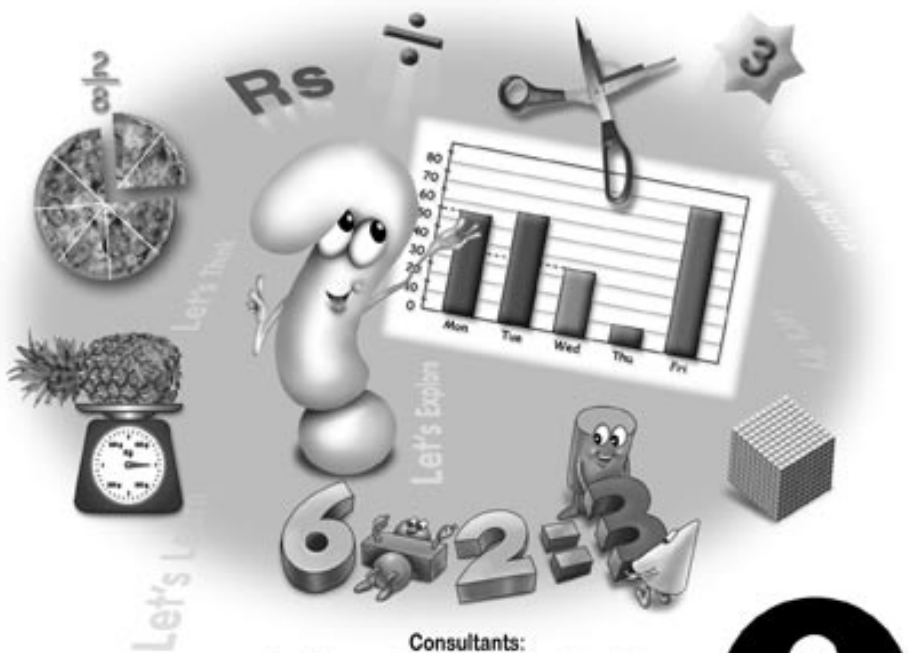


New Syllabus

Primary Mathematics

TEACHING GUIDE



Consultants:

Prof Foong Pui Yee • Dr Fan Liang Huo

Author:

Lu Jitan (Ph.D, MSc, BSc)

3

OXFORD
UNIVERSITY PRESS

Contents

Preface	iv
Unit 1: Numbers to 10 000	1
Unit 2: Addition and Subtraction Within 10 000	12
Unit 3: Length	26
Revision 1 and 2 (Workbook 3A)	36
Unit 4: Mass	38
Unit 5: Multiplication.....	47
Unit 6: Division	63
Unit 7: Money	73
Unit 8: Volume	81
Revision 3 and 4 (Workbook 3A)	89
Unit 9: Bar Graphs	90
Unit 10: Fractions	96
Revision 1 and 2 (Workbook 3B)	106
Unit 11: Time	108
Unit 12: Angles	119
Unit 13: Perpendicular and Parallel Lines	122
Unit 14: Area and Perimeter.....	127
Revision 3 and 4 (Workbook 3B)	134

Preface

The New Syllabus Primary Mathematics (NSPM) series is designed and written based on the latest primary mathematics syllabus. In this series, the concrete to abstract approach has been used to introduce new concepts. The knowledge base is built incrementally as pupils progress up the levels so as to consolidate the linkages between mathematical concepts.

The Teaching Guides have been developed to provide effective support to teachers following the series. The key features of the Teaching Guides are mentioned below.

1. Learning Outcomes

A set of learning outcomes is listed at the beginning of the each topic. At the end of a particular topic, the teacher should be able to evaluate whether or not the outcomes have been achieved. The revision sections in the workbooks will prove very helpful in assessing students' understanding of key concepts.

2. Instructions

Mathematics is often considered difficult and challenging, mainly as a result of the teaching approach used. Teachers should make sure that they are dynamic in their approach to teaching mathematics. Only if teachers are enthusiastic and dynamic will they be able to inspire their pupils to put in their best efforts, work hard, and learn successfully.

Keeping these aspects in mind, step-by-step guidance is provided to help teachers deliver mathematical concepts in a student-friendly manner. Varied activities have been included in the guides to help generate enthusiasm and enjoyment in the classroom, thereby making mathematics interesting. Group work or pair work has been encouraged to enhance learning and understanding of concepts.

An average timing is suggested to cover each topic in class, thereby helping teachers to plan and vary their lessons accordingly. The teachers can adjust this duration as per their requirements. With careful planning, sufficient time can be allocated to the more important concepts of mathematics, while introducing new and interesting ideas will make the class more lively.

Teachers should try to create an atmosphere in the class that is conducive to learning. This can be achieved physically by ensuring that the classroom is colourful, exciting, attractive, and full of interesting objects that help pupils to link mathematics with daily life. For example, a table should be set up in the classroom displaying different items such as shapes, number cards, 3-D figures, etc. that aid teaching. Similarly, on a psychological level, teachers should ensure that the pupils do not feel fearful or intimidated in class. The atmosphere should be peaceful and relaxed to accomplish effective learning.

3. Answers

The guides contain answers to all the questions and activities in the textbook and workbooks.

4. Additional activities

Extra activities have been included in the guides to reinforce and assess the children's understanding of the concepts taught. These can be done individually or in groups depending upon the strength of the class and the resources available.

Unit 1: Numbers to 10 000

THOUSANDS, HUNDREDS, TENS AND ONES

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- read and write numbers upto 10 000 in numerals and words
- identify the place values of the digits of a number up to 10 000

Instructions

Let's Learn...

Activity 1 (20 min): Count in ones, tens, hundreds and thousands up to 10 000

Things you need: 100 cubes, 10 base ten blocks, 10 base hundred blocks and 10 based thousand blocks

1. Scatter 45 cubes on a table in front of the class. Ask 2 pupils to count them. Replace every 10 ones with 1 base ten block and write on the board 10 ones make 1 ten.
2. Add more cubes and ask another 2 pupils to continue with the counting and to replace every 10 ones with 1 base ten block. Do this until there are 10 base ten blocks. Replace the 10 base ten blocks with 1 base hundred block and write on the board 10 tens make 1 hundred.
3. Add more cubes and ask another 2 pupils to continue with the counting and to replace every 10 ones with 1 base ten block and then replace every 10 base ten blocks with 1 base hundred block. Do this until there are 10 base hundred blocks. Replace the 10 base hundred blocks with 1 base thousand block and write on the board: 10 hundreds make 1 thousand.
- 4 Continue to add until the number of cubes reaches 9999 which means there are 9 base thousand blocks, 9 base hundreds block, 9 base ten blocks and 9 cubes. Add one more cube and introduce to the class the number '10 000' or 'ten thousand'.

Activity 2 (20 min): Recognise place values of ones, tens, hundreds and thousands

Things you need: 100 cubes, 9 base ten blocks and 9 based hundred blocks and 10 base thousand blocks

1. Draw a Place Value Chart on the board. Scatter some cubes, base ten blocks, base hundred blocks and base thousand blocks on a desk and ask three pupils to count the number of ones, tens, hundreds and thousands and guide them to write the numbers in the Place Value Chart. Write the number in words on the board and get the class to read them aloud. Do this 4 times for different number of cubes and blocks with different pupils.

2. Explain to the class that given any 4-digit number, the first digit on the extreme left is the 'thousands' place, followed by the 'hundreds' place, followed by the 'tens' place, and then the 'ones' place on the extreme right.

Activity 3 (15 min): Recognise numbers up to 10 000

Things you need: 4 sets of number cards 0 to 9

1. Select 4 pupils to stand in a straight line facing the class. From the pupils' view, ask each pupil starting from the extreme left, the 'thousands' place, 'hundreds' place, the 'tens' place, and the 'ones' place. Give each of them a set of number cards from 0 to 9. When you read out a 4-digit number using words, they are to lift up the required number cards and the rest of the class is to say if it is correct or wrong. Do this for 4 other numbers with the same 4 pupils. Repeat the entire activity twice with different pupils.
2. Select 4 more pupils to stand in a straight line facing the class. This time, they are to randomly hold up any number card and the class is to read the number out loud. Do this for 4 other numbers. Instead of the whole class reading out the number, you may randomly pick a pupil to do that.

Activity 4 (25 min): Read and write numbers in words up to 10 000

1. Write the words 'twenty', 'thirty', 'forty', 'fifty', 'sixty', 'seventy', 'eighty', 'ninety' on the board and read them together with the class. Cover up the words and get the pupils to write the words on a piece of paper. Reveal the words and check that the pupils spelt them correctly.
2. Write 'two thousand, 4 hundred and forty-five' on the board and get the pupils to read it together. Do this for 5 other, 4-digit numbers in words.
3. Write 6872 on the board and ask one pupil to write the number in words on the board. Do this for 5 other, 4-digit numbers with different pupils.
4. Remind the pupils that in writing numbers in words, there is no need to add 's' to the words 'hundred' and 'thousand'. The letter 's' is used only when the value of the digit is to be reflected e.g. 'The digit '8' in 6873 stands for 800 or 8 hundreds.' Another occasion when the letter 's' is used is when describing the place value of a digit, e.g. 'The digit 6 in 9645 is in the hundreds place.'

Activity 5 (25 min): Class practice

1. Go through with the pupils the examples on pages 2–6 of the Student's Book.

Let's Try...

Activity 6 (10 min): Individual practice

1. Ask the pupils to try the exercises on pages 7–8 of the Student's Book.

Homework

Ask the pupils to do Workbook 3A—Worksheets 1 and 2.

Answers



pages 7–8

- (a) 6535: six thousand five hundred and thirty-five
(b) 2574: two thousand five hundred and seventy-four
- (a) 500 (b) 3 (c) 5000 (d) 500 (e) 10 (f) 7

WORK **Sheet** 1

- (a) 1115 (b) 2304 (c) 3500 (d) 6007 (e) 9919
- (a) 1205 (b) 2186 (c) 2048 (d) 4350
- (a) 3 (b) 3000, 7, 9 (c) Three thousand five hundred and seventy nine
- (a) 7000 (b) 0 (c) 30 (d) 1 (e) 1
(f) Seven thousand and thirty-one

WORK **Sheet** 2

- (a) 3116 (b) 5278 (c) 6066 (d) 2302 (e) 8943
(f) 5002 (g) 7200 (h) 1256
- (a) Six thousand two hundred and nine.
(b) Three thousand seven hundred and forty one.
- (a) 70 (b) 600 (c) 2000 (d) 50 (e) 0
(f) 700 (g) 6000 (h) 3 (i) 10 (j) 8000
- (a) 5, 60, 700, 1000 (b) 3, 70, 000, 8000
(c) 6, 20, 300, 5000 (d) 4, 90, 800, 5000
(e) 1, 00, 200, 9000 (f) 0, 40, 400, 3000
- (a) 5, 4, 1, 2 (b) 0, 90, 800, 5000 (c) 5, 00, 200, 8000
- 3546 (b) 7435 (c) 5428

COMPARING AND ORDERING NUMBERS

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- compare and order numbers upto 10 000.

Instructions

Let's Learn...

Activity 1 (20 min): Revise comparing phrases

1. Write on the board all the comparing phrases: more than, greater than, bigger than, smaller than, fewer than, less than and as many as. Revise with the pupils by asking them to give an example for each of the phrases.
2. Play a simple game of guessing the number using the phrases as clues as follows:
 - Think of a 3-digit number
 - Ask the class to guess the number
 - Give clues such as 'It is less than that' or 'it is more than that'
 - Continue with guesses and clues until someone gives the right answer.

Activity 2 (20 min): Compare numbers up to 10,000 using 'more than', 'greater than', 'bigger than', 'smaller than', 'fewer than', 'less than' and 'as many as'

1. Explain to the class 4 simple steps to identify which number is greater or smaller given two 4-digit numbers:

Step 1: Compare the digit in the thousands place

 - Move to next step if the digits are the same.
 - If not, the number with the bigger digit is the greater number

Step 2: Compare the digit in the hundreds place

 - Move to Step 3 if the digits are the same,
 - If not, the number with the bigger digit is the greater number

Step 3: Compare the digit in the tens place

 - Move to Step 4 if the digits are the same.
 - If not, the number with the bigger digit is the greater number

Step 4: Compare the digit in the ones place

 - If the digits are the same, both numbers are identical
 - If not, the number with the bigger digit is the greater number
2. Go through with the pupils the examples on pages 9–11 of the Student's Book. Provide more examples of comparing numbers for the class to practise.

Let's Explore

Activity 3 (15 min): Class practice

1. Let the pupils try out the *Let's Explore* questions on page 13 of the Student's Book. Explain to the pupils that the first digit in any number must be between 1 to 9 and cannot be a zero.

Let's Try...

Activity 4 (25 min): Individual practice

1. Ask the pupils to do the exercises on pages 14–15 of the Student's Book.

Homework

Ask the pupils to do Workbook 3A—Worksheet 3.

Answers



pages 14–15

- (a) Ones: 7 and 5 Tens: 6 and 8
(b) 4285
- (a) Ones: 2 and 4 Tens: 1 and 3 Hundreds: 0 and 2
(b) 5012
- (a) Ones: 3, 3 and 2 Tens: 3, 6 and 4
 Hundreds: 2, 3 and 5 Thousands: 3, 3 and 3
(b) 3542 (c) 3233
- (a) 1268, 2435, 3608 (b) 4209, 4276, 4283
(c) 5417, 5421, 6523, 6871 (d) 7215, 7242, 7260, 7263
- (a) 2078, 2054, 2016, 2009 (b) 4947, 4739, 4556, 4140
(c) 8918, 8917, 8914, 8913, 8911 (d) 9540, 7620, 4133, 3620

WORK **Sheet** 3

- (a) A= 1112 B=1104
 set A is greater than set B
(b) R= 2220 S=2311
 set S is greater than set R
(c) X=3222 Y=3221
 set Y is smaller than set X
(d) P=2707 Q=968
 set Q is smaller than set P
- (a) 4087 (b) 2011 (c) 5505 (d) 3330
(e) 1099 (f) 8521 (g) 6970 (h) 4393
- (a) 1087 (b) 4330 (c) 6677 (d) 9009
(e) 8716 (f) 7477 (g) 2103 (h) 5035
- (a) < (b) > (c) < (d) > (e) > (f) <
- (a) 1088, 1800, 1808 (b) 9039, 3909, 2099
- (a) 3223 (b) 4021 (c) 1473 (d) 8999 (e) 6519
- (a) 8609 (b) 1268
- Greatest: 9730 Smallest: 3079

NUMBER PATTERNS

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- recognize number patterns
- use the language of 'more than' and 'less than'

Instructions

Let's Learn...

Activity 1 (10 min): Calculate '1 more than', '10 more than', '100 more than' '1000 more than', '1 less than', '10 less than', '100 less than' and '1000 more than'

1. Write the following questions on the board:
 - What number is 1 more than 356?
 - What number is 10 more than 673?
 - What number is 100 more than 217?
 - What number is 1000 more than 4634?
2. Give the answers to the above questions and ask the pupils if they notice anything common about the way the 3 answers were obtained? Lead them to see that all 3 questions require the adding the two numbers. Hence, point out to them that when the phrase 'more than' is used, an addition is required.
3. Repeat No. 1 and 2 using 'less than' and lead the pupils to see that when the phrase 'less than' is used, they need to do a subtraction.

Activity 2 (10 min) – Arrange numbers in ascending and descending order

1. Revise with the class the meaning of ascending and descending.
2. Play a game as follows:
 - Divide the class into 4 groups.
 - Give each pupil a slip of paper with a 4-digit number written on it.
 - At the start signal, pupils in each group are to arrange themselves in a straight row according to the ascending order of their numbers.
 - The team that correctly completes the arrangement first wins

Activity 3 (20 min): Write number patterns involving 4-digit numbers

1. Explain to the class that a number pattern is a set of numbers that follows a certain pattern. If the numbers (increase), it is an ascending number pattern and if the numbers become smaller, it is a descending number pattern. Give some examples of ascending and descending number patterns involving 4-digit numbers:

Number patterns that are ascending

- 3201, 3202, 3203, 3204, 3205 is a number pattern whose numbers increase by 1
- 7623, 7633, 7643, 7653, 7663 is a number pattern whose numbers increase by 10
- 6156, 6256, 6356, 6456, 6556 is a number pattern whose numbers increase by 100
- 2945, 3945, 4945, 5945, 6945 is a number pattern whose numbers increase by 1000

Number patterns that are descending

- 1999, 1998, 1997, 1996, 1995 is a number pattern whose numbers get smaller by 1
- 9094, 9084, 9074, 9064, 9054 is a number pattern whose numbers get smaller by 10
- 2798, 2698, 2598, 2498, 2398 is a number pattern whose numbers get smaller by 100
- 8302, 7302, 6302, 5302, 4302 is a number pattern whose numbers get smaller by 1000

2. Write on the board the following sets of number patterns:

- 3201, 3202, 3203, _____, _____
- 7239, 7249, 7259, _____, _____
- 5014, 5114, 5214, _____, _____
- 4256, 5256, 6256, _____, _____

3. Ask the class which digit in each of the number patterns changes and what is the pattern of change (whether it is more by 1, 10, 100 or 1000 or less by 1, 10, 100 or 1000). Lead the class to see that to obtain the next number in the number pattern, they have to either add or subtract 1 or 10 or 100 or 1000 to from the previous number.

4. Show the class slightly more complex number patterns and ask pupils to try completing the patterns as follows:

7997, 7998, 7999, _____, _____

3970, 3980, 3990, _____, _____

2701, 2801, 2901, _____, _____

9002, 9001, 9000, _____, _____

7825, 7815, 7805, _____, _____

6263, 6163, 6063, _____, _____

Activity 4 (20 min): Class practice

1. Go through with the pupils the examples on pages 16–17 of the Student's Book.

Let's Try...

Activity 5 (20 min): Individual practice

1. Ask pupils to do the exercises on page 17–18 of the Student's Book.

Homework

Ask pupils to do Workbook 3A—Worksheet 4.

Answers



page 18

- (a) 3420, 3450 (b) 4110, 4310
(c) 8117, 8116 (d) 6432, 4432
(e) 5611, 5511 (f) 7364, 7367
- (a) 1008, 1018 (b) 1310, 1510
(c) 3037, 937 (d) 9140, 9040

WORK **S**h**e**e**t** 4

Worksheet 4

- (b) -1000 (c) +10 (d) -100 (e) +1 (f) -1
- (a) 4420, 4450, 4480
(b) 6180, 6380, 6680, 7080
(c) 2418, 2415, 2412
- (a) 2300, 2000 (b) 8030, 8060 (c) 2089, 3089
- (a) 1085 (b) 9000 (c) 6945 (d) 9860

ODD AND EVEN NUMBERS

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- identify odd and even numbers

Instructions

Let's Learn...

Activity 1 (20 min): Identify odd and even numbers

- Refer the pupils to page 19 of the Student's Book and go through the odd and even numbers with them, from 0 to 9. Emphasize 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.
- Ask the pupils to write examples of even and odd numbers on the board for 2-digit and 3-digit numbers.

Let's Explore

Activity 2 (20 min): Class practice

- Let the pupils try out the *Let's Explore* activities given on page 20 of the Student's Book.

Let's Try...

Activity 3 (10 min): Individual practice

1. Ask the pupils to try the exercises on page 21 of the Student's Book.

Homework

Ask pupils to do Workbook 3A—Worksheet 5 and Practice 1.

Answers



page 21

2. 246

3. 1947

WORK **Sheet** 5

Worksheet 5

1. Green: 8, 30, 34, 34, 16, 2, 38, 24, 36, 40, 10, 22, 6, 4, 18, 26, 32, 14, 28, 12, 20

Blue: 29, 11, 25, 5, 27, 13, 35, 7, 21, 19, 15, 33, 31, 9, 23, 3, 17, 39, 37, 1

2. (a) 44, 48, 50 (b) 62, 70 (c) 116, 146 (d) 1500, 1300

(e) 52, 50, 46 (f) 274, 270

3. (a) 9, 15 (b) 53, 59 (c) 99 (d) 281, 273

4. Even nos: 826, 2004, 794, 320, 2006, 58

Odd nos: 157, 1977, 31, 279, 403, 1979, 1981, 47, 21

Ppractice 1

Practice 1 (of Unit 1)

1. (a) 5200, 6200 (b) 5980, 6010 (c) 3140, 3440

(d) 8400, 8200 (e) 7003, 7000 (f) 6660, 6560

2. (a) 8000 (b) 400 (c) 8403 (d) 3 (e) 00 (f) 3 (g) 8000, 400, 70

3. (a) 900, 8150, 6999 (b) 7200, 7195, 7185 (e) 4603, 4444, 4281

4. (a) 6105, 6107, 6134 (b) 2003, 2035, 2700 (c) 5046, 5155, 6317

5. (a) 1059, 1095, 1509, 1905, 1950 (b) 1950 (c) 1059

(d) 1905 and 1950 (e) 1059 and 1950

6. 235, 253, 325, 523

Greatest: 523 Smallest: 235

7. 168, 186, 618, 816

Greatest: 816 Smallest: 168

Fun with Maths

Activity 4 (10 min): Game to reinforce learning

1. Pair up the pupils and lead them to play the game given on page 24 of the Student's Book.

Revision (20 min)

Revise and go through pupils' homework.

ROMAN NUMERALS

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- read and write Roman numerals upto 10
- read and write the Roman numerals for 50, 100, 500, and 1000

Instructions

Let's Learn...

Activity 1 (40 min)

1. Use page 22 to introduce this unit.

Ask the students: to look at table 2 on page 22. They are familiar with the Roman numerals with relevance to classroom identification eg.

Class I A class VI C, etc.

Explain what 'Arabic' and 'Roman' numerals are. (Refer to page 22)

2. Explain how the Roman numerals increase / decrease as given on page 23.

3. Ask the students to make a list of Arabic and Roman numerals from 1 to 10 in their exercise books.

Ask them to try writing numbers 20 to 30 in Roman numerals.

Peer checking will provide more practice.

Activity 2 (20 min): Reognize the alphabets used in Roman numerals for 50, 100, 500 and 1000.

Things you need: 7 cards with I, V, X, L, C, , D, M printed on them and 7 more with the Arabic numerals 1, 5, 10, 50, 100, 500, and 1000 printed on them

1. Hold up the cards one at a time and ask the pupils to call out the alphabet on each card. Ask some of them to call out the alphabet they remember and with it on the board.

2. When the 7 alphabets are written ask the students if they can guess

What they represent. Some might say that I is 1 | V is 5 | X is 10 as they have learned the Roman numbers from I to X.

3. Put the alphabets in the order of 1, 5, 10, 50, 100, 500 and 1000 and write these numbers under the appropriate alphabet; then ask the students to copy them after the nos. 1 to 10 written as I 1; II 2; III 3' IV 4 etc.

Tell them that it is important to know these numbers by heart.

Let's Try...

Activity 3 (15 min) Individual practice.

1. Ask the students to try the exercises on page 23 of the Student's Book.

Homework

Ask the pupils to do Workbook 3A—Worksheet 6

Answers



page 23

1. (a) III (b) XV (c) XII (d) XX
2. (a) 9 (b) 13 (c) 16 (d) 7

WORK **Sheet** 6

Worksheet 6

1. (a)
2. (a) V (b) IX (c) VII (d) XVII

Unit 2: Addition and Subtraction Within 10 000

ADDITION

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- add numbers up to 4 digits
- use the term 'sum'

Instructions

Let's Learn...

Activity 1 (20 min): Revise ones, tens, hundreds and thousands

Things you need: 10 cubes, 10 base ten blocks and 10 base hundred blocks and 10 base thousand blocks

1. Scatter 10 cubes on the display table and remind the class, 10 ones make 1 ten and replace the 10 cubes with 1 base ten block. Write on the board: 10 ones = 1 ten or 10
2. Scatter 10 base ten blocks on the visualiser and remind the class, 10 tens make 1 hundred. Replace the 10 base ten blocks with 1 base hundred block. Write on the board: 10 tens = 1 hundred or 100
3. Scatter 10 base hundred blocks on the display table and remind the class, 10 hundreds make 1 thousand. Replace the 10 base ten blocks with 1 base thousand block. Write on the board: 10 hundreds = 1 thousand or 1000
4. Scatter 10 base thousand blocks on the visualiser and tell the class that there are now 10 thousands cubes or 10 000.
5. Draw a Place Value Chart on the board. Scatter some cubes, base ten blocks, base hundred blocks and base thousand blocks on a desk and ask three pupils to count the number of ones, tens, hundreds and thousands and guide them to write the digits in the Place Value Chart. Write the number in words on the board and ask the class to read aloud the number. Do this for 4 different number of cubes and blocks with different pupils.

Activity 2 (20 min): Add numbers within 10 000

1. Tell the pupils to remember the following 4 simple steps in adding numbers within 10 000:

Step 1: Add the ones

Step 2: Add the tens

Step 3: Add the hundreds

Step 4: Add the thousands

2. Emphasize, to the pupils, that the steps must be in the order from ones to tens, to hundreds, and to thousands.
3. Write on the board the addition sentence $6345 + 3123 = \underline{\quad}$. Show the class that the addition sentence can also be written vertically as follows:

6 3 4 5

+ 3 1 2 3

4. Indicate thousands, hundreds, tens and ones places using the letters 'Th' 'H', 'T' and 'O' as follows:

Th H T O

6 3 4 5

+ 3 1 2 3

5. Emphasize that the digits must be written neatly such that they are at the right place value and are aligned correctly.
6. Ask the pupils to turn to page 26 of the Student's Book. Go through Example 1 and explain the 4 steps slowly as you work through the steps on the board. Use the Place Value Chart to see how the numbers are represented. Take note that this example is the simplest as there is no need to carry over. Provide a few more similar examples with no carry over for the pupils to practise.

Activity 3 (40 min): Add numbers within 10 000 with carry over of 1 thousand

1. Ask the pupils to turn to page 27 of the Student's Book. Go through Example 2 and work through the 4 steps on the board. Take note that Step 1 and Step 2 involves simple addition with no carry over, but Step 3 involves addition with a carry over of 1 thousand from the hundreds place to the thousands place. Explain in detail the 4 steps giving attention to the carry over of 1 thousand in Step 3 as follows:

Step 1: Add the ones with no carry over

- $3 \text{ ones} + 0 \text{ ones} = \underline{3 \text{ ones}}$
- Since 3 ones is less than 10 ones, there is no need for carry over

Step 2: Add the tens with no carry over

- $0 \text{ tens} + 7 \text{ tens} = \underline{7 \text{ tens}}$
- Since 7 tens is less than 10 tens, there is no need to carry over

Step 3: Add the hundreds with a carry over of 1 thousand

- $4 \text{ hundreds} + 8 \text{ hundreds} = 12 \text{ hundreds}$
- Since 12 hundreds is more than 10 hundreds, split the 12 hundreds into 1 thousand and 2 hundreds

- Carry over the 1 thousand from the hundreds place to the thousands place.
- Write a small '1' on the left corner of the number '1' to show the carry over of 1 thousand.

Step 4: Add the thousands with no carry over

- 1 thousand (carried over) + 1 thousand + 2 thousands = 4 thousands

Answer: 4273

2. With the pupils Go through the exercises on page 28 of the Student's Book.

Activity 4 (30 min): Add with 'carry over' of 1 ten, 1 hundred and 1 thousand

1. Ask the pupils to turn to page 29 of the Student's Book. Go through Example 6 and work the 4 steps on the board. Take note that Step 1 involves a carry over of 1 ten and Step 2 involves a carry over of 1 hundred. Explain in detail the 4 steps giving attention to the carry over in Step 1 and Step 2 as follows:

Step 1: Add the ones with carry over of 1 ten

- 5 ones + 5 ones = 10 ones
- Since it is 10 ones, carry over the 10 ones or 1 ten from the ones place to the tens place, leaving behind 0 ones in the ones place
- Write a small '1' on the left corner of the digit '4' to show the carry over.

Step 2: Add the tens with carry over of 1 hundred

- 1 tens (carried over) + 4 tens + 8 tens = 13 tens
- Since 12 tens is more than 10 tens (or 1 hundred), split the 13 tens into 1 hundred and 3 tens.
- Carry over the 1 hundred from the tens place to the hundreds place and write a small '1' on the left corner of the digit '6' to show denote the carry over.

Step 3: Add the hundreds with no carry over

- 1 hundred (carried over) + 6 hundreds + 5 hundreds = 12 hundreds
- Since 12 hundreds is more than 10 hundreds, split the 12 hundreds into 1 thousand and 2 hundreds.
- Carry over the 1 thousand from the hundreds place to the thousands place and write a small '1' on the left corner of the digit '1' to denote the carry over

Step 4: Add the thousands with no carrying over

- 1 thousand (carried over) + 1 thousand + 1 thousand = 3 thousands

Answer: 3230

2. Let the pupils try out Example 7 on page 31 of the Student's Book. Provide a few more similar examples with carry over of 1 ten, 1 hundred and 1 thousand for pupils to practise.

Let's Try...

Activity 5 (10 min): Individual practice

1. Ask the pupils to try out the exercises on page 33 of the Student's Book.

Homework

Ask the pupils to do Workbook 3A—Worksheet 7.

Answers



page 33

1. (a) 3189 (b) 2301 (c) 9071
(d) 8014 (e) 5113 (f) 4393

WORK *Sheet* 7

Worksheet 7

1. (a) 2348 (b) 1499 (c) 3693
2. (a) 3256 (b) 4556 (c) 6481 (d) 8509 (e) 8866
(f) 6859 (g) 6188 (h) 4697 (i) 469 (j) 797
3. (a) 3185 (b) 3619 (c) 4118 (d) 5012 (e) 7372 (f) 6998
(g) 8611 (h) 10010 (i) 7056 (j) 6215 (k) 3507 (l) 3471
4. Planet Zen

SUBTRACTION

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- subtract numbers up to 4 digits
- use the term 'difference'

Instructions

Let's Learn...

Activity 1 (15 min): Subtract numbers within 10 000

1. Explain to the pupils the following 4 simple steps in adding numbers within 10 000:
- Step 1: Subtract the ones
 - Step 2: Subtract the tens
 - Step 3: Subtract the hundreds
 - Step 4: Subtract the thousands

- Emphasize to the pupils that the steps must be in the order from ones to tens, to hundreds and to thousands.
- Write on the board the subtraction sentence $7648 - 2513 = \underline{\quad}$. Explain to the pupils that just like addition sentence, subtraction sentence can also be written vertically as follows:

$$\begin{array}{r} 7648 \\ - 2513 \\ \hline \end{array}$$

- Indicate the thousands, hundreds, tens and ones places using the letters 'Th', 'H', 'T' and 'O' as follows:

$$\begin{array}{r} \text{Th H T O} \\ 7648 \\ + 2513 \\ \hline \hline \end{array}$$

- Emphasize that the digits must be written neatly such that the digits are at the right place value and are aligned correctly.
- Ask the pupils to turn to page 34 of the Student's Book. Go through Example 1 and work through the 4 steps on the board. Note that this example is the simplest as there is no need to do any **borrow and regroup**. Provide a few more similar examples with no borrow and regroup needed for pupils to practise.

Activity 2 (25 min): Subtract numbers within 10 000 using borrow and regroup in hundreds

- Ask the pupils to turn to page 35 of the Student's Book. Go through Example 2 and work through the 4 steps on the board. Take note that Step 1 and Step 2 are simple subtraction with no need to borrow and regroup, but Step 3 involves a borrow and regroup in hundreds. Explain the 4 steps in details, stressing on the borrow and regroup in hundreds in Step 3 as follows:

Step 1: Subtract the ones

- Since 6 ones is more than 5 ones, do a simple subtraction, with no borrowing from the tens.
- $6 \text{ ones} - 5 \text{ ones} = \underline{1 \text{ one}}$

Step 2: Subtract the tens

- Since 4 tens is more than 3 tens, do a simple subtraction with no borrowing from the hundreds.
- $4 \text{ tens} - 3 \text{ tens} = \underline{1 \text{ ten}}$

Step 3: Subtract the hundreds with borrowing and regroup in hundreds

- Since it is not possible to solve '5 hundreds - 7 hundreds', we need to borrow one, 1 thousand from the 3 thousands. Show this by striking the '3' thousands and replacing it with '2' thousands.

- Regroup the borrowed 1 thousand into 10 hundreds and add them to the 5 hundreds: $10 \text{ hundreds} + 5 \text{ hundreds} = 15 \text{ hundreds}$. Show this by replacing the 5 hundreds with 15 hundreds.
- Since 15 hundreds is more than 7 hundreds, a simple subtraction can now take place: $15 \text{ hundreds} - 7 \text{ hundreds} = \underline{8 \text{ hundreds}}$.
- Emphasize that whenever a smaller digit minus a bigger digit, a ‘borrow’ is needed from the next higher digit.

Step 4: Subtract the thousands

- 2 thousands (after the borrow) – 1 thousand = 1 thousand

Answer: 1811

2. Provide a few more similar examples that involve borrow and regroup in hundreds for pupils to practise.

Activity 3 (25 min): Subtract numbers within 10 000 with borrow and regroup in ones, tens and hundreds

1. Ask the pupils to turn to page 36 of the Student’s Book. Go through Example 3 and work through the 4 steps on the board. Take note that Step 1 involves a borrow and regroup in ones, Step 2 involves a borrow and regroup in tens and Step 3 involves a borrow and regroup in hundreds. Explain in detail the 4 steps emphasizing the borrow and regroup in Steps 1, 2 and 3 as follows:

Step 1: Subtract the ones with borrow and regroup in ones

- Since it is not possible to do a ‘3 ones – 7 ones’, need to borrow 1 ten from the 4 tens. Show this by striking the ‘4’ tens and replacing it with ‘3’ tens.
- Regroup the borrowed 1 ten into 10 ones and add them to the 3 ones: $10 \text{ ones} + 3 \text{ ones} = 13 \text{ ones}$. Show this by replacing the ‘3’ ones with ‘13’ one.
- Since 13 ones is more than 7 ones, a simple subtraction can now take place: $13 \text{ ones} - 7 \text{ ones} = \underline{6 \text{ ones}}$

Step 2: Subtract the tens with borrow and regroup in tens

- Since it is not possible to solve ‘3 tens – 8 tens’, we need to borrow 1 hundred from the 2 hundreds. Show this by striking the ‘2’ hundreds and replacing it with ‘1’
- Regroup the borrowed 1 hundred into 10 tens and add them to the 3 tens: $10 \text{ tens} + 3 \text{ tens} = 13 \text{ tens}$. Show this by replacing the ‘3’ tens with ‘13’ tens.
- Since 13 tens is more than 8 tens, a simple subtraction can now take place: $13 \text{ tens} - 8 \text{ tens} = \underline{5 \text{ tens}}$

Step 3: Subtract the hundreds with borrow and regroup in hundreds

- Since it is not possible to solve ‘1 hundred – 7 hundreds’, we need to borrow 1 thousand from the 5 thousands. Show this by striking the ‘5’ thousands and replacing it with ‘4’ thousands

- Regroup the borrowed 1 thousand into 10 hundreds and add them to the 1 hundred: 10 hundreds + 1 hundred = 11 hundreds. Show this by replacing the '1' hundred with '11' hundreds.
- Since 11 hundreds is more than 7 hundreds, a simple subtraction can now take place: 11 hundreds – 7 hundreds = 4 hundreds

Step 4: Subtract the thousands

- 4 thousands (after the borrow) – 2 thousands = 2 thousands

Answer: 2456

2. Go through the examples on pages 37–38 of the Student's Book. Let the pupils try out the example on page 39 of the Student's Book.

Let's Explore

Activity 4 (15 min): Class practice on subtraction using a Place Value Chart

Things you need: A4 size copies of Place Value Chart

1. Ask the class to work in pairs for the *Let's Explore* activity on page 40 of the Student's Book. Give each pair 4 pieces of Place Value Chart. The pupils are to find the sum and difference of 2 numbers by drawing number discs (1, 10, 100, 1000) on the Place Value Chart as follows:

For addition

One pupil will draw sets of number discs representing two, 4-digit numbers on the Place Value Chart while the other pupil will do the addition by counting the discs and do a carry over if necessary. The first pupil will check the answer.

For subtraction

One pupil will draw sets of number discs representing two, 4-digit numbers on the Place Value Chart while the other pupil will do the subtraction by crossing out the numbers and do a borrow and regroup if necessary. The first pupil will check the accuracy of the answer.

2. Both pupils take turns to play the roles. Let the pupils try out 4 different sets of numbers for both addition and subtraction.

Let's Think

Activity 5 (25 min): Challenging activity

1. Ask the pupils to think through the challenging sums of *Let's Think* on page 41 of the Student's Book for about 5 minutes. Ask if there is any pupil who knows how to do it, to demonstrate on the board.
2. Write on the board 4 different types of variations of such kinds of sums and provide pupils with simple rules to find the answer as follows:

Type 1: Addition where the first number is missing

$$\begin{array}{r} \square \square \square \square \\ + 1234 \\ \hline 5678 \end{array}$$

Or $\square + 1234 = 5678$ Rule to find answer
Big number minus small number

Type 2: Addition where the second number is missing

$$\begin{array}{r} 1234 \\ + \square \square \square \square \\ \hline 5678 \end{array}$$

Or $1234 + \square = 5678$ Rule to find answer
Big number minus small number

Type 3: Subtraction where the first number is missing

$$\begin{array}{r} \square \square \square \square \\ - 1234 \\ \hline 5678 \end{array}$$

Or $\square - 1234 = 5678$ Rule to find answer
Add both numbers

Type 4: Subtraction where the second number is missing

$$\begin{array}{r} 5678 \\ - \square \square \square \square \\ \hline 1234 \end{array}$$

Or $5678 - \square = 1234$ Rule to find answer
Big number minus small number

3. Point out to the pupils that there are only two rules to remember: (1) Big number minus small number and (2) Add both numbers. Rule (2) is only for Type 3 while Rule (1) is for all other types.

Let's Try...

Activity 6 (15 min): Individual practice

1. Ask the pupils to try out the exercises on page 41 of the Student's Book. Ask some pupils to show their workings on the board for all to see.

Homework

Ask the pupils to do Workbook 3A—Worksheet 8.

Answers



page 41

Let's Think.

2345 and 4321

1. (a) 4041 (b) 1713 (c) 3485 (d) 1396

WORK *Sheet* 8

Worksheet 8

- (a) 2442 (b) 3033 (c) 3005 (d) 4214
- (a) 1005 (b) 1120 (c) 400 (d) 4302 (e) 5050 (f) 1111
- (a) 2345 (b) 1880 (c) 1131 (d) 1945 (e) 2209 (f) 618
(g) 5407 (h) 4926 (i) 4470 (j) 2444 (k) 1877 (l) 3213
- Base camp B
- the same

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

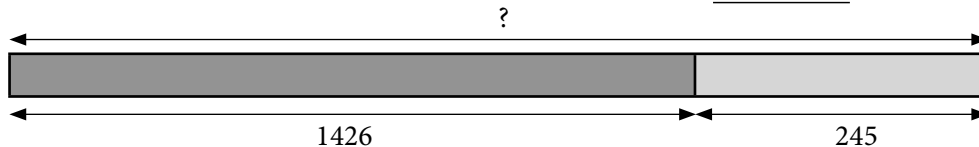
- use models to solve word problems involving numbers up to 10 000

Instructions

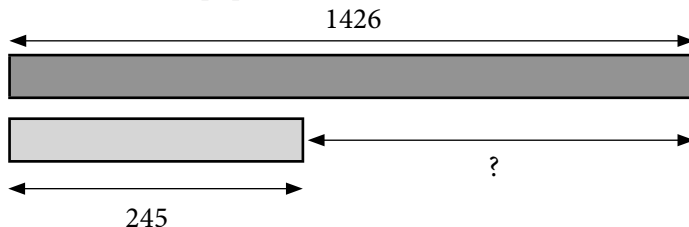
Let's Learn...

Activity 1 (20 min): Revise models on addition and subtraction word problem

- Revise with the pupils how to draw an addition model for $1426 + 245$ as follows:



- Explain to the class that the '?' mark represents the sum of the 2 numbers which is the answer to be worked out.
- Revise with the pupils how to draw a subtraction model for $1426 - 245$



- Explain to the class that the '?' mark represents the difference of the 2 numbers which is the answer to be worked out.

Activity 2 (20 min): Revise words associated with addition and subtraction

1. Tell the class that, to find out whether a word problem requires an addition or subtraction, one can look for clue words in the questions asked. On the board write the following clue words that usually appear in the questions asked in word problems:

Altogether	Fewer than	Sum of
Left	Total	Difference between
More than	Lesser than	In all

2. Ask the pupils which words are associated with the need to add, and which are associated with the need to subtract.
3. Provide the pupils with some examples of questions asked in word problems:
'How many marbles does John have **altogether**?'
'What is the **total** number of fish balls that Tom ate?'
'How many **more** marbles does John have **than** Tom?'
'What is the **difference** in the number of stamps **between** John and Tom?'
'How many children are there **in all**?'
'How many **fewer** apples does John have **than** Tom?'
'Find the *sum* of apples and oranges that John bought?'
4. Remind the pupils that sometimes, a word problem has 2 parts and the 2 parts can be as follows ;
 - An addition followed by subtraction
 - A subtraction followed by addition
 - An addition followed by another addition
 - A subtraction followed by another subtraction

Activity 3 (40 min): Solve addition and subtraction word problems using models

1. Go through with the pupils the examples on pages 43–44 of the Student's Book. Ask the pupils to share their answers with the class.

Let's Try...

Activity 4 (40 min): Individual practice

1. Ask the pupils to try out the exercises on page 45 of the Student's Book. Ask them to work in pairs to check their answers.

Homework

Ask the pupils to do Workbook 3A—Worksheet 9 and 10.

Answers



page 45

- (1) 1729 are not red.
(2) 5376 cows
(3) Rs 894
(4) 3283

WORK **Sheet** 9

Worksheet 9

- (a) 1320 (b) 2420
- (a) 6625 (b) 5250
- (a) 2295 women (b) 3535 people
- (a) 5880 (b) 1316

WORK **Sheet** 10

- 1236; - 1236; 1236; 1236, 3574; 3574
- 21727
- 8752
- Rs. 5307
- 4959

ADDING AND SUBTRACTING MENTALLY

Suggested Duration

4 periods (160 min)

Learning Outcomes

Pupils should be able to:

- add mentally two 2-digit numbers
- subtract mentally a 2 digit number from another 2-digit number

Instructions

Let's Learn...

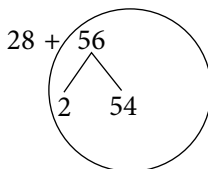
Activity 1 (40 min): Add mentally two 2-digit numbers

- Refer the class to page 46 of the Student's Book. Ask the class if anyone can add the number $28 + 56$ mentally without drawing a model and without doing the addition calculations. Write $28 + 56$ on the board.

2. Tell the pupils that they can form mental pictures of the addition using 2 methods as follows:

Method 1 – Make Tens

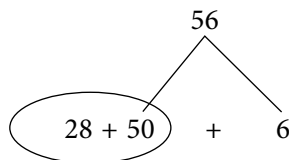
- Think of the number '28' and add a number to '28' to make tens i.e. '30'.
- Split the number '56' into '2' and '54' and form the mental picture as follows:



- $28 + 2 = 30$
- $30 + 54 = 84$
- So, $28 + 56 = 84$

Method 2 – Add tens first, then add ones

- Think of the number '56' and split it into tens and ones: 50 and 6 and form the mental picture as follows:



- Add the tens: $28 + 50 = 78$
- Add the ones: $78 + 6 = 84$

3. Go through the examples on page 47 of the Student's Book.
4. Ask the pupils which method they prefer. Point out that Method 2 can be used for all numbers whereas Method 1 is more suitable for addition involving smaller numbers.

Homework

Ask pupils to do Workbook 3A—Worksheet 11.

WORK *Sheet* 11

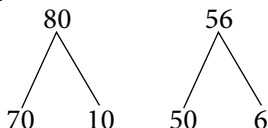
1. (a) 110 (b) 82; 2; 30; 30; 82 (c) 81; 50; 50; 81 (d) 63; 40, 40; 63
2. (a) 41; 41 (b) 80; 79; 79; 80 (c) 56; 54; 54; 56 (d) 90; 85; 85; 90

Activity 2 (40 min): Subtract mentally a 2-digit number from another 2-digit

- 1 Refer the pupils to page 48 of the Student's Book. Go through the 2 methods used to mentally subtract: $80 - 56$.

Method 1

- Split the numbers 80 and 56 into tens and ones. Form the mental picture as follows:



- Subtract the tens: $70 - 50 = 20$
- Subtract the ones: $10 - 6 = 4$
- Add the remainders: $20 + 4 = 24$

Method 2: Subtract the tens first, then subtract the ones

- Subtract the tens: $80 - 50 = 30$
 - Subtract the ones: $30 - 6 = 24$
2. Go through the examples on page 49 of the Student's Book.
 3. Ask the pupils which method they prefer. Point out that Method 2 can be used for all numbers whereas Method 1 is more suitable for subtraction involving smaller numbers.

Activity 3 (20 min): Class practice

1. Pair up the pupils. Say out an addition sentence e.g. '34 plus 57' once. Ask the pupils to work out the sum mentally and then share their answer with their partner. Say the addition sentence a second time so that pupils can confirm their answer.
2. Do the same for subtraction, e.g. say aloud '82 minus 34' once. Ask the pupils to work out the subtraction mentally and then share their answer with their partner. Say the subtraction sentence a second time so that pupils can confirm their answer.

Let's Try...

Activity 4 (20 min): Individual practice

1. Ask the pupils to try out the exercises on page 50 of the Student's Book.

Homework

Ask the pupils to do Workbook 3A—Worksheet 12 and Practice 2.

Answers



page 50

- (a) 82 (b) 34 (c) 71 (d) 11 (e) 38 (f) 96 (g) 36
(h) 57 (i) 33 (j) 42

WORK *Sheet* 12

1. (a) 72; 2; 70; 72 (b) 74; 73; 1; $73 + 1 = 74$
(c) 8; 10; 1; $7 + 1 = 8$ (d) 61; 60; 1; $60 + 1 = 61$
2. (a) 23; 23 (b) 35; 40; 40; 35 (c) 47; 50; 50; 47 (d) 32; 40; 40; 32

Practice 2

1. 50155_W; 8425_0; 9138_R; 8050_K
9025_W; 6846_1; 3928_T; 9135_H
7001_C; 9220_A; 9632_R; 8989_E

WORK WITH CARE

2. (a) 1826 (b) 2671 (c) 4678 (d) 1810 (e) 5398
3. (a) 3216 (b) 6910

4. 2557

5. (a) Rs. 3907 (b) Rs. 4899 (c) Rs. 891

6. Y 160 L 180 E 110 K 170

H 120 I 130 M 78 P 198

HELP ME

7. (a) 18 (b) 35 (c) 54 (d) 9

(e) 46 (f) 3 (g) 3 (h) 18

8. ACROSS: (2) 2851 (4) 7856 (7) 508 (8) 92 (9) 2379

(11) 5074 (12) 4169 (14) 3509

DOWN: (1) 45 (3) 195 (4) 738 (5) 612 (6) 1503

(10) 994 (11) 509 (13) 133 (15) 52

Fun with Maths

Activity 5 (20 min): Fun game

Things you need: Pen and paper

1. Pair up the pupils and ask pupils to play the game on page 51 of the Student's Book.

Revision (20 min)

Revise and go through pupil's homework.

Unit 3: Length

METRES AND CENTIMETRES

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- measure length in metres and centimetres
- convert length in compound units to the smaller unit, and vice versa

Instructions

Let's Learn...

Activity 1 (5 min): Recall the concept of length

1. Recall the concept of length as the distance between the 2 ends of an object. Show the length of any object by pointing to its two ends.
2. Remind the pupils that the height of an object or a person is also a form of length. Ask a pupil to stand in front of the class and show the height by pointing to his feet and moving up to the top of his head.
3. Point to the teacher's table and ask the pupils, 'What is the length of the table?' and 'What is the height of the table?' The pupils should be able to differentiate between the two.

Activity 2 (15 min): Recall the 'metre' and 'centimetre' as standard units for measuring length

Things you need: 1-metre ruler, strings of different lengths, measuring tapes and strips of coloured paper.

1. Revise with the class the 'metre' and 'centimetre' by asking and leading the pupils to answer the following questions:
 - 'What are the two standard units of measuring length?'
 - 'What is the short form of writing metres and centimetres?'
 - 'How long is 1 metre?'
 - 'How long is 1 centimetre?'
 - 'What are the tools that you can use to measure in metres and centimetres?'
 - 'How do you measure the length of curves?'
 - 'How do you add, subtract, multiply and divide in length?'
2. For each of the questions, you may use the items mentioned to help you explain to the pupils.

Activity 3 (20 min): Read and write lengths in compound units of metres (m) and centimetres (cm)

Things you need: 1-metre rulers and 5-m measuring tapes, strings more than 1m long

1. Tell the class that so far they have learned how to measure length in either metres or centimetres, but not a combination of both. Point out that most of the time, the length of an object may not be exactly in metres or centimetres, but in a combination of both metres and centimetres. Show this by asking a few pupils to come forward and have another pupil measure his height using the 1-metre ruler. For most Primary 3 pupils, it is likely that their heights will be between 1 m and 2 m.
2. Pull out from the 5-m measuring tape a length of 1 m 30 cm and get 2 pupils to hold it horizontally in front of the class. Ask the rest of the class to come forward to examine the readings. Help them to see that there are 2 types of numbers on the measuring tape: the bigger numbers refer to the metres while the smaller numbers refer to the centimetres. Ask the pupils to locate the numbers '1' and '30' for the length of 1 m 30 cm. Tell the class to write on the board the length: 1 m 30 cm and read it as '1 metre 30 centimetres'
4. Show the class that 100 cm is equal to 1 m. Write on the board: $1\text{ m} = 100\text{ cm}$
5. Show that 1 m 30 cm can be written as 130 cm as follows:

$$\begin{array}{c} \underline{1\text{ m } 30\text{ cm}} \\ \swarrow \quad \searrow \\ 100\text{ cm} \quad + \quad 30\text{ cm} \\ \underbrace{\hspace{10em}} \\ \underline{130\text{ cm}} \end{array} \quad \text{Or} \quad \begin{array}{l} 1\text{ m } 30\text{ cm} = 100\text{ cm} + 30\text{ cm} \\ = 130\text{ cm} \end{array}$$

Conversely, 130 cm can be written as 1 m 30 cm as follows:

$$\begin{array}{c} \underline{130\text{ cm}} \\ \swarrow \quad \searrow \\ 100\text{ cm} \quad + \quad 30\text{ cm} \\ \underbrace{\hspace{10em}} \\ \underline{1\text{ m } 30\text{ cm}} \end{array} \quad \text{Or} \quad \begin{array}{l} 130\text{ cm} = 100\text{ cm} + 30\text{ cm} \\ = 1\text{ m } 30\text{ cm} \end{array}$$

6. Repeat Nos. 1 to 5 for different lengths of more than 1 m. Ensure that the pupils are able to read and write lengths in compound units of metres and centimetres.

Activity 4 (20 min): Measure length in compound units of metres (m) and centimetres (cm)

Things you need: Three 2-m measuring tapes stuck vertically on three walls, and three hard cover books

1. Let the pupils practise measuring lengths in compound units of metres and centimetres by getting them to measure one another's heights as follows:
 - Have the pupils stand in 3 queues in front of the 3 measuring tapes that were stuck onto the walls.
 - Pupil A will stand upright with his back against the measuring tape that is stuck to the wall while Pupil B will place a hard cover book horizontally over the head of Pupil A,

and perpendicularly against the measuring tape. Pupil B will read off from the measuring tape and Pupil A is to listen carefully, and then record his height.

- The pupils take turns to measure each other's heights. Advise the pupil who is measuring the heights to stand on a small stool and to read off from the underside of the hardcover book. Remind the pupils to stand upright and look straight when their heights are being measured.
- Find out who the tallest and the shortest are in the class.

Activity 5 (15 min): Class practice

1. With the pupils go through the examples on pages 53–54 of the Student's Book.

Let's Try...

Activity 6 (5 min): Individual practice

1. Ask the pupils to try out the exercises on page 55 of the Student's Book.

Homework

Ask the pupils to do Workbook 3A—Worksheet 13.

Answers



page 55

(1) 172 cm (2) 1 m 43 cm (3) 4 m 57 cm

WORK **Sheet** 13

- (a) 500 cm (b) 900 cm (c) 400 cm (d) 6 m (e) 3 m
- (a) 560 cm (b) 207 cm (c) 1 m 19 cm
(d) 9 m 50 cm (e) 5 m 35 cm
- (a) 110 cm (b) 224 cm
- 1 m 68 cm

KILOMETRES AND METRES

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- measure length in kilometres and metres
- convert length in compound units to the smaller unit, and vice versa

Instructions

Let's Learn...

Activity 1 (10 min): Know the 'kilometre' as a standard unit for measuring length

Things you need: Picture of a single football field, and picture of 10 football fields joined together from end to end

1. Tell the class that besides the metre (m) and the centimetre (cm), another standard unit used to measure length is the 'kilometre'. Say aloud the word 'kilometre' and ask the class to repeat after you. Write on the board the word 'kilometre' and show that the short form of writing 'kilometre' is 'km'.
2. Ask the class if anyone knows how long 1 kilometre is. Show how long 1 kilometre is as follows:
 - Ask the class how long 100 m is and show them the picture of a football field and explain that the length of a football field is 100 m.
 - Show them a picture of 10 football fields joined together from end to end and lead the class to find the total length by writing $100\text{ m} \times 10 = 1000\text{ m}$. Explain that 1000 m is equal to 1 km and write on the board: $1\text{ km} = 1000\text{ m}$
3. Point out to the pupils that the 'kilometre' is used to measure long distances.

Activity 2 (10 min): Read and write lengths in compound units of kilometres (km) and metres (m)

Things you need: Picture of Singapore map showing the locations of Ang Mo Kio, Toa Payoh, Tampines, Bukit Batok, Woodlands and Bedok

1. Check out beforehand the estimated travelling distances in the following compound units:

Express in km and m

Ang Mo Kio → Tampines: _____ km _____ m

Bukit Batok → Bedok: _____ km _____ m

Toa Payoh → Woodlands: _____ km _____ m

Express in m only

Woodlands → Tampines: _____ m

Bedok → Ang Mo Kio: _____ m

Bukit Batok → Toa Payoh: _____ m

1. Tell the class that reading and writing lengths in compound units of kilometres and metres is similar to reading and writing lengths in compound units of metres and centimetres. Remind the class that 1 km equals 1000 m. Write on the board: $1\text{ km} = 1000\text{ m}$. Show an example of reading and writing lengths in compound units of kilometres and metres as follows:

- Show that 15 km 750 m can be written as 15 750 m as follows:

$$\begin{array}{r}
 \underline{15 \text{ km } 750 \text{ m}} \\
 \swarrow \quad \searrow \\
 15 \text{ 000 m} + \quad 750 \text{ m} \\
 \hline
 15 \text{ 750 m}
 \end{array}
 \quad \text{Or} \quad
 \begin{array}{r}
 15 \text{ km } 750 \text{ m} = 15 \text{ 000 m} + 750 \text{ m} \\
 = 15 \text{ 750 m}
 \end{array}$$

Read it as 'fifteen thousand, seven hundred and fifty metres'. Ask the class to repeat the statement.

- Conversely, 15 750 m can also be written as 15 km 750 m as follows:

$$\begin{array}{r}
 \underline{15 \text{ 750 m}} \\
 \swarrow \quad \searrow \\
 15 \text{ 000 m} + \quad 750 \text{ m} \\
 \hline
 15 \text{ km } 750 \text{ m}
 \end{array}
 \quad \text{Or} \quad
 \begin{array}{r}
 15 \text{ 750 m} = 15 \text{ 000 m} + 750 \text{ m} \\
 = 15 \text{ km } 750 \text{ m}
 \end{array}$$

Read it as 'Fifteen kilometres and seven hundred and fifty metres'. Ask the class to repeat the statement.

- On the display table place the picture of the Singapore map showing the locations of Ang Mo Kio, Toa Payoh, Tampines, Bukit Batok, Woodlands and Bedok. Ask the pupils to practise reading and writing the distance between the towns in km and m and in m only.

Activity 4 (20 min): Class exercise

- Go through the examples on pages 56–57 of the Student's Book.

Let's Explore

Activity 5: Individual practice

- Ask the pupils to try out the exercises on page 58 of the Student's Book on home at their own time. Ask some to show their answers during the next lesson.

Let's Try...

Activity 6 (40 min): Individual practice

- Ask the pupils to try out the exercises on page 59 of the Student's Book.

Homework

Ask the pupils to do Workbook 3A—Worksheet 14.

Answers



page 59

- 6000 m, 1240 m, 5950 m, 1 km. 80 m

WORK *Sheet* 14

- (a) 1020 m (b) 3005 m (c) 2193 m (d) 5085 m (e) 6156 m
(f) 4298 m (g) 1050 m (h) 2105 m (i) 8008 m (j) 3029 m
- (a) 1 km 2 m (b) 3 km 48 m (c) 4 km 295 m (d) 2 km 6 m
(e) 7 km 135 m (f) 5 km 40 m (g) 9 km 900 m
(h) 6 km 975 m (i) 4 km 589 m (j) 2 km 65 m
- (a) C (b) point B (c) 5 km 25 m (d) 2060 m

WORD PROBLEMS

Suggested Duration

4 periods (160 min)

Learning Outcomes

Pupils should be able to:

- solve word problems involving length

Instructions

Let's Learn...

Activity 1 (5 min): Recall solving word problems

- Revise with the pupils how solving simple word problems on addition and subtraction. Explain the use of models and write addition and subtraction sentences on the board.
- Provide word problems for the pupils to try out.

Activity 2 (15 min): Add and subtract lengths in compound units of metres and centimetres

- Tell the class that so far they have learned how to add, and subtract length in either metres or centimetres but not a combination of both metres and centimetres. Point out that most of the time, the addition and subtraction of length involve lengths that are in a compound unit of metres and centimetres. Introduce the following two methods in adding and subtracting lengths in a compound unit of metres and centimetres as follows:

ADDITION

Method 1: Add the metres and centimetres separately

Addition example 1: 14 m 50 cm + 3 m 45 cm = _____

$$\begin{array}{r} 14 \text{ m } 50 \text{ cm} \\ + 3 \text{ m } 45 \text{ cm} \\ \hline \\ \hline \end{array}$$

First add the lengths in cm: 50 cm + 45 cm = 95 cm

Next, add the lengths in m: $14\text{ m} + 3\text{ m} = 17\text{ m}$

Therefore, the answer is 17 m 95 cm.

Addition example 2: $12\text{ m } 65\text{ cm} + 9\text{ m } 45\text{ cm} = \underline{\hspace{2cm}}$

$$\begin{array}{r} 12\text{ m } 65\text{ cm} \\ + 9\text{ m } 45\text{ cm} \\ \hline \end{array}$$

First, add the lengths in cm: $65\text{ cm} + 45\text{ cm} = 110\text{ cm}$

$$= 1\text{ m } 10\text{ cm}$$

(Point out to the pupils that there is a carry over of 1 m.)

Next, add the lengths in m: $12\text{ m} + 9\text{ m} + 1\text{ m} = 22\text{ m}$

Therefore, the answer is 22 m 10 cm.

(Emphasize that the pupils add the centimetres first.)

Method 2: Convert all the readings into centimetres

Addition example 1: $14\text{ m } 50\text{ cm} + 3\text{ m } 45\text{ cm} = \underline{\hspace{2cm}}$

First, convert all into cm: $14\text{ m } 50\text{ cm} = 1450\text{ cm}$

$$3\text{ m } 45\text{ cm} = 345\text{ cm}$$

Next, add 1450 cm and 345 cm using the usual addition algorithm.

$$\begin{array}{r} 1450\text{ cm} \\ + 345\text{ cm} \\ \hline 1795\text{ cm} \end{array}$$

Finally, convert back to m and cm: $1795\text{ cm} = 17\text{ m } 95\text{ cm}$

Therefore, the answer is 14 m 95 cm.

Addition example 2: $12\text{ m } 65\text{ cm} + 9\text{ m } 45\text{ cm} = \underline{\hspace{2cm}}$

First, convert all to cm: $12\text{ m } 65\text{ cm} = 1265\text{ cm}$

$$9\text{ m } 45\text{ cm} = 945\text{ cm}$$

Next, add 1265 cm and 945 cm using the usual addition algorithm.

$$\begin{array}{r} 1265\text{ cm} \\ + 945\text{ cm} \\ \hline 2210\text{ cm} \end{array}$$

Finally, convert back to m and cm: $2210\text{ cm} = 22\text{ m } 10\text{ cm}$

Therefore, the answer is 22 m 10 cm.

SUBTRACTION

Method 1: Subtract the metres and centimetres separately

Subtraction example 1: $45\text{ m } 40\text{ cm} - 21\text{ m } 15\text{ cm} = \underline{\hspace{2cm}}$

First, subtract the lengths in cm: $40\text{ cm} - 15\text{ cm} = 25\text{ cm}$

Next, subtract the lengths in m: $45 \text{ m} - 21 \text{ m} = 24 \text{ m}$

$$\begin{array}{r} 45 \text{ m } 40 \text{ cm} \\ - 21 \text{ m } 15 \text{ cm} \\ \hline 24 \text{ m } 25 \text{ cm} \end{array}$$

Therefore, the answer is 24 m 25 cm.

Subtraction example 2: $26 \text{ m } 25 \text{ cm} - 17 \text{ m } 47 \text{ cm}$

First subtract the lengths in cm: $25 \text{ cm} - 47 \text{ cm} = \underline{\hspace{2cm}}$

But 25 cm is smaller than 47 cm, so need to borrow 1 m from 26 m.

Regroup the 1 m as 100 cm and add it to the 25 cm: $100 + 25 = 125 \text{ cm}$

Continue with the subtraction: $125 \text{ cm} - 47 \text{ cm} = 78 \text{ cm}$.

Next, subtract the lengths in m: $25 \text{ m} - 17 \text{ m} = 8 \text{ m}$

Therefore, the answer is 8 m 78 cm.

(Emphasize subtraction of the centimetres first.)

Method 2: Convert all the readings into centimetres

Addition example 1: $14 \text{ m } 55 \text{ cm} - 3 \text{ m } 45 \text{ cm} = \underline{\hspace{2cm}}$

First, convert all into cm: $14 \text{ m } 55 \text{ cm} = 1455 \text{ cm}$

$$3 \text{ m } 45 \text{ cm} = 345 \text{ cm}$$

Next, subtract 345 cm from 1455 cm using the usual subtraction algorithm.

$$\begin{array}{r} 1455 \text{ cm} \\ - 345 \text{ cm} \\ \hline 1110 \text{ cm} \end{array}$$

Finally, convert back to m and cm: $1115 \text{ cm} = 11 \text{ m } 15 \text{ cm}$

Therefore, the answer is 11 m 15 cm.

Addition example 2: $12 \text{ m } 25 \text{ cm} + 9 \text{ m } 45 \text{ cm} = \underline{\hspace{2cm}}$

First, convert all to cm: $12 \text{ m } 25 \text{ cm} = 1225 \text{ cm}$

$$9 \text{ m } 45 \text{ cm} = 945 \text{ cm}$$

Next, subtract 945 cm from 1225 cm using the usual subtraction algorithm.

$$\begin{array}{r} 1225 \text{ cm} \\ + 945 \text{ cm} \\ \hline 1280 \text{ cm} \end{array}$$

(Point out to the pupils that there is a borrow and regroup in tens.)

Finally, convert back to m and cm: $280 \text{ cm} = 2 \text{ m } 80 \text{ cm}$

Therefore, the answer is 2 m 80 cm.

2. Provide examples for the pupils to practise addition and subtraction of lengths in different compound units of metres and centimetres using both methods. Ask the pupils which method they prefer.

Activity 3 (20 min): Add and subtract lengths in compound units of kilometres and metres

1. Tell the class that the methods used for adding and subtracting lengths in compound units of kilometres and metres are exactly the same as those for adding and subtracting lengths in metres and centimetres. Revise with the pupils, the two methods they have learned earlier for metres and centimetres (refer to Activity 2).

Method 1: Add or subtract kilometres and metres separately

Method 2: Convert all readings to metres

2. Provide examples for the pupils to practise addition and subtraction of lengths in compound units of kilometres and metres using both methods.

Activity 4 (20 min): Multiply and divide lengths in compound units of metres and centimetres

1. Tell the class that multiplying and dividing lengths in metres and centimetres is similar to multiplying and dividing numbers.
2. Give some simple examples for pupils to practise. The examples should only involve multiplication and division of numbers that are found in the multiplication tables of 2, 3, 4, 5 and 10 as the pupils have not yet learnt other multiplication tables at this point.

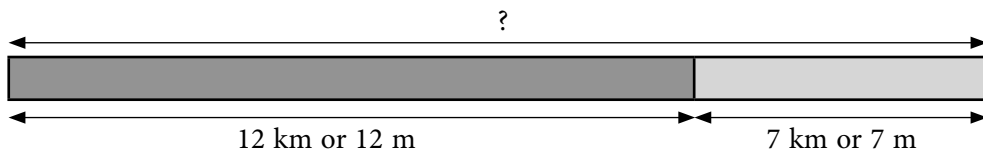
Activity 5 (20 min): Solve word problems involving addition and subtraction of lengths in kilometres and metres

Things you need: Colour strips of different length

1. Revise with the class the use of models to solve addition and subtraction of lengths as follows:

Addition

Display 2 colour strips of different length on the display table. Ask the class ‘What is the total length of both strips?’ Show the addition of lengths by joining the strips and writing the addition sentence as follows:



If in kilometres

$$12 \text{ km} + 7 \text{ km} = 19 \text{ km}$$

The total length of the strips is 19 km.

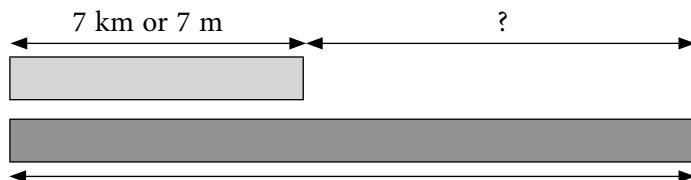
If in metres

$$12 \text{ m} + 7 \text{ m} = 19 \text{ m}$$

The total length of the strips is 19 m.

Subtraction

Next, ask the class ‘Which strip is longer and how much longer?’ Show the subtraction of lengths by placing the shorter strip over the longer strip and writing the subtraction sentence as follows:



If in kilometres

$$12 \text{ km} - 7 \text{ km} = 5 \text{ km}$$

The red strip is 5 km longer than the blue strip.

Or The blue strip is 5 km shorter than the red strip.

If in metres

$$12 \text{ m} - 7 \text{ m} = 5 \text{ m}$$

The red strip is 5 m longer than the blue strip.

Or The blue strip is 5 m shorter than the red strip.

2. Go through the examples on pages 60–61 of the Student’s Book. Provide additional word problems on length for the pupils to practise on the board. Ask 2 pupils to work on each example on the board. One pupil takes charge of drawing the model while the other does the calculations.

Let’s Try...

Activity 6 (10 min): Individual practice

1. Ask the pupils to work out the word problems on page 62 of the Student’s Book. Remind of them to use the addition and subtraction algorithms in working out the answers.

Homework

Ask the pupils to do Workbook 3A—Worksheet 15 and Practice 3.

Answers



page 62

- (1) 645 m (2) 600 m (3) 428 m

WORK **S**heet 15

1. 5100 m
2. (a) 1040 m or 1 km 40 m (b) 3040 m or 3 km 40 m

3. 7350 m or 7 km 350 m
4. 2100 m or 2 km 100 m
5. (a) Peter's home is nearer. (b) 9300 m or 9 km 300 m

Practice 3

1. 1 m 30 cm; 2 m 5 cm; 276 cm; 1 m 5 cm; 3 m 80 cm; 650 cm; 7 m 45 cm; 504 cm
2. (a) 6 m (b) 4 km (c) 2000 m (d) 50 cm
(e) 7 km 30 m (f) 3 km 800 m (g) 4 m 20 cm (h) 9 m 60 cm
3. 33 m 20 cm — 3320 cm
3 km 20 m — 3020 m
3 m 20 cm — 320 cm
3 km 320 m — 3320 m
3 m 2 cm — 302 cm
3 km 2 m — 3002 m
4. (a) 2005 m (b) 3 km (c) 1 km 130 m
(d) 3 km 40 m; 1970 m; 2016 m
5. 5600 m
6. 4050 m

Fun With Maths

Activity 7 (30 min): Outdoor activity to enhance learning

1. Organise the pupils to try out the outdoor activity on page 63 of the Student's Book.

Revision (40 min)

Revise and go through the pupils' homework.

Revision 1 (Workbook 3A)

1. (a) 2305 (b) 3256 (c) 5077
2. (a) 3116 (b) 6078 (c) 2904 (d) 5200
3. (a) Eight thousand three hundred and forty-nine.
(b) Two thousand and seventeen.
(c) Nine thousand five hundred and six.
4. (a) (i) 4726, 4627, 4276, 4267
(ii) 6317, 6305, 3156, 3033

- (b) (i) 1925, 2767, 3157, 4825
(ii) 5030, 5037, 7035, 7503
5. (a) 8, 10, 2, 116 (b) 11, 81, 45, 89, 67
6. (a) 3 m 52 cm (b) 505 cm (c) 6 m 7 cm (d) 480 cm
(e) 9 km 305 m (f) 2007 m (g) 7 km 40 m (h) 1701 m
7. (a) 3343 (b) 5101 (c) 8787
8. (a) 83 (b) 79 (c) 75 (d) 145
9. (a) 33 (b) 28 (c) 12 (d) 26
10. (a) 1000 (b) 5423 (c) 7222 (d) 5905 (e) 2950
11. (a) 3000 (b) 600 (c) 10
12. (a) < (b) > (c) > (d) <
13. III, IV, VI



Revision 2 (Workbook 3A)

1. (a) 614 (b) 1661 (c) 3632 (d) 2272 (e) 5277 (f) 1684
2. (a) 1065, 1075, 1105 (b) 4295, 4095, 3995
(c) 2389, 2390, 2392 (d) 7607, 5607, 3607
3. (a) 8104 (b) 6204
4. (a) 3962 (b) 5778
5. (a) 2876 (b) 1346 and 2876 (c) 2876 (d) 2876 and 6852
(e) 300 (f) 80 (g) 6852
6. (a) Ali 178 cm; Sameer 191 cm, Maheen 205 cm
(b) Maheen (c) 99 cm, 178 cm, 191 cm, 205 cm
7. 830 books
8. Rs 3100
9. Rs 3340
- 10 (a) 2375 m (b) 1090 m
11. (a) 2332 (b) 4484
12. (a) 821 (b) 7223
13. 3800 m
14. 2000 m
15. (a) 14,400 m (b) 1200 m

Unit 4: Mass

KILOGRAMS AND GRAMS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- measure mass in kilograms and grams
- convert mass in compound units to the smaller unit, and vice versa

Instructions

Let's Learn...

Activity 1 (10 min): Recall the concept of mass

1. Recall the concept of mass as 'how heavy' or 'how light' an object is.
2. Ask two pupils to come forward. Select pupils with a great difference in size. Ask each of them to take turns lifting each other. Ask the class, 'Which pupil is heavier?'
3. Show the balance and recall how to use the balance to compare the masses of two objects. Recall the use of marble as a non-standard unit to measure mass.
4. Show the kitchen scale and bathroom scale as common tools for measuring mass.

Activity 2 (10 min): Recall the 'kilogram' and 'gram' as standard units for measuring mass

1. Revise with the class the 'kilogram' and 'gram' by asking and leading the pupils to answer the following questions:
 - 'What are the two standard units of measuring mass?'
 - 'What is the short form of writing kilograms and grams?'
 - 'How heavy is 1 kilogram?'
 - 'How heavy is 1 gram?'
 - 'What are the tools that you can use to measure mass?'
 - 'How many grams make one kilogram?'
 - 'How do you add, subtract, multiply and divide mass in either kilogram or gram?'
2. For each of the questions, provide examples for the pupils to practise.

Activity 3 (20 min): Read and write mass in compound units of kilograms (kg) and grams (g)

Things you need: Kitchen scale. Blown up picture of a kitchen scale.

1. Tell the class that so far they have learned how to read and write mass in either kilograms or grams, but not as a compound unit. Point out that most of the time, the mass of an object may not be exact in kilograms or grams, but a compound unit of both kilograms and grams.
2. Show the class that 1000 g is equal to 1 kg. Write on the board: $1 \text{ kg} = 1000 \text{ g}$.
3. On the table, place a blown up picture of a kitchen scale. Explain that there are two types of markings on the scale: one type showing the 'kg' readings and the other showing the 'g' readings. Lead the pupils to see that between two 'kg' markings are smaller markings. These smaller markings represent equal parts in 1 kg and each equal part represents a part value of 1 kg. For example, if there are 10 equal parts in 1 kg, each part will stand for 100 g.
4. Display a kitchen scale on the table and have the pupils come forward, group by group, to look at the two types of markings.
5. Teach the pupils how to read the mass in kg and g by looking at both the 'kg' and 'g' markings. But before that, the pupils must first find the value of each smaller part within the 1 kg markings as follows:
 - First, locate where the '1 kg' markings are
 - Second, count the number of smaller parts within the '1 kg' markings. These parts are the equal parts in 1 kg.
 - Third, divide 1000 g by the number of equal parts to find the value of each equal part. For example, if there are 5 equal parts in 1 kg, then the value of each equal part is $1000 \text{ g} \div 5 = 200 \text{ g}$.
6. Have the pupil write on the board the mass read. For example: 2 kg 400 g. Read it as 'two kilograms and four hundred grams' and get the class to repeat the statement.
7. Show that 2 kg 400 g can be written as 2400 g as follows:

$$\begin{array}{r}
 \underline{2 \text{ kg } 400 \text{ g}} \\
 \swarrow \quad \searrow \\
 2000 \text{ kg} + 400 \text{ g} \\
 \hline
 2400 \text{ g}
 \end{array}
 \quad \text{Or} \quad
 \begin{array}{r}
 2 \text{ kg } 400 \text{ g} \\
 = 2000 \text{ kg} + 400 \text{ g} \\
 = 2400 \text{ g}
 \end{array}$$

2400 g can also be written as 2 kg 400 g:

8. Repeat No. 5 to 6 for different objects. Ensure that the pupils are able to read and write mass in compound units of kilograms and grams.

Activity 4 (20 min): Class exercise

1. With the pupils go through the examples on pages 65–67 of the Student's Book. It is best that you blow up these pages and place them on the display table as you explain the steps in reading the mass from the scale.

Let's Explore

Activity 5 (20 min): Interesting activity to enhance learning

1. Guide the pupils on the **Let's Explore** activity on page 68 of the Student's Book. Ask them a day earlier, to bring the fruits to school. At the end of the activity, the pupils may consume the fruits during recess.

Let's Try...

Activity 6 (20 min): Individual practice

1. Ask the pupils to try out the exercises on page 69 of the Student's Book.

Homework

Ask the pupils to do Workbook 3A—Worksheet 16.

Answers



page 69

1. (a) 2 kg, 500 g (b) 1600 g
2. (a) 1570 g (b) 5835 g (c) 4002 g
3. (a) 6 kg, 789 g (b) 8 kg, 231 g (c) 3 kg 76 g

WORK **Sheet** 16

1. (a) 2 kg 500 g (b) 1 kg 300 g (c) 2 kg 800 g (d) 1 kg 800 g
 (e) 1 kg 900 g (f) 3 kg 500 g (g) 4 kg 200 g (h) 5 kg 200 g
2. (a) 8000 g (b) 4000 g (c) 3 kg (d) 9 kg (e) 7000 g (f) 2 kg
3. (a) 1600 g (b) 3 kg 430 g (c) 8000 g (d) 4 kg 22 g; 22 g
 (e) 5 kg 500 g; 5500 g
4. (a) 5030 (b) 9101 g (c) 8600 g
5. A: 2399 g = 2 kg 399 g; B: 1 kg 880 g
 C: 3 kg 50 g D: 1 kg 2 g

Let's Explore

Activity 7 (20 min): Practise using different weighing scales

1. Refer the pupils to page 70 of the Student's Book. For each of the scales, ask the pupils to first locate the 'kg' and 'g' readings and then to find the value of each smaller part within 1 kg before matching the items to the suitable scale. Ask a few pupils to share their answers.

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- solve word problems involving mass

Instructions

Let's Learn...

Activity 1 (10 min): Recall solving word problems

1. Revise solving simple word problems on addition and subtraction with the pupils. Explain the use of models and write addition and subtraction sentences on the board.
2. Provide word problems for the pupils to try out.

Activity 2 (20 min): Add and subtract mass in either kilograms or grams

1. Tell the class that so far they have learned how to add and subtract mass in either kilograms or grams but not a compound unit of both kilograms and grams. Point out that most of the time, the addition and subtraction of mass involve masses that are different compound units of kilograms and grams. Go through, with the pupils, the following two methods in adding and subtracting mass in compound units of kilograms and grams.

ADDITION

Method 1: Add the kilograms and grams separately

Addition example 1: $14 \text{ kg } 500 \text{ g} + 3 \text{ kg } 450 \text{ g} = \underline{\hspace{2cm}}$

$$\begin{array}{r} 14 \text{ kg } 500 \text{ g} \\ + 3 \text{ kg } 450 \text{ g} \\ \hline \hline \end{array}$$

First add the mass in g : $500 \text{ g} + 450 \text{ g} = 950 \text{ g}$

Next, add the mass in kg: $14 \text{ kg} + 3 \text{ kg} = 17 \text{ kg}$

Therefore, the answer is 17 kg 950 g.

Addition example 2: $12 \text{ kg } 650 \text{ g} + 9 \text{ kg } 450 \text{ g} = \underline{\hspace{2cm}}$

$$\begin{array}{r} 12 \text{ kg } 650 \text{ g} \\ + 9 \text{ kg } 450 \text{ g} \\ \hline \hline \end{array}$$

First, add the mass in g: $650 \text{ g} + 450 \text{ g} = 1100 \text{ g}$

$$= 1 \text{ kg } 100 \text{ g}$$

(Point out to the pupils that the 1 kg must be carried over to the kg portion.)

Next, add the mass in kg: $12 \text{ kg} + 9 \text{ kg} + 1 \text{ kg} = 22 \text{ kg}$

Therefore, the answer is 22 kg 100 g.

(Emphasize that the grams must be added first.)

Method 2: Convert all the readings into grams

Addition example 1: $14 \text{ kg } 500 \text{ g} + 3 \text{ kg } 450 \text{ g} = \underline{\hspace{2cm}}$

First, convert all into g: $14 \text{ kg } 500 \text{ g} = 14\,500 \text{ g}$

$$3 \text{ kg } 450 \text{ g} = 3\,450 \text{ g}$$

Next, add $14\,500 \text{ g}$ and $3\,450 \text{ g}$ using the usual addition algorithm.

$$\begin{array}{r} 14\,500 \text{ g} \\ + 3\,450 \text{ g} \\ \hline 17\,950 \text{ g} \end{array}$$

Finally, convert back to kg and g: $17\,950 \text{ g} = 17 \text{ kg } 950 \text{ g}$

Therefore, the answer is 17 kg 950 g.

Addition example 2: $12 \text{ kg } 650 \text{ g} + 9 \text{ kg } 450 \text{ g} = \underline{\hspace{2cm}}$

First, convert all to g: $12 \text{ kg } 650 \text{ g} = 12\,650 \text{ g}$

$$9 \text{ kg } 450 \text{ g} = 9\,450 \text{ g}$$

Next, add $12\,650 \text{ g}$ and $9\,450 \text{ g}$ using the usual addition algorithm.

$$\begin{array}{r} 12\,650 \text{ g} \\ + 9\,450 \text{ g} \\ \hline 22\,100 \text{ g} \end{array}$$

Finally, convert back to kg and g: $22\,100 \text{ g} = 22 \text{ kg } 100 \text{ g}$

Therefore, the answer is 22 kg 100 g.

SUBTRACTION

Method 1: Subtract the kilogram and grams separately

Subtraction example 1: $45 \text{ kg } 400 \text{ g} - 21 \text{ kg } 150 \text{ g} = \underline{\hspace{2cm}}$

First, subtract the mass in grams: $400 \text{ g} - 150 \text{ g} = 250 \text{ g}$

Next, subtract the mass in kilograms: $45 \text{ kg} - 21 \text{ kg} = 24 \text{ kg}$

$$\begin{array}{r} 45 \text{ kg } 400 \text{ g} \\ - 21 \text{ kg } 150 \text{ g} \\ \hline 24 \text{ kg } 250 \text{ g} \end{array}$$

Therefore, the answer is 24 kg 250 g.

Subtraction example 2: $26 \text{ kg } 250 \text{ g} - 17 \text{ kg } 470 \text{ g}$

First subtract the mass in grams: $250 \text{ g} - 470 \text{ g} = \underline{\hspace{2cm}}$

But 250 g is smaller than 470 g , so need to borrow 1 kg from 26 kg. Regroup the 1 kg as 1000 g and add it to the 250 g : $1000 \text{ g} + 250 \text{ g} = 1250 \text{ g}$

Continue with the subtraction: $1250 \text{ g} - 470 \text{ g} = 780 \text{ g}$.

Next, subtract the mass in kilograms: $25 \text{ kg} - 17 \text{ kg} = 8 \text{ kg}$

Therefore, the answer is 8 kg 780 g.

(Emphasize to the pupils to subtract the grams first.)

Method 2: Convert all the readings into grams

Subtraction example 1: $14 \text{ kg } 550 \text{ g} - 3 \text{ kg } 450 \text{ g} = \underline{\hspace{2cm}}$

First, convert all into g: $14 \text{ kg } 550 \text{ g} = 14\,550 \text{ g}$

$$3 \text{ kg } 450 \text{ g} = 3\,450 \text{ g}$$

Next, subtract 3450 g from 14 550 g using the usual subtraction algorithm.

$$\begin{array}{r} 14\,550 \text{ g} \\ - 3\,450 \text{ g} \\ \hline 11\,100 \text{ g} \end{array}$$

Finally, convert back to kg and g: $11\,110 \text{ g} = 11 \text{ kg } 100 \text{ g}$

Therefore, the answer is 11 kg 100 g.

Subtraction example 2: $12 \text{ kg } 250 \text{ g} - 9 \text{ kg } 450 \text{ g} = \underline{\hspace{2cm}}$

First, convert all to g: $12 \text{ kg } 250 \text{ g} = 12\,250 \text{ g}$

$$9 \text{ kg } 450 \text{ g} = 9\,450 \text{ g}$$

Next, subtract 9450 g from 12 250 g using the usual subtraction algorithm.

$$\begin{array}{r} 12\,250 \text{ g} \\ - 9\,450 \text{ g} \\ \hline 2\,800 \text{ g} \end{array}$$

(Point out to the pupils that there is a borrow, and regroup in hundreds.)

Finally, convert back to kg and g: $2800 \text{ g} = 2 \text{ kg } 800 \text{ g}$

Therefore, the answer is 2 kg 800 g.

2. Provide examples for the pupils to practise addition and subtraction of mass in different compound units of kilograms and grams using both methods. Ask the pupils which method they prefer.

Activity 3 (10 min): Multiply and divide mass in compound units of kilograms and grams

1. Tell the class that multiplying and dividing mass in kilograms and grams is similar to multiplying and dividing numbers.
2. Give some simple examples for pupils to practise. The examples should only involve multiplication and division of numbers that are found in the multiplication tables of 2, 3, 4, 5 and 10 as the pupils have not yet learnt other multiplication tables at this point.

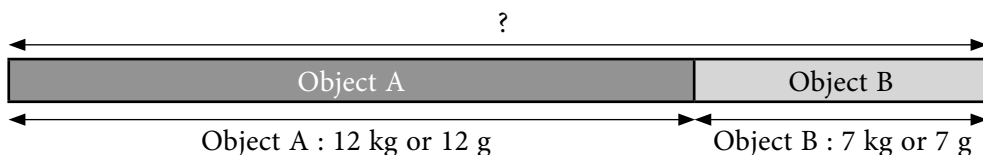
Activity 4 (20 min): Solve word problems involving addition, subtraction, multiplication and division of mass in kilograms and grams

Things you need: Colour strips of different lengths

1. Revise the use of models to solve addition and subtraction of mass as follows:

Addition

Display 2 colour strips of different lengths on the visualiser to represent the masses of 2 different objects, Object A and Object B. Ask the class 'What is the total mass of the 2 objects?' Show the addition of mass by joining the strips and writing the addition sentence as follows:



If in kilograms

$$12 \text{ kg} + 7 \text{ kg} = 19 \text{ kg}$$

The total mass of both objects is 19 kg.

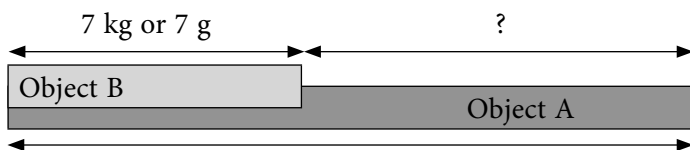
If in grams

$$12 \text{ g} + 7 \text{ g} = 19 \text{ g}$$

The total mass of both objects is 19 g.

Subtraction

Next, ask the class 'Which object is heavier and by how much?' Show the subtraction of mass by placing the shorter strip over the longer strip and writing the subtraction sentence as follows:



If in kilograms

$$12 \text{ kg} - 7 \text{ kg} = 5 \text{ kg}$$

Object A is 5 kg heavier than Object B.

Or Object B is 5 kg lighter than Object A.

If in grams

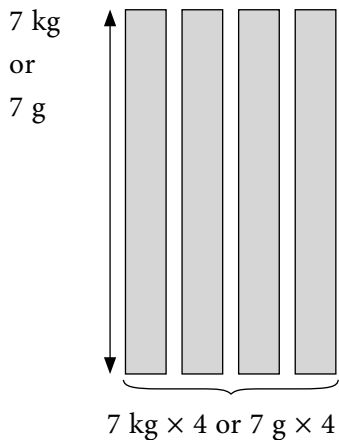
$$12 \text{ g} - 7 \text{ g} = 5 \text{ g}$$

Object A is 5 g heavier than Object B.

Or The Object B is 5 g lighter than Object A.

Multiplication

On a table, place 4 strips of equal lengths to represent the masses of 4 identical objects and ask the class, 'What is the total mass of the 4 objects?' Show the multiplication of masses by placing the strips side by side and writing the multiplication sentence as follows:



If in kilograms

$$7 \text{ kg} \times 4 = 28 \text{ kg}$$

The total mass of the 4 equal objects is 28 kg.

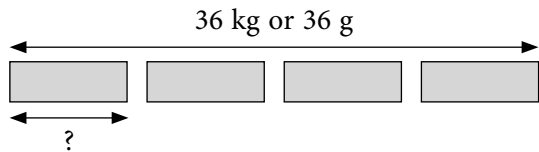
If in grams

$$7 \text{ g} \times 4 = 28 \text{ g}$$

The total mass of the 4 equal objects is 28 g

Division

Show a strip to represent the mass of a pack of sugar. Tell the class that the pack of sugar is to be shared with 4 people. Ask the class, ‘What will the mass of sugar be, that each person gets?’ Show the division of mass by cutting the strip into 4 equal strips and writing the division sentence as follows:



If in kilograms

$$36 \text{ kg} \div 4 = 9 \text{ kg}$$

The mass of sugar each person gets is 9 kg.

If in grams

$$36 \text{ g} \div 4 = 9 \text{ g}$$

The mass of sugar each person gets is 9 g.

2. Emphasize that for multiplication and division, if the masses are given in compound units of kg and g, the pupils need to first convert them into grams before solving them as in the above steps. The final answer can then be converted to kg and g if necessary.
3. Go through the examples on pages 71 and 72 of the Student’s Book. Provide additional word problems on mass for the pupils to practise on the board. Ask 2 pupils to work on each example on the board. One pupil takes charge of drawing the model while the other does the calculations.

Let’s Try...

Activity 5 (20 min): Individual practice

1. Ask the pupils to work out the word problems on page 73 of the Student’s Book. Remind them to use the addition and subtraction algorithms in working out the answers.

Homework

Ask the pupils to do Workbook 3A—Worksheet 17 and Practice 4.

Answers



page 73

- (1) 2500 g (2) 10 kg 300 g (3) 19 kg (4) 5 kg. 750 g

WORK **S**heet 17

- (a) 3100 g
(b) 5900 g
- 2960 g
- 27 kg
- 13, 100 g or 13 kg 100 g
- 700 g



Practice 4

Practice 4

- 4805 g; 4085 g
4 kg 860 g; 2058 g
- (a) 1900 g (b) 7015 g (c) 4026 g (d) 2002 g
(e) 6100 g (f) 8325 g
- (a) 1 kg 290 g (b) 6 kg 69 g (c) 4 kg 4 g
(d) 2 kg 107 g (e) 5 kg 10 g (f) 3 kg 299 g
- (a) True (b) False (c) True (d) False
- 800 g
- 350 g

Fun With Maths

Activity 6 (15 min): Activity to enhance learning

- Let the pupils work in pairs on the *Fun With Maths* activity on page 74` of the Student's Book.

Revision (25 min)

Revise and go through pupils' homework.

Unit 5: Multiplication

MULTIPLICATION TABLES OF 6 AND 7

Suggested Duration

5 periods (200 min)

Learning Outcomes

Pupils should be able to:

- build up the multiplication table of 6 and commit to memory
- build up the multiplication table of 7 and commit to memory
- use the term 'product'

Instructions

Let's Learn...

Activity 1 (40 min): Recall the Multiplication Tables of 2, 3, 4, 5 and 10

Things you need: Multiplication Tables of 2, 3, 4, 5 and 10 posters. 20 sets of cards numbered 1 to 10

1. Pin up the posters of the Multiplication Tables of 2, 3, 4, 5 and 10 at 5 different stations in the classroom. Divide the class into 5 groups and ask each group to one station. Every group is to spend about 3 mins at each station to memorise the multiplication table. Encourage the pupils to test each other at each station.
2. Play a game to test the pupils' ability to recall the Multiplication Table of 2 as follows:
 - Pair up the pupils. Give each pair a deck of cards numbered 1 to 10. Shuffle the cards.
 - One pupil will draw a card to show a number and the other pupil will have to multiply the number by 2. Every correct answer will be awarded 2 points.
 - The pupils take turns to draw the cards and to multiply the number by 2.
 - Play 10 rounds of the game and acknowledge the pupil with the highest score.
3. Repeat the game for the Multiplication Tables of 3, 4, 5 and 10.
4. Write on the board the following multiplication sums of 2, 3, 4, 5 and 10 and ask individual pupil to fill in the blanks:

$2 \times \underline{\quad} = 6$

$\underline{\quad} \times 2 = 18$

$3 \times \underline{\quad} = 27$

$2 \times \underline{\quad} = 16$

$3 \times \underline{\quad} = 21$

$2 \times \underline{\quad} = 14$

$\underline{\quad} \times 3 = 9$

$\underline{\quad} \times 2 = 12$

$2 \times \underline{\quad} = 2$

$3 \times \underline{\quad} = 6$

$3 \times \underline{\quad} = 18$

$2 \times \underline{\quad} = 10$

$\underline{\quad} \times 3 = 3$

$\underline{\quad} \times 2 = 20$

$\underline{\quad} \times 3 = 30$

$3 \times \underline{\quad} = 15$

$2 \times \underline{\quad} = 4$

$3 \times \underline{\quad} = 24$

$4 \times \underline{\quad} = 20$

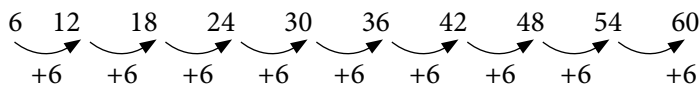
$\underline{\quad} \times 4 = 12$

$\underline{\quad} \times 4 = 32$	$4 \times \underline{\quad} = 8$	$4 \times \underline{\quad} = 16$	$\underline{\quad} \times 4 = 4$
$\underline{\quad} \times 4 = 40$	$4 \times \underline{\quad} = 28$	$4 \times \underline{\quad} = 24$	$\underline{\quad} \times 4 = 36$
$5 \times \underline{\quad} = 25$	$\underline{\quad} \times 5 = 45$	$\underline{\quad} \times 5 = 10$	$5 \times \underline{\quad} = 5$
$2 \times \underline{\quad} = 20$	$\underline{\quad} \times 10 = 100$	$\underline{\quad} \times 5 = 50$	$6 \times \underline{\quad} = 60$
$5 \times \underline{\quad} = 50$	$\underline{\quad} \times 5 = 20$	$\underline{\quad} \times 5 = 40$	$5 \times \underline{\quad} = 15$
$8 \times \underline{\quad} = 80$	$\underline{\quad} \times 10 = 90$	$\underline{\quad} \times 10 = 60$	$7 \times \underline{\quad} = 70$

Activity 2 (20 min): Multiply by 6

Things you need: Picture of 60 objects and the poster of the Multiplication Table of 6

1. Display the picture of 60 objects. Circle every 6th object and lead the class to count the objects in sixes: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60
2. Show the class the concept of multiplication by repeated addition of sixes as follows:



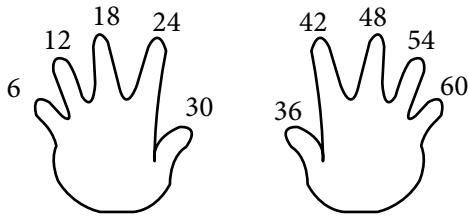
3. With the picture of the 60 objects grouped into sixes still, show the class the concept of multiplication by grouping of items as follows:
 - Box up 1 group of objects, say '1 group of 6' and write: $1 \times 6 = 6$
 - Box up 2 groups of objects, say '2 groups of 6' and write: $2 \times 6 = 12$
 - Box up 3 groups of objects, say '3 groups of 6' and write: $3 \times 6 = 18$
 - Box up 4 groups of objects, say '4 groups of 6' and write: $4 \times 6 = 24$
 - Box up 5 groups of objects, say '5 groups of 6' and write: $5 \times 6 = 30$
 - Box up 6 groups of objects, say '6 groups of 6' and write: $6 \times 6 = 36$
 - Box up 7 groups of objects, say '7 groups of 6' and write: $7 \times 6 = 42$
 - Box up 8 groups of objects, say '8 groups of 6' and write: $8 \times 6 = 48$
 - Box up 9 groups of objects, say '9 groups of 6' and write: $9 \times 6 = 54$
 - Box up 10 groups of objects, say '10 groups of 6' and write: $10 \times 6 = 60$
4. Introduce to the class the Multiplication Table of 6. Pin up the Multiplication Table of 6 poster.

Activity 3 (20 min): Memorize the Multiplication Table of 6

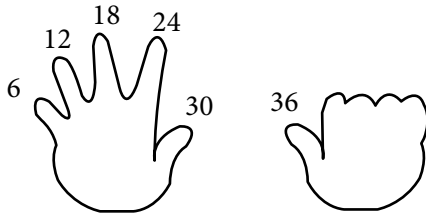
1. Ask the pupils to work in pairs to write down the Multiplication Table of 6 from $1 \times 6 = 6$ to $10 \times 6 = 60$ and then backwards from $10 \times 6 = 60$ to $1 \times 6 = 6$.
2. Encourage the pupils to memorise by heart the Multiplication Table of 6. To help pupils recall the multiplication table, the 'Count with Fingers' method can be used:

Count with Fingers

- Get the pupils to recite and memorise the sequence:
6, 12, 18, 24, 30, 36, 42, 48, 54, 60
- Use the 10 fingers to represent each of the 10 numbers



- To find 6×6 , ask the pupils to raise 6 fingers and then recite the sequence starting from 6 at the first finger and ending with 36 at the 6th finger.



- Ask the pupils to practise with their partners, each taking turns to call out a multiplication question and using their fingers to find the answer.
- Draw the attention of the class to see that the numbers are all even numbers.

Activity 4 (40 min): Class practice

- Go through the examples on pages 76–77 of the Student's Book. Get a few pupils to share their answers with the class.

Homework

- Ask the pupils to do Workbook 3A—Worksheet 18

Answers

WORK *Sheet* 18

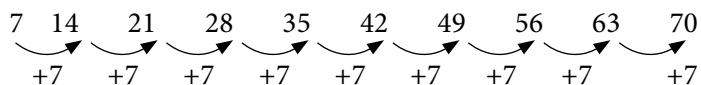
- (a) 24 (b) 36 (c) 54
- (a) 18 (b) 24 (c) 30 (d) 54 (e) 6
(f) 36 (g) 48 (h) 42 (i) 12
- 30
- Ask the pupils to memorize the Multiplication Table of 6.

Activity 5 (20 min): Multiply by 7

Things you need: Picture of 70 objects and the poster of the Multiplication Table of 7

- Display the picture of 70 objects. Circle every 7th object and lead the class to count the objects in sevens: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70

2. Show the class the concept of multiplication by repeated addition of sevens as follows:



3. With the picture of the 70 objects grouped into sevens still, show the class the concept of multiplication by grouping of items as follows:

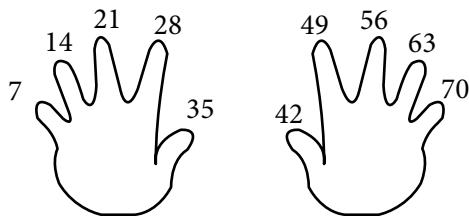
- Box up 1 group of objects, say '1 group of 7' and write: $1 \times 7 = 7$
 - Box up 2 groups of objects, say '2 groups of 7' and write: $2 \times 7 = 14$
 - Box up 3 groups of objects, say '3 groups of 7' and write: $3 \times 7 = 21$
 - Box up 4 groups of objects, say '4 groups of 7' and write: $4 \times 7 = 28$
 - Box up 5 groups of objects, say '5 groups of 7' and write: $5 \times 7 = 35$
 - Box up 6 groups of objects, say '6 groups of 7' and write: $6 \times 7 = 42$
 - Box up 7 groups of objects, say '7 groups of 7' and write: $7 \times 7 = 49$
 - Box up 8 groups of objects, say '8 groups of 7' and write: $8 \times 7 = 56$
 - Box up 9 groups of objects, say '9 groups of 7' and write: $9 \times 7 = 63$
 - Box up 10 groups of objects, say '10 groups of 7' and write: $10 \times 7 = 70$
4. Introduce to the class the Multiplication Table of 7. Pin up the Multiplication Table of 7 poster.

Activity 6 (20 min): Memorize the Multiplication Table of 7

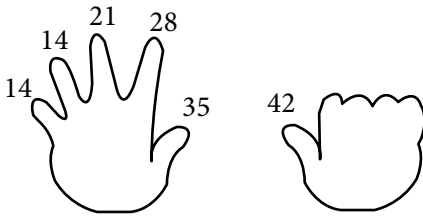
1. Ask the pupils to work in pairs to write down the Multiplication Table of 7 from $1 \times 7 = 7$ to $10 \times 7 = 70$ and then backwards from $10 \times 7 = 70$ to $1 \times 7 = 7$.
2. Encourage the pupils to memorize by heart the Multiplication Table of 7. To help pupils recall the multiplication table, the 'Count with Fingers' method can be used:

Count with Fingers

- Get the pupils to recite and memorise the sequence:
7, 14, 21, 28, 35, 42, 49, 56, 63, 70
- Use the 10 fingers to represent each of the 10 numbers



- To find 6×7 , ask the pupils to raise 6 fingers and then recite the sequence starting from 7 at the first finger and ending with 42 at the 6th finger.



- Ask the pupils to practise with their partners by taking turns to call out a multiplication question and using their fingers to find the answer.
 - Draw the attention of the class to see that the numbers are all odd numbers.
3. Tell the class that, another term for multiplication is ‘product’. Write the word on the board and ask the class to repeat the word after you. Then say, ‘Product of 6 and 7 means 6×7 ’. Give a few more examples to emphasize the point.

Activity 7 (40 min): Class practice

1. Go through the examples on pages 78–79 of the Student’s Book with the pupils. Ask a few pupils to share their answers with the class.

Homework

1. Ask the pupils to do Workbook 3A—Worksheet 19
2. Ask the pupils to memorise the Multiplication Table of 7.

Answers

WORK **Sheet** 19

1. (a) 21 (b) 35 (c) 56 (d) 28
 (e) 70 (f) 63 (g) 42 (h) 14
2. (a) 28 (b) 36 (c) 63

MULTIPLICATION TABLES OF 8 AND 9

Suggested Duration

5 periods (200 min)

Learning Outcomes

Pupils should be able to:

- build up the multiplication table of 8 and commit to memory
- build up the multiplication table of 9 and commit to memory
- use the term ‘product’

Instructions

Let's Learn...

Activity 1 (40 min): Multiply by 8

Things you need: Picture of 80 objects and the poster of the Multiplication Table of 8

1. Display the picture of 80 objects. Circle every 8th object and lead the class to count the objects in eights: 8, 16, 24, 32, 40, 48, 56, 64, 72, 80
2. Show the class the concept of multiplication by repeated addition of eights as follows:

$$\begin{array}{cccccccccccc} 8 & 16 & 24 & 32 & 40 & 48 & 56 & 64 & 72 & 80 \\ \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright \\ +8 & +8 & +8 & +8 & +8 & +8 & +8 & +8 & +8 & +8 \end{array}$$

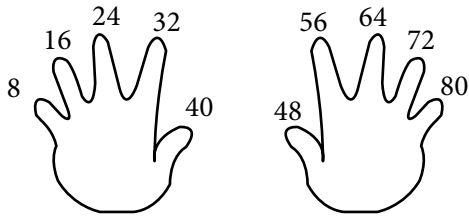
3. With the picture of the 80 objects grouped into eights, show the class the concept of multiplication by grouping of items as follows:
 - Box up 1 group of objects, say '1 group of 8' and write: $1 \times 8 = 8$
 - Box up 2 groups of objects, say '2 groups of 8' and write: $2 \times 8 = 16$
 - Box up 3 groups of objects, say '3 groups of 8' and write: $3 \times 8 = 24$
 - Box up 4 groups of objects, say '4 groups of 8' and write: $4 \times 8 = 32$
 - Box up 5 groups of objects, say '5 groups of 8' and write: $5 \times 8 = 40$
 - Box up 6 groups of objects, say '6 groups of 8' and write: $6 \times 8 = 48$
 - Box up 7 groups of objects, say '7 groups of 8' and write: $7 \times 8 = 56$
 - Box up 8 groups of objects, say '8 groups of 8' and write: $8 \times 8 = 64$
 - Box up 9 groups of objects, say '9 groups of 8' and write: $9 \times 8 = 72$
 - Box up 10 groups of objects, say '10 groups of 8' and write: $10 \times 8 = 80$
4. Introduce to the class the Multiplication Table of 8. Pin up the Multiplication Table of 8 poster.

Activity 2 (20 min): Memorise the Multiplication Table of 8

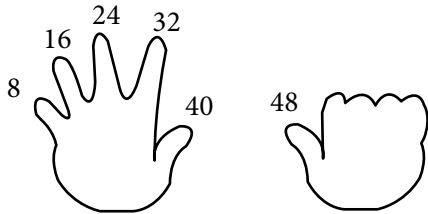
1. Ask the pupils to work in pairs to write down the Multiplication Table of 8 from $1 \times 8 = 8$ to $10 \times 8 = 80$ and then backwards from $10 \times 8 = 80$ to $1 \times 8 = 8$.
2. Encourage the pupils to memorise by heart the Multiplication Table of 8. To help pupils recall the multiplication table, the 'Count with Fingers' method can be used:

Count with Fingers

- Get the pupils to recite and memorise the sequence:
8, 16, 24, 32, 40, 48, 56, 64, 72, 80
- Use the 10 fingers to represent each of the 10 numbers



- To find 6×8 , ask the pupils to raise 6 fingers and then recite the sequence starting from 8 at the first finger and ending with 48 at the 6th finger.



- Ask the pupils to practise with their partners by taking turns to call out a multiplication question and using their fingers to find the answer.
- Draw the attention of the class to see that the numbers are all even numbers.

Activity 3 (20 min): Class practice

- Go through the examples on pages 80–81 of the Student's Book. Get a few pupils to share their answers with the class.

Homework

- Ask the pupils to do Workbook 3A—Worksheet 20
- Ask the pupils to memorize the Multiplication Table of 8.

Answers

WORK **Sheet** 20

- $40 = 5 \times 8$; $72 = 9 \times 8$; $32 = 4 \times 8$; $16 = 2 \times 8$
- (a) 24 (b) 40 (c) 64

Activity 4 (40 min): Multiply by 9

Things you need: Picture of 90 objects and the poster of the Multiplication Table of 9

- Display the picture of 90 objects. Circle every 9th object and lead the class to count the objects in nines: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90
- Show the class the concept of multiplication by repeated addition of nines as follows:

$$\begin{array}{cccccccccccc}
 9 & 18 & 27 & 36 & 45 & 54 & 63 & 72 & 81 & 90 \\
 \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright \\
 +9 & +9 & +9 & +9 & +9 & +9 & +9 & +9 & +9 & +9
 \end{array}$$

- With the picture of the 90 objects grouped into nines, show the class the concept of multiplication by grouping of items as follows:

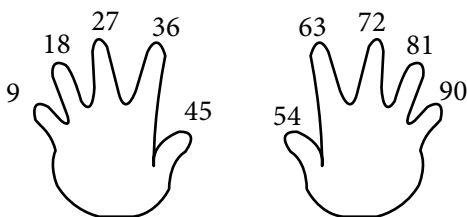
- Box up 1 group of objects, say '1 group of 9' and write: $1 \times 9 = 9$
 - Box up 2 groups of objects, say '2 groups of 9' and write: $2 \times 9 = 18$
 - Box up 3 groups of objects, say '3 groups of 9' and write: $3 \times 9 = 27$
 - Box up 4 groups of objects, say '4 groups of 9' and write: $4 \times 9 = 36$
 - Box up 5 groups of objects, say '5 groups of 9' and write: $5 \times 9 = 45$
 - Box up 6 groups of objects, say '6 groups of 9' and write: $6 \times 9 = 54$
 - Box up 7 groups of objects, say '7 groups of 9' and write: $7 \times 9 = 63$
 - Box up 8 groups of objects, say '8 groups of 9' and write: $8 \times 9 = 72$
 - Box up 9 groups of objects, say '9 groups of 9' and write: $9 \times 9 = 81$
 - Box up 10 groups of objects, say '10 groups of 9' and write: $10 \times 9 = 90$
4. Introduce to the class the Multiplication Table of 9. Pin up the Multiplication Table of 9 poster.

Activity 5 (20 min): Memorise the Multiplication Table of 9

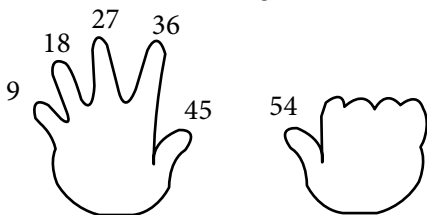
1. Ask the pupils to work in pairs to write down the Multiplication Table of 9 from $9 \times 9 = 9$ to $10 \times 9 = 90$ and then backwards from $10 \times 9 = 90$ to $1 \times 9 = 9$.
2. Encourage the pupils to memorise by heart the Multiplication Table of 9. To help pupils recall the multiplication table, the 'Count with Fingers' method can be used:

Count with Fingers

- Get the pupils to recite and memorise the sequence:
9, 18, 27, 36, 45, 54, 63, 72, 81, 90
- Use the 10 fingers to represent each of the 10 numbers



- To find 6×9 , ask the pupils to raise 6 fingers and then recite the sequence starting from 9 at the first finger and ending with 54 at the 6th finger.



- Ask the pupils to practise with their partners by taking turns to call out a multiplication question and using their fingers to find the answer.

3. Tell the class that another term for multiplication is 'product'. Write the word on the board and get the class to repeat the word after you. Then say, 'Product of 6 and 9 means 6×9 '. Give a few more examples to emphasize the point.

Activity 6 (20 min): Class practice

1. Go through the examples on pages 82–83 of the Student's Book. Get a few pupils to share their answers with the class.

Homework

1. Ask the pupils to do Workbook 3A—Worksheet 21
2. Ask the pupils to memorise the Multiplication Table of 9.

Answers

WORK *Sheet* 21

1. (a) 36 (b) 54 (c) 72
2. (a) 27 (b) 36 (c) 18 (d) 54
(e) 72 (f) 45 (g) 63 (h) 90
3. 36

Let's Explore

Activity 7 (20 min): Exercise to enhance learning

1. Let the pupils try out the exercise on page 84 of the Student's Book. Ask the pupils to compare their answers with their partners.
2. You may prepare similar worksheets on other multiplication tables for the pupils to practise.

Let's Try...

Activity 8 (20 min): Individual practice

1. Ask the pupils to try out the exercises on page 85 of the Student's Book.



page 85

54; 49; 64; 45

18; 63; 32; 18

MULTIPLYING MENTALLY

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- use mental calculation strategy to multiply

Instructions

Let's Learn...

Activity 1 (40 min): Recall the Multiplication Tables of 2 to 10

Things you need: Posters of the Multiplication Tables of 2 to 10. 20 sets of cards numbered 1 to 10

1. Pin up the posters of the Multiplication Tables of 2 to 10 at 9 different stations in the classroom. Divide the class into 9 groups and ask each group to one station. Every group is to spend about 3 mins at each station to memorise the multiplication table. Encourage the pupils to test each other at each station.
1. Play a game to test the pupils' ability to recall the Multiplication Table of 2 as follows:
 - Pair up the pupils. Give each pair a deck of cards numbered 1 to 10. Shuffle the cards.
 - One pupil will draw a card to show a number and the other pupil will have to multiply the number by 2. Every correct answer will be awarded 2 points.
 - The pupils take turns to draw the cards and to multiply the number by 2.
 - Play 10 rounds of the game and acknowledge the pupil with the highest score.
3. Repeat the game for the rest of the Multiplication Tables.

Activity 2 (40 min): Multiply mentally numbers involving tens and hundreds

1. Write ' $6 \times 4 = \underline{\quad}$ ' on the board. Ask a pupil to fill in the answer.
2. Next, write on the board ' $60 \times 4 = \underline{\quad}$ ' and ' $600 \times 4 = \underline{\quad}$ ' and ask the class to guess the answer.
3. Explain the steps in multiplying numbers involving tens and hundreds as follows:
$$60 \times 4 = 6 \text{ tens} \times 4$$
$$= 24 \text{ tens}$$
$$= 240$$

$$600 \times 4 = 6 \text{ hundreds} \times 4$$
$$= 24 \text{ hundreds}$$
$$= 2400$$
4. Show the class a shortcut in multiplying tens and hundreds by simply multiplying the non-zero digits and then add the zeros as follows:
$$60 \times 4 = 240 \text{ (} 6 \times 4 = 24 \text{ and then add a zero to '24' to become '240')}$$
$$600 \times 4 = 2400 \text{ (} 6 \times 4 = 24 \text{ and then add 2 zeros to '24' to become '2400')}$$
5. Go through with the pupils the examples on page 86 of the Student's Book. Provide more examples on the board for the pupils to practise.

MORE MULTIPLICATIONS

Suggested Duration

4 periods (160 min)

Learning Outcomes

Pupils should be able to:

- multiply numbers up to 3 digits by 1 digit

Instructions

Let's Learn...

Activity 1 (20 min): Revise hundreds, tens and ones.

Things you need: 10 cubes, 10 base ten blocks and 10 base hundred blocks

1. Scatter 10 cubes and remind the class, 10 ones make 1 ten and replace the 10 cubes with 1 base ten block. Write on the board: 10 ones = 1 ten or 10
2. Scatter 10 base ten blocks on the visualiser and remind the class, 10 tens make 1 hundred. Replace the 10 base ten blocks with 1 base hundred block. Write on the board: 10 tens = 1 hundred or 100
3. Scatter 10 base hundred blocks on the visualiser and remind the class, 10 hundreds make 1 thousand. Replace the 10 base ten blocks with 1 base thousand block. Write on the board: 10 hundreds = 1 thousand or 1000
4. Scatter 10 base thousand blocks on the visualiser and tell the class that there are now 10 thousands cubes or 10 000.

Activity 2 (20 min): Revise the place value of hundreds, tens and ones

Things you need: 10 cubes, 10 base ten blocks and 10 base hundred blocks

1. Draw a Place Value Chart on the board. Scatter 4 base hundred blocks, 2 base ten blocks and 5 cubes to form the number '425'. Write the digits '4', '2' and '5' on the Place Value Chart according to their place values.
2. Ask pupils to recall that for any 3-digit number, the first digit on the extreme left is the 'hundreds' place followed by the 'tens' place and 'ones' place in the extreme right.
3. Write several 3-digit numbers and let the pupils practise writing the digits of the number on the Place Value Chart.

Activity 3 (20 min): Multiply by a 1-digit number

1. Tell the pupils to remember the following 3 simple steps in multiplying any number by a 1-digit number:
Step 1: Multiply the ones
Step 2: Multiply the tens
Step 3: Multiply the hundreds

- Emphasize to the pupils that the steps must be in the order from ones to tens and to hundreds.
- Write on the board the multiplication sentence $312 \times 3 = \underline{\quad}$. Explain that the multiplication sentence can also be written vertically as follows:

$$\begin{array}{r} 312 \\ \times 3 \\ \hline \hline \end{array}$$

- Indicate the hundreds, tens and ones places using the letters 'H', 'T' and 'O' as follows:

$$\begin{array}{r} \text{H T O} \\ 312 \\ \times 3 \\ \hline \hline \end{array}$$

Activity 4 (20 min): Multiply numbers of up to 3 digits by a 1-digit number without any carry over

- Ask the pupils to turn to page 90 of the Student's Book. Go through with the pupils Example 1 and explain the 3 steps slowly as you work through them on the board. Let the pupils try out Examples 2, 3 and 4 on pages 87–89 of the Student's Book.
- Lead the pupils to see that these examples involve simple multiplications where the result of each multiplication step is less than 10 and therefore there is no need to carry over of 1 ten or 1 hundred. Provide a few more similar examples (with no regrouping needed) for pupils to practise.
- Explain that in the event that the multiplication step result in an answer that is 10 or more, then a carry over will be needed.

Activity 5 (40 min): Multiply a 2-digit number by a 1-digit number with carry over of 1 ten and 1 hundred

- Ask the pupils to turn to page 88 of the Student's Book. Go through with the pupils Example 5 and explain the 3 steps slowly as you work through the steps on the board. Take note that for this example, Step 1 which is to multiply the ones, requires a carry over of 1 ten from the ones position to the tens positions and Step 2 which is to multiply the tens requires a carry over of 1 hundred from the tens place to the hundreds place. Explain to the pupils the 3 steps giving extra attention to the carry over of 1 ten and 1 hundred as follows.

(Example 5: 45×3)

Step 1: Multiply the ones with carry over of 1 ten

- Multiply 5 ones by 3: $5 \text{ ones} \times 3 = 15 \text{ ones}$
- Since 15 ones is more than 10 ones, split the 15 ones into 1 ten and 5 ones
- Carry over the 1 ten from the ones place to the tens place.

- Write a small '1' on the left corner of the number '4' to denote the carry over of 1 ten.

Step 2: Multiply the tens with carry over of 1 hundred

- Multiply 4 tens by 3: $4 \text{ tens} \times 3 = 12 \text{ tens}$
- Add 12 tens to 1 ten (carry over): $12 \text{ tens} + 1 \text{ ten} = 13 \text{ tens}$
- Since 13 tens is more than 10 tens, split the 13 tens into 1 hundred and 3 tens.
- Carry over the 1 hundred from the tens place to the hundreds place. So, there is now 1 hundred in the hundreds place.

Therefore, the answer is 135.

2. Point out to the pupils that in Step 2 above, the multiplication of 4 tens by 3 must be done first before adding the carry over of 1 ten.
3. Let the pupils try out Example 6 on page 91 of the Student's Book. Provide a few more similar examples involving 2-digit numbers and with carry over of 1 ten and 1 hundred for pupils to practise on the board.

Activity 6 (25 min): Multiply a 3-digit number by a 1-digit number with carry over of 1 ten, 1 hundred and 1 thousand

1. Ask the pupils to turn to page 93 of the Student's Book. Go through with the pupils Example 8 and explain the 3 steps slowly as you work through the steps on the board. Take note that for this example, Step 1 which is to multiply the ones, involves a simple multiplication with no carry over, Step 2 which is to multiply the tens, requires a carry over of 1 hundred from the tens place to the hundreds place and Step 3 which is to multiply the hundreds, requires a carry over of 1 thousand from the hundreds place to the thousands place. Explain to the pupils the 3 steps giving extra attention to the carry over of 1 hundred and 1 thousand as follows:

(Example: 342×5)

Step 1: Multiply the ones with no carry over

- Multiply 2 ones by 3: $2 \text{ ones} \times 3 = \underline{6 \text{ ones}}$
- Since 6 ones is less than 10 ones, there is no need to do any carry over.

Step 2: Multiply the tens with carry over of 1 hundred

- Multiply 4 tens by 3: $4 \text{ tens} \times 3 = 12 \text{ tens}$
- Since 12 tens is more than 10 tens, split the 12 tens into 1 hundred and 2 tens.
- Carry over the 1 hundred from the tens place to the hundreds place and write a small '1' on the left corner of the number '2' to denote the carry over.

Step 3: Multiply the hundreds with carry over of 1 thousand

- Multiply 3 hundreds by 3: $3 \text{ hundreds} \times 3 = 9 \text{ hundreds}$
- Add 9 hundreds and 1 hundred (carry over): $9 \text{ hundreds} + 1 \text{ hundred} = \underline{10 \text{ hundreds}}$
- Since 10 hundreds is equal to 1 thousand, carry the 1 thousand over to the thousand place, leave a zero in the hundreds place.

Therefore the answer is 1026.

2. Let the pupils try out Example 8, 9 and 10 on pages 94–97 of the Student’s Book. Provide a few more similar examples (with carry over of 1 ten, 1 hundred and 1 thousand) for pupils to practise.

Let’s try

Activity 7 (15 min): Individual practice

1. Ask the pupils to try out the exercises on page 98 of the Student’s Book.

Homework

Ask the pupils to do Workbook 3A—Worksheet 22.

Answers



page 98

2. (a) 756 (b) 368 (c) 828 (d) 4077

WORK **Sheet** 22

1. (a) 120 (b) 240 (c) 1600 (d) 1400 (e) 3600
(f) 400 (g) 540 (h) 1800 (i) 6400 (j) 3500
2. (b) $56 = E$ (c) $160 = E$ (d) $273 = O$ (e) $77 = O$ (f) $256 = E$
(g) $639 = O$ (h) $42 = E$ (i) $1000 = E$ (j) $900 = E$
3. A = 96 E = 174 F = 270 O = 534 U = 693 P = 808
C = 1359 R = 1644 S = 4077 T = 3577 W = 6608
- Water is precious
4. (a) 264 (b) 804 (c) 1905
5. (a) 1872 (b) 2034 (c) 4716 (d) 4440

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- solve upto 2-step word problems involving multiplication

Instructions

Let's Learn...

Activity 1 (40 min): Solve one-step word problems involving multiplying by 6, 7, 8, and 9

Things you need: Pictures of items grouped in 6s, 7s, 8s and 9s

1. Remind the pupils of the following steps in solving multiplication word problems:
 - Look for the number of identical groups
 - Look for the number of items in each group
 - Write the multiplication sentence
 - Work through the multiplication steps and where applicable, show the carry over of 1 ten, 1 hundred and 1 thousand
 - Solve the multiplication by recalling the multiplication facts from the multiplication table, use Count with Fingers method to help recall the facts.
 - Write the answer statements.
2. Go through with the pupils Examples 1 and 2 on page 99 of the Student's Book. Read together with the class each of the word problems. Work out the word problem on the board. Point out that these are one-step word problems involving multiplying by 6,7,8 and 9.
3. Write on the board more examples of one-step word problems involving multiplying by 6, 7, 8 and 9 and get pupils to solve them.
4. Display pictures of items grouped in 6s, 7s, 8s and 9s. Get the pupils to create one-step word problems from the pictures. For example, you may show a picture of 6 bundles of sticks with 7 sticks in each bundle and the pupils can create a word problem as follows:
There are 6 bundles of sticks. Each bundle has 7 sticks. What is the number of sticks altogether?
5. Ask some pupils to share their word problems created. Pair up the pupils and ask them to solve each other's word problem.

Activity 1 (25 min): Solve 2-step word problems involving multiplying by 6, 7, 8 and 9

Things you need: Pictures of items

1. Go through Examples 3 and 4 on page 100 of the Student's Book. Read together with the class each of the word problems. Work out the word problems on the board. Point out that these are 2-step word problems involving multiplication with addition or multiplication with subtraction.
2. Write on the board more examples of 2-step word problems involving multiplication with addition and multiplication with subtraction, and get pupils to solve them.
3. Display pictures of items and create 2-step word problems based on the pictures shown. Do not ask the pupils to create 2-step word problems as it may be too difficult for them at this level.

Let's Try...

Activity 2 (15 min): Individual practice

1. Ask the pupils to work out the word problems on page 101 of the Student's Book. Ask some pupils to show their workings on the board.

Homework

Ask the pupils to do Workbook 3A—Worksheet 23 and Practice 5.

Answers



page 101

- (1) 2295 (2) Rs 294 (3) 237 (4) 408 (5) 96

WORK 23

1. 288
2. 210 pupils
3. 308 children
4. 108 pencils
5. 2872 books
6. 1704 labels
7. 1588 comic books
8. 3168 stamps
9. 268 pages
- 10 (a) 744 stickers (b) 3720 stickers

Practice 5

1. (a) 360 (b) 360 (c) 180 (d) 10
(e) 720 (f) 360 (g) 180 (h) 200
(i) 270 (j) 360 (k) 360 (l) 30 (m) 280 (n) 108
2. 65 oranges
3. 115 are boys

Revision (40 min)

Revise and go through pupils' homework.

Unit 6: Division

DIVIDING BY 6, 7, 8 AND 9

Suggested Duration

5 periods (200 min)

Learning Outcomes

Pupils should be able to:

- divide within the multiplication tables of 6, 7, 8 and 9

Instructions

Let's Learn...

Activity 1 (20 min): Recall the Multiplication Tables of 6, 7, 8 and 9

Things you need: Posters of Multiplication Tables of 6, 7, 8 and 9. 20 sets of cards numbered 1 to 10

1. Pin up the posters of 6, 7, 8 and 9 at 4 different stations in the classroom. Divide the class into 4 groups and ask each group to go to one station. Every group is to spend about 5 mins at each station to memorise the multiplication table. Encourage the pupils to test each other at each station.
2. Play a game to test the pupils' ability to recall the Multiplication Table of 6 as follows:
 - Pair up the pupils. Give each pair a deck of cards numbered 1 to 10. Shuffle the cards.
 - One pupil will draw a card to show a number and the other pupil will have to multiply the number by 6. Every correct answer will be awarded 2 points.
 - The pupils take turns to draw the cards and to multiply the number by 6.
 - Play 10 rounds of the game and acknowledge the pupil with the highest score.
3. Repeat the game for 7, 8 and 9.
4. Tell the class that in order to do division, one must know the multiplication tables well.
5. Write on the board the following multiplication sentences of 6, 7, 8 and 9 and ask individual pupil to fill in the blanks:

$6 \times \underline{\quad} = 12 \quad \underline{\quad} \times 6 = 24 \quad 6 \times \underline{\quad} = 60 \quad 6 \times \underline{\quad} = 36$

$7 \times \underline{\quad} = 70 \quad 7 \times \underline{\quad} = 7 \quad \underline{\quad} \times 7 = 49 \quad \underline{\quad} \times 7 = 14$

$8 \times \underline{\quad} = 24 \quad 8 \times \underline{\quad} = 16 \quad 8 \times \underline{\quad} = 72 \quad 8 \times \underline{\quad} = 48$

$\underline{\quad} \times 9 = 27 \quad \underline{\quad} \times 9 = 63 \quad \underline{\quad} \times 9 = 18 \quad 9 \times \underline{\quad} = 9$

$6 \times \underline{\quad} = 54 \quad 6 \times \underline{\quad} = 18 \quad 6 \times \underline{\quad} = 6 \quad \underline{\quad} \times 6 = 30$

$\underline{\quad} \times 7 = 35 \quad 7 \times \underline{\quad} = 42 \quad 7 \times \underline{\quad} = 56 \quad \underline{\quad} \times 7 = 21$

$\underline{\quad} \times 8 = 32$	$8 \times \underline{\quad} = 8$	$8 \times \underline{\quad} = 80$	$\underline{\quad} \times 8 = 40$
$9 \times \underline{\quad} = 54$	$\underline{\quad} \times 9 = 45$	$\underline{\quad} \times 9 = 72$	$9 \times \underline{\quad} = 81$
$7 \times \underline{\quad} = 28$	$\underline{\quad} \times 7 = 42$	$\underline{\quad} \times 6 = 50$	$6 \times \underline{\quad} = 60$
$8 \times \underline{\quad} = 64$	$\underline{\quad} \times 8 = 56$	$\underline{\quad} \times 9 = 36$	$9 \times \underline{\quad} = 18$

Activity 2 (20 min): Recall the concept of division

Things you need: Cubes

- Recall the concept of division as in finding the number of items in a group as follows:
 - Select 12 pupils to come forward and arrange them into 4 equal groups. Explain that you have just done a division. Ask the pupils 'How many pupils are there in each group?' Then, ask a pupil to write the division sentence on the board.
 - Repeat the above for different number of pupils for 5 more times to help them recall the concept of division as finding the number of items in a group.
- Revise the concept of division as finding the number of equal groups as follows:
 - Tell the class that you want to distribute 42 cubes equally to some pupils and each pupil is to have 7 cubes. Ask the class 'How many pupils will receive the cubes?' Lead the class to see that to find the answer is to find the number of equal groups of 7. Write the division sentence: $42 \div 7 = 6$. Hence, the number of equal groups or the number of pupils receiving the cubes is 6. Remind the class that to obtain the answer 6, the pupils need to refer to the Multiplication Table of 7.
 - Repeat the above for different number of cubes and ask the pupils to write the division sentences.

Activity 3 (20 min): Divide by 6

Things you need: Pictures showing different number of animals, fruits or any items and poster of Multiplication Table of 6

- Show a picture of 42 apples (can be any objects). Tell the class that you are going to arrange the apples into 6 equal groups and ask the class 'What would be the number of apples in each group?' Lead the class to see that a division is needed to find the answer. Show the division by circling the apples to form 6 groups of 7 apples each. Count the number of apples in each group and write on the board the division sentence: $42 \div 6 = 7$. Tell the class that to obtain the answer 7, the pupils need to refer to the multiplication fact of $7 \times 6 = 42$ in the Multiplication Table of either 6 or 7.
- Repeat the above using different pictures showing different number of items.
- Write on the board: $8 \times 6 = 48$. Remind the pupils that division is the inverse of multiplication. Show the relation as follows:
 $8 \times 6 = 48$ can be written in division as
 $48 \div 8 = 6$ or $48 \div 6 = 8$
- Refer the pupils to the Multiplication Table of 6 poster. For each multiplication sentence, ask two pupils, one at a time, to come forward to write the two corresponding division sentences on the board. The pupils can refer to the Multiplication Table poster for help.

Activity 4 (20 min): Class practice

1. Go through with the pupils the examples on pages 103–104 of the Student's Book.

Activity 5 (20 min): Divide by 7

Things you need: Pictures showing different number of animals, fruits or any items and poster of Multiplication Table of 7

1. Show a picture of 35 apples (or any objects). Tell the class that you are going to arrange the apples into 7 equal groups and ask the class 'What would be the number of apples in each group?' Lead the class to see that a division is needed to find the answer. Show the division by circling the apples to form 7 groups of 5 apples each. Count the number of apples in each group and write on the board the division sentence: $35 \div 7 = 5$. Tell the class that to obtain the answer 5, the pupils need to refer to the multiplication fact of $7 \times 5 = 35$ in the Multiplication Table of either 7 or 5.
2. Repeat the above using different pictures showing different number of items.
3. Write on the board: $9 \times 7 = 63$. Remind the pupils that division is the opposite of multiplication. Show the relation as follows:
 $9 \times 7 = 63$ can be written in division as
 $63 \div 9 = 7$ or $63 \div 7 = 9$
4. Refer the pupils to the Multiplication Table of 7 poster. For each multiplication sentence, ask two pupils, one at a time, to come forward to write the two corresponding division sentences on the board. The pupils can refer to the Multiplication Table poster for help.

Activity 6 (20 min): Class practice

1. Go through the examples on pages 105–106 of the Student's Book.

Activity 7 (20 min): Divide by 8

Things you need: Pictures showing different number of animals, fruits or any items and poster of Multiplication Table of 8

1. Show a picture of 32 apples (or any objects). Tell the class you are going to arrange the apples into 8 equal groups and ask the class 'What would be the number of apples in each group?' Lead the class to see that a division is needed to find the answer. Show the division by circling the apples to form 8 groups of 4 apples each. Count the number of apples in each group and write on the board the division sentence: $32 \div 8 = 4$. Tell the class that to obtain the answer 4, the pupils need to refer to the multiplication fact of $4 \times 8 = 32$ in the Multiplication Table of either 8 or 4.
2. Repeat the above using different pictures showing different number of items.
3. Write on the board: $7 \times 8 = 56$. Remind the pupils that division is the opposite of multiplication. Show the relation as follows:
 $7 \times 8 = 56$ can be written in division sentences as
 $56 \div 7 = 8$ or $56 \div 8 = 7$

4. Refer the pupils to the Multiplication Table of 8 poster. For each multiplication sentence, ask two pupils, one at a time, to come forward to write the two corresponding division sentences on the board. The pupils can refer to the Multiplication Table poster for help.

Activity 8 (20 min): Class practice

1. Go through the examples on pages 107–108 of the Student's Book.

Activity 9 (20 min): Divide by 9

Things you need: Pictures showing different number of animals, fruits or any items and poster of Multiplication Table of 9

1. Show a picture of 45 apples (or any objects). Tell the class you are going to arrange the apples into 9 equal groups and ask 'What would be the number of apples in each group?' Lead the class to see that a division is needed to find the answer. Show the division by circling the apples to form 9 groups of 5 apples each. Count the number of apples in each group and write on the board the division sentence: $45 \div 9 = 5$. Tell the class that to obtain the answer 5, the pupils need to refer to the multiplication fact of $5 \times 9 = 45$ in the Multiplication Table of either 9 or 5.
2. Repeat the above using different pictures showing different number of items.
3. Write on the board: $6 \times 9 = 54$. Remind the pupils that division is the opposite of multiplication. Show the relation as follows:
 $6 \times 9 = 54$ can be written in division sentences as
 $54 \div 6 = 9$ or $54 \div 9 = 6$
4. Refer the pupils to the Multiplication Table of 9 poster. For each multiplication sentence, ask two pupils, one at a time, to come forward to write the two corresponding division sentences on the board. The pupils can refer to the Multiplication Table poster for help.

Activity 10 (10 min): Class practice

1. Go through with the pupils the examples on pages 109–110 of the Student's Book.

Let's Try...

Activity 11 (10 min): Individual practice

1. Ask the pupils to try out the exercises on page 111 of the Student's Book. Ask a few pupils to share their answers with the class.

Homework

1. Ask the pupils to do Workbook 3A—Worksheet 24.

Answers



page 111

1. (a) 8 (b) 7 (c) 4 (d) 8
2. (a) $9 \times 3 = 27$; $27 \div 3 = 9$; $27 \div 9 = 3$
(b) $5 \times 7 = 35$; $7 \times 5 = 35$; $35 \div 7 = 5$; $35 \div 5 = 7$

WORK *Sheet* 24

1. (a) 4 (b) 3 (c) 7 (d) 6 (e) 9
 (f) 4 (g) 8 (h) 10 (i) 5
2. (a) 6 (b) 4 (c) 7 (d) 5 (e) 9 (f) 8
4. (b) 18 9 (c) 63 9 (d) 45 9
 18 2 63 7 45 5

QUOTIENT AND REMAINDER

Suggested Duration

1 period (40 min)

Learning Outcomes

Pupils should be able to:

- use the term 'quotient' and 'remainder'
- divide with remainder

Instructions

Let's Learn...

Activity 1 (20 min): Identify the 'quotient' and 'remainder' in a division

Things you need: 5 clear containers and 19 ping pong balls

1. Display 5 clear containers in front of the class. Ask a volunteer to put the ping pong balls equally into the 5 containers. Lead the class to see that there are 4 ping pong balls left that cannot be put equally into the 5 containers. Write on the board the number '4' and tell the students that the number '4' is known as the 'remainder'. Write the word 'remainder' on the board and ask the class to repeat the word 'remainder' after you.
2. Ask another pupil to count the number of ping pong balls in each container. There should be 3 balls in each container. Write the number '3' on the board and tell the class that the number '3' is known as the 'quotient'. Write the word 'quotient' on the board and ask the class to repeat the word after you. Tell the class, then 'when 19 is divided by 5, the quotient is 3 and the remainder is 4.'
3. Write on the board:
 $19 \div 5 = 3 \text{ R } 4$ (R stands for remainder)
4. Explain to the class that division can also be written in vertical format as follows:

$$\begin{array}{r} 3 \rightarrow \text{quotient} \\ 5 \overline{) 19} \\ \underline{-15} \\ 4 \rightarrow \text{remainder} \end{array}$$

5. Repeat the above with different number of containers and ping pong balls.

Activity 2 (20 min): Class practice

1. Go through the examples on pages 112–113 of the Student’s Book.

DIVIDING MENTALLY

Suggested Duration

1 period (40 min)

Learning Outcomes

Pupils should be able to:

- use mental calculation strategy to divide

Instructions

Let’s Learn...

Activity 1 (40 min): Divide mentally numbers involving tens and hundreds

1. Write ‘ $9 \div 3 = \underline{\quad}$ ’ on the board. Ask a pupil to fill in the answer.
2. Next, write on the board ‘ $90 \div 3 = \underline{\quad}$ ’ and ‘ $900 \div 4 = \underline{\quad}$ ’ and ask the class to guess the answer.

3. Explain the steps in dividing numbers involving tens and hundreds as follows:

$$\begin{aligned} 90 \div 3 &= 9 \text{ tens} \div 3 \\ &= 3 \text{ tens} \\ &= 30 \end{aligned}$$

$$\begin{aligned} 900 \div 3 &= 9 \text{ hundreds} \div 3 \\ &= 3 \text{ hundreds} \\ &= 300 \end{aligned}$$

4. Show the pupils a shortcut in dividing tens and hundreds by dividing the non-zero digits and then adding the zeros as follows:

$$90 \div 3 = 30 \text{ (} 9 \div 3 \text{ and then add a zero to '3' to become '30')}$$

$$900 \div 3 = 300 \text{ (} 9 \div 3 \text{ and then add 2 zeros to '3' to become '300')}$$

5. Go through the examples on pages 114 –115 of the Student’s Book.

MORE DIVISIONS

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- divide numbers up to 3 digits by 1-digit number

Instructions

Let's Learn...

Activity 1 (25 min): Divide by a 1-digit number using the long division algorithm

1. Tell the pupils that in division, the digit in the highest place value is divided first. This is different from multiplication where the multiplication starts from the digit in the lowest place value. So, to divide a 2-digit number by a 1-digit number, the steps are as follows:
Step 1: Divide the tens
Step 2: Divide the ones
2. To divide a 3-digit number, the steps are as follows:
Step 1: Divide the hundreds
Step 2: Divide the tens
Step 3: Divide the ones
3. Display Example 1 of page 116 of the Student's Book. Explain slowly, the steps in the long division algorithm. Point out to the pupils that this example shows a division with no remainder. Tell them that we say '48 is divided by 2 exactly'. Identify the quotient.
4. Ask a volunteer to solve, on the board, Example 2 of page 117 of the Student's Book.
5. Display Example 3 of page 118 of the Student's Book. Explain slowly the steps in the long division algorithm. Highlight to the pupils that this example shows a division with a remainder of 2. Point out the quotient.
6. Ask a volunteer to solve, on the board Example 4 of page 119 of the Student's Book.
7. Go through the rest of the examples on pages 120–128 of the Student's Book. Point out the quotient and remainder for each example.
8. For all the long divisions, highlight the importance of aligning the digits in the correct place value when representing them in the vertical format.

Let's Explore

Activity 2 (15 min): Pair work

1. Ask the pupils to work in pairs the activity on page 129 of the Student's Book.

Let's Think

Activity 3 (20 min): Challenging exercise to stimulate thinking

1. Ask the pupils to try out the challenging exercise on page 130 of the Student's Book. Ask the pupils to present their answers to the whole class.

Let's Try

Activity 4 (20 min): Individual practice

1. Ask the pupils to try out the exercises on page 131 of the Student's Book.

Homework

Ask the pupils to do Workbook 3A—Worksheet 25.

Answers



page 131

- (a) Q: 312 R: 0 (b) Q: 408 R: 1
- (a) Q: 12 R: 2 (b) Q: 17 (c) Q: 271
(d) Q: 69 R: 2 (e) Q: 15 (f) Q: 26 R: 1
(g) Q: 32 R: 2 (h) Q: 14 R: 1 (i) Q: 71 R: 3
(j) Q: 119 (k) Q: 29 R: 2 (l) Q: 203 R: 1

WORK **Sheet** 25

- (a) Q: 1 R: 3 (b) Q: 1 R: 1 (c) Q: 2 R: 2 (d) Q: 3 R: 1
(e) Q: 3 R: 3 (f) Q: 3 R: 1 (g) Q: 4 R: 3 (h) Q: 5 R: 3
- (a) 80 (b) 30 (c) 40 (d) 60 (e) 90 (f) 60
- A = Q: 67 R: 1 B = Q: 27 R: 1 C = Q: 79 R: 3
D = Q: 102 R: 1 E = Q: 302 R: 1 F = Q: 65 R: 2
- (a) Q: 28 R: 4 (b) Q: 77 R: 5 (c) Q: 44 R: 7
(d) Q: 101 R: 1 (e) Q: 75 R: 3 (f) Q: 494 R: 0
- (a) Q: 143 R: 1 (b) Q: 264 R: 1 (c) Q: 200 R: 1 (d) Q: 123 R: 1
(e) Q: 86 R: 3 (f) Q: 126 R: 6 (g) Q: 34 R: 1 (h) Q: 137 R: 2

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- solve upto 1-step word problems involving division
- solve upto 2-step word problems involving the 4 operations

Instructions

Let's Learn...

Activity 1 (20 min): Solve 1-step word problems involving dividing by 6, 7, 8 and 9

Things you need: Pictures of items grouped in 6s, 7s, 8s and 9s

- Explain with an example of a 1-step word problem the following steps in solving division word problems:
 - Look for the total number of items given
 - Look for the:
 - Number of equal groups to be formed
 - or
 - Number of items to be given to each group
 - Draw a model if necessary
 - Write the division sentence
 - Write the long division format and solve it using the long division algorithm
 - Identify the quotient and the remainder if any
 - Write the answer statement
- Go through Examples 1–6 on pages 132–134 of the Student’s Book. Read together with the class each of the word problems. Work out the word problem on the board. Point out that these are 1-step word problems involving dividing by 6,7,8 and 9.
- Write on the board more examples of 1-step word problems involving dividing by 6, 7, 8 and 9 and get pupils to solve them.

Activity 2 (20 min): Solve 2-step word problems involving the 4 operations

- Go through Examples 7–10 on pages 135–137 of the Student’s Book. Read together with the class each of the word problems. Work out the word problems on the board. Point out that these are 2-step word problems involving the 4 operations.
- Write on the board more examples of 2-step word problems involving the 4 operations and get pupils to solve them.

Let’s Try...

Activity 3 (40 min): Individual practice

- Ask the pupils to work out the word problems on page 138 of the Student’s Book. Ask some pupils to show their workings on the board.

Homework

Ask the pupils to do Workbook 3A—Worksheet 26–27 and Practice 6.

Answers



page 138

- (1) 243 (2) 21; 3 (3) 20 (4) 117 (5) 73

WORK **S**heet 26

1. 52 pots of plants.
2. 96 groups
3. 2637 non-fiction books.
4. 36 beads
5. (a) 7 (b) 4
6. (a) 62 (b) 6
7. (a) 66 (b) 6

WORK **S**heet 27

1. (a) 68 (b) 6
2. 65 crayons
3. Rs. 65
4. 25 beads
5. 339 marbles
6. 117 almonds
7. 108 sweets
8. 36 books

Practice 6

1. (a) 39 (b) 62 (c) 39_3 rem (d) 72_5 rem (e) 97_2 rem
(f) 63 (g) 84_6 rem (h) 210_2 rem (i) 308_2 rem
(j) 15 (k) 16_3 rem (l) 43 (m) 35 (n) 19_6 rem
2. $S = 103$, $U = 15$, $V = 79$, $N = 47$ $D = 90$, $0 = 56$, $F = 71$, $1 = 28$

Division is fun

Revision (40 min)

Fun With Maths

Things you need: Darts and dart boards

1. Make groups of 3 or 4 and let the pupils play the interesting game on page 139 of the Student's Book.
2. Revise and go through homework done.

Unit 7: Money

ADDING MONEY

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- add money in decimal notation

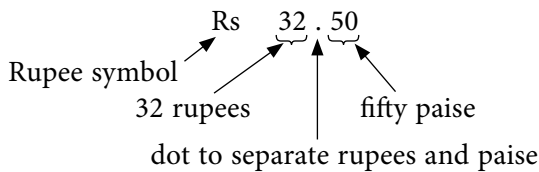
Instructions

Let's Learn...

Activity 1 (20 min): Recall writing money in decimal notation

Things you need: Real coins and notes.

1. Display some notes and coins and read out their values one at a time. Ask the pupils to repeat after you.
2. Ask the class, 'What is the total amount of money displayed?' Count the rupees and the paise and then write on the board the amount in decimal notation. Explain the decimal notation as follows:



3. Display other combinations of notes and coins and ask the pupils to practise writing the amounts in decimal notation on the board.

Activity 2 (20 min): Add money in decimal notation

1. Explain to the class that adding money is similar to adding numbers. There are 2 steps in adding money. Step 1 is to add the paise and Step 2 is to add the rupees
2. Write on the board an addition sentence involving 2 amounts of money in decimal notation and show the 2 steps in adding money as follows:

$$\text{Rs } 8.20 + \text{Rs } 4.70 = ?$$

Step 1: Add paise Step 2: Add rupees

$$\text{Rs } 8.20 \xrightarrow{+ 70 \text{ paise}} \text{Rs } 8.90 \xrightarrow{+ \text{Rs } 4} \text{Rs } 12.90$$

3. Note that the above example involves simple addition without any carry over. Show other examples of adding money with no carry over. Ask the class, 'What happens if the addition

of the paise results in 100 paise or more?' Lead the class to see that the 100 paise can be carried over to the rupee part to be added as Re 1.

4. Tell the pupils that for addition of money that results in 100 paise or more where the 100 paise is to be carried over to the rupees, it is better to represent the addition sentence vertically as follows:

Example: $\text{Rs } 18.60 + \text{Rs } 4.70$

Write the addition sentence of $\text{Rs } 18.60 + \text{Rs } 4.70$ vertically as follows:

$$\begin{array}{r} \text{Rs } 18 . 60 \\ + \text{Rs } 4 . 70 \\ \hline \end{array}$$

Step 1: Add the paise

- $60 \text{ paise} + 70 \text{ paise} = 130 \text{ paise}$
- Since 130 paise is more than 100 paise, split it into 100 paise and 30 paise
→ $130 \text{ paise} = 100 \text{ paise} + 30 \text{ paise}$
- Convert the 100 paise into Re 1 and carry it over to the rupees part by writing a small '1' on the left corner of the digit '8' to denote the carry over. The 30 paise remains at the paise part.

Step 2: Add the rupees

- $\text{Rs } 1 \text{ (carry over)} + \text{Rs } 8 + \text{Rs } 4 = \text{Rs } 13$

Therefore, the answer is Rs 13.30.

5. Provide more examples of adding money with, and without carry over, for the pupils to practise on the board.

Activity 5 (40 min): Jumbo sale game to enhance learning

Things you need: Blank stickers and small pieces of paper for writing the total cost

1. Pair up the pupils and get them to play a jumbo sale game as follows:
- Tell the pupils to pretend that they are at a jumbo sale where they can both buy, and sell stationery or books.
 - Give every pupil 10 stickers and 5 pieces of blank paper as paper money
 - Ask every pupil to take out any 9 items from his bag or pencil case and set a price to each item by writing the price on the sticker and sticking it on the item.
 - The pupils take turns to buy from each other, three items at a time. The buyer is to add the prices of the 3 items and then write down the total cost in decimal notation on the small piece of paper money. The seller then checks if the total cost is correct by doing the addition before collecting the paper money from the buyer.

Activity 6 (20 min): Class practice

1. Go through the examples on pages 141–142 of the Student's Book. Ask some pupils to share their answers with the class.

Let's Try...

Activity 7 (20 min): Individual practice

1. Ask pupils to do the exercises on page 143 of the Student's Book.

Homework

Ask pupils to do Workbook 3A—Worksheets 28.

Answers

WORK *Sheet* 28

- 1 (a) Rs 6.50 (b) Rs 7.00
3. (a) Rs 4.90—Rs 8.90 (b) Rs 8.55—10.55
(c) Rs 12.10—18.10 (d) Rs 3.00—Rs 10.00
4. (a) Rs 1.65 (b) Rs 3.85 (c) Rs 14.00
(d) Rs 30.75 (e) Rs 44.00 (f) Rs 47.40
5. (a) Rs 5.15 (b) Rs 13.75 (c) Rs 38.05
(d) Rs 53.10 (e) Rs 28.10 (f) Rs 61.50

SUBTRACTING MONEY

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- subtract money in decimal notation

Instructions

Let's Learn...

Activity 1 (40 min): Subtract money in decimal notation

1. Explain to the class that subtracting money is similar to subtracting numbers. Just like adding money, there are also 2 steps in subtracting money. Step 1 is to subtract the paise and Step 2 is to subtract the rupees.
2. Write on the board a subtraction sentence involving 2 amounts of money in decimal notation and show the 2 steps in subtracting money as follows:

$$\text{Rs } 8.90 - \text{Rs } 4.50 = ?$$

Step 1: Subtract paise Step 2: Subtract rupees

$$\text{Rs } 8.90 \xrightarrow{- 50 \text{ paise}} \text{Rs } 8.40 \xrightarrow{- \text{Rs } 4} \text{Rs } 4.40$$

- Tell the pupils that the above example involves a simple subtraction without any need to borrow and regroup in paise because you are subtracting a smaller amount (50 paise) from a bigger amount (90 paise). Ask the class, 'What happens if we need to subtract a bigger amount from a smaller amount, e.g. 30 paise – 60 paise?' Lead the class to see that in order to subtract 60 paise, an amount of Re. 1 needs to be borrowed from the rupee part and then regrouping it into 100 paise to be added to the 30 paise, so that we now have 130 paise which is bigger than the 60 paise.
- Tell the pupils that for subtraction of money that requires regrouping, it is better to represent the subtraction sentence vertically as follows:

Example: Rs 18.20 – Rs 6.50

Write the subtraction sentence of Rs 18.20 – Rs 6.50 vertically as follows:

$$\begin{array}{r} \text{Rs } 18.20 \\ - \text{Rs } 6.50 \\ \hline \\ \hline \end{array}$$

Step 1: Subtract the paise

- 20 paise – 50 paise =?
- Since we cannot subtract 50 paise from 20 paise, we need to borrow Re 1 from the rupee part and then regroup the Re 1 into 100 paise and added it to the 20 paise.
→ 100 paise + 20 paise = 120 paise
- We can now subtract 50 paise from 120 paise → 120 paise – 50 paise = 70 paise
- The Rs 18 is replaced with Rs 17 since Re 1 has been given to the paise part.

Step 2: Subtract the rupees

- Rs 17 – Rs 6 = Rs 11

Therefore, the answer is Rs 11.70.

- Emphasize that we need to 'borrow' Re 1 from the rupee part and regroup it into 100 paise whenever we are subtracting a bigger amount of paise from a smaller amount of paise.
- Provide more examples of subtraction of money with and without the borrow and regroup, for the pupils to practise on the board.

Activity 2 (40 min): Buying and selling food game to enhance learning

Things you need: A blank A4 size paper. Small pieces of red and blue papers to act as paper money

- Pair up the pupils. Ask them to play a buying and selling food game as follows:
 - Tell the pupils to pretend that they are in a food court buying and selling food.
 - Give every pupil a blank A4 size paper, 5 pieces of red paper money as payment and 5 pieces of blue paper money.

- Ask every pupil to write down on the blank paper 10 food items with their prices. This acts as the menu.
- The pupils take turns to buy food from each other. To buy food, the buyer will choose one item from the menu and then writes on a red paper an amount as payment for the food. The payment amount can be any amount but must be higher than the price.
- The seller is to calculate the amount of change to return to the buyer by subtracting the price of the food from the payment given by the buyer. Once the seller has obtained the amount of change, he is to write the amount of the change on the blue paper and give it to the buyer.
- The buyer will check if the change is correct by doing the subtraction as well.
- The game continues for 4 more times until all the red and blue papers are used up.

Activity 3 (20 min): Class practice

1. Go through with the pupils the examples on pages 144–145 of the Student’s Book. Ask some pupils to share their answers with the class.

Let’s Try...

Activity 4 (20 min): Individual practice

Ask pupils to do the exercises on page 146 of the Student’s Book.

Homework

Ask pupils to do Workbook 3A—Worksheet 29.

Answers



page 146

- (1) Rs 22.40, Rs 1.20 (2) Rs 32.80

WORK **S**heet **29**

1. (a) Rs 3.50 (b) Rs 3.75
2. (a) Rs 14.40—Rs 11.40
 (b) Rs 28.10—Rs 17.10
 (c) Rs 18.50—Rs 12.50
 (d) Rs 86.80—Rs 59.80
3. (a) Rs 2.30 (b) Rs 1.70 (c) Rs 8.20 (d) Rs 9.20
 (e) Rs 15.30 (f) Rs 34.85 (g) Rs 26.35 (h) Rs 26.45
4. (a) Rs 28.60 (b) Rs 16.70 (c) Rs 21.75
5. (a) Rs 1.35 (b) Rs 2.60 (c) Rs 0.50
 (d) Rs 8.80 (e) Rs 15.95 (f) Rs 22.35

6. (a) Rs 11.45 (b) Rs 4.70 (c) Rs 8.80 (d) Rs 15.75
7. (a) Rs 2.20 (b) Rs 3.00 (c) Rs 6.25

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- solve word problems involving addition and subtraction of money in decimal notation

Instructions

Let's Learn...

Activity 1 (40 min): Solve one-step word problems involving addition and subtraction of money in decimal notation

1. Go through Example 1 on page 147 of the Student's Book. Point out that this is a one-step word problem involving addition and subtraction of money in decimal notation.
2. Show more examples of one-step word problems on the board and ask the pupils to solve them.
3. Ask pupils to create one-step word problems involving addition and subtraction of money in decimal notation. You may give them newspaper cuttings on supermarket items with the prices indicated and ask them to create stories on the items shown. Provide some examples to guide the pupils:

For addition

The cost of one can of baked beans is _____. The cost of one tin of biscuits is _____. What is the total cost of the two items?

For Subtraction

The cost of one shampoo is _____ and the cost of one cake of soap is _____. How much cheaper is the soap than the shampoo?

4. Ask some pupils to share with the class the word problems they have created.
5. Pair up the pupils and get them to solve each other's word problems.

Activity 2 (40 min): Solve 2-step word problems involving addition and subtraction of money in decimal notation

1. Go through Examples 2, 3 and 4 on pages 147–148 of the Student's Book. Point out that these are 2-step word problems involving addition and subtraction of money in decimal notation.

- Show more examples of 2-step word problems on the board and ask pupils to solve them.
- Ask the pupils to work in pairs to create 2-step word problems involving addition and subtraction of money in decimal notation. Use the same newspaper cutting of the supermarket items. However, you need to provide helping sentences for the pupils to fill in the blanks as follows:

Addition followed by subtraction

I bought a _____ for _____ and a _____ for _____. I gave _____ to the cashier. How much change did I get back?

Subtraction followed by addition

I have Rs 10. I paid _____ for a _____. Later, my mother gave me another _____. How much money did I have after that?

Addition followed by another addition

I bought 3 items from the supermarket, a _____ for _____, a _____ for _____ and a _____ for _____. How much did I spend altogether?

Subtraction followed by another subtraction

I brought Rs 50 to the supermarket to buy a _____ which cost _____ and a _____ which cost me _____. How much money did I have left?

- Ask some pupils to share the word problems they have created.
- Ask the pupils to solve each other's word problems created.

Let's Try...

Activity 3 (20 min): Individual practice

- Ask the pupils to try out the exercises on page 149 of the Student's Book. Ask some pupils to work out the steps on the board.

Homework

Ask pupils to do Workbook 3A—Worksheet 30 and Practice 7.

Answers



page 149

- (1) Rs 59.10 (2) Rs 41.40 (3) Rs 28 (4) Rs 8.74

WORK **Sheet** 30

- Rs 47.90
- Rs 95
- Rs 45.80
- Rs 14.60
- Rs 2.50

6. Rs 5.00
7. Rs 96.45
8. Rs 13.95

Practice 7

1. (a) Rs 130.95 (b) Rs 135.60 (c) Rs 45.55 (d) Rs 16.90
2. (a) Rs 20.10 (b) Rs 14.50 (c) Rs 21.00 (d) Rs 14.75
3. (a) Rs 30.50 (b) Rs 26.05
- 4.....
5. Rs 45.10
6. Rs 16.60
7. Rs 5.85
8. Rs 245.29
9. Rs 19.00
10. Rs 25.00

Revision (20 min)

Let's Explore

1. Let the pupils try out the exercise on page 150 of the Student's Book. Give hints to the pupils.

Fun with Maths

1. Ask the pupils to record their weekly expenses for the next 7 days. You may wish to reward those pupils who faithfully record their expenses at the end of the 7 days with some candy.
2. Revise and go through pupils' homework done.

Unit 8: Volume

MILLILITRES

Suggested Duration

1 periods (40 min)

Learning Outcomes

Pupils should be able to:

- measure and read volumes of liquid in millilitres (ml)

Instructions

Let's Learn...

Activity 1 (25 min): Measure and read volumes of liquid in millilitres (ml)

Things you need: 1-litre mineral water bottle, 1-litre measuring beaker, 500-ml measuring beaker, 100-ml measuring beaker and colour dye

1. Recall the concept of volume of a liquid as the amount of the liquid. Show the 1-litre mineral water bottle filled with 1 litre of water. Pour the water into the 1-litre measuring beaker and point to the water level to show that the volume of water is 1 litre or *l*.
2. Empty the 1- *l* beaker. Pour some water in the 1- *l* mineral water bottle with an amount less than 1 *l*. Drop a few drops of colour dye. Pour the coloured water into the 1- *l* beaker. Point out that the water level is now below the 1- *l* mark. Ask the class, 'How do you measure the volume of a liquid that is less than 1 *l*?'. Introduce to the class 'millilitre' as another unit for measuring volume of a liquid that is less than 1 *l*.
3. Write on the board 'millilitre'. Tell the class that the short form for millilitre is 'ml'. Read the word 'millilitre' and get the class to repeat after you.
4. Ask the class to guess how many millilitres make 1 *l*. Write on the board $1\ l = 1000\ \text{ml}$.
5. Display the 1- *l* beaker. Teach the pupils to read the volumes of liquid less than 1 *l* or 1000 ml as follows:
 - ➔ Tell the class that the beaker can contain up to 1 *l* or 1000 ml of water
 - ➔ So, we say that the capacity of the 1- *l* beaker is 1 *l* or 1000 ml.
 - ➔ Point out that there are 10 markings on the beaker and each marking represents 100 ml.
 - ➔ Pour some coloured water into the beaker so that the water level reaches one of the markings and ask a few pupils to come forward to find out the volume of the water by reading off from the markings. Repeat this until all the pupils have the chance to read volumes of liquid that are less than 1 *l* or 1000 ml.

6. Display the 500-ml beaker. Teach the pupils to read the volumes of liquid that are less than 500 ml as follows:
 - Tell the class that the beaker can contain up to 500 ml of water
 - So, we say that the capacity of the 500-ml beaker is 500 ml.
 - Point out that there are 10 markings on the beaker and each marking represents 50 ml.
 - Pour some coloured water into the beaker so that the water level reaches one of the markings and ask a few pupils to come forward to find out the volume of the water by reading off from the markings. Repeat this until all the pupils have the chance to read volumes of liquid that are less than 500 ml.
7. Display the 100-ml beaker. Teach the pupils to read the volumes of liquid that are less than 100 ml as follows:
 - Tell the class that the beaker can contain up to 100 ml of water
 - So, we say that the capacity of the 100-ml beaker is 100 ml.
 - Point out that there are 10 markings on the beaker and each marking represents 10 ml.
 - Pour some coloured water into the beaker so that the water level reaches one of the markings and ask a few pupils to come forward to find out the volume of the water by reading off from the markings. Repeat this until all the pupils have had a chance to read volumes of liquid that are less than 100 ml
8. Go through the examples on pages 153–154 of the Student's Book.

Let's Try...

Activity 2 (15 min): Individual practice

1. Ask the pupils to try out the exercises on page 155 of the Student's Book.

Homework

Ask the pupils to do Workbook 3B—Worksheet 31.

Answers



page 155

- (a) 30 ml (b) 90 ml (c) 200 ml
 (d) 450 ml (e) 580 ml (f) 140 ml

WORK *Sheet* 31

- 1.
2. (a) 900 ml (b) 200 ml (c) 100 ml
 (d) 450 ml (e) 10 ml (f) 70 ml

LITRES AND MILLILITRES

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- measure and read volumes of liquids in compound units
- convert measurement in compound units to smaller units, and vice versa

Instructions

Let's Learn...

Activity 1 (40 min): Measure and read volumes of liquid in compound units

Things you need: 1-litre measuring beaker, 500-ml measuring beaker and, 100-ml measuring beaker

1. Recall that 1 l is equal to 1000 ml. Write on the board, '1 l = 1000 ml'. Fill the 1- l beaker with water to the 1- l mark. Pour the water into the 500-ml beaker to show that 1 l = 500 ml + 500 ml = 1000 ml
2. Fill the 1- l beaker with water to the 1- l mark and the 500-ml beaker to the 200 ml mark. Ask the class, 'How much water is there in both containers?' Explain the following steps in obtaining the answer:
 - Write 1 l = 1000 ml
 - Write 1000 ml + 200 ml = 1200 ml
 - Write 1200 ml = 1 l 200 ml (Point out that this is known as compound units which means using both l and ml to express the answer)
3. Repeat No. 2 as many times as possible and get pupils to work out the answer on the board using the steps explained earlier.
4. Fill the 1- l beaker with water to the 1- l mark, the 500-ml beaker to the 200 ml mark and the 100-ml beaker to the 40 ml mark. Ask the class, 'How much water is there in the three containers?' Explain the following steps in obtaining the answer:
 - Write 1 l = 1000 ml
 - Write 1000 ml + 200 ml + 40 = 1240 ml
 - Write 1240 ml = 1 l 240 ml (Remind the pupils that this is known as compound units which means using both l and ml to express the answer)
5. Repeat No. 4 as many times as possible and ask pupils to work out the answer on the board using the steps explained earlier.
6. Go through the examples on pages 156–157 of the Student's Book.

Activity 2 (40 min): Convert measurement in compound units to smaller units, and vice versa

- Show the pupils how to convert volumes expressed in compound units into the smaller unit of milliliters as follows:
 - Write on the board a volume expressed in compound units: 2 l 600 ml
 - Rename 2 l as 2000 ml
 - $2000 \text{ ml} + 600 \text{ ml} = 2600 \text{ ml}$
- Provide more examples on the board for the pupils to try.
- Show them how to convert volumes expressed in millilitres into compound units as follows:
 - Write on the board a volume expressed in millilitres: 4700 ml
 - Express 4700 ml as $4000 \text{ ml} + 400 \text{ ml}$
 - Rename 4000 ml as 4 l
 - Write $4700 \text{ ml} = 4 \text{ l } 400 \text{ ml}$
- Provide more examples on the board for the pupils to try.

Let's Explore and Let's Try

Activity 3 (40 min): Pair work to compare volume using smaller similar containers

Things you need: 1-litre mineral water bottle, 1-litre measuring beaker, 500-ml measuring beaker and 100-ml measuring beaker

- Divide the class into groups of 4. Let the groups take turns to carry out the **Let's Explore** activity on page 158 of the Student's Book. While one group is working on the activity, the other groups try out the exercises on page 159 of the Student's Book.

Homework

Ask the pupils to do Workbook 3B—Worksheet 32.

Answers



page 159

- (1) $1100 \text{ ml} = 1 \text{ l } 100 \text{ ml}$
- (2) (a) 2235 ml (b) 1030 ml
(c) 1 l 50 ml (d) 4 l 905 ml
- (3) 1 l 290 ml or 1290 ml

WORK **32**

- (a) 1 l 350 ml (b) 1 l 380 ml (c) 2 l 350 ml
(d) 1 l 700 ml (e) 1 l 390 ml (f) 2 l 30 ml
- (a) 1 l 500 ml (b) 330 ml (c) 20 ml
(d) 2 l 600 ml (e) 10 l 100 ml
- (a) 6205 (b) 1020 (c) 1300 (d) 2005

- (e) 3200 ml (f) 5003 ml (g) 2345 ml (h) 4030 ml
4. (a) 7 l + 600 ml (b) 1 l 190 ml (c) 2 l 80 ml (d) 2 l 102 ml
- (e) 4 l 372 ml (f) 3 l 20 ml (g) 5 l + 1 ml (h) 6 l 975 ml

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- solve word problems involving volume

Instructions

Let's Learn...

Activity 1 (40 min): Add and subtract volumes in compound units of kilograms and grams

1. Teach the class the following two methods adding and subtracting volumes in compound units of litres and millilitres as follows:

ADDITION

Method 1: Add the litres and millilitres separately

Addition example 1: 14 l 500 ml + 3 l 450 ml = _____

$$\begin{array}{r} 14 \text{ l } 500 \text{ ml} \\ + 3 \text{ l } 450 \text{ ml} \\ \hline \end{array}$$

First add the volume in ml: 500 g + 450 g = 950 g

Next, add the volume in l: 14 l + 3 l = 17 l

Therefore, the answer is 17 l 950 ml.

Addition example 2: 12 l 650 ml + 9 l 450 ml = _____

$$\begin{array}{r} 12 \text{ l } 650 \text{ ml} \\ + 9 \text{ l } 450 \text{ ml} \\ \hline \end{array}$$

First, add the volume in ml: 650 ml + 450 ml = 1100 ml

$$= 1 \text{ l } 100 \text{ ml}$$

(Point out to the pupils that the 1 l need to be carried over to the litres portion.)

Next, add the mass in kg: 12 l + 9 l + 1 l = 22 l

Therefore, the answer is 22 l 100 ml.

(Emphasize that they must always add the ml first.)

Method 2: Convert all the readings into millilitres

Addition example 1: $14\text{ l } 500\text{ ml} + 3\text{ l } 450\text{ ml} = \underline{\hspace{2cm}}$

First, convert all into ml: $14\text{ l } 500\text{ ml} = 14\,500\text{ ml}$

$$3\text{ l } 450\text{ ml} = 3\,450\text{ ml}$$

Next, add $14\,500\text{ ml}$ and $3\,450\text{ ml}$ using the usual addition algorithm.

$$\begin{array}{r} 14\,500\text{ ml} \\ + 3\,450\text{ ml} \\ \hline 17\,950\text{ ml} \end{array}$$

Finally, convert back to *l* and ml: $17\,950\text{ ml} = 17\text{ l } 950\text{ ml}$

Therefore, the answer is $17\text{ l } 950\text{ ml}$

Addition example 2: $12\text{ l } 650\text{ ml} + 9\text{ l } 450\text{ ml} = \underline{\hspace{2cm}}$

First, convert all into ml: $12\text{ l } 650\text{ ml} = 12\,650\text{ ml}$

$$9\text{ l } 450\text{ ml} = 9\,450\text{ ml}$$

Next, add $12\,650\text{ ml}$ and $9\,450\text{ ml}$ using the usual addition algorithm.

$$\begin{array}{r} 12\,650\text{ ml} \\ + 9\,450\text{ ml} \\ \hline 22\,100\text{ ml} \end{array}$$

Finally, convert back to *l* and ml: $22\,100\text{ ml} = 22\text{ l } 100\text{ ml}$

Therefore, the answer is $22\text{ l } 100\text{ ml}$.

SUBTRACTION

Method 1: Subtract the litres and millilitres separately

Subtraction example 1: $45\text{ l } 400\text{ ml} - 21\text{ l } 150\text{ ml} = \underline{\hspace{2cm}}$

First, subtract the volumes in millilitres: $400\text{ ml} - 150\text{ ml} = 250\text{ ml}$

Next, subtract the volumes in litres: $45\text{ l} - 21\text{ l} = 24\text{ l}$

$$\begin{array}{r} 45\text{ l } 400\text{ ml} \\ - 21\text{ l } 150\text{ ml} \\ \hline 24\text{ l } 250\text{ ml} \end{array}$$

Therefore, the answer is $24\text{ l } 250\text{ ml}$.

Subtraction example 2: $26\text{ l } 250\text{ ml} - 17\text{ l } 470\text{ ml}$

First subtract the volumes in milliliters: $250\text{ ml} - 470\text{ ml} = \underline{\hspace{2cm}}$

But 250 ml is smaller than 470 ml , so need to borrow 1 l from 26 l . Rename the 1 l as 1000 ml and add it to the 250 ml : $1000\text{ ml} + 250\text{ ml} = 1250\text{ ml}$

Continue with the subtraction: $1250\text{ ml} - 470\text{ ml} = 780\text{ ml}$.

Next, subtract the volume in litres: $25\text{ l} - 17\text{ l} = 8\text{ l}$

Therefore, the answer is $8\text{ l } 780\text{ ml}$.

(Remind the pupils to always subtract the millilitres first.)

Method 2: Convert all the readings into millilitres

Subtraction example 1: $14\text{ l } 550\text{ ml} - 3\text{ l } 450\text{ ml} = \underline{\hspace{2cm}}$

First, convert all into ml: $14\text{ l } 550\text{ ml} = 14\,550\text{ ml}$

$$3\text{ l } 450\text{ ml} = 3\,450\text{ ml}$$

Next, subtract 3450 ml from 14 550 ml using the usual subtraction algorithm.

$$\begin{array}{r} 14\,550\text{ ml} \\ - 3\,450\text{ ml} \\ \hline 11\,100\text{ ml} \end{array}$$

Finally, convert back to l and ml: $11\,100\text{ ml} = 11\text{ l } 100\text{ ml}$

Therefore, the answer is 11 l 100 ml.

Subtraction example 2: $12\text{ l } 250\text{ ml} - 9\text{ l } 450\text{ ml} = \underline{\hspace{2cm}}$

First, convert all to ml: $12\text{ l } 250\text{ ml} = 12\,250\text{ ml}$

$$9\text{ l } 450\text{ ml} = 9\,450\text{ ml}$$

Next, subtract 9450 ml from 12 250 ml using the usual subtraction algorithm.

$$\begin{array}{r} 12\,250\text{ ml} \\ - 9\,450\text{ ml} \\ \hline 2\,800\text{ ml} \end{array}$$

(Point out to the pupils that there is a borrow and rename in hundreds.)

Finally, convert back to l and ml: $2\,800\text{ ml} = 2\text{ l } 800\text{ ml}$

Therefore, the answer is 2 l 800 ml.

2. Provide examples for the pupils to practise addition and subtraction of volumes in compound units of litres and millilitres using both methods. Ask the pupils which method they prefer.

Activity 2 (15 min): Multiply and divide volumes in compound units of litres and millilitres

1. Tell the class that multiplying and dividing volumes in litres and millilitres is similar to multiplying and dividing numbers except that the compound units must first be converted to the smaller unit of millilitres before carrying out the multiplication and division.
2. Provide more examples for pupils to practise.

Activity 3 (25 min): Solve word problems involving addition, subtraction, multiplication and division of volumes in litres and millilitres

1. Go through the examples on pages 160–161 of the Student's Book. Get the pupils to read the question twice. Guide the pupils in analysing each question. Draw models on the board to help pupils understand the questions.
2. Provide more, word problem examples, for pupils to practise.

Activity 4 (20 min): Individual practice

1. Ask the pupils to work out the word problems on page 162 of the Student's Book. Remind the pupils to use the addition and subtraction algorithms in working out the answers.

Homework

Ask the pupils to do Workbook 3B—Worksheet 33 and Practice 8.

Answers



page 162

1. (a) 9 buckets (b) 24 l
2. (a) 1100 ml or 1 l 100 ml (b) 7700 ml or 7 l 700 ml
3. 1000 ml 4. 88 l

WORK *Sheet* 33

1. (a) 3750 ml or 3 l 350 ml (b) 550 ml 2. 1480 ml or 1 l 480 ml
3. 600 ml 4. 1590 ml or 1 l 590 ml



1. (a) Mrs. Lin 2 l 100 ml—Mrs. Kamran 1 l 300 ml
Mrs. Shamim 1 l 250 ml
Mrs. Hashim 2 l 5ml
(b) Mrs. Lin (c) 2 l 100 ml, 2 l 5 ml, 1 l 300 ml, 1 l 25 ml.
2. (a) litres (b) millilitres (c) litres (d) millilitres (e) millilitres
3. Set A 1070 ml Set B 1450 ml Set C 1000 ml Set D 1350 ml
Set C, Set A, Set D, Set B
4. (a) 7010 ml (b) 4030 ml (c) 3950 ml
(d) 4010 ml (e) 5606 ml (f) 2022 ml
5. (a) 3 l 405 ml (b) 4 l 8 ml (c) 9 l 850 ml
(d) 6 l 354 ml (e) 7 l 411 ml (f) 5 l 15 ml
6. 1190 ml or 1 l 190 ml
7. 7800 ml or 7 l 800 ml

Revision (20 min)

Fun With Maths

1. Let the pupils work in pairs on the *Fun With Maths* activity on page 163 of the Student's Book. The pupils are to share with each other their answers.
2. Revise and go through pupils' homework.



Revision 3 (Workbook 3A)

- (a) 12 (b) 35 (c) 32 (d) 63 (e) 140 (f) 4000 (g) 5
(h) 4 (i) 7 (j) 4 (k) 60 (l) 200
- (a) Rs 7.40 → Rs 11.40 (b) Rs 31.70 → Rs 19.70
- (a) 159 (b) 90 (c) 154 (d) 384
- (a) 2 kg 500 g (b) 1 kg 800 g (c) 2 kg 200 g (d) 1 kg 300 g
- (a) Q: 4 R:5 (b) Q: 7 R: 1 (c) Q: 14 R: 2 (d) Q: 105 R: 0
(e) Q: 54 R: 7 (f) Q: 309 R: 0
- (a) Rs 17.35 (b) Rs 16.60 (c) Rs 85.05
(d) Rs 43.75 (e) Rs 53.10 (f) Rs 34.45
- (a) 3 kg 575 g (b) 3 kg 70 g (c) 8 kg 7 g (d) 6 kg 700 g
- 240 cards 9. 5300 g 10. 35 l per container 6 l left 11. Rs 47.25



Revision 4 (Workbook 3A)

- (a) 28 (b) 18 (c) 54 (d) 72 (e) 9 (f) 8
(g) 7 (h) 8 (i) 210 (j) 400 (k) 1800 (l) 30
- (a) 5025 g (b) 8008 g (c) 9100 g (d) 4040 g (e) 7670 g
- A 126 E 228 L 344 N 399 P 408
G 1089 R 1818 I 2912 O 4088
- (a) Rs 5.95 (b) Rs 11.05 (c) Rs 12.65
(d) Rs 40.40 (e) Rs 43.05 (f) Rs 25.60
- L=Q:25 E=Q:54 R:1 T=Q: 72 R:3 P=Q: 59 R: 7
S=Q: 123 R: 4 A=Q: 72 H=Q: 101 Y=Q: 148 R:2
O=Q: 154 R:3 N=Q: 34 R:2
- (a) Rs 40.40 (b) Rs 13.65
- (1) 6 m (2) 1000 m (3) 1912 (4) 20 m (5) 80
(6) 112 (7) 70 km / h (8) 3200 m
- 762 books 9. 31 boxes 10. Rs 36.75 11. 55,000 g.
- 144 apples 13. 3,392 stamps.
- (a) Rs 70.25 (b) Rs 525.90 and Rs 391.45 (c) Rs 134.45

Unit 9: Bar Graphs

BAR GRAPHS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- read and interpret bar graphs in both horizontal and vertical forms
- read scales
- solve problems using information presented in bar graphs

Instructions

Let's Learn...

Activity 1 (40 min): Read and interpret bar graphs in both horizontal and vertical forms and read scales

1. Display the picture graph on page 13 of the Student's Book showing the number of pupils who like different colours. Do not show the other bar graph yet. Ask the pupils to talk about the data shown on the picture graph. They should be able to notice that each smiling face symbol represents 5 pupils they should ask be able to use simple multiplication to arrive at the number of pupils who like the respective colours as follows:
There are 25 (5×5) pupils who like blue.
There are 15 (3×5) pupils who like red.
There are 20 (4×5) pupils who like yellow.
There are 10 (2×5) pupils who like green.
2. Next, display the bar graph shown on page 13 of the Student's Book. Tell the class that the bar graph is another way of showing the same information. Point out that it is called a bar graph because it uses bars to represent the data. Explain to the pupils the following components of the bar graph:
 - X-axis - the horizontal line
 - Y-axis - the vertical line
 - Scale - the markings on either the x-axis or the y-axis.
 - Bars - vertical or horizontal columns representing the data or value for each of the items (emphasise that the widths of all the bars are the same)
3. Point out that the scales are written in increasing order.
4. Display the bar graph as shown on page 165 of the Student's Book. Go through the

components of the bar graph. Explain how to read the values of the bars by drawing horizontal dotted lines from the top of the bars to the y-axis where the scales are. They may use the ruler to help them draw the dotted line. Where the horizontal dotted line cuts y-axis, that will be the value of the bar. Lead the pupils to read the marks (scale) for each of the subjects. Point out that the scales are in increasing order. Tell the pupils that this is an example of a vertical bar graph.

5. Show the bar graph on page 166 of the Student's Book. Point out that the bars are now drawn horizontally and the scales are on the x-axis. To find the values of the bars, the pupils will draw vertical dotted lines from the end of the bars to the x-axis. Where the vertical dotted line meets the x-axis, that will be the value of the bar. Emphasise that both the vertical bar graph and horizontal bar graph can be used to represent the same set of data.
6. Show the horizontal bar graph on page 169 of the Student's Book. Ask the pupils to talk about the data shown on the bar graphs. Ask them the following questions:
 - How many pupils like to read adventure stories?
 - How many pupils like to read fairy tales?
 - How many pupils like to read animal stories?
 - How many pupils like to read Science fiction stories?
 - How many pupils are there altogether?
 - How many more pupils like to read Science fiction than animal stories?
 - Which two types of stories are liked by the same number of pupils?
 - Which type of stories over liked by most of the pupils?
 - How many fewer pupils like to read fairy tales, than adventure stories?
7. Provide more examples of bar graphs for pupils to practise reading and interpreting them.

Activity 2 (40 min): Solve problems using information presented in bar graphs

1. Show page 17 of the Student's Book and tell the pupils that this is an example of solving problems using information presented in bar graphs.
2. Explain that the first step in solving such problems is to write down all the values represented by the bars. Remind the pupils to draw dotted lines from the end of the bar using a ruler. The pupils are to write at the end of each bar, its value.
3. Go through the questions asked about the bar graph.
4. Provide more examples of vertical and horizontal bar graphs and let the pupils practise solving problems using information presented in bar graphs.

Let's Explore

Activity 3: (15 min): Interesting activity

1. Get the pupils to work in pairs on the activity found on page 169 of the Student's Book. Go through the answers with the pupils.

Let's Try...

Activity 4 (25 min): Individual practice

1. Ask the pupils to try out the exercises on pages 170–171 of the Student's Book.

Homework

Ask the pupils to do Workbook 3B—Worksheet 34.

Answers



page 170–171

1. bruger; chicken rice; 55; paratha and broasted chicken; 30.
2. (a) June (b) 30 (c) 20 (d) July (e) June (f) 140

WORK **Sheet** 34

1. (a) False (b) False (c) True
2. (a) 25 (b) chicken (c) mutton—egg (f) 70
3. (a) 53 (b) 20 (c) Rs 5
4. (a) Peter (b) 50 (c) 18 (d) Kelvin
5. (a) 45 (b) Tuesday (c) Friday (d) 15
6. (a) 330 (b) 60 (c) February (d) 680
7. (a) Peter (b) John and Shahid (c) Michael, John and Shahid (d) 50 km

COMPLETING BAR GRAPHS

Suggested Duration

5 periods (200 min)

Learning Outcomes

Pupils should be able to:

- complete a bar graph from given data

Instructions

Let's Learn...

Activity 1 (40 min): Complete a bar graph from the given data

1. Show page 172 of the Student's Book. Teach the pupils how to draw bars as follows:

For vertical bar graphs

- Draw a horizontal dotted line from the scale axis (or y-axis) to the place where the bar is to be drawn. This marks the top of the bar to be drawn.

- Draw vertical lines to complete the bar.
- Take note that the width of the bar must be the same for all bars.

For horizontal bar graphs

- Draw a vertical dotted line from the scale axis (or x-axis) to the place when the bar is to be drawn. This marks the end of the bar to be drawn.
- Draw horizontal lines to complete the bar.
- Remind the pupils that the width of the bars must be the same for all bars.

2. Go through the example on page 172 of the Student's Book.

Activity 2 (40 min): Class practice on drawing bar graphs

1. Write the following information on the board:

'John has 15 marbles. Tom has twice as many marbles as John. Peter has 20 marbles less than Tom. Ali has 5 marbles more than Peter. Rahmat has thrice as many marbles as Ali.'

2. Ask the pupils to draw a horizontal bar graph based on the given information. Advise them to follow the steps below:

Step 1: Draw models to work out the number of marbles each of the boys have.

Step 2: Draw the x-axis and y-axis. Since it is a horizontal bar graph, the scales will be on the y-axis. Label the y-axis as 'No. of marbles' and the x-axis as 'Boys'

Step 3: Draw the scales on the y-axis from 0 to 50 and divided it into small units of 5 each.

Step 4: Write the name of the boys along the x-axis, evenly spaced out.

Step 5: Based on the data found in step 1, draw the bars ensuring that they are all of the same widths.

3. Ask some pupils to show their bar graphs.

4. Ask the following questions based on the data presented in their bar graphs:

How many marbles are there altogether?

Who has the most number of marbles?

Who has the least number of marbles?

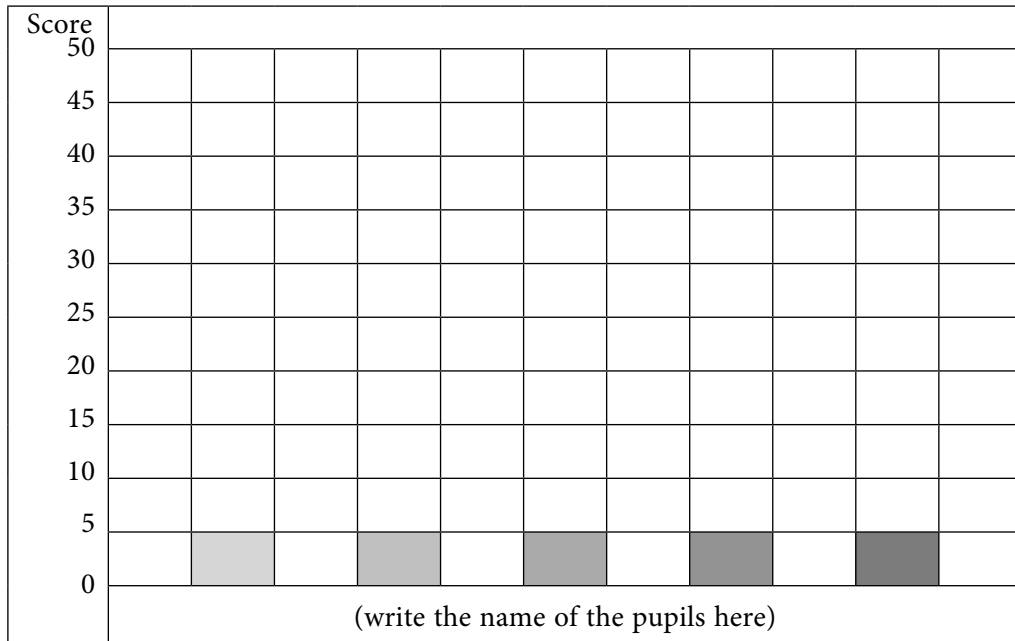
How many more marbles does John have than Peter?

How many fewer marbles does Peter have than Rahmat?

Activity 3 (40 min): Group game to enhance learning

Things you need: Dice and a paper with a blank vertical bar graph

1. Divide the class into groups of 4 or 5. Give each group a dice and a paper with the vertical bar graph drawn on it as follows:



2. Have the pupils write their names along the x-axis under each of the coloured bars.
3. The pupils take turns to roll the dice and record their number. Do this for 8 rounds. Each pupil will add up all the numbers that he obtained from the 8 times of rolling the dice. This will be his total score. The pupils will take turns to draw of their own bar on the bar graph corresponding to his score. The team that completes the bar graph first is the winner.
4. As the pupils work on the activity, go around the class to check that the pupils draw the bar graph correctly. Ask a representative from each group to show their bar graph.

Let's Explore

Activity 4 (40 min): Group exercise to enhance learning

1. Divide the pupils into groups of 4 or 5. Ask them to complete the bar graph on page 173 of the Student's Book and then compare their completed graphs with one another. Everyone should have the same answer. After a while, show the answer to everyone to make sure all have the correct answers.
2. Once everyone has the bar graph completed, the pupils will take turns to ask their friends in the same group one question about the bar graph.

Let's Try...

Activity 5 (15 min): Individual practice

1. Give the pupils each a coloured copy of page 174 of the Student's Book and get them to work on the word bar graph. Ask them to compare their completed bar graph with their partners.

Homework

Ask the pupils to do Workbook 3B—Worksheet 35 and Practice 9.

Answers

Practice 9

- 1 (a) Team D (b) 100 (c) Team C (d) 20 (e) 200
2. (a) 10 kg (b) Sunday (c) 4 kg. (d) 69 kg.
5. (a) 500 (b) 500 (c) 1000

Revision (25 min)

Fun With Maths

1. Ask the pupils to try out the exercise on page 175 of the Student's Book. Encourage the pupils to try drawing bar graphs using their computers at home.
2. Revise and go through pupils' homework.

Unit 10: Fractions

EQUIVALENT FRACTIONS

Suggested Duration

5 periods (200 min)

Learning Outcomes

Pupils should be able to:

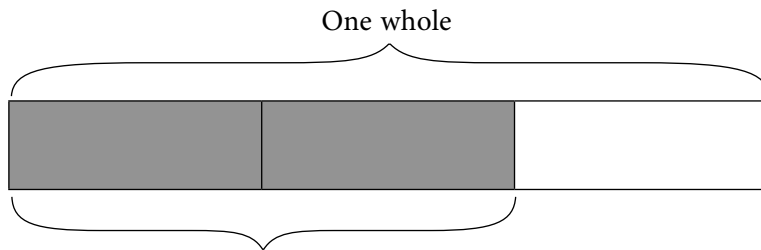
- recognise and name equivalent fractions
- list the first 8 equivalent fractions of a given fraction
- write the equivalent fraction of a fraction given the denominator or the numerator
- express a fraction in its simplest form

Instructions

Let's Learn...

Activity 1 (15 min): Recall the concept of fractions and the terms, numerator and denominator

1. Recall the concept of fraction as equal parts of a whole as follows:

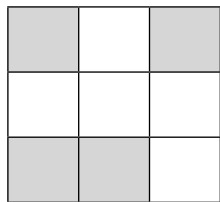


Write the fraction and recall the terms, numerator and denominator as follows:

2 ← numerator, it tells how many equal parts are being talked about

3 ← denominator, it tells how many equal parts something has

2. Show a square divided into 9 equal parts and revise with pupils by asking the following questions:

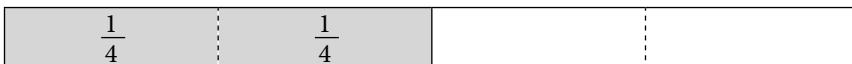


- How many equal parts are there?
- What is the fraction representing one equal part?
- What fraction of the square is shaded?
- What fraction of the square is unshaded?

Activity 2 (25 min): Recognise and name equivalent fractions

Things you need: Strips of paper

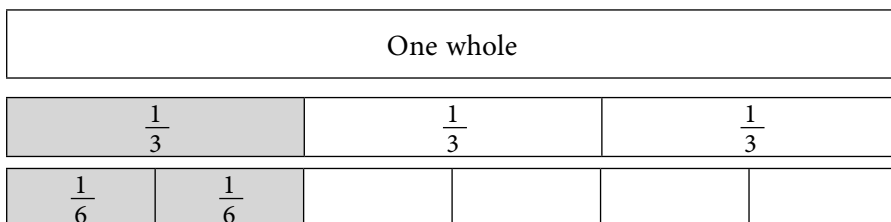
1. Give each pupil a rectangular strip of paper. Guide them as follows:
 - Fold the strip of paper into 2 equal parts.
 - Unfold and shade 1 part.
 - Fold the paper again to obtain 4 equal parts.
 - Unfold the paper and write $\frac{1}{4}$ on each of the two shaded parts as follows:



2. Tell the class that the shaded parts represent $\frac{1}{2}$ (one half) of the paper which is also made of two $\frac{1}{4}$ (2 one fourths). Write on the board:

$$\begin{aligned}\frac{1}{2} &= \frac{1}{4} + \frac{1}{4} \\ &= \frac{2}{4}\end{aligned}$$

3. Explain to the pupils that both $\frac{1}{4}$ and $\frac{2}{4}$ refers to the same shaded part, so they are called equivalent fractions.
4. Next, show 3 rectangular strips of the same size, one to show one whole, another to show one whole divided into 3 equal parts and the third one to show one whole divided into 6 equal parts.



5. Lead the pupils to see that both $\frac{1}{3}$ and the $\frac{2}{6}$ are represented by the same length in the rectangular strips. Therefore $\frac{1}{3}$ is equal to $\frac{2}{6}$. Write:

$$\begin{aligned}\frac{1}{3} &= \frac{1}{6} + \frac{1}{6} \\ &= \frac{2}{6}\end{aligned}$$

6. Ask the pupils that $\frac{1}{3}$ and $\frac{2}{6}$ form another set of equivalent fractions.
7. Provide more examples on the board for the pupils to practise naming equivalent fractions.

Activity 3 (20 min): Class practice

1. Go through the examples on pages 177–178 of the Student's Book.

Let's Explore

Activity 4 (20 min): Pair work to enhance learning

1. Pair up the pupils and ask them to try out the activity on page 179 of the Student's Book.

Let's Learn...(continue)

Activity 5 (40 min): Find equivalent fractions of a given fraction by multiplying the numerator and denominator by the same number

1. Review with the pupils the terms, numerator and denominator.
2. Explain how to find equivalent fractions by multiplying the numerator and denominator by the same number as follows:

$$\begin{array}{ccc} & \times 5 & \\ \frac{2}{3} & = & \frac{10}{15} \\ & \times 5 & \end{array} \quad \text{Therefore, } \frac{2}{3} \text{ is equivalent to } \frac{10}{15} .$$

3. Ask the class, If there are any other equivalent fractions of $\frac{2}{3}$? Show, by changing the multiplying number, another equivalent fraction can be obtained. Tell the class that there is no limit to the number of equivalent fractions one can find for any given fraction.
4. Go through the method of multiplying the numerator and denominator by the same number to find equivalent fractions page 180. Lead the pupils to see that in using the multiplying method, although the numerator and denominator have both increased in value, the value of fraction remains the same. Tell the pupils that the fraction has been 'expanded'. Also point out that there can be no end to the expanding and as long as both the numerator and denominator are multiplied by the same number, the fractions remains unchanged in value.
5. Go through the examples on page 181 of the Student's Book.
6. Provide more examples on the board for the pupils to practise.

Activity 6 (40 min): Find equivalent fractions of a given fraction by dividing the numerator and denominator by the same number

1. Explain how to find equivalent fractions by dividing the numerator and denominator by the same number as follows:

$$\begin{array}{ccc} & \div 2 & \\ \frac{20}{30} & = & \frac{10}{15} \\ & \div 2 & \end{array} \quad \text{Therefore, } \frac{20}{30} \text{ is equivalent to } \frac{10}{15} .$$

2. Ask the class, 'Are there any other equivalent fractions of $\frac{20}{30}$?' Show another equivalent fraction of $\frac{20}{30}$ by dividing the numerator and denominator by 5:

$$\begin{array}{ccc} & \div 5 & \\ \frac{20}{30} & = & \frac{4}{6} \\ & \div 5 & \end{array} \quad \text{Therefore, } \frac{20}{30} \text{ is also equivalent to } \frac{4}{6} .$$

- Refer page 182 of the Student's Book and go through the method of dividing the numerator and denominator by the same number to find equivalent fractions. Lead the pupils to see that in using the dividing method, although the numerator and denominator have both decreased in value, the value of fraction remains the same. Tell the pupils that the fraction has been 'reduced' to a 'simpler' form.
- Ask the pupil what happens when the fraction goes through repeated division. Lead the class to see that when the numerator and denominator can no longer be divided by the same number, the fraction is said to have been reduced to its lowest terms or simplest form. Give a few examples to show repeated division resulting in reducing a fraction into its simplest form.
- Go through the examples on page 183 of the Student's Book.
- Provide more examples on the board for the pupils to practise.

Let's Explore

Activity 7 (20 min): Work in Groups

- Group the pupils into groups of 3 and ask them to discuss among themselves to find the answer to the exercise on page 184 of the Student's Book.

Let's Try...

Activity 8 (20 min): Individual practice

- Ask the pupils try out the exercises on page 185 of the Student's Book.

Homework

Ask pupils to do Workbook 3B—Worksheet 36.

Answers



page 185

- $\frac{3}{6} = \frac{6}{12}$
- (a) 3 (b) 3 (c) 12
- $\frac{6}{8} = \frac{9}{12} = \frac{12}{16} = \frac{15}{20} = \frac{18}{24} = \frac{21}{28} = \frac{24}{32} = \frac{27}{36}$
- (a) $\frac{3}{2}$ (b) $\frac{3}{4}$ (c) $\frac{5}{6}$

WORK **Sheet** 36

- (a) $\frac{2}{4}$ (b) $\frac{6}{9}$ (c) $\frac{9}{12}$ (d) $\frac{8}{10}$
- (a) 4 (b) 3 (c) 12 (d) 5 (e) 8 (f) 6
- (a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{3}$
- (a) $\frac{1}{3}$ (b) $\frac{6}{8} = \frac{3}{4}$ (c) $\frac{6}{9} = \frac{2}{3}$ (d) $\frac{4}{10} = \frac{2}{5}$
- (a) $\frac{5}{6}$ (b) $\frac{2}{7}$ (c) $\frac{2}{6}$

7. (a) $\frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15}$ (b) $\frac{2}{8} = \frac{3}{12} = \frac{4}{16} = \frac{5}{20}$
 (c) $\frac{6}{10} = \frac{9}{15} = \frac{12}{20} = \frac{15}{25}$ (d) $\frac{4}{14} = \frac{6}{21} = \frac{8}{28} = \frac{10}{35}$
 (e) $\frac{4}{16} = \frac{9}{24} = \frac{12}{32} = \frac{15}{40}$ (f) $\frac{8}{18} = \frac{12}{27} = \frac{16}{36} = \frac{20}{45}$
8. $\frac{4}{5} = \frac{8}{10}$; $\frac{2}{10} = \frac{1}{5}$; $\frac{3}{6} = \frac{1}{2}$; $\frac{3}{4} = \frac{9}{12}$; $\frac{3}{12} = \frac{1}{4}$; $\frac{2}{24} = \frac{1}{12}$

COMPARING AND ORDERING FRACTIONS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- compare fractions with respect to half
- compare and order unlike fractions

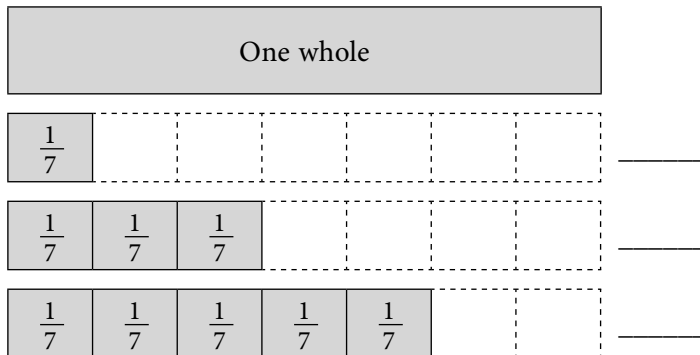
Instructions

Let's Learn...

Activity 1 (15 min): Review comparing and ordering like fractions (i.e. fractions with the same denominators)

1. Recall comparing, and ordering like fractions as follows:

- Draw on the board a rectangular strip to show a whole. Draw 3 more of the same size to show $\frac{1}{7}$ and $\frac{3}{7}$ and $\frac{5}{7}$ as follows:

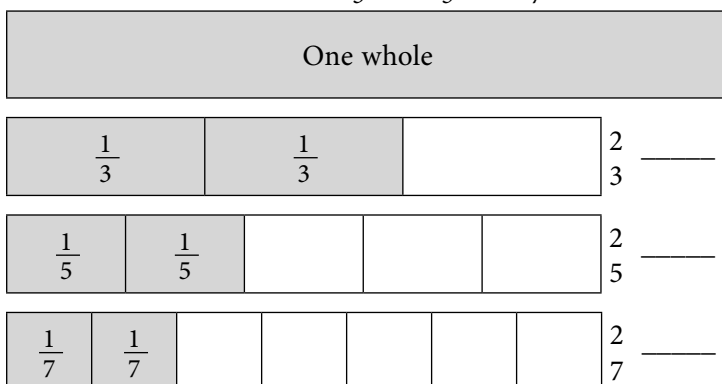


- Ask the class to identify the biggest fraction and the smallest fraction by looking at the rectangular strips.
- Provide a few more examples for different denominators using rectangular strips and test the pupils' understanding.
- Lead the class to see that for fractions with the same denominators, the bigger the numerator, the bigger the fraction.

Activity 2 (25 min): Recall comparing and ordering fractions with different denominators but same numerators

1. Recall comparing and ordering fractions with different denominators but same numerators as follows:

- Draw on the board a rectangular strip to show a whole. Draw 3 more rectangular strips of the same size to show $\frac{2}{3}$ and $\frac{2}{5}$ and $\frac{2}{7}$ as follows:



- Ask the class to identify the biggest fraction and the smallest fraction by looking at the rectangular strips.
 - Point out to the class that the numerators of the above fractions are the same but the denominators are different. Explain to the class that when the denominator gets bigger, it means that the whole is split into more equal parts and therefore each part becomes smaller.
 - Lead the pupils to see that for fractions having the same numerators, the bigger the denominator, the smaller the fractions.
 - Provide a few more examples using rectangular strips to test the pupils' understanding.
2. Give a few more examples of fractions to further illustrate the above without the use of rectangular strips:

Fractions with same denominators (or like fractions) but different numerators

$$\frac{4}{9} \text{ is more than } \frac{2}{9} \text{ and } \frac{7}{12} \text{ is more than } \frac{5}{8}$$

Fractions with different denominators (or unlike fractions) but same numerators

$$\frac{2}{5} \text{ is more than } \frac{2}{7} \text{ and } \frac{5}{6} \text{ is more than } \frac{5}{8}$$

Activity 3 (20 min): Compare and order fractions by drawing rectangular strips

1. Refer the pupils to Example 1 and 2 on page 186 of the Student's Book. Explain to the class the method of drawing rectangular strips to compare and order fractions. Emphasize that this method requires one to draw accurately the size of the equal parts.

- Point out to the pupils that this method may not be suitable for comparing fractions that are very close in value.
- Provide more examples on the board and get some pupils to practice drawing rectangular strips to compare and order fractions.

Activity 4 (20 min): Compare and order fractions by comparing with $\frac{1}{2}$

- Refer the pupils to Example 3 and 4 on page 186 of the Student's Book. Explain to the class the method of comparing with $\frac{1}{2}$. Point out to the pupils that this method can be used to find out whether a fraction is more or less than $\frac{1}{2}$.
- Give some examples of fractions that are less than and more than $\frac{1}{2}$ and explain as follows:

$\frac{3}{8}$ is less than $\frac{1}{2}$ because 3 is less than half of 8

$\frac{3}{7}$ is less than $\frac{1}{2}$ because 3 is less than half of 7

$\frac{5}{8}$ is more than $\frac{1}{2}$ because 5 is more than half of 8

$\frac{4}{7}$ is more than $\frac{1}{2}$ because 4 is more than half of 7

- Refer to Example 5 and 6 of page 187 of the Student's Book.

Activity 5 (20 min): Compare and order fractions by listing their equivalent fractions

- Refer the pupils to Example 6, 7 and 8 of the Student's Book. Explain to the class the method of listing the equivalent fractions. Ask the pupils to recall how to find equivalent fractions by multiplying the numerator and denominator with the same number.
- Point out to the pupils that this method of comparison requires the equivalent fractions to have the same denominator.

Let's Explore

Activity 6 (10 min): Thinking activity to enhance understanding

- Ask the pupils to think through the *Let's Explore* exercise on page 190 of the Student's Book and then share their answers with their partners.

Let's Try...

Activity 7 (10 min): Individual practice

- Ask pupils to do the exercises on page 190 of the Student's Book.

Homework

Ask pupils to do Workbook 3B—Worksheet 37.

Answers



page 190

- (a) < (b) > (c) < (d) > (e) < (f) >

2. (a) $\frac{1}{3}, \frac{3}{5}, \frac{1}{2}$ (b) $\frac{1}{4}, \frac{2}{7}, \frac{1}{2}$ (c) $\frac{1}{6}, \frac{2}{3}, \frac{3}{4}$ (d) $\frac{1}{2}, \frac{3}{4}, \frac{4}{5}$

WORK *Sheet* 37

2. (a) $3; \frac{3}{4}$ and $7; \frac{7}{8}$ (b) $3; \frac{3}{10}$ and $2; \frac{2}{5}$ (c) $4; \frac{4}{12}$ and $4; \frac{4}{8}$
3. (a) $\frac{3}{5}$ (b) $\frac{4}{7}$ (c) $\frac{1}{2}$ (d) $\frac{5}{6}$ (e) $\frac{5}{8}$ (f) $\frac{1}{2}$ (g) $\frac{7}{10}$
4. (b) smaller — greater = <
 (c) greater — smaller = >
 (d) greater — smaller = >
5. (a) 6, 9, 10, 15 : 9, 10 : $\frac{3}{4}$ is smaller
 (b) 4, 6, 8, 10, 12, 14 :
 8, 12, 16, 20, 24, 28 :
 14, 12 : $\frac{2}{3}$ is greater
6. (a) $\frac{3}{5}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{2}{5}$
7. (a) $\frac{1}{3}, \frac{1}{2}, \frac{3}{4}$ (b) $\frac{1}{2}, \frac{3}{5}, \frac{7}{10}$
 (c) $\frac{1}{4}, \frac{2}{3}, \frac{5}{6}$ (d) $\frac{2}{6}, \frac{3}{8}, \frac{7}{12}$

ADDING RELATED FRACTIONS

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- add two related fractions within one whole

Instructions

Let's Learn...

Activity 1 (40 min): Add related fractions

1. Review with the pupils how to find equivalent fractions by multiplying the numerator and denominator with the same number.
2. Explain to the class that related fractions are fractions that relate to the same whole object. Give some word problem examples to illustrate the meaning of related fractions:
 - Ali ate $\frac{1}{2}$ of the cake and John ate $\frac{1}{4}$ of the cake.
 ($\frac{1}{2}$ and $\frac{1}{4}$ are related fractions)

- Tom gave $\frac{1}{3}$ of his stamps to his brother, $\frac{1}{5}$ to his sister and $\frac{1}{6}$ to his friend. ($\frac{1}{3}$, $\frac{1}{5}$ and $\frac{1}{6}$ are related fractions)
3. Explain to the class that to add related fractions, the denominators of fractions must be the same. If the denominators are different, then they must be made the same by converting one or both fractions into their equivalent fractions such that the denominators are the same. You may tell the class that to add related fractions, the method is to convert the fractions into like fractions.
 4. Show the adding of related fractions as follows ;
Write on the board: $\frac{1}{6} + \frac{1}{12}$ Convert $\frac{1}{6}$ to a fraction that has a denominator of 12:
Therefore the fraction has been converted to a like fraction: $\frac{2}{12}$
→ Denominator $\times 2 \rightarrow 6 \times 2 = 12$
→ Numerator $\times 2 \rightarrow 1 \times 2 = 2$
Add the like fractions $\rightarrow \frac{2}{12} + \frac{1}{12} = \frac{3}{12}$
 5. Provide some examples on adding related fractions to further strengthen pupils' understanding.
 6. Provide some word problems on adding related fractions and get the pupils to work on them on the board.

Activity 2 (20 min): Class practice

1. Go through the examples on pages 191–192 of the Student's Book.

Let's Try...

Activity 3 (20 min): Individual practice

1. Ask pupils to do the exercises on page 193 of the Student's Book.

Homework

Ask pupils to do Workbook 3B—Worksheet 38.

Answers



page 193

(a) $\frac{8}{12} = \frac{2}{3}$ (b) $\frac{5}{6}$ (c) $\frac{6}{10} = \frac{3}{5}$

WORK **Sheet** 38

1. (a) 4, 7 (b) $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$ (c) $\frac{4}{5}$ (d) $\frac{5}{6}$
(e) $\frac{5}{9}$ (f) $\frac{7}{12}$ (g) $\frac{7}{8}$ (h) $\frac{3}{4}$

SUBTRACTING RELATED FRACTIONS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- subtract two related fractions within one whole

Instructions

Let's Learn...

Activity 1 (40 min): Subtract related fractions

1. Revise, with the pupils how to find equivalent fractions by multiplying the numerator and denominator with the same number.
2. Recall, with the pupils that, related fractions are fractions that relate to the same whole object. Give some word problem examples to illustrate the meaning of related fractions:
 - Ali ate $\frac{1}{2}$ of the cake and John ate $\frac{1}{4}$ of the cake.
($\frac{1}{2}$ and $\frac{1}{4}$ are related fractions)
 - Tom gave $\frac{1}{3}$ of his stamps to his brother, $\frac{1}{5}$ to his sister and $\frac{1}{6}$ to his friend. ($\frac{1}{3}$, $\frac{1}{5}$ and $\frac{1}{6}$ are related fractions)
3. Explain to the class that subtracting related fractions is similar to adding related fractions and that is, the fractions must be converted into like fractions i.e. with the same denominators. To convert fractions into like fractions, one can use the multiplying method.
4. Show the subtraction of related fractions as follows ;
Write on the board: $\frac{1}{6} - \frac{1}{12}$
Convert $\frac{1}{6}$ to a fraction that has a denominator of 12:
Therefore the fraction has been converted to a like fraction: $\frac{2}{12}$
 - Denominator $\times 2$ → $6 \times 2 = 12$
 - Numerator $\times 2$ → $1 \times 2 = 2$Subtract the like fractions → $\frac{2}{12} - \frac{1}{12} = \frac{1}{12}$
5. Provide some examples on subtracting related fractions to further strengthen the pupils' understanding.
6. Provide some word problems on subtracting related fractions and ask the pupils to work on them on the board.
7. Remind the pupils to always subtract from the bigger fraction.

Activity 2 (20 min): Class practice

1. Go through with the class the examples on pages 193–194 of the Student's Book.

Let's Try...

Activity 3 (20 min): Individual practice

1. Ask pupils to do the exercises on page 196 of the Student's Book.

Homework

Ask pupils to do Workbook 3B—Worksheet 39 and Practice 10.

Answers



page 196

(a) $\frac{2}{9}$ (b) $\frac{3}{10}$ (c) $\frac{1}{6}$

WORK 39

1. (a) $\frac{1}{3}$ (b) $\frac{1}{4}$ (c) $\frac{3}{8}$ (d) $\frac{4}{7}$ (e) $\frac{2}{10} = \frac{1}{5}$
(f) $\frac{3}{12} = \frac{1}{4}$ (g) $\frac{3}{12} = \frac{1}{4}$ (h) $\frac{2}{12} = \frac{1}{6}$

Practice 10

2. greatest $\frac{4}{5}$; smallest $\frac{1}{10}$
3. (a) $\frac{4}{5}$, $\frac{7}{10}$, $\frac{1}{2}$ (b) $\frac{5}{6}$, $\frac{2}{3}$, $\frac{1}{4}$ (c) $\frac{5}{6}$, $\frac{1}{2}$, $\frac{3}{7}$
4. (a) $\frac{7}{8}$ (b) $\frac{8}{9}$ (c) $\frac{5}{8}$ (d) $\frac{1}{9}$

Revision (40 min)

Revise and go through pupils' homework.



Revision 1 (Workbook 3B)

2. (a) 12 (b) 3 (c) 3 (d) 5 (e) 2
(f) 6 (g) 2 (h) 8 (i) 24 (j) 3
3. (a) 1 l 150 ml (b) 1 l 590 ml (c) 2 l 350 ml
(d) 2 l 590 ml (e) 1 l 320 ml (f) 1 l 40 ml
4. (a) $\frac{1}{4}$, $\frac{1}{2}$, $\frac{7}{12}$ (b) $\frac{1}{8}$, $\frac{1}{2}$, $\frac{3}{4}$ (c) $\frac{1}{11}$, $\frac{1}{7}$, $\frac{1}{3}$ (d) $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$

6. (a) 5l 40 ml (b) 6007 ml (c) 4l 508 ml (d) 3401 ml
 (e) 9l (f) 7035 ml (g) 8l 36 ml (h) 3105 ml
7. (b) 4 (c) 5 (d) 4
8. (a) True (b) True (c) False (d) True
9. (a) $\frac{7}{12}$ (b) $\frac{3}{4}$ (c) $\frac{1}{2}$ (d) $\frac{1}{3}$
 (e) $\frac{5}{9}$ (f) $\frac{2}{3}$ (g) $\frac{3}{4}$ (h) $\frac{1}{12}$
10. (a) $\frac{3}{12} = \frac{1}{4}$ (b) $\frac{6}{10} = \frac{3}{5}$ (c) $\frac{2}{9}$ (d) $\frac{3}{6} = \frac{1}{2}$
 (e) $\frac{9}{10}$ (f) $\frac{8}{12} = \frac{2}{3}$ (g) $\frac{5}{8}$ (h) $\frac{1}{12}$



Revision 2 (Workbook 3B)

1. (a) $\frac{1}{5}$ and $\frac{2}{10}$ (b) $\frac{4}{6}$ and $\frac{8}{12}$ (c) $\frac{4}{8}$ and $\frac{2}{4}$
2. (a) $\frac{1}{8}, \frac{1}{2}, \frac{7}{8}$ (b) $\frac{1}{3}, \frac{5}{12}, \frac{3}{4}$
 (c) $\frac{1}{2}, \frac{6}{10}, \frac{4}{5}$ (d) $\frac{7}{12}, \frac{2}{3}, \frac{5}{6}$
3. (a) 60 (b) John (c) 10
4. (a) 25 (b) Rabia (c) 275 (d) Rs. 125
6. (a) John (b) Mary (c) 20 (d) 160
7. (a) Friday (b) Wednesday, Saturday (c) Monday (d) 300
8. (a) 12 (b) 6 (c) 3 (d) 35 (e) 87
9. (a) 3 (b) 5 (c) 1 (d) $\frac{1}{2}$ (e) 9 (f) 15
10. (a) ml (b) l (c) l (d) ml (e) l (f) l
11. (a) 3025 (b) 4350 (c) 1405 (d) 6045
 (e) 5, 5 (f) 7, 650 (g) 2, 940 (h) 6, 15
12. 1300 ml or 1 l 300 ml
13. 2200 ml or 2 l 200 ml
14. 5200 ml or 5 l 200 ml
15. 3480 ml or 3 l 480 ml

Unit 11: Time

TELLING TIME

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- tell and write time to 1 minute
- use the terms 'past' and 'to'

Instructions

Let's Learn

Activity 1 (20 min): Review telling and writing time to 5 minutes

Things you need: A real clock.

1. Revise telling and writing time to 5 minutes.
2. Show a real clock and get a pupil to adjust the hands to show 4 o'clock. Move the minute hand from 12 to 1 and explain that this represents a time of 5 minutes. As you move the minute hand from 12 to 1, 1 to 2, 2 to 3 ...and 11 to 12, lead the pupils to count in fives to tell the time. Write on the board the time accordingly as follows:
4.05 read as 'four o five'
4.10 read as 'four ten'
4.15 read as 'four fifteen'
4.20 read as 'four twenty'
4:25 read as 'four twenty five'
4.30 read as 'four thirty'
4.35 read as 'four thirty five'
4.40 read as 'four forty'
4.45 read as 'four forty-five'
4.50 read as 'four fifty'
4.55 read as 'four fifty-five'
5.00 read as 'five o'clock'
3. Lead the class to see that as the minute hand points to a number on the clock, the time in minutes can be obtained by multiplying the number by 5. For example, if the minute hand points to the number 7, then the time is $7 \times 5 = 35$ minutes. Explain further that each number on the clock is a multiple of 5.

4. Ask 3 pupils to come forward. One pupil will adjust the hands to show a time to 5 minutes, another pupil will read out loud the time shown and the third pupil will write the time on the board. Ask the rest of the class to check if the time is correctly shown and written. The 3 pupils take turns to try out each other's role. Repeat this with other groups of pupils.

Activity 2 (20 min): Telling and writing time to 1 minute and using terms 'past' and 'to'

Things you need: A real clock.

1. Ask the class to guess the number of markings on the face of the clock. Tell the class that there are 60 markings and each marking represents 1 minute.
2. Display the face of a clock showing the time 6.08. Lead the class to read the time by counting the number of markings and reading it off starting from 6.05 till it reaches 6.08 as follows:

6.05 read as six o five



6.06 read as six o six



6.07 read as six o seven



6.08 read as six o eight

3. Display more faces of clock showing different times. For each example, get one pupil to write the time on the board and another pupil to read the time aloud.

Activity 3 (25 min): Use the term 'past' and 'to' to tell time

Things you need: A real clock.

1. Show a real clock and adjust the time to show 7.09. Ask the class, 'What time is it?' Tell the class that another way of telling time is to use the term 'past'. Explain that 7.09 means 9 minutes after 7 o'clock, so we say the time is '9 minutes **past** 7'.
2. Show more examples of time with the minute hand pointing anywhere from 1 to 29 minutes. For each example, ask one pupil to read the time using the term 'past' and another pupil to write the time on the board also using the term 'past'. Ensure that all pupils have a chance to practise telling and writing time using the term 'past'.
3. Adjust the clock to show the time 8.52. Ask the class, 'What time is it?' Tell the class that another way of telling time is to use the term 'to'. Explain that 8.52 means 8 before 9 o'clock, so we say the time is '8 minutes **to** 9'. Explain further that to obtain 8, simply count the number of minutes that will bring the time to the next hour.

- Show more examples of time with the minute hand pointing anywhere from 31 to 59 minutes. For each example, ask one pupil to read the time using the term 'to' and another pupil to write the time on the board also using the term 'to'. Ensure that all pupils have a chance to practise telling and writing time using the term 'to'.
- Ask the pupils, 'When do you use the term 'past' and the term 'to'?' Point out that when the time involves 1 to 29 minutes, i.e. the first half of the hour, the term 'past' should be used and when the time involves 31 to 59 minutes, the term 'to' should be used. Tell the pupils that for time showing 30 minutes, 'half-past' is used.
- Go through with the pupils the examples on pages 198–199 of the Student's Book.

Let's Try...

Activity 4 (15 min): Individual practice

- Ask the pupils to try out the exercises on page 200 of the Student's Book.

Homework

Ask the pupils to do Workbook 3B—Worksheet 40.

Answers



page 200

- (a) 27 (b) 20 (c) 8 (d) 14

WORK *Sheet* 40

- (a) 10 min past 2 or 10:02 (b) 2 min to 3 or 2 : 53
 (c) 23 min past 8 or 8 : 23 (d) 14 min to 10 or 9 : 44
 (e) 2 min past 7 or 7 : 02 (f) 16 min past 6 or 6 : 16
- (a) 15 (b) 5 (c) 15 (d) 5 (e) 3 (f) 5

DURATION

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- find the duration of a time interval
- measure time in hours and minutes
- find the starting time/finishing time

Instructions

Let's Learn

Activity 1 (40 min): Find the duration of a time interval

1. Recall that there are 60 minutes in 1 hour and the minute hand makes one complete round in 1 h. Write $1 \text{ h} = 60 \text{ min}$.
2. Use page 201 of the Student's Book to introduce the concept of using a time-line to solve word problems involving time. Explain that to find the duration of time, the starting and finishing time must first be reflected on the time-line.
3. Use page 202 of the Student's Book to introduce the concept of finding the duration by first finding part of the duration that adds up to the next hour and then continue finding the remaining duration that adds up to the finishing time. Add both durations to arrive at the answer.
4. Provide more word problems on finding the duration of time given the starting and finishing times.
5. Pair up the students and get each pair to test each other using the following examples:
One pupil tells the other pupil the starting and finishing times for the following activities:
 - School starts and school ends
 - Recess starts and recess ends
 - Dinner starts and dinner ends
 - Movies starts and movie ends
 - Sleep time and waking time

The other pupil will find the duration by first drawing the time-line and then the breaking up the time by the hour.

Have the pupils exchanged roles.

Activity 2 (20 min): Measure time in hours and minutes

1. Remind the class that 1 hour is equal to 60 minutes. Write 85 min on the board and ask the class to express it in hour and minutes. Explain that every 60 min makes 1 hour, so $85 \text{ min} = 60 \text{ min} + 25 \text{ min} = 1 \text{ h } 25 \text{ min}$.
2. Provide more examples on the board for the pupils to practise expressing time in hours and minutes.
3. Tell the pupils that one needs to change the time into hours and minutes only when the number of minutes is 60 or more.

Activity 3 (20 min): Find the starting time/finishing time

1. Go through the examples on pages 203–205 of the Student's Book. Note that each example provides a different way of finding the starting or finishing time given a different duration. Explain as follows:

Examples No. 4 and 6 - Duration is expressed exactly in hours

To find *finishing time*, count forwards the duration in hours from the starting time. The minute portion remains unchanged.

To find *starting time*, count backwards the duration in hours from the finishing time. The minute portion remains unchanged.

Example 5 and 7-Duration is expressed in minutes and less than 1 hour

To find finishing time, count forwards part of the duration in minutes from the starting time so that it brings the time to the next hour and then starting from this next hour, count forward further the remaining part of the duration in minutes.

To find the starting time, count backwards part of the duration in minutes from the finishing time so that it brings the time to the earlier hour and then from this earlier hour, count backwards further the remaining part of the duration in minutes.

Example 8 - Duration is expressed in hour and minutes

To find finishing time, count forward the hour portion of the duration and then count forward further the minute portion of the duration.

To find the starting time, count backwards the hour portion of the duration and then count backwards further the minute portion of the duration.

2. For each of the above variations, provide more examples for the pupils to practise.

Let's Think

Activity 4 (20 min): Challenging activity

1. Ask the pupils to think through the *Let's Think* question on page 205 of the Student's Book. Ask some pupils to share their answers with the class before telling them the correct answers.

Let's Try...

Activity 5 (20 min): Individual practice

1. Ask the pupils to try out the exercises on page 207 of the Student's Book. Go around checking the pupils' answers and provide individual guidance where necessary.

Homework

1. Ask the pupils to work on the *Let's Explore* activity on page 206 of the Student's Book. (Need to search the internet)
2. Ask the pupils to do Workbook 3B—Worksheet 41.

Answers



page 207

- (a) 5, 2 (b) 10,11 (c) 10:40

WORK *Sheet* 41

- (a) 30 min (b) 40 min (c) 1 hr. 5 min (d) 1 hr. 15 min
- (a) 2 O'clock (b) 25 mins past 2 (2 : 25)
c. 7 O'clock (d) 15 mins past 10 (10 : 15)
- 6 pm 5. 10 pm 6. 1 : 45 pm

CONVERSION OF HOURS AND MINUTES

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- convert time in hours and minutes to minutes only, and vice versa

Instructions

Let's Learn

Activity 1 (40 min): Convert time in hours into minutes and vice versa

Things you need: Two real clocks.

- Show what is 1 hour by turning the minute hand one round. Bring to the pupils' attention that the minute hand has moved through 60 mins. Write $1 \text{ h} = 60 \text{ min}$.
- Turn the minute hand 2 rounds and ask the class,
 - 'How many hours does 2 rounds of the minute hand represent?'
 - 'How many minutes does 2 rounds of the minute hand represent?'
- Lead the class to see that when hours are converted to minutes, the answer is in multiples of 60. For example:

$$1 \text{ h} = 60 \times 1 = 60 \text{ min}$$

$$2 \text{ h} = 60 \times 2 = 120 \text{ min}$$

$$3 \text{ h} = 60 \times 3 = 180 \text{ min}$$

$$4 \text{ h} = 60 \times 4 = 240 \text{ min}$$

$$5 \text{ h} = 60 \times 5 = 300 \text{ min}$$

$$6 \text{ h} = 60 \times 6 = 360 \text{ min}$$

$$7 \text{ h} = 60 \times 7 = 420 \text{ min}$$

$$8 \text{ h} = 60 \times 8 = 480 \text{ min}$$

$$9 \text{ h} = 60 \times 9 = 540 \text{ min}$$

$$10 \text{ h} = 60 \times 10 = 600 \text{ min}$$

- Test the pupils' understanding by giving a time in minutes (multiples of 60) and asking them to convert it to hours. Pupils should use the following method:
 $(?) \times 60 = (\text{given duration in minutes})$
- Show two clocks with the time adjusted to show two different times (o'clock times). Explain that one clock represents the starting time while the other represents the finishing time. Ask the pupils,
 - 'What is the duration in hours represented by the two times?'
 - 'What is the duration in minutes represented by the two times?'
- Ask two pupils to adjust the clocks to show another set of starting and finishing times (o'clock times only) while two other pupils calculate the duration, one in hours and the other in minutes.

Activity 2 (40 min): Convert time in hours and minutes, to minutes only and vice versa

Things you need: Two real clocks.

- Explain to the class the following steps to convert time in hours and minutes to minutes only and vice versa:

From hours and minutes to minutes only

- Convert the hours into minutes
- Add the minutes

From minutes only to hours and minutes

- Convert part of the minutes into multiples of 60 to form the hours portion.
 - Combine the hour's portion and remaining portion of the minutes.
- Using the two real clocks, go through the examples on pages 208–211 of the Student's Book.
 - Ask two pupils to adjust the clocks to show a set of starting and finishing times (time involving hours and minutes) while two other pupils calculate the duration, one in hours and the other in minutes.

Let's Try...

Activity 3 (40 min): Individual practice

- Ask the pupils to try out the exercises on page 212 of the Student's Book. Ask some pupils to share their answers with the rest of the class.

Homework

Ask the pupils to do Workbook 3B—Worksheet 42.

Answers



page 212

- (a) 160 min (b) 275 min (c) 310 min

2. (a) 2 hr. 55 m (b) 3 hr. 25 min (c) 2 hr. 10 min
(d) 2 hr. 35 min (e) 3 hr. 55 min
3. (a) 1 hr. 35 min (b) 4:45 pm.

WORK *Sheet* 42

1. (a) 80 (b) 195 (c) 168 (d) 276 (e) 189
2. (a) 1 hr 35 min (b) 2 hr 50 min (c) 4 hr 13 min
(d) 2 hr 29 min (e) 3 hr 37 min

ADDITION AND SUBTRACTION OF TIME

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- add and subtract time

Instructions

Let's Learn

Activity 1 (20 min): Add time

1. Write '2 h 20 min + 3 h 30 min=?' on the board and explain that the steps involved in adding times are:
 - Add the hours first.
 - Then add the minutes.
2. Go through the examples on pages 213–215 of the Student's Book. For each example, display the word problem. Explain each of the examples as follows:
Example No. 1 and 2
These are examples of simple addition of times with no renaming.
Example No. 3 and 4
These are examples of addition of times involving renaming the minutes into hours and minutes.
3. Provide more examples of word problems for the pupils to practise.

Activity 2 (20 min): Game to enhance learning

Things you need: Time cards with time in hours and minutes written on each card

1. Display 2 time cards. Every pupil must add the times shown on the cards. Whoever gets the correct answer first gets to keep the two cards. Play this for about 20 rounds. The winner is the one with the most number of cards.

Activity 3 (40 min): Subtract times

Things you need: Time cards with time in hours and minutes written on each card

1. Write '4 h 20 min – 2 h 15 min =?' on the board and explain that the steps involved in adding times are:

- Subtract the hours first.
- Then subtract the minutes.

2. Go through the examples on pages 216–217 of the Student's Book. For each example, display the word problem. Explain each of the examples as follows:

Example No. 5 and 6

These are examples of simple subtraction of times with no borrowing and regrouping into minutes.

Example No. 7 and 8

These are examples of subtraction involving borrowing of 1 hour from the hour portion and regrouping it into 60 minutes.

3. Provide more examples of word problems for the pupils to practise.

Activity 4 (20 min): Game to enhance learning

Things you need: Time cards with time in hours and minutes written on each card

1. Display 2 'time' cards and every pupil is to subtract the smaller time from the bigger time shown. Whoever gets the correct answer first gets to keep the two cards. Play this for about 20 rounds. The winner is the one with the most number of cards.

Let's Try...

Activity 5 (20 min): Individual practice

1. Ask the pupils to try out the exercises on page 218 of the Student's Book. Ask some pupils to share their answers with the rest of the class.

Homework

Ask the pupils to do Workbook 3B—Worksheet 43.

Answers



page 218

- (a) 2 hr. 30 min (b) 1 hr. 25 min
(c) 50 min (d) 6 hr. 20 min

WORK **Sheet** 43

1. (b) 5 hr 52 min (c) 4 hr 37 min (d) 2 hr 22 min
 (e) 1 hr 14 min (f) 2 hr 15 min (g) 2 hr 10 min
2. (a) 4 hr 15 min (b) 16 hr 3 min (c) 5 hr 22 min

3. (a) 1 hr 35 min (b) 2 hr 34 min (c) 0 hr 38 min
 4. 3 hr 10 min 5. 2 hr 21 min 6. 59 min 7. 2 hr 34 min

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- solve word problems involving the addition and subtraction of time given in hours and minutes

Instructions

Let's Learn

Activity 1 (40 min): Solve word problems involving addition and subtraction of time given in hours and minutes

1. Recall the steps in adding and subtracting times. (Add or subtract the hours first followed by the minutes.)
2. Display the word problems on pages 219–221 of the Student's Book without the solutions. Ask the pupils to read each word problem a few times to help analyse the question. Ask leading questions to help the pupils work through the steps. Time-lines should be drawn to provide pictorial representation of the problems.
3. All the examples involve 2 steps: (i) Addition followed by subtraction or (ii) Subtraction followed by addition.
4. Provide more examples for the pupils to practise.

Activity 2 (20 min): Interesting game to enhance learning

Things you need: 4 blue time cards and 4 red time cards with time in hours and minutes written on each card

1. Pair up the pupils. Each pair is given a set of 4 blue time cards and 4 red time cards. The pair is to work together to add up the times shown on all the blue cards and all the times shown on the red cards. After that, they are to find the difference in the total time represented by the blue and red cards. They are to write their answers in the table below:

Total time on blue cards	Total time on red cards	Difference in time

2. The group which finishes first with all the correct answers wins the game.

Let's Try...

Activity 3 (20 min): Individual practice

1. Ask the pupils to try out the exercises on page 222 of the Student's Book. Ask some pupils to share their answers with the rest of the class.

Homework

Ask the pupils to do Workbook 3B—Worksheet 44 and Practice 11.

Answers



page 222

- | | | |
|------------------|------------------|------------------|
| (1) 6 hr. 30 min | (2) 5 hr. 35 min | (3) 1 hr. 55 min |
| (4) 4 hr. 20 min | (5) 5 hr. 40 min | (6) 14 hrs. |

WORK *Sheet* 44

1. 1 hr 35 min
2. 2 hr 10 min
3. 10 hr 20 min
4. 1 hr 1 min
5. 11 hr 27 min
6. 2 hr 33 min

***P* Practice 11**

1. (a) 10 : 00 am (b) 11 : 10 am (c) 8 : 35 am (d) 8 : 20 am
2. (a) 9 : 15 (b) 6 : 40 (c) 3 : 30 (d) 6 : 53 (e) 4 : 47
3. (a) 155 min (b) Fatimah (c) Lilly-3 hr 20 min
4. (a) 1 hr 30 min (b) 70 min (c) Soccer—20 min
5. 8 : 30 pm
6. (a) 45 min (b) 60 min or 1 hr
7. (a) 7 hr 10 min (b) Saturday (c) 2 hr 40 min
8. (a) 15 min (b) 1 hr (c) 120 min (d) 75 min

Revision (40 min)

Revise and go through pupils' homework.

Unit 12: Angles

RECOGNIZING ANGLES

Suggested Duration

2 periods (80 min)

Learning Outcomes

Pupils should be able to:

- recognise angle as an amount of turning
- identify angles in 2-D and 3-D objects.
- identify angles in 2-D figures

Instructions

Let's Learn...

Activity 1 (20 min): Recognize angles

Things you need: Ice-cream sticks, fastener, cut-out shapes of rectangle, square, triangle, hexagon, pentagon and octagon

1. Show two ice-cream sticks fastened at the ends. Move the sticks such that they form a straight line. Then move one of the sticks slowly and tell the class that an 'angle' is being formed. Explain to the pupils that an 'angle' is formed at the point where two lines meet.
2. Place two ice-cream sticks parallel to each other. Ask the class, 'Is there an angle formed by the two sticks?' Lead the class to see that since the two parallel sticks do not meet, no angle is formed.
3. Show some cut-out shapes and ask pupils to come forward to point out where the angles are. For each shape, count the number of angles.
4. Go through the examples on pages 224–225 of the Student's Book.

Activity 2 (20 min): Find angles in things around

1. Show a book and tell the class that angles are formed at the corners of the book. Show other items that have angles.
2. Go through examples of the things around us that have angles shown on page 226 of the Student's Book.

Let's Explore

Activity 3 (20 min): Interesting activity to enhance learning

1. Ask the pupils to look around for items that form angles. Tell them to write down as many items as possible. Ask some pupils to share what they have found with the class.

Let's Try...

Activity 4 (20 min): Individual practice

1. Ask the pupils to try out the exercises on page 227 of the Student's Book.

Homework

Ask the pupils to do Workbook 3B—Worksheet 45.

Answers



page 227

- (1) C, B (2) (a) A4; B6; C4 (b) A4; B6; C4

WORK **45**

1. b, c, f
2. (a) B; (b) C; (c) B; (d) C
3. A=5 B=4 C=3, D=4, E=8 F=4
4. No ans needed

RIGHT ANGLES

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- identify right angles
- identify angles greater than/ smaller than a right angle

Instructions

Let's Learn...

Activity 1 (40 min): Identify right angles

Things you need: A4 size paper

1. Introduce the right angle to the pupils according to the instructions given on page 228 of the Student's Book.
2. Ask every pupil to share an example of a right angle in things around them.
3. Go through the examples on page 229 of the Student's Book. Have pupils to present their answers to the class.

Let's Think

Activity 3 (20 min): Challenging exercises

1. Ask the pupils to try on the challenging exercises on page 230 of the Student's Book and share their answers with their partners.

Let's Try...

Activity 4 (20 min): Individual practice

1. Ask the pupils to try out the exercises on page 231 of the Student's Book. Remind them to use the addition and subtraction algorithms in working out the answers.

Homework

Ask the pupils to do Workbook 3B—Worksheet 46 and Practice 12.

Answers



page 231

s; qp; rt.

WORK *Sheet* 46

3. (a) obtuse (b) obtuse (c) acute
4. (a) smaller (b) smaller (c) larger
(d) larger (e) equal (f) equal
5. A: right; B: obtuse; C: right; D: acute; E: acute

***P* practice 12**

1. (a) 6 (b) 5 (c) 5
2. 8; 2; 2
3. Triangle C

Revision (40 min)

1. Revise and go through pupils' homework.

Unit 13: Perpendicular and Parallel Lines

PERPENDICULAR LINES

Suggested Duration

6 periods (240 min)

Learning Outcomes

Pupils should be able to:

- identify and name perpendicular lines
- draw perpendicular lines on square grids

Instructions

Let's Learn...

Activity 1 (40 min): Identify and name perpendicular lines

1. Recall with the pupils what a right angle is. Draw on the board 2 intersecting lines that form a right angle. Tell the pupils that when 2 lines intersect to form a right angle, they are called 'perpendicular lines'. Write the term on the board and get the class to repeat it after you.
2. Draw on the board a pair of perpendicular lines and name them as AB and CD. Label the right angle using the right angle symbol. Ask the class, 'How are perpendicular lines written?' Write the symbol ' \perp ' and lead the class to learn writing perpendicular lines as 'AB \perp CD'.
3. Write on the board pairs of perpendicular and non-perpendicular lines and ask the pupils to identify them.
4. Go through the examples on pages 234–235 of the Student's Book.

Let's Explore

Activity 2 (40 min): Identify perpendicular lines in things around

1. Divide the class into groups to work on the *Let's Explore* activity on page 235 of the Student's Book. Within a time of 20 minutes, get the groups to identify items around that have perpendicular lines. Get the groups to write down the items identified and have a leader in each group to read out the items. The group with the most number of items is the winner.

Activity 3 (40 min): Draw perpendicular lines on square grids

Things you need: Square grid papers

1. Display a square grid paper to show the pupils what a square grid is.

2. Go through the steps in drawing perpendicular lines on square grids using the step-by-step explanations given on pages 236–238 of the Student's Book. Each of the examples illustrate a particular method of drawing perpendicular lines as follows:

Example 1

Draw a pair of intersecting horizontal and vertical lines using the grid lines of the square grid.

Example 2

First draw a square with the given line as one of the diagonals of the square and then draw the other diagonal to form a pair of perpendicular lines

Example 3

First draw a rectangle with the given line as one of the diagonals of the rectangle. Next, draw another rectangle of the same size but rotated through a right angle (either clockwise or anticlockwise direction). Then, draw one of the diagonals of the second rectangle to form a pair of perpendicular lines.

Activity 4 (40 min): Identify perpendicular lines drawn on square grids

1. Display on the OHP pairs of perpendicular and non-perpendicular lines drawn on a square grid. Teach the pupil how to find out whether the lines are perpendicular by the following methods:

Method 1

If the pair of lines is formed by the vertical and horizontal grid lines of the square grids, then the lines are perpendicular. If one of the lines is a vertical or horizontal grid line but the other line is neither a vertical or horizontal grid line, then the lines are not perpendicular.

Method 2

If the pair of lines is the diagonals of 2 squares positioned side by side and the lines are pointing in different direction, then they are perpendicular lines, otherwise they are not.

Method 3

If the pair of lines are the diagonals of 2 similar rectangles with the rectangles positioned such that they are at right angle to each other, and the lines are pointing in different directions, then they are perpendicular lines, otherwise they are not.

2. Provide examples on a transparency and get some pupils to practise identifying perpendicular lines drawn on square grids.

Activity 5 (40 min): Work in pairs to practise drawing perpendicular lines on square grids

Things you need: Square grid paper

1. Pair up the pupils. Give each pair some square grid papers. One pupil will draw a pair of lines while the other will try to identify if the lines are perpendicular or not. The pupils take turns to draw and test each other.

Let's Try...

Activity 6 (40 min): Individual practice

1. Let the pupils try out the exercises on pages 239–240 of the Student's Book.

Homework

Ask the pupils to do Workbook 3B—Worksheet 47.

Answers



page 239

1. (a) yes (b) yes (2) E F H

WORK *Sheet* 47

1. (a) yes (b) no (c) yes (d) no
(e) no (f) yes (g) no (h) yes

PARALLEL LINES

Suggested Duration

5 periods (200 min)

Learning Outcomes

Pupils should be able to:

- identify and name parallel lines
- draw parallel lines on square grids

Instructions

Let's Learn...

Activity 1 (40 min): Identify and name parallel lines

1. Recall with the pupils what perpendicular lines are. Point out that perpendicular lines will always intersect or meet at a point. Ask the pupils, 'What do you call lines that do not meet each other no matter how long can you extend the lines?' Draw on the board, 2 parallel lines. Tell the pupils that when 2 lines do not meet or intersect, they are called 'parallel lines.' Write the term on the board and ask the class to repeat it after you.
2. Point out that the distance between parallel lines is always the same. Also point out that lines that meet after they are extended are not parallel lines.
3. Draw a pair of parallel lines on the board and name them as AB and CD. Ask the class, 'How are parallel lines drawn?' Introduce the arrowheads symbols for parallel lines. Ask the class, 'How are parallel lines written?' Introduce the symbol '//' and lead the class to learn writing parallel lines as 'AB // CD'.

- Write on the board pairs of parallel and non-parallel lines and ask the pupils to identify them.
- Go through the examples on pages 241–243 of the Student's Book.

Let's Explore

Activity 2 (40 min): Identify parallel lines in things around

- Divide the class into groups to work on the **Let's Explore** activity on page 244 of the Student's Book. Within a time of 20 minutes, get the groups to identify items around that have parallel lines. Ask the groups to write down the items identified and have a leader in each group to read them out. The group with the most number of items is the winner.

Activity 3 (20 min): Draw parallel lines on square grids

Things you need: Square grid papers

- Go through the steps in drawing parallel lines on square grids using the step-by-step explanations given on pages 245–246 of the Student's Book.
- Ask some pupils to practise drawing parallel lines on square grids using transparencies placed on the OHP.

Activity 4 (20 min): Work in pairs to practise drawing parallel lines on square grids

Things you need: Square grid paper

- Pair up the pupils. Give each pair some square grid papers. One pupil will draw a pair of lines while the other will try to identify if the lines are parallel or not. The pupils take turns to draw and test each other.

Let's Try...

Activity 5 (40 min): Individual practice

- Ask pupils to do the exercises on pages 247–248 of the Student's Book.

Homework

Ask the pupils to do Workbook 3B—Worksheet 48 and Practice 13.

Answers

WORK 48

- (a) yes (b) no (c) no (d) yes
(e) yes (f) no (g) no (h) no

Practice 13

- (a) no (b) yes (c) no (d) no
- Is written as question 1 (page 128) pl. check
(a) yes (b) no (c) no (d) no
- and 4. no ans needed

Revision (40 min)

Fun With Maths

1. Ask the pupils to try out the exercise on page 249 of the Student's Book. Ask them to compare their answers with their partners. Ask a few pupils to share their answers with the class.
2. Revise and go through pupils' homework.

Unit 14: Area and Perimeter

PERIMETER

Suggested Duration

4 periods (160 min)

Learning Outcomes

Pupils should be able to:

- understand the concept of perimeter of a plane figure.
- calculate perimeter of rectilinear figure, rectangle and square

Instructions

Let's Learn...

Activity 1 (40 min): Understand the concept of perimeter of a plane figure

1. Draw 2 rectangles of different sizes on the board. Ask the class, 'If a wire is bent to form the rectangles, which rectangle will require a longer wire?' Lead the class to see that the bigger rectangle will require a longer wire because it has a longer 'distance' around it. Tell the class the distance around the rectangle is called the 'perimeter' of the rectangle. In general, the distance around a figure is called the perimeter of the figure. Write 'perimeter' on the board and get the class to repeat the word after you.
2. Show more examples of pairs of rectilinear figures of different sizes and ask the class which figure has a larger perimeter.

Activity 2 (40 min): Calculate the perimeter of rectilinear figure, rectangle and square

Things you need: 1-cm square grid

1. Show a 1-cm square grid on the OHP. Draw a rectilinear figure on the grid using only the vertical and horizontal grid lines. Lead the class to calculate the perimeter of the figure by counting the 1-cm square grid round the figure. Before you start counting, remember to mark an 'x' on the figure to denote the starting point.
2. Repeat No. 1 for more examples of finding perimeter of figures drawn on 1-cm square grid.
3. Go through the examples on pages 251–252 of the Student's Book.
4. Draw a rectilinear figure on the board. Indicate on the figure the length of each of the sides. Tell the class that another way of finding the perimeter of a figure is to add up the length of all the sides of the figure.
5. Repeat No. 4 for more examples of finding rectilinear figures by adding up the lengths of all the sides of the figure.
6. Go through the examples on page 253 of the Student's Book.

Let's Explore

Activity 3 (40 min): Form different figures with the same perimeter

Things you need: Geoboards

1. Ask the class to carry out the **Let's Explore** activity on page 254 of the Student's Book to show that the different figures can have the same perimeter. Let the pupils check their answers with their partners.

Let's Try...

Activity 4 (40 min): Individual practice

1. Ask the pupils to try out the exercises on page 255 of the Student's Book.

Homework

Ask the pupils to do Workbook 3B—Worksheet 49.

Answers



page 255

(a) $P = 16 \text{ cm}$ $Q = 16 \text{ cm}$ $R = 16 \text{ cm}$

(b) 34 m; 32 m; 31 m; 14 m

WORK **Sheet** 49

1. (a) 24 (b) 14 (c) 26 (d) 16 (e) 6 (f) 12

2. (a) 16 (b) 16 (c) 20 (d) 22

3. (a) 18 m (b) 10 m (c) 24 m

4. (a) 35 cm (b) 60 m (c) 41 cm (d) 62 cm

5. $A = 18 \text{ cm}$; $B = 24 \text{ cm}$; $C = 26 \text{ cm}$ (a) C (b) 44

AREA IN SQUARE UNITS

Suggested Duration

5 periods (200 min)

Learning Outcomes

Pupils should be able to:

- understand the concept of area
- measure area in square units

Instructions

Let's Learn...

Activity 1 (40 min): Understand the concept of area

1. Draw on the board 2 rectangles of different sizes. Ask the class, 'Which rectangle occupies more space?' Lead the class to see that the bigger rectangle occupies more space because it covers a bigger amount of space. Tell the class the amount of space covering the rectangles is called the 'area' of the rectangle. In general, the amount of space covering a figure is called the area of the figure. Write 'area' on the board and get the class to repeat the word after you.
2. Show more examples of pairs of rectilinear figures of different sizes and ask the class which figure has a bigger area.

Activity 2 (40 min): Measure area in square units

Things you need: 1-cm square grid

1. Show a 1-cm square grid on the OHP. Point out that every square in the square grid is of the same size and each square is defined as '1 square unit' while a half square is defined as ' $\frac{1}{2}$ square unit'.
2. Draw a rectilinear figure on the grid using only the vertical and horizontal grid lines. Lead the class to measure the area of the figure by counting the number of full square units. Provide more examples of rectilinear figures drawn on square grid for pupils to practise measuring the area of figures by counting the number of square units.
3. Draw a rectilinear figure involving half squares by drawing diagonals across square units. Lead the class to measure areas of the figure by counting the number of full and half square units. Point out that 2 half squares are equal to 1 full square. Provide more examples of rectilinear figures drawn on square grid for pupils to practise measuring the area of figures by counting the number of full and half square units.
4. Go through the examples on pages 256–258 of the Student's Book.

Activity 3 (40 min): Work in pairs to practise drawing perpendicular lines on square grids

Things you need: Square grid paper

1. Pair up the pupils. Give each pair some square grid papers. One pupil will draw a rectilinear figure consisting of full and half square units while the other will measure the area by counting the number of full and half square units. The pupils take turns to draw and test each other.

Let's Explore

Activity 4 (40 min): Form different figures with the same area

1. Go through with the pupils the *Let's Explore* activity on page 259 of the Student's Book. Use the manual method of drawing full and half squares on square grid paper to show how different figures with same area can be formed. Steps as follows:

Step 1

Ask pupils to first create 4 combinations of full and half squares which add up to the same area of 5 square units as follows:

Combination	No. of full squares	No. of half- squares	Total area
1	4	2	5
2	3	4	5
3	2	6	5
4	1	8	5

Step 2

From the 4 different combinations, ask pupils to draw 4 different figures on the square grid

- Encourage the pupils to carry out the same activity using a suitable computer software to draw full and half squares to form figures.

Let's Try...

Activity 5 (40 min): Individual practice

- Ask the pupils to try out the exercises on page 260 of the Student's Book.

Homework

Ask the pupils to do Workbook 3B—Worksheet 50.

Answers



page 260

- (a) 7 (b) 9 (c) 8 (d) 5 (e) 10 (f) 9

WORK *Sheet* 50

- (a) 7 (b) 12 (c) 9 (d) 10
- B (o); A (x)
- 24 (b) 19 (c) 7 (d) 9 (e) A

AREA IN cm^2 AND m^2

Suggested Duration

4 periods (120 min)

Learning Outcomes

Pupils should be able to:

- measure area in square centimetres (cm^2)/ square metres (m^2)
- use the formula to calculate the area of a rectangle/ square

Instructions

Let's Learn...

Activity 1 (25 min): Measure area in square centimetres (cm²)

1. Draw a 1-cm square with sides 1 cm. Tell the class that the area of a 1-cm square is 1 cm². Point out that such a square of size 1 cm² is a standard unit for measuring area of small figures.
2. Write on the board '1 cm²' and read it as '1 square centimetre'. Ask the pupils to repeat it after you. Tell the class that it should not be read as '1 centimetre square'.
3. Draw a 2-cm square and ask the class 'What is the area of a 2-cm square?' Divide the 2-cm square into 4 smaller squares of size 1 cm². Lead the class to find the area of the 2-cm square by counting the number of 1-cm squares. Pupils should see that the area of a 2-cm square is 4 cm².
4. Repeat No. 3 for a 3-cm square, 4-cm square, 5-cm square and 6-cm square. Ask pupils to guess the areas before you work out the answer.

Activity 2 (15 min): Measure area in square metres (m²)

1. Draw a 1-m square with sides 1 m. Point out that 1 m = 100 cm. Tell the class that the area of a 1-m square is 1 m². Point out that such a square of size 1 m² is another standard unit used for measuring bigger area.
2. Write on the board '1 m²' and read it as '1 square metre'. Get the pupils to repeat it after you. Tell the class that it should not be read as '1 metre square'.
3. Draw a 2-m square (need not be in actual size) and ask the class 'What is the area of a 2-m square?' Divide the 2-m square into 4 smaller squares of size 1 m². Lead the class to find the area of the 2-m square by counting the number of 1-m squares. Pupils should see that the area of a 2-m square is 4 m².
4. Repeat No. 3 for a 3-m square, 4-m square, 5-m square and 6-m square. Get pupils to guess the areas before you work out the answers.

Let's Explore

Activity 3 (40 min): Activity to compare areas of 1 cm² and 1 m²

1. Divide the class into groups of 7–8 and lead them in carrying out the *Let's Explore* activity on page 262 of the Student's Book.

Activity 4 (40 min): Use formula to calculate the area of a rectangle/ square

1. Go through with the pupils the formula for calculating the area of a rectangle/square as described on pages 263–264 of the Student's Book.
2. Ask the class to say aloud the formula (Area of square = Length × Length/Area of rectangle = Length x Breadth) several times so as to help them commit the formulae to memory.

Let's Try...

Activity 5 (40 min): Individual practice

1. Ask the pupils to try out the exercises on page 265 of the Student's Book.

Homework

Ask the pupils to do Workbook 3B—Worksheet 51.

Answers



page 265

A=49 cm²; B=18 cm²; C=28 cm²; D=49 cm²

WORK **Sheet** 51

1. a = 10 cm²; b = 7 cm²; c = 8 cm²; d = 13 cm²; f = 12 cm²
2. (a) A = 7 m²; B = 15 m²; C = 6 m²; D = 8 m²
(b) C (c) C, A, D, B
3. (a) 9 cm² (b) 16 cm² (c) 25 cm² (d) 14 cm²
4. (a) $4 \times 4 = 16 \text{ cm}^2$ (b) $6 \times 6 = 36 \text{ cm}^2$
(c) $5 \times 2 = 10 \text{ m}^2$ (d) $7 \times 5 = 35 \text{ m}^2$
5. (a) 14 cm² (b) 49 cm² (c) 12 cm² (d) 18 cm²
6. (a) $4 \times 4 = 16 \text{ cm}^2$; $8 \times 2 = 16 \text{ cm}^2$; $7 \times 3 = 21 \text{ cm}^2$
(b) C (c) A and B (d) $16 + 16 + 21 = 53 \text{ cm}^2$
7. (a) 3 m² (b) painting (c) 18 m²

WORD PROBLEMS

Suggested Duration

3 periods (120 min)

Learning Outcomes

Pupils should be able to:

- solve word problems involving the area/ perimeter of squares and rectangles

Instructions

Let's Learn...

Activity 1 (10 min): Solve word problems involving the area/ perimeter of squares and rectangles

1. Go through the examples on pages 266–267 of the Student's Book. Point out that in solving word problems involving area and perimeter of squares and rectangle, it is important to draw a figure and label the length and breadth with the given information.

Activity 2 (30 min): To find area and perimeter

Things you need: Cut-out pieces of rectangles and squares of different sizes. Make sure that the lengths and breadths are whole numbers in cm

1. Pair up the pupils. Give every pupil a rectangle and a square. Ask them to measure the lengths and breadths and then calculate the perimeter and area for each of them. Then, get them to write the answers on the cut-out pieces (e.g. Perimeter = ____ / Area = ____). Have the partners check each other's answer. Go around checking the pupils' work and provide guidance where necessary.

Let's Try...

Activity 3 (40 min): Individual practice

1. Ask the pupils to work out the word problems on page 268 of the Student's Book. Ask some pupils to show their workings on the board.

Homework

Ask the pupils to do Workbook 3B—Worksheet 52 and Practice 14.

Answers



page 268

- (1) (a) 68 cm (b) 225 m²
- (2) 330 m (3) Rs 405

WORK 52

1. (a) 104 m (b) 315 m² (c) 416 m
2. 16 m²
3. 12 dresses
4. 150 m²
5. 140 cm

Practice 14

2. (a) 32 cm (b) 37 cm (c) 39 cm
3. (a) 36 m² (b) 27 m² (c) 63 m²
4. (a) 220 m (b) 100 m (c) 800 m
5. (a) $5 \times 4 = 20 \text{ m}^2$ (b) $5\text{m} + 4\text{m} + 5\text{m} + 4\text{m} = 18\text{m}$

Revision (40 min)

Fun With Maths

1. Go through with the pupils the *Fun with Maths* activity on page 269 of the Student's Book.

Ask the pupils to manually draw 2 different floor plans (with same area) for 2 types of houses. Steps as follows:

Step 1

Ask pupils to first create 2 combinations of floor plans as follows:

Room	House A	House B
Living Room	40	50
Master Bedroom	30	30
Bedroom 1	20	15
Bedroom 2	20	15
Kitchen	10	10
Total Area	120 m ²	120 m ²

Step 2

For each of the rooms, work out the length and breadth of the rectangular figure (e.g. for living room of size 40 m², its length and breadth can be 8m by 5m)

Step 3

Draw the floor plan based on the dimensions of the rooms worked out in Step 2.

- Encourage the pupils to draw the different floor plans with the same area using a suitable computer software.
- Revise and go through pupils' homework.



Revision 3 (Workbook 3B)

- (a) 5 (b) 5 (c) 5
- (a) 1 : 35 (b) 5 : 10 (c) 4 : 25
(d) 6 : 02 (e) 9 : 57 (f) 2 : 18
- (a) 234 min (b) 159 min (c) 3 hr 6 min (d) 5 hr 15 min
- (a) 8 (b) 8
- (a) Area : 26 cm², perimeter = 28 cm
(b) Area : 47 cm², perimeter = 32 cm
- (b) 15 past 11 (c) 10 to 11 (d) 25 to 10
- 28 m
- (a) 3; 1 (b) 4; 2 (c) 4; 4 (d) 5; 0
- (a) 6 hr 55 min (b) 6 hr 0 min (c) 1 hr 30 min



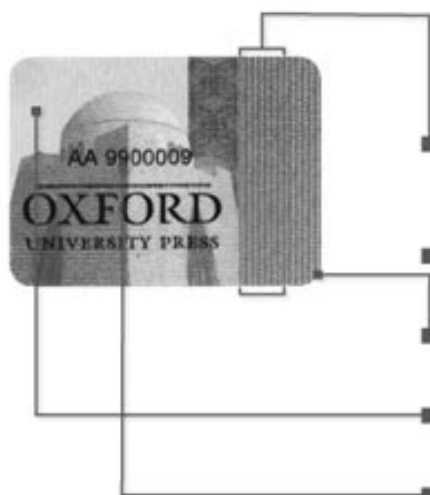
Revision 4 (Workbook 3B)

1. (a) 13 (b) 10 (c) 9 (d) 15
2. (a) 8 : 10 am (b) 11 hr 30 min (c) 8 : 20 pm
3. (a) 13 cm^2 (b) 18 cm^2 (c) 14 cm^2 (d) 16 cm^2
4. (a) Area = 35 cm^2 ; Perimeter = 24 cm
(b) Area = 16 cm^2 ; Perimeter = 16 cm
(c) Area = 18 cm^2 ; Perimeter = 18 cm
5. 4 hr 5 min
6. 50 min
7. 2 hr 30 min
8. 13 min
9. 1 hr 10 min
10. 31 min
11. 90 m^2
12. 600 m

Beware of Piracy

Buy **genuine** Oxford Books

With a view to curbing piracy and helping customers distinguish between original and pirated books, all Oxford Pakistan textbooks will now carry a new security label on the book covers. The labels with the following features are an indication of genuine Oxford books:



- An iridescent stripe running down the right corner of the label. The stripe changes colour from blue to golden when viewed from different angles.
- The labels are liable to tear easily if peeled from the surface of the book cover.
- The labels have security cuts at the edges to prevent them from being peeled off and reused.
- The words 'Oxford University Press' written in very small print form a pattern on the background of the labels.
- Each label features a unique alpha-numeric serial number in the centre above the Oxford University Press logo.

Look out for the new security label whenever you purchase an Oxford textbook and do not accept the book if the label is missing, has been torn or tampered with, or the colour on the security label does not change.

Also, pirated books can be recognized by the production quality which is distinctly inferior because of low grade paper, poor print quality and poor binding resulting in variations in texture and colour, blurred text and images, and substandard appearance.

OXFORD
UNIVERSITY PRESS

If you suspect that you are being sold a pirated book without the security label, please contact:

Oxford University Press, No. 38, Sector 15, Korangi Industrial Area,
P.O. Box No. 8214, Karachi-74900, Pakistan.
Tel.: 35071580-86; Fax: (92-21) 35055071-72
E-mail: oup.pk@oup.com; Website: www.oup.com/pk