9

Thus, 2819 children visited the museum.

Then motivate students to solve the questions given in the book.

## EVALUATE

**Classwork:** Ask the students to solve Q.1 (a), (b); Q.2 (a), (b) of Practice Time 3E; Q.1 and 2 of Practice Time 3F. If the students make any error while solving, the teacher will correct it and explain.

**Homework:** Complete remaining questions of Practice Time 3E and 3F.

## ENHANCE

Ask students to download the worksheet from “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)” and practise them.

**Periods: 17–18**

**Topic: (Revision) Chapter Assessment**

**Suggested extra teaching aids:  
Math Genius 3 pages 64–66**

## ENGAGE

Make students comfortable, so that they can ask any question on any previously taught topics in which they have any confusion.

## EXPLAIN

Start the revision of the exercise by using ‘Mind Map’, ‘Mental Maths’, ‘Chapter Assessment’, and ‘Challenge Question’. Also guide them to perform the activity in the classroom.

## ELABORATE

Discuss questions 1 to 5 in the 'Chapter assessment' and accept students' answer, if there is any confusion or error then explain and correct it. Discuss 'Challenge Question' and motivate students to solve 'Mental maths'. At last guide to the students to do the activity given on page 66.

## EVALUATE

**Classwork:** Discuss questions 1 to 5 of the 'Chapter assessment' in classroom.

Do the activity given on page 66.

**Homework:** Q.6 to 10 of 'Chapter Assessment' given on page 65.

## ENHANCE

Find a process of subtraction other than the one discussed in the book, using internet and with the help of friends, teachers and parents.



# Multiplication

## Learning Objectives

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

- ◆ Know the multiplication fact
- ◆ multiply 2- and 3-digit numbers by a 1-digit number (without and with regrouping)
- ◆ multiply 2- and 3-digit numbers by a 2-digit number
- ◆ explore multiplication
- ◆ evaluate and estimate the product
- ◆ build and remember multiplication tables
- ◆ understand the properties of multiplication
- ◆ solve word problems based on multiplication

## LESSON PLAN

**Suggested number of periods:** 14

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, some real-life objects like sketch pens, pens, pencils, number arrow cards etc.

**Keywords:** Multiplicand, multiplier, product, multiplication fact, Lattice, estimation.

**Pre-requisite knowledge:** Students must be familiar with the multiplication of 2-digit numbers by 1-digit number without regrouping. Solve multiplication stories based on digits.

**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: Multiplication Facts, Multiplication tables	Suggested extra teaching aids: Some real-life objects, Chart of multiplication table up to 20, Chart of multiplication table up to 10 with missing products, Math Genius 3 pages 67–70
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### ENGAGE

Introduce the topic in the classroom with some interesting activities like placing some objects on the table and show that the repeated addition of any number is equal to the multiplication of that number by the number of times the addition is done.

Place a chart of multiplication table up to 10 with some missing numbers (products) on the board. And ask the students to recall the corresponding table of the given number and find the missing numbers (products).

## EXPLORE

The teacher will revise the learners' previous knowledge of multiplication with the help of the following game: "Find the same result in a row".

- Hang a chart of  $10 \times 10$  on the display board where some multiplication facts or repeated addition using numbers up to 10 are written like:

$3 \times 4$	$2 + 2 + 2 + 2$ $+ 2 + 2 + 2$	$5 + 5$	$1 \times 2 \times 5$	$2 \times 3 \times 2$	$3 + 3 + 3$ $+ 3$	$1 \times 12$	$4 + 4 + 4$	$6 + 6$	$2 + 2 + 2 +$ $2 + 2$
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- Divide the class into groups and invite them one by one.
- Ask group to choose the number whose multiplication facts or repeated addition they want to find in the given chart. Then tell them to find the corresponding facts and mark the facts, within a limited time period.
- The group that marks most of the correct facts in minimum time will be the winner.

Teacher can also use the 'Get Ready' and 'Let's Recall' section given on pages 67 and 68.

[Collaborative Learning]

## EXPLAIN

Explain to the students that repeated addition can be also represented as multiplication.

Recall the multiplication tables up to 10 by using the grid given on page 69.

Next, use the chart of multiplication tables from 11 to 20. And motivate the students to learn them by writing in their notebooks.

## ELABORATE

Explain that here, we have 5 groups of 2 pencils each, *i.e.*,

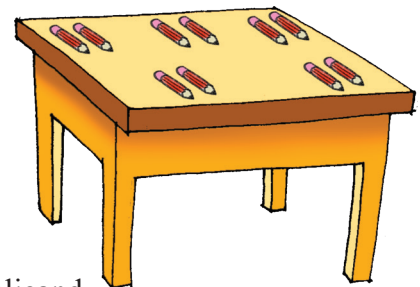
$$2 + 2 + 2 + 2 + 2 = 10 = 5 \times 2 = 10$$

$5 \times 2 = 10$  is read as '5 into 2 is 10' or '5 multiplied by 2 is 10' or '5 times 2 is 10'.

$5 \times 2 = 10$  is called the multiplication fact or multiplication statement.

Where 5 is the multiplicand, 2 is the multiplier and 10 is the product.

5	←	Multiplicand
2	←	Multiplier
10	←	Product



Use chart of multiplication tables from 11 to 20, and motivate the students to remember it.

[Experiential learning]

## EVALUATE

**Classwork:** Ask the students to solve Q.1 and 2 of Practice Time 4A. If the students make any error, teacher will correct it and explain.

**Homework:** Ask the students to prepare a colourful chart on tables from 11 to 20.

## ENHANCE

- Fill the grid under 'Fast Check' section given on page 71.
- Download multiplication fact worksheet from "<https://math-drills.com/multiplication.php>" and solve it.

### ENGAGE

In the beginning, put the chart of tables in front of students so that they can memorise the tables. Then recall one-digit multiplication by using the multiplication tables. As,

$$5 \times 5 = 25; \quad 8 \times 7 = 56; \quad 9 \times 8 = 72; \quad 8 \times 8 = 64 \text{ and so on.}$$

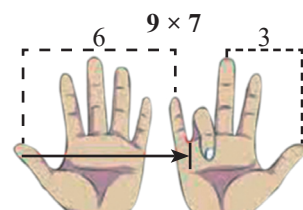
In this topic first discuss multiplication without regrouping and then with grouping.

### EXPLORE

The teacher can introduce a quick method of multiplication of any number by 9 using fingers as follows:

For example, to multiply 9 by 7,

Down the seventh finger towards the palm. Count the left side fingers and make it tens digit of the product, and the remaining fingers on the right side of folded finger as the ones digit of the product.



For example,  $9 \times 7 = 63$ .

### EXPLAIN

Explain to them multiplication is exactly like extended addition. Refer textbook pages 71–72 for the explanation of multiplication of 2-digit numbers by 1-digit numbers and that of 3-digit numbers by 1-digit numbers. Explain the process of multiplication without regrouping.

First, make the students, revise their knowledge of multiplication by writing the question on the board “multiply 31 by 3”. Ask the steps from students and accept the response, if there is any wrong response, explain and correct.

- Multiply the ones by 3.

$$1 \text{ one} \times 3 = 3 \text{ ones}$$

- Multiply the tens by 3.

$$3 \text{ tens} \times 3 = 9 \text{ tens}$$

	<b>T</b>	<b>O</b>
	3	1
$\times$		3
	9	3

#### Multiplication of 3-digit number by 1-digit number:

Write on board: Multiply 342 by 2.

Arrange the numbers in their place value columns on the board.

- Multiply the ones by 2.  $2 \text{ ones} \times 2 = 4 \text{ ones}$ , and write 4 at the ones place of the product.
- Multiply the tens by 2.  $4 \text{ tens} \times 2 = 8 \text{ tens}$ , write the product at the tens place of the product.
- Multiply the hundreds by 2.  $3 \text{ hundreds} \times 2 = 6 \text{ hundreds}$ . Write the product at the hundreds place of the product.

	<b>H</b>	<b>T</b>	<b>O</b>
	3	4	2
$\times$			2
	6	8	4

Encourage the students to practise the questions given in Practice Time 4B.

## ELABORATE

Consider any real life situation, where we need to multiply a 2- or 3-digit number by a 1-digit number with grouping. For instance, let Amit want to distribute chocolates among his classmates on his birthday. If there are 36 students in the class and a chocolate costs ₹5, how much money should he arrange. Elaborate to the students that:

	H	T	O
		3	6
×			5

The cost of 1 chocolate is ₹5.

So, the cost of 36 chocolates would be ₹(36 × 5).

Now demonstrate how to multiply it.

- Multiply the ones by 5.

$$6 \text{ ones} \times 5 = 30 \text{ ones} = 3 \text{ tens } 0 \text{ ones.}$$

Write 0 in the ones column of the product and carry over 3 in the tens column.

- Multiply the tens by 5.

$$3 \text{ tens} \times 5 = 15 \text{ tens.}$$

$$15 \text{ tens} + 3 \text{ tens} = 18 \text{ tens} = 1 \text{ hundred } 8 \text{ tens}$$

Write 8 in the tens column of the product and carry over 1 in the hundreds column.

Clearly, Amit should arrange ₹180 for distributing the chocolates among all classmates.

Refer textbook pages 72–74 for explanation and examples.

[Conceptual Learning]

	H	T	O
		3	6
×			5
			0

	H	T	O
	1	3	
		3	6
×			5
	1	8	0

## EVALUATE

**Classwork:** Ask the students to solve Q.1 of Practice Time 4C. If the students make any error while doing the multiplication, the teacher will correct it and explain.

**Homework:** Ask the students to solve Q.2 of Practice Time 4C.

## ENHANCE

Download worksheets on multiplication from the “www.orangewebsupport.co.in” and practise multiplication of 2- and 3-digit numbers by 1-digit numbers.

Periods: 6–8	Topic: Multiplication by a 2-digit Number, Lattice Multiplication	Suggested extra teaching aids: Math Genius 3 pages 74–77
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## ENGAGE

First make students comfortable, so they can ask any question from the previous topic if they have any doubts. Introduce multiplication of a 2-digit number by a 2-digit number.

## EXPLORE

We can also multiply the numbers by breaking up numbers: BLOCK METHOD. This is one of the most useful mental math strategies. It involves breaking up one of the factors, multiplying in groups, and then adding those groups together.

For example: multiply 35 by 44.

Break up the numbers 35 into 30 and 5, 44 into 40 and 4 and then multiply it in parts.

$$\begin{aligned} \text{So, } 35 \times 44 &= (30 \times 40) + (5 \times 40) + (30 \times 4) + (5 \times 4) \\ &= 1200 + 200 + 120 + 20 = 1540. \end{aligned}$$

×	30	5
40	1200	200
4	120	20

[Conceptual Learning]

## EXPLAIN

When we multiply a 2-digit number by another 2-digit number, we expand the multiplier. And multiply the multiplicand by the ones and tens digits of the multiplier. Find 2 partial products and add these partial products



to get the final answer. The same process we will follow to multiply a 3-digit number by a 2-digit number. Refer textbook pages 74–76 and solve some questions on the board.

Multiply 232 by 23.

- Expand the multiplier 23 as  $20 + 3 = 2 \text{ tens} + 3 \text{ ones}$  and multiply 232 with it by using the following steps:

**Step 1:** Multiply 232 by 3 ones.

$$232 \times 3 \text{ ones} = 696$$

**Step 2:** Multiply 232 by 2 tens.

$$232 \times 2 \text{ tens} = 232 \times 20 \text{ ones} = 4640 \text{ ones}$$

Write 4640 as the second line product.

**Step 3:** Add the products.

$$696 + 4640 = 5336$$

$$\text{Thus, } 232 \times 23 = 5336$$

	Th	H	T	O	
		2	3	2	
×			2	3	
		6	9	6	← 1st product
+	4	6	4	0	← 2nd product
	5	3	3	6	← Sum

[Conceptual Learning]

## ELABORATE

Refer textbook pages 76–77 and demonstrate how to multiply two numbers using Lattice multiplication method.

Consider  $56 \times 34$ .

Since 56 and 34 are both 2-digit numbers.

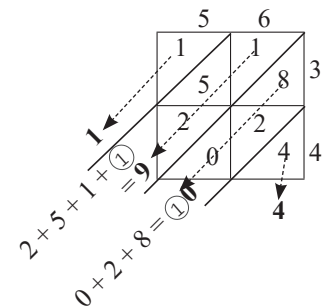
Draw a  $2 \times 2$  square grid and draw diagonal lines in each box.

Write the multiplicand on top and the multiplier on the right of the grid.

Multiply the corresponding numbers and write the tens place digit in the upper triangle of each box and the ones digit at the lower triangle of each box.

Add the number of boxes diagonally to find the product. While adding the numbers diagonally if the sum is of two digits, retain the ones and carry over the tens to the next diagonal and add with them.

Thus,  $56 \times 34 = 1904$ .



[Experiential Learning]

## EVALUATE

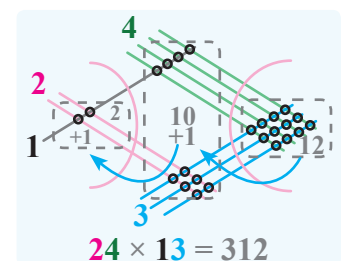
**Classwork:** Ask to solve Q.1 of Practice Time 4D. If the students make any error while solving, the teacher will correct it and explain.

**Homework:** Ask the students to solve Q.2 and 3 of Practice Time 4D.

## ENHANCE

Present an interesting method to visualize multiplication that reduces it to simple counting!

- Draw sets of parallel lines representing each digit of the first number to be multiplied (the multiplicand)
- Draw another set of parallels, perpendicular to the first set of parallel lines, corresponding to each digit of the second number (the multiplier).
- Put dots where each line crosses another line.
- Count the points in the right corner, middle and left corner.
- If the number on the right is greater than 9, carry and add the number in the tens place to the number in the middle. If the number in the middle is greater than 9, add the carry-over to the number at the hundreds place.



[Experiential Learning]

**ENGAGE**

Begin with a discussion on the previously learned topic Lattice multiplication. Introduce the method of multiplication by expanding the bigger number and multiplication of numbers when the multiplier contains zeros.

**EXPLORE**

There is one more method of multiplication called the ‘Criss-cross system of multiplication’ of ‘Vedic mathematics’ which helps in doing the calculation faster.

Let us multiply 23 by 12.

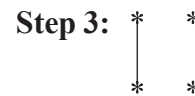
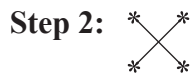
- Multiply the digits in the ones place, that is,  $3 \times 2 = 6$ .  
Write 6 in the ones place of the product.
- Next, cross multiply and add the products, that is,  $(2 \times 2) + (3 \times 1) = 7$ .  
Write the 7 in the tens place of the product.
- Next, multiply the tens digits, that is,  $2 \times 1 = 2$ .

$$\begin{array}{r} 23 \\ \times 12 \\ \hline 276 \end{array}$$

$$\begin{array}{r} 23 \\ \downarrow \\ \times 12 \\ \hline 6 \\ \hline 23 \\ \swarrow \downarrow \\ \times 12 \\ \hline 76 \\ \hline 276 \end{array}$$

Thus,  $23 \times 12 = 276$ .

The three steps involved in multiplying a 2-digit number by a 2-digit number are as follows:



**EXPLAIN**

Explain to the students, that there is another method of multiplication where we expand the bigger number and then multiply each term of the expanded form with the multiplier and add the product thus obtained.

Next, explain how to multiply any number with 10, 20, 30, ..., 90.

First, multiply the number without 0. Then, write ‘0’ to the right of the product obtained.

Similarly, to multiply a number by 100, 200, 300, 400, ..., 900, first multiply the number without 00.

Then, write two zeros (00) to the right of the product obtained.

Refer textbook pages 77–78 for examples and more explanation.

**ELABORATE**

Solve some questions on the board for demonstrating the process.

**Multiplying by Expanding the Bigger Number:**

Multiply 134 by 3.

Expand the bigger number 134:  $134 = 100 + 30 + 4$

Multiply each term of expanded form by 3:  $100 \times 3 + 30 \times 3 + 4 \times 3$



Add the product obtained:  $300 + 90 + 12 = 402$ .

Thus,  $134 \times 3 = 402$ .

Next, demonstrate multiplication of numbers by 10, 20, 30, ..., 90, and 100, 200, 300, ..., 900.

- To multiply a number by 10, write a '0' to the right of the number.

For example,  $2 \times 10 = 20$

- To multiply a number by 20, 30, 40, ..., 90, first multiply the number without 0. Then, write a '0' to the right of the product obtained.

For example,  $15 \times 40 = \underline{600}$

- To multiply a number by 100, write two zeros (00) to the right of the number.

For example,  $5 \times 100 = 500$

- To multiply a number by 200, 300, 400, ..., 900, first multiply the number without 00. Then, write two zeros (00) to the right of the product obtained.

For example,  $12 \times 400 = \underline{4800}$

Motivate students to complete Think Tank given on page 78.

## EVALUATE

**Classwork:** Ask students to solve Q.1 and 2 (a), (b), (c) of Practice Time 4E.

**Homework:** Ask the students to solve remaining questions of Practice Time 4E.

## ENHANCE

Ask students to download the worksheet from “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)” and practise them.

**Periods:** 11-12

**Topics:** Properties of multiplication,  
estimating the product, word problems

**Suggested extra teaching aids:**  
Some real-life objects  
Math Genius 3 pages 79–80

## ENGAGE

Begin with a discussion on the previously learned topics. Introduce properties of multiplication, estimating product and take a real-life situation based on multiplication sentence having multiplication by 1- or 2-digit numbers like: If teacher brought 48 dozen pencils for her class, how many pencils did she bring in total?

Discuss how to solve the word problems.

## EXPLORE

Divide the class into groups. Distribute a paper to each student and tell them to solve this problem: “There are 58 bags of cookies in a sale. Each bag has 12 cookies. How many cookies are there in total?”

- Tell students to discuss the solution within their groups.
- Point out to students how their explanation became clearer and more specific as they had more practice with using the method for multiplication.
- Appreciate the group who solved the problem accurately in minimum time.



## EXPLAIN

Write on the board that numbers can be multiplied in any order and their product will remain the same. Use any real-life object to demonstrate this property.

Like, 4 notebooks in 3 groups = 3 notebooks in 4 groups.

Similarly, explain what is the effect on product, if we multiply any number with 0 and 1.

- When a number is multiplied by 1, the product is the number itself.

**Examples:** (a)  $7 \times 1 = 7$

(b)  $53 \times 1 = 53$

(c)  $124 \times 1 = 124$

- When a number is multiplied by '0', the product is always '0'.

**Examples:** (a)  $5 \times 0 = 0$

(b)  $17 \times 0 = 0$

(c)  $142 \times 0 = 0$

Next, explain the estimation of the product and to solve real-life situations based on multiplication sentences like simple multiplication. Refer textbook pages 79–80 for explanation and examples.

## ELABORATE

Consider any real-life situation where we need estimating product. For example, chairs are being arranged for an school event. If there are 72 chairs in each of the 27 rows, about how many people can take a seat? For this, let us estimate the product  $72 \times 27$ .

Demonstrate estimating the product of 72 and 27 on board as follows:

- 72 rounded down to the nearest 10 is 70
- 27 rounded up to the nearest 10 is 30

Thus, the estimated product = 2100

That is, about 2100 people can take a seat.

Also, discuss some real-life situations where we need to find the actual product. For example, "A bus can carry 52 passengers. How many passengers can be carried by 36 buses?"

Since, the number of passengers a bus can carry = 52

And, the number of buses = 36

So, the number of passengers carried by 36 buses =  $52 \times 36 = 1872$

	Th	H	T	O
			7	0
×			3	0
			0	0
+	2	1	0	0
	2	1	0	0

	Th	H	T	O
			5	2
×			3	6
		3	1	2
+	1	5	6	0
	1	8	7	2

## EVALUATE

**Classwork:** Ask students to solve Q.1, Q.3 (a), (b) of Practice Time 4F and Q.1 of Practice Time 4G. If the students make any error, the teacher will correct it and explain.

**Homework:** Do the remaining questions of the Practice Time 4F and 4G.

## ENHANCE

Ask students to download the worksheet from the "www.orangewebsupport.co.in" and practise them.

Periods: 13–14

Topic: (Revision) Chapter Assessment

Suggested extra teaching aids:  
Math Genius 3 pages 81–83

## ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they are facing problems.



## **EXPLAIN**

Start the revision of the exercise by using ‘Mind Map’, ‘Mental Maths’, ‘Chapter Assessment’ and ‘Challenge Question’. Also guide them to perform the activity in the classroom.

## **ELABORATE**

Discuss questions 1 to 4 of the ‘Chapter assessment’ and accept students’ answer, if there is any confusion or error then explain and correct it. Discuss ‘Challenge Question’ and motivate students to solve ‘Mental maths’. At last guide to the students to do the activity given on page 83.

## **EVALUATE**

**Classwork:** Discuss questions 1 to 4 of the ‘Chapter Assessment’ in the classroom. Do the activity given on page 83.

**Homework:** Q.5 on page no.82.

## **ENHANCE**

Ask students to find two processes of multiplication other than those discussed in the book, with the use of the internet or with the help of friends, teachers and parents.



# Division

## Learning Objectives

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

- ◆ describe division as equal distribution and repeated subtraction
- ◆ understand the properties of division
- ◆ learn division of 2 and 3-digit numbers by 1-digit number (without and with regrouping)
- ◆ divide a number by 10 and 100
- ◆ identify the mathematical operations to be used in real-life situations
- ◆ use long division and its checking
- ◆ solve word problems based on division

## LESSON PLAN

**Suggested number of periods:** 12

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, some real-life objects like candies, sketch pens, pens, pencils, etc.

**Keywords:** Dividend, divisor, remainder, multiplication facts, division facts, etc.

**Pre-requisite knowledge:** Students must be familiar with the division of 2-digit numbers by 1-digit numbers without regrouping. Solve division stories based on single-digit 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	<b>Topics: Division as equal distribution, Division as repeated subtraction, Relationship between division and multiplication, Properties of division and Long division.</b>	<b>Suggested extra teaching aids: Math Genius 3, pages 84–92</b>
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### ENGAGE

Introduce the topic in the classroom with some interesting activities like placing some objects on the table and asking students to distribute them in equal groups.

Discuss the concept given in “Get Ready” and “Let’s Recall” sections on pages 84 and 85.

### EXPLORE

Bring a packet of 40 pencils to the classroom and invite the students in different numbers say 2, 4, 5, and 8. Instruct the students to distribute the pencils equally among themselves. Ask how many pencils each student gets. Accept the responses. Write it as a division sentence using the division sign.

[Experiential and Collaborative Learning]

After understanding the division as equal distribution, deal the concept of repeated subtraction by involving a group of students.

## EXPLAIN

- Start with the topic ‘division as equal distribution’ by taking the reference of real-life situation and examples given on page 86 of the book.
- Then discuss the topic ‘division as repeated subtraction on board’ by using the example given on page 87. Motivate the students to solve the questions given under ‘Think Tank’ and ‘Fast Check’ before doing Practice Time 5A.
- Explain the topic ‘establish the relation between division and multiplication’ by using the example given on page 88.
- And demonstrate that there are two division facts corresponding to each multiplication fact. Like:

### Multiplication fact

$$2 \times 6 = 12$$

### Division facts

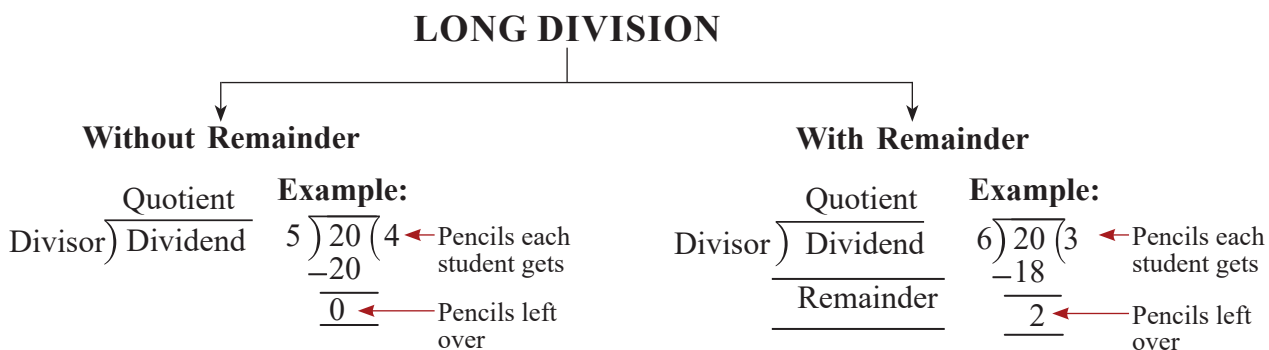
$$12 \div 2 = 6 \text{ and } 12 \div 6 = 2$$

- Demonstrate on board, how the multiplication table helps us in division by using the example of division ‘divide 28 by 4’.
- Next, discuss the topic ‘properties of division’ by demonstrating on board that:
  - When a number is divided by 1, the quotient is the number itself.  
**Examples:** (a)  $5 \div 1 = 5$  (b)  $10 \div 1 = 10$
  - Division of a number by itself: When a number is divided by itself, the quotient is 1.  
**Examples:** (a)  $12 \div 12 = 1$  (b)  $26 \div 26 = 1$
  - Division of zero by any number: When 0 is divided by any number (except 0) gives the quotient 0.  
**Example:**  $0 \div 14 = 0$

## ELABORATE

Start long division, first by revising the division of 1-digit numbers, then checking the division by the relationship “Quotient  $\times$  Divisor + Remainder = Dividend”.

- Demonstrate on board that in division, sometimes we get remainder 0 and sometimes we get the remainder by taking reference of book. For hands-on learning, call two groups – A with 5 students and B with 6 students. Give 20 pencils to each group and tell them to share it equally. Elaborate what they observe.



Also, discuss the subtopic ‘checking division’, the relation between the dividend, divisor, quotient and remainder. As,

$$\text{Quotient} \times \text{Divisor} + \text{Remainder} = \text{Dividend}$$

Verify the relationship on the board as:

$$\begin{array}{l} 4 \times 5 + 0 = 20 \\ 3 \times 6 + 2 = 20 \end{array} \left. \vphantom{\begin{array}{l} 4 \times 5 + 0 = 20 \\ 3 \times 6 + 2 = 20 \end{array}} \right\} \text{Dividend}$$

[Conceptual Learning]

## EVALUATE

**Classwork:** Ask to solve questions 1, 2 and 3 of Practice Time 5A and 5B. If students make any error, the teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 5A and 5B.

## ENHANCE

Ask students to list 4–5 situations from daily life where they use concept of division.

<b>Periods: 4–7</b>	<b>Topics: Division by 1-digit number (without regrouping), Division by 1-digit number (with regrouping), Division by 10 and 100.</b>	<b>Suggested extra teaching aids: Math Genius 3, pages 92–97</b>
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## ENGAGE

Revise the concept of division using the example of pencils distribution activity in previous period.

## EXPLORE

Demonstrate that division can be also done using the Vedic method. (Nikhilam Sutra)

In this method divide the dividend into two parts LHS and RHS. The RHS will contain as many digits as the number of zeros in the base.

**For example, divide 23 by 9.**

- Since 23 is a 2-digit number, so it is of base 10. And base 10 has one zero in it.
- Divide the dividend in such a way that the RHS has one digit.
- Bring down the first digit of the dividend, 2 as shown in the diagram:
- Here, the divisor is 9, the base is 10, find the difference of base and the divisor, the difference is 1.
- Multiply 2 with the difference 1 and add the answer to the next digit of the dividend as shown.
- The product of 2 and 1 (the difference) is 2, write it below 3. The sum of 3 and 2 is 5.

	Dividend
Quotient	Remainder
2	3
↓	
2	
	10
	-9
	1

	LHS		RHS
	2		3
			+ 2
	2		5

Thus, when 23 is divided by 9 the quotient is 2 and the remainder is 5.

The final answer obtained on the LHS is the quotient and on RHS is the remainder. [Vedic maths Learning]

Note: In case of the number on RHS is greater than divisor, subtract the divisor from that number and increase the quotient by 1. Consider  $23 \div 7$ .

	LHS		RHS
	2		3
			+ 6
	2		9
	+1		-7
	3		2

Thus, Q = 3, R = 2

## EXPLAIN

Demonstrate on board ‘division by 1-digit number, without and with regrouping’ and division by 10 and 100.

## ELABORATE

- Revise the division of 2-digit number by 1-digit number by starting the topic “division by 1-digit number (without regrouping)”. Use the methods and examples given on page 92 and demonstrate the division on board.

Next, explain division of a 3-digit number by 1-digit number by using the examples given on page 93.

- Introduce division of 2-digit and 3-digit numbers with regrouping. Use the examples and detailed explanations given on page 94 and 95.
- Division by 10 and 100: Demonstrate on board that,
  - when we divide a number by 10, the digit at the ones place of the number is the remainder and the number formed by the remaining digits is the quotient. For example,  $87 \div 10$ ,  
Then, quotient = 8, remainder = 7.
  - when a number is divided by 100, the number formed with the tens and ones digits of the number is the remainder and the number formed by the remaining digits is the quotient.  
For example,  $458 \div 100$ ,  
Then, quotient = 4, remainder = 58.

Use the examples given on page 96 of the book.

## EVALUATE

**Classwork:** Ask to solve questions 1, 2, 3 and 4 of Practice Time 5C and 5D. If students make any error, teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 5C, 5D and 5E.

## ENHANCE

- Discuss ‘Think Tank’ given on Pages 93, 95 and 96.
- Ask to watch the video on division with regrouping on “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)”. [Tech Connect]

**Periods:** 8–10

**Topics:** Word problems, Identifying the mathematical operations.

**Suggested extra teaching aids:** Math Genius 3, pages 97–99

## ENGAGE

Revise the important points of previously learned topics by asking a few questions in the classroom. Write any number on the board and tell the students to write any fact for that number. For example, consider number 24.

$$6 \times 4 = 24; 20 + 4 = 24; 4 + 4 + 4 + 4 + 4 + 4 = 24; 60 - 36 = 24; 48 \div 2 = 24$$

24 is an even number. It has 2 tens and 4 ones.

Accept the answers. Explain if anyone has any confusion.

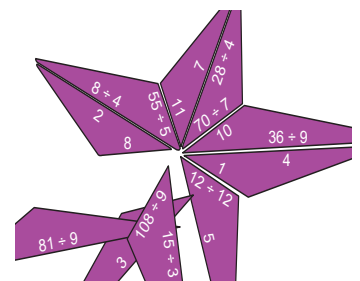
## EXPLORE

Divide the class into groups of 5.

Distribute 10 cut-outs (2 for each part of stars) to each group, such that there is a question on one piece of cut-out and its answer on another piece.

Ask the groups to match the questions with answers to complete the star.

[Experiential Learning]



## EXPLAIN

Discuss in the classroom the real-life situations, where we use the division. Lastly, in the topic ‘Identifying the mathematical operations’, demonstrate the process of identifying the mathematical operations involves deciding which mathematical operation (addition, subtraction, multiplication, or division) will be useful in solving a word problem. Refer textbook page 98 for explanation and examples.

## ELABORATE

Consider any problem from exercise or take another one, such as: After winning the final match, a Kabaddi Team was rewarded with a prize money of ₹945. How much money would each of the 7 players get?

Total prize money = ₹945

Number of players in the team = 7

So, prize money got by each player = ₹945 ÷ 7 = ₹135

[Conceptual Learning]

$$\begin{array}{r} 7 \overline{)945} \quad (135 \\ \underline{-7} \phantom{0} \phantom{0} \\ 24 \phantom{0} \\ \underline{-21} \phantom{0} \\ 35 \\ \underline{-35} \\ 0 \end{array}$$

## EVALUATE

**Classwork:** Ask to solve some questions of Practice Time 5F and 5G. If students make any error, the teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 5F and 5G.

## ENHANCE

Ask to solve Mental Maths given on page 99.

Periods: 11–12

Topic: Revision (Chapter assessment)

Suggested extra teaching aids:  
Math Genius 3 pages 100–102

## ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they are facing problems.

## EXPLORE

Conduct the activity as suggested in ‘Gamified Learning’ section on page 102.

## EXPLAIN

Start the revision of the exercise by using ‘Mind Map’, ‘Challenge Question’, ‘Chapter Assessment’ and ‘MATHS FUN’.

## ELABORATE

Discuss questions 1 to 2 in the ‘Chapter Assessment’ and accept students’ answer, if there is any confusion or error then explain and correct it. Discuss ‘Challenge Question’ and motivate students to solve ‘MATHS FUN’.

## EVALUATE

**Classwork:** Discuss questions 1 and 2 of the ‘Chapter Assessment’ in the classroom.

**Homework:** Ask to solve Q.3 and 4 of ‘Chapter Assessment’ and ‘MATHS FUN’ given on page 102.

## ENHANCE

Ask students to find two processes of division other than those discussed in the book, with the use of the internet or with the help of friends, teachers and parents.





# Fractions

## Learning Objectives

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

- ◆ learn the concept of fractions
- ◆ know how to represent part of a whole or a collection
- ◆ find fractions of a whole or a collection
- ◆ identify the numerator and denominator in a given fraction
- ◆ explore the use of fractions in real-life situations

## LESSON PLAN

**Suggested number of periods:** 8

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, some real-life objects like candies, fruits, cut-outs of different plane shapes showing fractions, sketch pens, pens, pencils, etc.

**Keywords:** Fraction, halves, one-third, one-fourth, numerator, denominator, etc.

**Pre-requisite knowledge:** Students must be familiar with fractions, part of a whole or a collection.

**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.

<b>Periods:</b> 1–3	<b>Topics:</b> Understanding fractions, Fractions of a region, Writing fractions	<b>Suggested extra teaching aids:</b> Some real-life objects, like pencils, toffees, fruits etc. Math Genius 3, Pages 103–108
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### ENGAGE

Introduce the topic in the classroom with some interesting activities like, distribute some coloured square, rectangle and circle shaped papers in the class and ask: “How will you divide the shapes into two, three and four equal parts?” Accept the responses.

Introduce: Division of a whole into two halves, three one-thirds and four one-fourths.

Teacher can discuss the concept given in “Get Ready” and “Let’s Recall” sections on pages 103 and 104.

### EXPLORE

Divide the class into pairs. Distribute squared paper sheets to them. Ask to fold the square paper into equal halves, press the crease and then unfold the sheet.

Ask: How many equal divisions are made in sheet? Accept the responses.

Now, again instruct to fold the square sheet into three equal parts. And unfold the sheet. Ask: How many equal divisions are made in the sheet in both cases? Accept the responses. **[Experiential Learning]**

## EXPLAIN

A fraction is a part of a whole when divided into equal parts. A whole can be a region or a collection. The parts of a whole of the same size are called equal parts. Explain halves, one-third, one-fourth. Show on board how to write fractions using two numbers, *i.e.*, numerator and denominator. Explain what are numerator and denominator. Refer textbook pages 104–107 for explanation and examples.

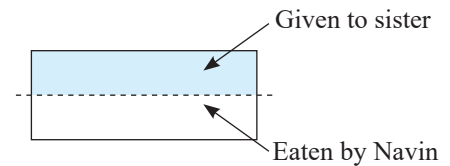
## ELABORATE

Interact with the students and encourage them to share their daily life experience where they want to distribute something among friends and family members. For example,

- Navin shares his chocolate bar with her sister equally.
- Neha cuts 4 pieces of a cake and eats with her 3 friends.

Taking their responses, describe the concept of fractions on the board.

Considering the Navin's case, we have two pieces of the chocolate. Navin gives 1 out of 2 pieces to his sister. So, she gets  $\frac{1}{2}$  (one-half) and Navin himself eats the other half of the chocolate.

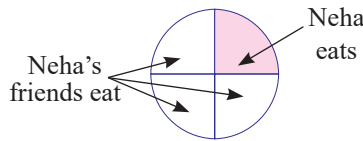


Further, demonstrate on board that fractions are the representation as follows:

$$\text{Fraction} = \frac{\text{Number of parts being talked about}}{\text{Total number of equal parts}}$$

In the above situation, Fraction =  $\frac{1}{2}$  ← Numerator  
 ← Denominator

Similarly, elaborate the Neha's case as:



Clearly, Neha eats one-quarter  $\left(\frac{1}{4}\right)$  and her friends eat three-quarters  $\left(\frac{3}{4}\right)$ .

- Discuss the 'Think Tank' section given on page 107.

**[Logical and Critical Thinking]**

## EVALUATE

**Classwork:** Ask to solve questions 1, 2 and 4 of practice time 6A. If any student make any error, the teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of practice time 6A.

## ENHANCE

- Discuss 'Knowledge Desk' given on page 106 and 'MATHS FUN' given on page 107. **[Cross Curricular]**
- Ask to watch the video on "www.orangewebsupport.co.in". **[Tech connect]**

Periods: 4–5

Topics: Fraction of a collection, Finding fractions of a collection using division

Suggested extra teaching aids: Math Genius 3, pages 109–112, some real-life objects like balls, pencils, etc.

## ENGAGE

Write a few fractions on the board and ask to identify the numerator and denominator of the fractions. Accept the responses. Engage the students in an activity as suggested on page 108.

## EXPLORE

Divide the class into pairs. Choose a pair of students randomly. Give a rectangular piece of card sheet having equal divisions to both the students of the pair. Instruct them to shade as many parts as they want, and write them in fractions, also identify the numerator and denominator of each fraction. Rectify if any student makes any error.

## EXPLAIN

Discuss that a collection can also be taken as a whole and fractions are equal parts of a collection. For instance, instruct the students sitting in the 1st row or the students of roll numbers 1–10 to stand up. Explain what fractions of these students are boys and girls. Suppose there are 6 students in the 1st row and 2 are boys. Then,  $\frac{2}{6}$  of the group are boys and  $\frac{4}{6}$  of the group are girls.

Motivate them to solve the questions given under ‘Fast Check’ on page 109.

We can find fraction of a collection using division.

The teacher can take the example and explanation given on pages 109–110.

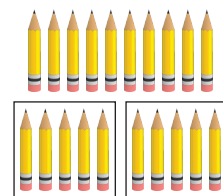
## ELABORATE

Write on board half  $\left(\frac{1}{2}\right)$  of a collection.

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

So,  $\frac{1}{2}$  of 10 = 5 or  $10 \div 2 = 5$ , i.e., half of 10 pencils is 5.

Similarly, demonstrate one-third  $\left(\frac{1}{3}\right)$ , one-fourth  $\left(\frac{1}{4}\right)$  of a collection by using division.



[Experiential Learning]

## EVALUATE

**Classwork:** Ask to solve questions 1, 2, 3 and 4 of Practice Time 6B. If students make any error, teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 6B.

## ENHANCE

- Discuss ‘Life Skills’ and ‘Think Tank’ given on pages 109 and 110 respectively.
- Watch the video on fractions on “www.orangewebsupport.co.in”.

[Tech connect]



**ENGAGE**

Revise the important points of previously learned topics by asking a few questions in the classroom. Accept the answers. Ask if anyone has any confusion.

**EXPLORE**

Write on board:

Total number of students:

Number of students present:

Number of girls present:

Number of boys present:

Call three students of the class and ask one of them to count the total number of students present. And others to count the number of boys and girls present in the classroom and write the numbers alongside the respective headings. Next, ask the class one by one to represent them in fractions. **[Experiential Learning]**

**EXPLAIN**

Discuss the real-life situations where we use fractions by using the examples and methods given on page 112 to solve them.

**ELABORATE**

Write on board “Madhuri made a garland using 16 roses. 5 of them are red. What is the fraction representing:

(a) Red roses out of the total roses?

(b) Not red roses out of the total roses?”

(a) Given, total number of roses used = 16

And, number of red roses = 5

So, the fraction representing red roses =  $\frac{5}{16}$

(b) Number of roses, which are not red =  $16 - 5 = 11$

So, fraction representing not red roses =  $\frac{11}{16}$

Also discuss other examples given on Page no. 112 on board.



**[Conceptual Learning]**

**EVALUATE**

**Classwork:** Ask to solve questions 1 and 2 of Practice Time 6C. If any student makes any error, the teacher will correct and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 6C.

**ENHANCE**

• Discuss the ‘Think Tank’ given on page 113.

**[Logical Thinking]**

• Ask to watch the video on fractions on “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)”.

**[Tech Connect]**

**ENGAGE**

Make students comfortable, so they can ask any question on any previously taught topics in which they have doubts.

**EXPLAIN**

Start the revision of the exercise by using ‘Mind Map’, ‘Mental Maths’, ‘Chapter Assessment’ and ‘Challenge Question’.

**ELABORATE**

Discuss questions 1 to 3 of the ‘Chapter Assessment’ and accept students’ answer, if there is any confusion or error then explain and correct it. Discuss and motivate students to solve mental maths.

At last guide them to perform the activity given in ‘Gamified Learning’ on page 116. **[Art integration]**

**EVALUATE**

**Classwork:** Ask to solve Q.1 to 3 of the ‘Chapter Assessment’ and ‘Challenge Question’ given on page 116.

**Homework:** Ask to solve Q.4 to 8 of ‘Chapter Assessment’.

**ENHANCE**

Ask students to prepare colourful charts on fractions, with the help of friends, teachers and parents.



# Geometry

## Learning Objectives

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

- ◆ define the basic geometrical concepts
- ◆ recognise plane and curved surface
- ◆ learn to measure and to draw a line segment
- ◆ learn about solid shapes
- ◆ recognise different views
- ◆ understand plane shapes
- ◆ learn about diagonals in plane shapes

## LESSON PLAN

**Suggested number of periods:** 16

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, some real-life objects like: Dice, birthday cap, any cuboidal shape object, cut-outs of plane shapes, circular objects, cylindrical objects, etc.

**Keywords:** Point, line, ray, horizontal line, vertical line, slanting line, line segment, triangle, rectangle, square, circle, centre, side, vertex, cube, cuboid, cylinder, cone, sphere, hemisphere, diagonal, side view, front view, top view, tangram, plane surface, curved surface, etc.

**Pre-requisite knowledge:** Students must be familiar with plane shapes rectangle, square, triangle, circle, oval, straight line, curved line, drawing a straight line, solid 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.

<b>Periods: 1–4</b>	<b>Topics: Basic geometrical concepts, Measuring and drawing a line segment</b>	<b>Suggested extra teaching aids: Ruler, pencil, some thread, torch, etc. Math Genius 3, pages 119-124</b>
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## ENGAGE

Start the class with an interaction. Talk about the presence of geometrical shapes all around. Tell the students to look around and identify some shapes that you see in different objects. Next, ask them to take a sharpened lead pencil and mark a dot with the tip of pencil on a paper. Recognise it as a point. Introduce simple geometrical shapes, like: point, line, line segment, ray, etc. Discuss the concepts given in 'Get Ready' and 'Let's Recall' sections on pages 119 and 120 respectively.

## EXPLORE

Divide the class into pairs. Ask one pair to draw four pairs of points on the board. Call 2nd pair and instruct them to name the points. Call another pair to identify the shortest way from one point to another point. Ask the students, how many end-points are there in a line segment? Accept the responses.

[Experiential Learning]

## EXPLAIN

A point is represented by a tiny dot (.). To distinguish points, we name them using capital letters, such as A, B, C, ... and read these points as point A, point B, point C and so on. Demonstrate five or six points on the board to the students. Also name these points using capital letters. The straight line which joins two points is called line segment. The line segment has two end points (say, A and B). With the help of diagrams, explain that a ray and a line segment are the parts of a straight line. Refer explanation given on pages 120–122.

Further, invite the students in small groups and demonstrate how to measure and draw a line segment using a ruler and a pencil.

## ELABORATE



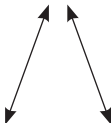
Demonstrate that a point shows an exact position and it is said to have no length, width or thickness.

A line is a one-dimensional figure, that does not have a thickness. It can extend in both direction. There are two types of lines:

1. Straight line 

2. Curved line 

There are three types of straight lines:

(a) horizontal	(b) vertical	(c) slanting
		

Next, demonstrate ‘line segment’ and ‘ray’ on board by taking references given on pages 121 and 122. After understanding this concept, demonstrate measuring and drawing a line segment with help of a ruler by taking the reference of the book.

[Conceptual learning]

## EVALUATE

**Classwork:** Ask to solve Q.3 of Practice Time 7A and Q.1 of Practice Time 7B.

**Homework:** Ask to solve the remaining questions of Practice Time 7A and 7B.

## ENHANCE

- Discuss ‘Fast Check’ given on page 121.
- Discuss Q.4 of Practice Time 7A and ‘Think Tank’ given on page 123.

Periods: 5–8

Topics: Plane shapes, Diagonals, Tangram

Suggested extra teaching aids: Chart having images based on geometrical plane shapes, dot paper, one word of plane shapes etc.  
Math Genius 3 pages 124–127

## ENGAGE

Hang a chart of images based on plane shapes on the board as shown. Ask the students to identify the different shapes and count the number of each shapes. Accept the answers.



## EXPLORE

Divide the class into four groups. Distribute dot paper to each group. Ask groups to construct with help of each other

- A square joining only 16 dots and colour it yellow.
- A rectangle joining only 20 dots and colour it red.
- A triangle joining only 18 dots and colour it blue.

Now try to identify the sides and vertices of the shapes drawn. Next, draw a rough sketch of a circle on a plane paper and try to find its side and vertex, if any.

[Collaborative Learning]

## EXPLAIN

Any closed figure joining three or more points that can be drawn on a flat surface is called a plane figure or shape. Triangles, rectangles, squares, etc., are plane shapes. These shapes are also called 2-dimensional shapes because they have length and breadth.

Next, explain that when we join two vertices of a plane shape that are not next to each other is a diagonal.

Demonstrate on board with images that

- A triangle has 3 sides and 3 vertices.
- A rectangle has 4 sides and 4 vertices.
- A square also has 4 sides and 4 vertices.
- A circle has no vertex or side.

For detailed explanation, refer pages 124 and 125 of the book. Discuss ‘Fast Check’ and ‘Activity’ given on page 125.

## ELABORATE

Demonstrate that we can create different shapes like swan, human, bird, dog, etc. by using the plane shapes called tangram.

Distribute different cut-outs of plane shapes as given on page 126 of the book. Show the formation of shapes given in the book, and instruct the students to follow the steps. Encourage them to make some figures using their own imagination.

[Creative Thinking]

## EVALUATE

**Classwork:** Ask to solve questions 1, 2, 5 and 6 of Practice Time 7C. If students make any error, teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 7C.

## ENHANCE

- Ask to do the activity given on ‘Think Tank’ and ‘MATHS FUN’ on pages 126 and 127 respectively.

[Creative and Logical Thinking]

<b>Periods: 9–12</b>	<b>Topics: Solid shapes, Views</b>	<b>Suggested extra teaching aids: Some real-life 3D objects like: Ball, bowl, battery, pencil box, Christmas cap, etc. Math Genius 3 pages 127–130</b>
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## ENGAGE

Place some real-life objects on teacher’s table and ask about its shapes, differentiate between 2-dimensional and 3-dimensional shapes. Accept the responses.

## EXPLORE

One day before, ask students to bring lunch based on 3-dimensional shapes, like: Sandwiches, parathas, juice tetra packs or cans, laddoos, etc.

On the next day, ask each student one by one to open the lunchbox and describe the shape of the food items in it. Allow students to enjoy their lunch by sharing with each other. [Collaborative and Holistic Learning]

## EXPLAIN

Demonstrate some solid objects in the classroom and explain that solids are not flat like plane figures. They are 3-dimensional shapes/figures. It has length, breadth (or width) and depth (or height). A solid occupies a fixed amount of space. Solid have two types of surfaces: Plane and curved. Solid shapes have faces, edges and vertices. Further explain front view, side view and top view of a 3-dimensional object.

## ELABORATE

Demonstrate some 3-dimensional objects in the classroom and explain that the part of an object which we see, touch and feel is known as the surface. The surface can be plane (or flat) or curved. Take reference of page 128 to explain it in detail.

Further demonstrate faces, edges and vertices of solid of objects: cube, cuboid, cylinder, cone, sphere and hemisphere by taking reference of pages 128 and 129. Also show real objects to reinforce the concepts.

Demonstrate a cube and cuboid in the classroom and ask the differences between these two. Accept the responses. Also, discuss the differences given between these two on page 129.

Next, demonstrate front view, side view and top view of water bottle in the classroom.

Ask students to draw front view, side view and top view of teacher table in their classwork notebook.

[Experiential Learning]

## EVALUATE

**Classwork:** Ask to solve ‘Fast Check’ given on page 129, Q.2 and 3 of Practice Time 7D. If any student makes any error, the teacher will correct and explain.

**Homework:** Ask to solve remaining questions of Practice Time 7D.

## ENHANCE

- Ask to do the activity given on page 129.
- Ask to collect and paste images of different 3-dimensional objects on a chart paper and represent shapes, number of plane faces, curved faces, edges and vertices of each in a tabular form.

[Creative Thinking]

<b>Periods: 13-14</b>	<b>Topic: Maps</b>	<b>Suggested extra teaching aids: Chart showing maps or route between two locations. Math Genius 3 pages 131–132.</b>
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## ENGAGE

Ask students about the route of school from their home, important landmarks that come on the way. Accept the responses. Introduce the topic maps.

## EXPLORE

Divide the class into groups.

Distribute paper to each group. Ask to draw route map from the classroom to principal room using keys. Teacher will help if any group wants it. The group whose route map is the best and proper will be appreciated.

[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). Also, used for guiding directions and to find out distances in a locality.

## ELABORATE

Take reference of page 131 to explain the map. Demonstrate the example on board.

## EVALUATE

**Classwork:** Ask to solve Q.1 of Practice Time 7E. If any student makes any error, the teacher will correct and explain.

**Homework:** Ask to solve Q.2 of Practice Time 7E.



## ENHANCE

- Discuss “Maths Connect” given on page 131.

[Cross Circular Learning]

**Periods: 15–16**

**Topic: (Revision) Chapter Assessment**

**Suggested extra teaching aids:  
Math Genius 3 pages 133–135**

## ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they are confused. Start the revision of the exercise.

## EXPLAIN

Start the revision of the exercise by using ‘Mind Map’, ‘Mental Maths’, ‘Challenge Question’ and ‘Chapter Assessment’.

## ELABORATE

Discuss questions 1, 2 and 6 of the ‘Chapter Assessment’ and accept students’ answer, if there is any confusion or error then explain and correct it. Discuss and motivate students to solve mental maths.

## EVALUATE

**Classwork:** Discuss questions 1, 2 and 6 of the ‘Chapter Assessment’ and ‘Challenge Question’ given on page 132.

**Homework:** Ask to solve Q.3, 4 and 5 of ‘Chapter Assessment’ and ‘Mental Maths’.

## ENHANCE

Help the students to perform the activity given on ‘Gamified Learning’ on page 135.

[Art Integration]





# Symmetry and Patterns

## Learning Objectives

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

- ◆ explore symmetry in surroundings and nature
- ◆ identify symmetrical figures using a mirror
- ◆ understand patterns and their types
- ◆ recognise tiling patterns (Tessellation)

## LESSON PLAN

**Suggested number of periods:** 12

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, some cut-outs of real-life objects like butterflies, monuments, etc.

**Keywords:** Identical, symmetrical shapes, asymmetrical shapes, line of symmetry, pattern, etc.

**Pre-requisite knowledge:** Students must be familiar with 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.

<b>Periods: 1–5</b>	<b>Topic: Symmetry</b>	<b>Suggested extra teaching aids: Math Genius 3 pages 137–139</b>
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### ENGAGE

Distribute some cut-outs of monuments, human faces, or other objects. Instruct to fold the cut-outs into two identical halves and open them. Ask: Is the crease formed on the cut-out dividing the shape into two identical halves? Accept the responses. Introduce the concept of symmetry.

### EXPLORE

Distribute papers in the classroom. Instruct to make some closed shapes on it. Draw a crease line on the shapes wherever you want to divide the shape into two identical halves and observe the shapes.

Ask: Which shapes are divided into two identical halves by the crease line? Accept the responses. Explain that if the crease line divides the shapes into two identical halves, it is called line of symmetry and shapes are symmetrical.

**[Experiential Learning]**

## EXPLAIN

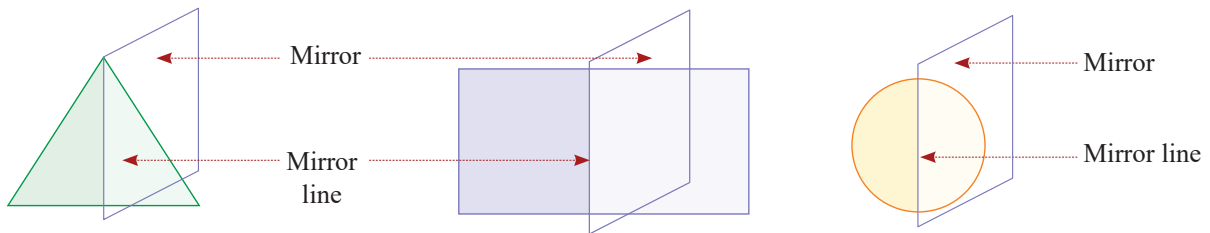
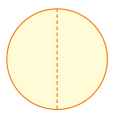
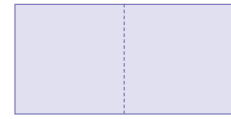
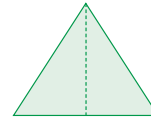
When a figure or shape can be divided into two halves by drawing a line, then they are called symmetrical figures or shapes. The line which divides the figure into two halves is called the line of symmetry or axis of symmetry.



Figures that are not symmetrical are called asymmetrical figures. They do not have a line of symmetry.

## ELABORATE

Write on the board “Identifying symmetrical figures using a mirror”. Demonstrate by taking a triangular, rectangular and circular piece of paper and fold them into halves. Cut them along the line of symmetry. Place a mirror along the line of symmetry on each piece.



Demonstrate that the shape viewed in the mirror is the same as the shape on the left side and the two together form the complete shape. Take help from the topics described on page no. 137 and 138. **[Conceptual Learning]**

## EVALUATE

**Classwork:** Ask to solve questions 1 and 2 of Practice Time 8A. If any student makes any error, the teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 8A.

## ENHANCE

- Discuss the ‘Fast Check’ and ‘Get It Right’ given on page 138.

**[Critical Thinking]**

- Ask to watch the video on symmetry on the link “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)”.

**[Tech Connect]**

<b>Periods: 6–10</b>	<b>Topics: Patterns, Tiling Patterns or Tessellation</b>	<b>Suggested extra teaching aids: Chart paper having pictures of some patterns and tiling patterns, etc. Math Genius 3 pages 139–143</b>
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## ENGAGE

Ask the class to pay attention. Draw some object patterns on the board with some blank spaces. Ask the students to tell the name of the next two shapes or objects to complete/continue the pattern drawn on the board. Accept the responses. Introduce the concept of different kinds of patterns and tessellation.

## EXPLORE

Divide the class into pairs. Give them some cut-outs of different shapes.

Instruct to make their own pattern using these cut-outs of shapes.

Ask a students of the other pairs to identify and tell the name of the next two cut-outs of the shapes to continue the pattern. Accept the responses. Discuss some other kinds of patterns.

## EXPLAIN

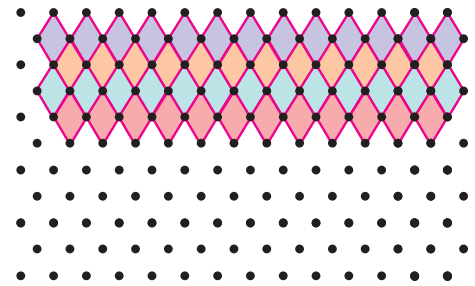
A pattern is a set of shapes, numbers or letters that can be repeated according to a rule so that a sequence is formed. Patterns are found everywhere around us. The pattern is formed when different shapes are drawn repeatedly. We can find beautiful patterns on *sarees*, carpets, *rangolis*, tiles, and in nature. Different colours can be used to create different patterns with the same shapes.

Also refer page no. 139 and 140 of the book for discussion.

[Conceptual Learning]

## ELABORATE

Divide the class into small groups. Provide each group an isometric/ square dot/grid paper. Instruct each student to take a crayon/coloured pencil of any colour but not same. Then shade the square/diamond/triangle shape in order and observe the tiling pattern/tessellation so formed.



Discuss with other groups.

[Collaborative Learning]

You can organise a competition for ‘Diya decoration’ as given in Life Skills on page 142.

## EVALUATE

**Classwork:** Ask to solve Q.1 and 2 of Practice Time 8B and Q.1 of 8C. If students make any error, the teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 8B and 8C.

## ENHANCE

- Motivate students to do ‘Think Tank’ and ‘Project’ given on page 140.
- Discuss ‘MATHS FUN’ and ‘Fast Check’ given on pages 141 and 142 respectively.

[Critical Thinking]

- Watch the video on symmetry and patterns on “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)”.

[Tech Connect]

Periods: 11-12

Topic: (Revision) Chapter Assessment

Suggested extra teaching aids:  
Math Genius 3 pages 143-145

## ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they have confusion.



## EXPLAIN

Start the revision of the exercise by using ‘Mind Map’, ‘Mental Maths’, ‘Chapter Assessment’, and ‘Challenge Question’ of the chapter.

## ELABORATE

Discuss ‘Mental Maths’, ‘Challenge Question, Q.1 to 3 of the ‘Chapter Assessment’ in the classroom and accept students’ answers. If there is any confusion or error then explain and correct it.

## EVALUATE

**Classwork:** Discuss questions 1 to 3 of the ‘Chapter Assessment’ in the classroom.

**Homework:** Q.4 to 6 of the ‘Chapter Assessment’.

## ENHANCE

- Ask students to perform the activity given in ‘Gamified Learning’ on page 145.
- Take a chart paper and paste images of five symmetrical monuments on it.

**[Art Integration]**



# Measurement

## Learning Objectives

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

- ◆ measure length and distance using standard units like centimetre, metre and kilometre
- ◆ understand the conversion of units of length
- ◆ measure weight using standard units like milligram, gram and kilogram
- ◆ understand the conversion of units of weight
- ◆ learn to make equal weights
- ◆ measure capacity using standard units like millilitre and litre
- ◆ understand the conversion of units of capacities
- ◆ learn to make equal volumes
- ◆ learn to add the lengths, weights and capacities
- ◆ learn to subtract the lengths, weights and capacities

## LESSON PLAN

**Suggested number of periods:** 18

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, some chits on which different measurement are written, bowl, ruler, some weights, some containers of different capacities, etc.

**Keywords:** Metre, centimetre, millimetre, gram, kilogram, litre, millilitre, etc.

**Pre-requisite knowledge:** Students must be familiar with units of measurement, conversion, addition and subtraction 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

**Topics:** Measuring length, conversion

**Suggested extra teaching aids:**  
Math Genius 3, pages 148–151

## ENGAGE

Divide the class into pairs. Help students in measuring the length of various objects in cm using a ruler. Ask: What is the length of the pencil? Is cm a standard unit of length? Is there any other standard unit of length? Accept the responses. Use 'Get Ready' and 'Let's Recall' given on page 146 and 147 to revise the previous concept.

## EXPLORE

Divide the class into pairs and give them a measuring tape having markings in cm and m. Instruct students to use the measuring tape to measure the length of their desk, the length of their classroom, and the height of their partner.

Ask: What is the length of the desk?, What is the length of the classroom?, What is the height of their partner in m?, How many cm are there in 1 metre?, In what unit do we measure the distance between the school and our home? Accept the responses. **[Experiential Learning]**

## EXPLAIN

Introduce standard units of length and how to convert them into other units. There are three standard units of length, centimetre (cm), metre (m), and kilometre (km). A centimetre is used to measure small lengths, like the length of a pencil, twig, pencil box, etc. A metre is used to measure big objects, like the length of a garden, room, cloth, etc., and the large lengths like the distance between two cities is measured in kilometres. There are 100 cm in 1 m, *i.e.*,  $1\text{ m} = 100\text{ cm}$ , and there are 1000 m in 1 km, *i.e.*,  $1\text{ km} = 1000\text{ m}$ .

## ELABORATE

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. Choose a pair randomly. Instruct: Read aloud the measurement written on the board, pick out a chit, and convert the measurement into the units written on the chit. Repeat this activity with more pairs till time permits. Accept the responses. Also, discuss the topic of ‘measuring length’ given on page 148. Demonstrate the conversion of units on the board with examples. (Take reference of the pages 149 and 150 to explain the conversion of units.)

**[Experiential Learning]**

## EVALUATE

**Classwork:** Ask to solve Q. 1 and 2 of Practice Time 9A, if any student makes any error, the teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 9A.

## ENHANCE

- Discuss the ‘MATHS FUN’ given on page 149. **[Logical thinking]**
- Ask to watch the video on measurement on the link “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)”.

<b>Periods: 4–6</b>	<b>Topics: Measuring weight (mass), Conversion</b>	<b>Suggested extra teaching aids: Weighing machine (small) and some weights of 50 g, 100 g, 250 g, 500 g, etc. Math Genius 3, pages 151–154</b>
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## ENGAGE

Place a weighing machine on the table. Take some objects, like a book, school bag, water bottle, eraser, etc. Instruct the class to hold the objects one by one, guess their weights and then, verify their weight by using the weighing machine.

Ask: Which is heavier?, Which objects have their weight in kg and g? Accept the responses.

## EXPLORE

Divide the class into groups. Give them a set of all weights including gram and kg weight (up to 2 kg). Instruct: Measure the weight of their school bags, first by using kilogram weight and after that by using gram weight only and note down their weights in both units.

Ask: What is the weight of your school bag in kg and g respectively?, If the weight of your school bag is 5 kg, then how many grams are there in 5 kg? Accept the responses and discuss the conversion of kg into grams.

## EXPLAIN

Introduce standard units of weight and their conversions. Gram is used to measure the weight of small or lighter objects, while 'kilogram' is used to measure the weight of big or heavier objects. There are 1000 g in 1 kg, *i.e.*,  $1 \text{ kg} = 1000 \text{ g}$ .

To convert the kg into grams, multiply by 1000 or simply add three zeros to the right of weight in kg.

To convert grams into kilograms, we divide the number of grams by 1000. Similarly, to convert kilograms and grams into grams, we multiply the number of kilograms by 1000 and add the product to the number of grams and to convert grams into kilograms and grams, we divide the number of grams by 1000. Here, we get the quotient (in kg) and remainder (in g).

## ELABORATE

Write some measurements of weights in g on the blackboard.

Instruct: Convert them into kg. Accept the responses and on that basis explain that on converting measurements of weights from g into kg, divide by 1000 or simply remove the last three zeros, if the weight is exactly divisible by 1000. And, when the measure in grams is not exactly divisible by 1000, then the quotient is written in kg, and the remainder is written in g. Or simply write last three digits from the right in grams and the remaining digits in kilograms. Demonstrate conversion of kg into g on the board.

- Convert 6 kg to g.

As,  $1 \text{ kg} = 1000 \text{ g}$

So,  $6 \text{ kg} = (6 \times 1000) \text{ g} = 6000 \text{ g}$

- Convert 9000 g into kg.

Remove the last three zeros from the right to convert g to kg.

Or,  $9000 \text{ g} = (9000 \div 1000) \text{ kg} = 9 \text{ kg}$

- Convert 3 kg 150 g to g.

$3 \text{ kg } 150 \text{ g} = (3 \times 1000) \text{ g} + 150 \text{ g} = 3000 \text{ g} + 150 \text{ g} = 3150 \text{ g}$

- Convert 4640 g into kg and g.

$4640 \div 1000$ , Q = 4 and R = 640

So,  $4640 \text{ g} = 4 \text{ kg } 640 \text{ g}$

Also, take reference of the pages 152 to 154 to explain the conversion of units.

Demonstrate the making of equal weights by taking the reference of the table given on page 154.

[Conceptual Learning]

## EVALUATE

**Classwork:** Ask to solve Q.1 and 3 of Practice Time 9B. If students make any error, the teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of practice time 9B.



## ENHANCE

- Ask to solve ‘Think Tank’ and ‘Life Skills’ given on page 154.
- Watch the video on measurement on “www.orangewebsupport.co.in”.

[Logical Thinking]

[Tech Connect]

<b>Periods: 7–9</b>	<b>Topics: Measuring capacity, Conversion, Making equal volumes(capacity)</b>	<b>Suggested extra teaching aids: Some containers of different measurements, some liquids for measurement. Math Genius 3 pages 155–158</b>
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## ENGAGE

Recall the concept of capacity. Put some containers of different measurements on the table. Ask: Which container will contain more liquid?, Which containers have their capacity in litres and in millilitres respectively? Accept the responses. Introduce conversion of capacities.

## EXPLORE

Divide the class into 5 groups. Distribute measuring jars (with 50 mL, 100 mL, 200 mL, 300 mL, 400 mL and 500 mL marking), a small measuring cup (1, 2, 3, 4, 5 mL marking), a 1 L water bottle, and an empty 5 L bucket. Instruct each group to fill 1 L of bottle with liquid using measuring jars/cups in different capacities and write on the board.

$$1 \text{ L} = \underline{\quad} (100 \text{ mL})$$

$$1 \text{ L} = \underline{\quad} (200 \text{ mL}) \dots \text{and so on.}$$

Accept the responses and summarise the conversion of capacities to them.

## EXPLAIN




The quantity of a liquid that a container or vessel can hold is called its capacity or volume. Vessels of different sizes are used to measure different quantities of liquid. To measure the capacity of a small quantity of liquid mL is used, while ‘litre’ is used to measure the capacity of a large amount of liquid. There are 1000 mL in 1 L, i.e.,  $1 \text{ L} = 1000 \text{ mL}$ .

- To convert the L into mL, multiply by 1000 or simply add three zeros to the right of capacity in L.
- To convert litres and millilitres into millilitres, we multiply the number of litres by 1000 and add it to the number of millilitres.
- To convert millilitres into litres, we divide the number of millilitres by 1000.
- To convert millilitres into litres and millilitres, we divide number of millilitres by 1000. We get the quotient (in litres) and the remainder (in millilitres).

## ELABORATE

Demonstrate with the help of book page 155, that small quantities of liquids are measured in millilitre. It is denoted by ‘mL’.

Like:

		
200 mL	5 mL	150 mL

Large quantities of liquids are measured in litres. It is denoted by 'L'.

Like:

		
20 L	150 L	225 L

Write some measurements of capacities in mL on the blackboard.

Demonstrate conversion of L into mL on the board. As,

- Convert the 5 L into mL.

$$5 \text{ L} = (5 \times 1000) \text{ mL} = 5000 \text{ mL}$$

- Convert 4 L 328 mL into mL.

$$4 \text{ L } 328 \text{ mL} = (4 \times 1000) \text{ mL} + 328 \text{ mL} = 4000 \text{ mL} + 328 \text{ mL} = 4328 \text{ mL}$$

- Convert 6000 mL into L.

$$6000 \text{ mL} = (6000 \div 1000) \text{ L} = 6 \text{ L}$$

- Convert 9950 into L and mL.

$$9950 \text{ mL} = (9950 \div 1000) \text{ L} = 9 \text{ L } 950 \text{ mL}$$

$$\text{Or } 9950 \text{ mL} = 9000 \text{ mL} + 950 \text{ mL} = 9 \text{ L} + 950 \text{ mL} = 9 \text{ L } 950 \text{ mL}.$$

Also discuss examples of pages 156 and 157 of the book.

Discuss making equal volumes by using the reference given on page 157.

## EVALUATE

**Classwork:** Ask students to solve Q.1 and 2 of Practice Time 9C.

**Homework:** Ask students to solve Q.3 to 5 of Practice Time 9C.

## ENHANCE:

- Ask students to perform the activity given in 'project' on page 157.

**Periods:** 10–12

**Topics:** Addition of lengths, Addition of weights, Addition of capacity

**Suggested extra teaching aids:** Math Genius 3, pages 158–162.

## ENGAGE

Write some measurements in different standard units on the board.

Instruct: Convert them into m and cm, km and m, g and kg, L and mL. Ask to add any two measurements written on the board. Accept the responses. Introduce addition of different measurements to the class.

## EXPLORE

Divide the class into pairs. Take three bowls with tags, length, weight and capacity and put some chits having measurements of lengths, weight and capacity written on them. Choose a pair of students randomly. Instruct them to pick out one chit from each bowl, read aloud and write the measurements on the board and then add them. (Both students of the pair will choose one chit each).

Ask to find the sum of length, weight and capacity written on chits. Accept the response. Rectify if there is any error. Repeat this with more pairs of students till time permits.

## EXPLAIN

To add different units of lengths, follow these steps.

- Write length in km, m and cm in their respective columns.
- Add centimetres, metres, and then kilometres, as you add ordinary numbers and get the result.

Similarly, to add measurements of weights, write the weights in kg and g columns respectively, then add grams and then add kilograms.

To add measurements of capacities, write the capacities in L and mL columns respectively, then add mL and then add L. Demonstrate the addition of units of lengths on the board.

Also, discuss the examples given on pages 158–161.

## ELABORATE

Divide the class into small groups. Keep a set of instruments for measuring height/length and weight, such as measuring tape, weighing machine. Invite a group in front of the class and instruct them to measure their heights and weights. Tell them to write the measurement on the board. Consider the measurements of any two members and demonstrate how to add them. Ask the class to add the weights of the heaviest and the lightest students of the group.

For instance,

kg		g		
1	1	1		
3	2	5	4	0
2	9	6	9	0
6	2	2	3	0

Similarly, invite other groups and give opportunity to perform the activity.

Encourage students to solve Think Tank given on pages 160 and 161.

## EVALUATE

**Classwork:** Instruct to solve Q.1 of Practice Time 9D.

**Homework:** Ask to solve Q.2 and 3 of Practice Time 9D.

## ENHANCE

Ask to solve worksheets on measurement given on “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)”.

[Tech Connect]

Periods: 13–14

Topics: Subtraction of lengths, Subtraction of weights, Subtraction of capacities

Suggested extra teaching aids:  
Math Genius 3 pages 162–166.

## ENGAGE

Write some measurements in different standard units on the board.

Instruct: Convert them into m and cm, km and m, kg and g, L and mL.

Ask to find the difference between any two measurements written on the board. Accept the responses. Introduce subtraction of different measurements to the class.

## EXPLORE

Divide the class into pairs. Take three bowls with tags, length, weight and capacity and put some chits having measurements of lengths, weights and capacity written on them. Choose a pair of students randomly. Instruct them to pick out one chit from each bowl, read aloud and write the measurements on the board. (Both the students will choose one chit each).



Ask to find the difference of measurements written on chits. Accept the response. Rectify if there is any error. Repeat this with more pairs of students till time permits.

## EXPLAIN

To find the difference between different units of measurement, follow these steps.

Write larger measurement of length, weight or capacity in upper row.

Subtract corresponding units and get the result.

Explain some examples on the board to help students understand the concept. Refer textbook pages 162–166 for more examples. **[Conceptual Understanding]**

## ELABORATE

Talk about some real life situations where we need to subtract measurement of length, weight and capacity. For example, a street vendor left home with 60 kg 500 g tomatoes on his cart in the morning. Till noon he could sell 35 kg 750 g tomatoes. How much tomato was left with him to sell?

**Subtract 35 kg 750 g from 60 kg 500 g.**

	kg		g		
		9	14		
	5	<del>10</del>	<del>4</del>	10	
	<del>6</del>	<del>0</del>	<del>5</del>	<del>0</del>	0
–	3	5	7	5	0
	2	4	7	5	0

Thus,  $60 \text{ kg } 500 \text{ g} - 35 \text{ kg } 750 \text{ g} = 24 \text{ kg } 750 \text{ g}$ .

Encourage students to attempt ‘Think Tank’ given on page 164.

## EVALUATE

**Classwork:** Instruct to solve Q.1 of Practice Time 9E.

**Homework:** Ask to solve Q.2 of Practice Time 9E.

## ENHANCE

Ask to solve worksheets on measurement given on “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)”. **[Tech Connect]**

**Periods: 15-16**

**Topic: Word Problems**

**Suggested extra teaching aids:  
Math Genius 3 pages 167–168**

## ENGAGE

Discuss a real-life problem based on addition and subtraction of length, weight or capacity in the classroom. Write a question on the board. Instruct to read aloud the problem and try to solve it. Accept the responses. Then explain in detail.

## EXPLORE

Divide the class into groups. Write some simple real-life problems based on addition and subtraction of length, weight and capacity on paper chits and mix them in a bowl.



Call one group and ask them to pick one chit from the bowl and instruct them to read aloud the problem and solve it on the board. Accept the responses. Rectify any errors.

## **EXPLAIN**

Understand the problem written on the board, and after that devise a plan for how to solve the problem, then work out the solution and at last check the solution.

## **ELABORATE**

Demonstrate the solution of word problems on the board (take the reference of examples given on pages 167 and 168). **[Conceptual Learning]**

## **EVALUATE**

**Classwork:** Instruct to solve Q.1 and 2 of Practice Time 9F.

**Homework:** Ask to solve Q.3 to 6 of Practice Time 9F.

## **ENHANCE**

Ask to solve worksheets on measurement given on “www.orangewebsupport.co.in”. **[Tech Connect]**

**Periods: 17–18**

**Topic: (Revision) Chapter Assessment**

**Suggested extra teaching aids:  
Math Genius 3 pages 169–172**

## **ENGAGE**

Make students comfortable, so they can ask any question on any previously taught topics in which they are facing problems.

## **EXPLAIN**

Start the revision of the exercise by using ‘Mind Map’, ‘Mental Maths’, ‘Chapter Assessment’, and ‘Challenge Question’ of the chapter.

## **ELABORATE**

Discuss ‘mental maths’, ‘Challenge Question’, Q. 1 to 6 of the ‘chapter assessment’ in the classroom and accept students’ answers. If there is any confusion or error, then explain and correct it.

## **EVALUATE**

**Classwork:** Discuss questions 1 to 6 of ‘Chapter Assessment’ in the classroom.

**Homework:** Q.7 to 13 of the ‘Chapter Assessment’ given on page 171 as homework assignment.

## **ENHANCE**

- Ask students to perform the activity given in ‘Gamified Learning’ on page 172.

**[Experiential Learning]**



# Time

## Learning Objectives

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

- ◆ explore about clock
- ◆ read the time to 5 minutes intervals
- ◆ estimate the time
- ◆ learn to read time in seconds
- ◆ learn to write dates
- ◆ arrange the sequence of the events occurring over longer periods
- ◆ read the time correctly using a clock
- ◆ differentiate a.m. and p.m.
- ◆ compare times (before and after)
- ◆ identify a particular day and date on a calendar
- ◆ understand the conversion of units of time

## LESSON PLAN

**Suggested number of periods:** 10

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, wall clock/table clock, calendar, etc.

**Keywords:** A.M., P.M., ante meridiem, post meridiem, minutes, seconds, quarter past, quarter to, conversion, leap year, 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 past the hour, days of the week, 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.

<b>Periods: 1–3</b>	<b>Topics: Clock, Reading the time on the clocks, Reading time to 5 minutes intervals</b>	<b>Suggested extra teaching aids: Wall clock or table clock Math Genius 3 pages 173–179</b>
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### ENGAGE

After the introduction, start with a discussion like: At what time do you wake up? At what time do you come to school? At what time do you leave the school? At what time do you sleep? Accept the responses.

Discuss the concepts given in “Get Ready” and “Let’s Recall” sections on pages 173 and 174.

### EXPLORE

Divide the class into two groups A and B. Give them a cardboard clock with minute and hour hands. Instruct group A to display the time at 5 minutes interval and the group B will read the time. If group B identifies the time shown on the clock correctly, then group B will get 1 point. In the similar way, there will be five rounds for each group. The group that will identify more correct time will win the game. **[Experiential Learning]**

## EXPLAIN

A clock has two hands; one is shorter than the other. The shorter hand is hour hand and the longer hand is the minute hand. These hands move in a clockwise direction. The dial of the clock is divided into 12 big divisions, numbered from 1 to 12. The gap between every pair of consecutive numbers are divided into 5 equal small divisions. There are 60 small divisions on the whole dial. The minute hand (longer hand) moves from one small division to the next small division in 1 minute. It goes once around the dial in 1 hour. So, the minute hand covers 60 small divisions in 1 hour.

So, 1 hour = 60 minutes.

The hour hand moves from one number to the next number in 1 hour. So, it takes 12 hours to complete one round. The hour hand takes 2 complete rounds in a day. So, 1 day = 24 hours.

The time is in full hours when the minute hand is at twelve. The time is half past the hour when it is on 6, quarter past the hour when it is on 3, and quarter to the hour when it is on 9.

The minute hand moves from one number to the next number in 5 minutes.

Any time can be read and written using 'past the hour' as well as 'to the next hour'.

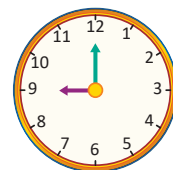
- When the minute hand is in the left half, the time is read as to.
- When the minute hand is in the right half, the time is read as past.

## ELABORATE

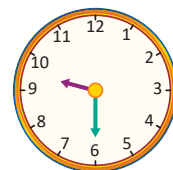
Involve the students to make a clock using paper plate as suggested on page 175. Then demonstrate how to read time by setting the hands for different times.

Demonstrate that the hour hand is on 9 and the minute hand is on 12.

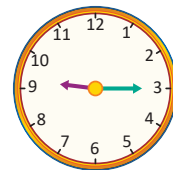
So, the time is 9:00 or 9 o'clock.



Again demonstrate half past time on the clock. As in the given clock, the hour hand is between 9 and 10 and the minute hand is on 6. So, the time is 9:30 or half past 9.



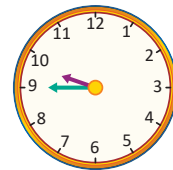
Similarly, demonstrate the time for quarter past and quarter to on the clock. As, the minute hand on the clock is at 3. It shows 15 minutes, as  $3 \times 5 = 15$ . The hour hand is slightly past 9. The time by the clock is 'quarter past nine' or 9:15.



Now, show a quarter to an hour. As in the given clock

The hour hand is near 10. And the minute hand is on 9.

The time is 9:45 or quarter to 10.



Further, demonstrate the complete dial is divided into  $12 \times 5 = 60$  small equal divisions. *i.e.*, 1 small division = 1 minute, 5 small divisions = 5 minutes. And 1 hour =  $12 \times 5 = 60$  minutes.

The minute hand moves from one number to the next number in 5 minutes.

When the minute hand is on 1, it means  $1 \times 5 = 5$  minutes have passed.

When the minute hand is on 2, it means  $2 \times 5 = 10$  minutes have passed.

When the minute hand is on 3, it means  $3 \times 5 = 15$  minutes have passed, and so on.

Next, explain reading time when the minute hand is in the left half or in the right half by using references given on page 178. **[Experiential Learning]**

## EVALUATE

**Classwork:** Ask to solve Q.1, 2 and 3 of Practice Time 10A, Q.1 and 2 of Practice Time 10B. If any student makes any error, the teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 10A and 10B.

## ENHANCE

- Ask to do ‘MATHS FUN’ given on page 176.

**[Experiential Learning]**

- Discuss ‘Fast Check’ given on page 179.

**[Logical Thinking]**

<b>Periods: 4–5</b>	<b>Topics: A.M. and P.M., Time in seconds, Estimating the Time, Between Time (Before and After)</b>	<b>Suggested extra teaching aids: Wall clock or table clock, cut-outs of images showing daily activities of a child Math Genius 3 pages 180–183</b>
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## ENGAGE

After the introduction, ask the students about the time when they wake up. What time do they come to school? At what time do they take their dinner? Accept the responses. Suppose they came to school at 8 o'clock and take the dinner at 8 o'clock. Ask: how is it possible? Accept the responses.

Introduce the time in a.m. and p.m.

## EXPLORE

Divide the class into two groups. Show some cut-outs of daily activities done by a kid. Ask students to observe the activities and tell the time in a.m. or p.m. when the activities are performed. The group that tells the correct time for more number of activities will win the game.

## EXPLAIN

There are 24 hours in a day. We write the time between 12 midnight and 12 noon using a.m. (ante meridiem). The time before noon is a.m. We write the time between 12 noon and 12 midnight using p.m. (post meridiem). The time after noon is p.m. Teacher can also take reference of page 180 to explain the concept.

## ELABORATE

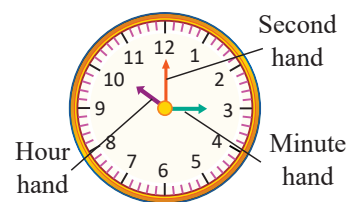
Use the references given on page 180 to talk about the second hand.

Explain that, there is another hand, *i.e.*, the third hand in a clock.

It is very thin and long. It is called the second hand. It moves faster than the minute hand.

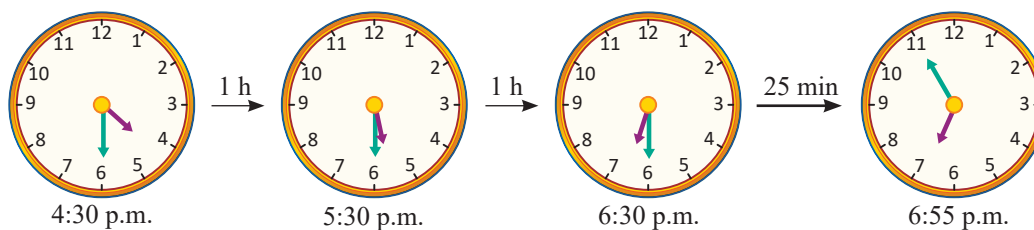
It completes one round in 1 minute or 60 seconds. So, 1 minute = 60 seconds.

Further, demonstrate the cutouts of child's activities where the estimated time is in seconds.



Next move on to page 182, explain the between time (Before and after) i.e., elapsed time between two activities. Write on board: Shweta started solving puzzles at 4:30 p.m. She stopped solving at 6:55 p.m. For how long did she solve?

Demonstrate with clock as follows:



She solved for 2 hours 25 minutes.

[Experiential Learning]

## EVALUATE

**Classwork:** Ask to solve Q. 1 and 2 of Practice Time 10C and Q.1, 2 and 3 of Practice Time 10D. If students make any error, teacher will correct it and explain.

**Homework:** Ask to solve the remaining questions of Practice Time 10C and 10D.

## ENHANCE

- Discuss 'Think Tank' given on page 180.

[Logical and Critical Thinking]

<b>Periods: 6–7</b>	<b>Topics: Calendar, Writing Dates</b>	<b>Suggested extra teaching aids: Calendar of current year Math Genius 3 pages 184–186</b>
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## ENGAGE

Start the class with an interaction with the students. Ask some questions, such as: which year is going on? What day was yesterday? What day is today? On which day of the week is the school closed? Tell the names of the days of the week. How many months are there in a year? What are the names of the months? Accept the responses.

## EXPLORE

Hang a calendar on the board.

Instruct students, to come one by one and mark their birthday on calendar.

Ask the other students of the class to identify the month and day of their birthday? Accept the responses.

[Experiential Learning]

## EXPLAIN

A calendar is a chart, which shows days, dates, weeks and months in a year. One year has twelve months. There are 365 days in a year. Each month has 4 weeks. There are 7 days in a week. After every three years, a leap year comes, that has 366 days. In a leap year February has 29 days.

Further, explain that while writing dates, we specify the number of the day in a month (that is, date), the name of the month and then the year.

## ELABORATE

Demonstrate calendar of current year in the class, or show it on smartboard and present that

- A year is divided into 12 months; that is, a year has 365 days.
- January is the first month and December is the last month of the year.
- Some months have 30 days and some months have 31 days.
- February is a special month having only 28 or 29 days.
- January, March, May, July, August, October and December have 31 days.
- April, June, September and November has 30 days.
- Each month is divided into weeks and a week has seven days, namely, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday.
- A leap year is the year in which the month of February has 29 days. It comes every four years and has 366 days.

Also explain rules of a leap year.

Further demonstrate on board that we write a date as a group of three numbers separated by two dots (.) or slashes (/). The first number stands for the day, the second number for the month and the third number is the year. For example,

15 . 08 . 1947  
↓        ↓        ↓  
Day    Month    Year

or

15 / 08 / 1947  
↓        ↓        ↓  
Day    Month    Year

[Conceptual Learning]

## EVALUATE

**Classwork:** Ask to solve Q1 of Practice Time 10E, and Q1 of Practice Time 10F. If any student makes any error, the teacher will correct and explain.

**Homework:** Ask to solve Q2 of Practice Time 10E.

## ENHANCE

- Discuss the ‘Maths Connect’ given on page 186. [Cross Circular Learning]
- Ask to collect and paste images of calendar of current year, previous year and following year on a chart paper. Make a table to represent the number of days like Monday, Tuesday, ... in each month of the year. [Experiential Learning]

Periods: 8–9	Topics: Conversion of Units of Time, Timeline	Suggested extra teaching aids: A chart having cutouts/images of some festivals Math Genius 3 pages 186–190
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## ENGAGE

Ask from students what is the duration of your maths class in minutes? How many days do they come to school? How many hours do they spent on school? Accept the responses.

Introduce conversion of units of time and timeline.

## EXPLORE

Teacher will revise the topic of the calendar and motivate students toward understanding timeline by using the following activity:

Divide the class into 12 groups.

Either hang a chart having cut-outs/images of festivals or present it on smartboard.

Call one group, and ask them to write the date of festivals that come in the first month of the year by using the calendar.

Next call another group and ask them to write the date of festivals that come in the second month of the year by using the calendar.

The process will continue till all the months are covered. Now, name any five-six festivals randomly and instruct the groups to arrange them in order as per their time of celebration in the year. The group who will do their task in minimum time will be the winner. **[Experiential Learning]**

## EXPLAIN

Demonstrate on board the relationships between the units of time as follows:

1 hour = 60 minutes; 1 month = 30 days; 1 day = 24 hours; 1 year = 12 months

1 week = 7 days and 1 year = 365 days.

And use these relationships in conversion of units of time.

In the next period, discuss that a timeline shows the order or sequence in which some events happened. This helps us in understanding the sequence of events.

## ELABORATE

Demonstrate on board the examples given on page 187 of the book in detail.

In the next period, explain ‘timeline’ by using example of presidents of India given on pages 188 and 189.

Guide students to complete it.

**[Conceptual Learning]**

## EVALUATE

**Classwork:** Ask to solve Q3 of Practice Time 10F. If any student makes any error, the teacher will correct and explain.

**Homework:** Ask to solve Q2 of Practice Time 10F and Q1 of Practice Time 10G.

## ENHANCE

- Discuss the ‘Think Tank’ given on page 187.

**[Critical Thinking]**

**Period: 10**

**Topic: (Revision) Chapter Assessment**

**Suggested extra teaching aids:  
Math Genius 3 pages 190–194**

## ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they have any doubt or query. Have them engage in the activity as suggested in ‘Gamified Learning’ section.

**Time**



## **EXPLAIN**

Start the revision of the exercise by using ‘Mind Map’, ‘Mental Maths’, ‘Chapter Assessment’, ‘Project’ and ‘Challenge Question’.

## **ELABORATE**

Discuss questions 1 to 6 of the ‘chapter assessment’ and accept students’ answer, if there is any confusion or error then explain and correct it. Discuss and motivate students to solve ‘Mental Maths’. Guide them to do the ‘Project’ given on page 193.

## **EVALUATE**

**Classwork:** Discuss questions 1 to 6 of the ‘Chapter Assessment’ and ‘Challenge Question’.

**Homework:** Ask to solve Q.7 to 11 of ‘Chapter Assessment’.

## **ENHANCE**

Ask students to prepare a chart on ‘timeline’ on Prime Ministers of India, with the help of friends, teachers and parents.

**[Cross Curricular Learning]**



# Money

## Learning Objectives

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

- ◆ explore Indian coins and notes
- ◆ understand conversion of rupees and paise
- ◆ multiply and divide money
- ◆ write money in words and figures
- ◆ add and subtract money
- ◆ know about bills

## LESSON PLAN

**Suggested number of periods:** 8

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, some dummy notes and coins of different denominations.

**Keywords:** Currency, notes, coins, rupees, paise, addition, subtraction, total amount, balance etc.

**Pre-requisite knowledge:** Students must be familiar with what currencies are used for, Indian currency and its symbol, conversion of money, addition and subtraction of numbers, multiplication and division of 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.

<b>Periods: 1–2</b>	<b>Topics: Writing Money in Words and Figures, Conversion of Rupees and Paise</b>	<b>Suggested extra teaching aids: Some dummy notes and coins of different denominations. Math Genius 3 pages 195–199</b>
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### ENGAGE

Show currency notes and coins of different denominations in the classroom. Instruct to identify them and write their values. Ask: How do you write money in rupees and paise? Accept the responses. Discuss the concepts given in ‘Get Ready’ and ‘Let’s Recall’ sections on pages 195 and 196.

### EXPLORE

Divide the class into pairs. Choose a pair of students randomly. Give few dummy currency notes and coins. Instruct each pair to take a currency note of fixed denomination and collect coins of paise for the same amount. (One student will show the note and the other student will convert the value of currency note into paise by collecting the coins). Accept the responses. Observe them and help them if any pair wants it.

**[Experiential learning]**

### EXPLAIN

Money can be expressed in figures and words. We use a point (.) for separating rupees and paise. The number on the left side of the point shows rupees and the number on the right side of the point shows paise.

Further explain conversion of rupees and paise. To convert rupees into paise, we multiply the amount in rupees by 100. To convert rupees and paise into paise, we multiply the amount in rupees by 100 and then add paise to it. To convert paise into rupees and paise, we divide the number of paise by 100.

## ELABORATE

Demonstrate on board how to write amount in words and figures by taking references given on pages 196 and 197.

Further explain on board ‘conversion of rupees and paise’ by taking references given on pages 197 and 198.

[Conceptual learning]

## EVALUATE

**Classwork:** Ask to solve Q1, 2 and 3 of Practice Time 11A.

**Homework:** Ask to solve the remaining questions of Practice Time 11A.

## ENHANCE

- Discuss ‘Maths Connect’ given on page 198.

Periods: 3–4	Topic: Addition and Subtraction of Money	Suggested extra teaching aids: Some Dummy Currency Notes and some Coins Math Genius 3 pages 200–202
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## ENGAGE

Show some currency notes of fixed denomination in the class, then add some more money to it. Instruct to class to count the total amount of money they have now. Also, remove an amount from it and ask: How much money do they have now? Accept the responses.

Introduce addition and subtraction of money.

## EXPLORE

Divide the class into pairs. Choose a pair of students randomly. Give some dummy currency notes and coins to each student of the pair.

Instruct: Write the amount of money that you have on the board and add them.

Also, ask to find the difference of money they have. Accept the responses. Guide them in doing the sum.

[Collaborative learning]

## EXPLAIN

Addition and subtraction of money are carried out as usual addition and subtraction of numbers. Keep in mind that the value of rupees and paise differs by a ‘.’ between them.

## ELABORATE

Demonstrate on board examples based on ‘addition and subtraction of money’ by taking references given on pages 200 and 201.

[Conceptual Learning]

## EVALUATE

**Classwork:** Ask to solve Q1 and 2 of Practice Time 11B. If students make any error, teacher will correct it and explain.

**Homework:** Ask to solve Q3, 4, 5 and 6 of Practice Time 11B.



## ENHANCE

- Discuss and motivate to solve ‘Think Tank’ given on page 201.
- Ask to do Project work given on page 202.

[Logical Thinking]  
[Creative Thinking]

Periods: 5–6

Topic: Multiplication and division  
of money

Suggested extra teaching aids: Math  
Genius 3 pages 202–204

## ENGAGE

Take a pencil and 10 notebooks of fixed amount. Ask: If cost of 1 pencil is ₹ 4, how much is the cost of 11 pencils? If cost of 10 notebooks is ₹ 320, then how much is the cost of 1 notebook? Accept the responses.

Introduce them about multiplication and division of money.

## EXPLORE

Divide the class into pairs. Choose a pair of students randomly. Instruct: pick out the maths book from the bag. Ask to check the M.R.P of the book. What will be the cost of such 11 maths book? Similarly, ask to check M.R.P of a crayon box, and then find the cost of one crayon. Accept the responses, observe and guide them if students have any confusion.

[Collaborative Learning]

## EXPLAIN

Multiplication and division of money are carried out as usual multiplication and division of numbers. For multiplication of decimal notation of money, remove decimal point and multiply and then replace the decimal point after two places from right. Similarly, in division divide the given amount by the given number, ignoring dot (.). Then, put a dot after the second digit counting from the right of the quotient.

## ELABORATE

Demonstrate on board examples based on ‘multiplication and division of money’ by taking references given on pages 202 to 204.

[Conceptual Learning]

## EVALUATE

**Classwork:** Solve Q1 (a), (b); Q2 (a), (b) and Q3 (b), (c) of Practice Time 11C. If any student makes any error, the teacher will correct and explain.

**Homework:** Ask to solve remaining questions of Practice Time 11C.

## ENHANCE

- Discuss and solve ‘Think Tank’ given on page 203.
- Discuss ‘Maths Connect’ given on page 204.

Period: 7

Topic: Bills

Suggested extra teaching aids: Pieces of chart  
paper having images and price of some kid’s  
items, Math Genius 3 page 205

## ENGAGE

Ask students, “When they go to market for shopping, what do they experience?” Accept the responses. Introduce the topic bills.

## EXPLORE

Divide the class into groups.



Distribute chart paper having images and price of some kid's items to each group. Ask to prepare a bill for items they want. Teacher will help the students in preparing the bill. **[Experiential Learning]**

## EXPLAIN

We go to market to buy various items like fruits, vegetables, clothes, toys, etc. in different quantity. The shopkeeper gives us articles and we make the payment to him for the total cost of these articles. The slip of paper on which the shopkeeper notes down or prints the requirements of customers or buyer and calculates the total cost of items purchased is called a BILL. In our daily life, we receive a variety of bills, for example telephone bill, cooking gas bill, water bill etc.

## ELABORATE

Take reference of page 205 to explain bills. Demonstrate the example on board.

## EVALUATE

**Classwork:** Discuss and solve question given in 11D in the classroom. If any student makes any error, the teacher will correct and explain.

**Homework:** Ask to do the activity given in 'Life Skills' on page 205 as a homework assignment.

## ENHANCE

- Ask students to collect all bills for all of their expenses for 1 week and discuss with their parents to control the unnecessary expenses and calculate how much money they can save weekly.

**[Social Emotional Learning]**

**Period: 8**

**Topic: (Revision) Chapter Assessment**

**Suggested extra teaching aids:  
Math Genius 3 pages 206–209**

## ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they have confusion.

## EXPLAIN

Start the revision of the exercise by using 'Mind Map', 'MATHS FUN', 'Chapter Assessment', 'Mental Maths' and 'Challenge Question'.

## ELABORATE

Ask to solve questions 1, 2 and 6 of the 'Chapter Assessment' and accept students' answer, if there is any confusion or error then explain and correct it. Discuss and motivate students to solve 'Mental Maths'. Guide them to solve 'Challenge Question' given on page 208.

## EVALUATE

**Classwork:** Ask to solve Q.3, 4, 5 of the 'Chapter Assessment'.

**Homework:** Q.6 to 11 of 'Chapter Assessment' and 'Mental Maths'.

## ENHANCE

Ask and guide students to do activity given in 'Gamified Learning' section on page 209.

**[Experiential and Collaborative Learning]**





# Data Handling

## Learning Objectives

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

- ◆ understand tally marks
- ◆ read, interpret and draw pictographs
- ◆ Bar graph (interpret)

## LESSON PLAN

**Suggested number of periods:** 8

**Suggested Teaching Aids:** Book: Math Genius 3, blackboard or whiteboard, etc.

**Keywords:** Data, collection, tally marks, pictograph, bar graph.

**Pre-requisite knowledge:** Students must be familiar with data and its collection to gather the information, Tabular form of data.

**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

**Topic:** Tally Marks

**Suggested extra teaching aids:**  
Math Genius 3 pages 210–212

### ENGAGE

Discuss the concept given in “Get Ready” and introduce the topic by using Q.1 and 2 of “Let’s Recall” given on page 211. Introduce tally marks.

### EXPLORE

Write name of 5 favourite ice-cream flavours of the students on board in a tabular form as follows:

Favourite ice cream flavour	Tally marks	Number of students
Vanilla		
Chocolate		
Raspberry		
Mango		
Black currant		

Ask students to come one-by-one and mark a vertical line (|) in front of their favourite flavour. The teacher will introduce the rules for tally marks. Ask: How many of them like mango ice cream? Which flavour is liked by the most? Which flavour is liked by the least number of students? Accept the responses.

[Experiential Learning]



## EXPLAIN

When the data is represented in a tabular form with tally marks, that table is known as a tally chart. The general way of writing tally marks is as a group or set of five lines. The first four lines are drawn vertically and each of the fifth line runs diagonally over the previous four vertical lines, *i.e.*, from the top of the first line to the bottom of the fourth line, such as ||||.

## ELABORATE

Demonstrate the example on board by using the references given on pages 211 and 212 of the book.

[Conceptual Learning]

## EVALUATE

**Classwork:** Ask to solve question 1 of Practice Time 12A. If any student makes any error, the teacher will correct it and explain.

**Homework:** Ask to create a tally mark chart on data given in Q.2 of Let's Recall and answer the questions.

## ENHANCE

- Ask to do the Project given on page 212.

Periods: 3–4

Topic: Pictograph

Suggested extra teaching aids:  
Math Genius 3 pages 212–216

## ENGAGE

Introduce that we can also represent data by using a pictorial representation. Use the data given under the topic 'Tally Marks' and present it as 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 is liked by the least number of children? Which game is liked by the 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 212–214.

[Conceptual Learning]

## EVALUATE

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

**Homework:** Ask to solve the remaining questions of Practice Time 12A.



## ENHANCE

- Discuss and motivate to solve ‘MATHS FUN’ and ‘Challenge Question’ given on pages 214 and 219 respectively.

[Critical Thinking]

Periods: 5–6

Topic: Bar Graph

Suggested extra teaching aids: Math  
Genius 3 pages 216–218

## 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 bar graph.

## EXPLORE

Divide the class into groups. Instruct each group to collect the data within the class about favourite fruits, favourite sweets or favourite subjects, etc. Accept the responses and instruct each group to represent the collected data in tally chart/pictograph/ bar graph on a paper sheet/board.

Ask: How many children like a particular fruit/sweet/subject? Which fruit/sweet/subject is liked by the least number of children? Accept the responses.

[Experimental Learning]

## EXPLAIN

We can also represent data using rectangular bars of equal width. This visual representation is called the bar graph. A bar graph also helps us to compare information.

## ELABORATE

Demonstrate interpretation of bar graph using the example given on pages 216 and 217 of the book.

[Conceptual Learning]

## EVALUATE

**Classwork:** Ask to do Q.1 of Practice Time 12B. If any student makes any error, the teacher will correct and explain.

**Homework:** Ask to do the remaining questions of Practice Time 12B.

## ENHANCE

- Ask to do the question given in ‘Mental Maths’ on page 218.

[Creative Thinking]

Periods: 7–8

Topic: (Revision) Chapter Assessment

Suggested extra teaching aids:  
Math Genius 3 pages 219–222

## ENGAGE

Make students comfortable, so they can ask any question on any previously taught topics in which they have any confusion.

## EXPLAIN

Start the revision of the exercise by using ‘Mind Map’ and ‘Chapter Assessment’.



## **ELABORATE**

Discuss and ask to do questions 1 to 3 of the ‘Chapter Assessment’ and accept students’ answer. If there is any confusion or error then explain and correct it. Guide them to perform the activity given in ‘Gamified Learning’ on page 222.

## **EVALUATE**

**Classwork:** Discuss questions 1 to 3 of the ‘chapter assessment’ in the classroom.

**Homework:** Ask to solve Q.4 of ‘Chapter Assessment’.

## **ENHANCE**

- Ask to watch the video on data handling on “[www.orangewebsupport.co.in](http://www.orangewebsupport.co.in)”. **[Tech Connect]**