OXFORD

New Syllabus PRIMARY MATHEMATICS

Teacher's Resource Book

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CONTENTS

CHAPTER 1
Numbers to 10 000

Estimated number of periods: 10

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	**Counting to 10 000** • Count in thousands, hundreds, tens and ones.	• Work in groups using number discs/number line to represent and compare numbers • Make sense of the size of 1000 and use it to estimate the number of objects in the size of thousands	Textbook 3 P1 – 5	Worksheet 1 Workbook 3A P1 – 2	Textbook 3 P5	Number discs, paper clips, two similar transparent containers
2	2	**Place Value** • Represent numbers within 10 000 in thousands, hundreds, tens and ones. • State the values of the digits in a given number up to 10 000. • Read and write numbers to 10 000 in numerals and in words.	• Use place-value cards to illustrate and explain place values, e.g. the digit 3 stands for 3000, 300, 30 or 3 depending on where it appears in a number	Textbook 3 P6 – 8	Worksheet 2 Workbook 3A P3 – 8	Textbook 3 P8	Number discs, place-value cards, place-value chart
3	2	**Comparing and Ordering Numbers** • Compare and order numbers within 10 000.	• Use number discs/place-value cards to compare numbers digit by digit from left to right, and use language such as ‘greater than’, ‘greatest’, ‘smaller than’, ‘smallest’ and ‘the same as’ to describe the comparison	Textbook 3 P9 –14	Worksheet 3 Workbook 3A P9 – 12	Textbook 3 P13	Place-value cards, place-value chart, number discs, bag

4	2	**Number Patterns** • Recognise and complete number patterns.	• Use number discs/play money to represent a number that is 1, 10, 100 or 1000 more than/less than a 4-digit number • Describe a given number pattern before continuing the pattern or finding the missing number(s)	Textbook 3 P15 – 18	Worksheet 4 Workbook 3A P13 – 14	–	Number discs, mini whiteboards, markers
–	2	**Problem Solving, Maths Journal and Pupil Review**	• Discuss examples of big numbers in real life	–	Review 1 Workbook 3A P17 – 18	Textbook 3 P18 – 19 Workbook 3A P15 – 16	Number discs

CHAPTER 2
Addition and Subtraction Within 10 000

Estimated number of periods: 32

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	10	**Addition** • Perform the addition algorithm for up to 4-digit numbers. • Mentally add two 2-digit numbers.	• Associate the word sum with the part-whole model • Work in groups using number discs to illustrate the standard algorithms for addition up to 4 digits by playing games including applets and digital games • Do mental addition of two 2-digit numbers and discuss the different mental calculation strategies	Textbook 3 P20 – 23	Worksheet 1A Workbook 3A P19 – 20	Textbook 3 P23	Number discs
				Textbook 3 P23 – 31	Worksheet 1B Workbook 3A P21 – 24	Textbook 3 P24, 25, 26, 28, 30	Number discs

2	10	**Subtraction** • Perform the subtraction algorithm for up to 4-digit numbers. • Mentally subtract a 2-digit number from another 2-digit number.	• Associate the word difference with the comparison model • Work in groups using number discs to illustrate the standard algorithms for subtraction up to 4 digits by playing games including applets and digital games • Achieve mastery of addition and subtraction up to 4 digits by using applets or playing digital games • Do mental subtraction of two 2-digit numbers and discuss the different mental calculation strategies	Textbook 3 P32 – 35	Worksheet 2A Workbook 3A P25 – 26	Textbook 3 P34	Number discs
				Textbook 3 P35 – 43	Worksheet 2B Workbook 3A P27 – 30	Textbook 3 P36, 38, 40, 42	Number discs
3	10	**Solving Word Problems** • Solve 1-step and 2-step word problems involving addition and subtraction.	• Solve a variety of problems: 1-step word problems, 2-part word problems (1 step for each part), 2-step word problems to become familiar with the problem-solving process	Textbook 3 P44 – 47	Worksheet 3A Workbook 3A P31 – 34	–	–
				Textbook 3 P47 – 49	Worksheet 3B Workbook 3A P35 – 40	–	–
				Textbook 3 P49 – 52	Worksheet 3C Workbook 3A P41 – 45	Textbook 3 P52	Drawing block, markers, scissors, newspapers/ magazines
–	2	**Problem Solving, Maths Journal and Pupil Review**	–	–	Review 2 Workbook 3A P47 – 52	Textbook 3 P53 Workbook 3A P46	–

CHAPTER 3
Multiplication and Division

Estimated number of periods: 51

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	8	**Multiplication Tables of 6, 7, 8 and 9** • Memorise the multiplication tables of 6, 7, 8 and 9.	• Work in groups to make multiplication stories, and write multiplication equations for the stories • Use concrete objects and pictorial representations to illustrate the concepts of multiplication such as 'multiplying 6 by 5' • Explore number patterns in the multiplication tables of 6, 7, 8 and 9 through activities such as colouring the hundreds chart • Achieve mastery of multiplication facts by using multiplication fact cards and playing games including applets and digital games	Textbook 3 P54 – 56	–	Textbook 3 P56	Counters, drawing block, markers
				Textbook 3 P56 – 59	Worksheet 1A Workbook 3A P53 – 56	–	–
				Textbook 3 P60 – 63	Worksheet 1B Workbook 3A P57 – 60	–	–
				Textbook 3 P64 – 67	Worksheet 1C Workbook 3A P61 – 64	–	–
				Textbook 3 P68 – 72	Worksheet 1D Workbook 3A P65 – 68	Textbook 3 P72	Multiplication fact cards, counters
2	4	**Dividing by 6, 7, 8 and 9** • Divide within the multiplication tables of 6, 7, 8 and 9.	• Work in groups to make division stories, write a division equation for each story and explain the meaning of the equal sign • Achieve mastery of division facts by using division fact cards and playing games including applets and digital games	Textbook 3 P73 – 77	Worksheet 2 Workbook 3A P69 – 72	Textbook 3 P76 – 77	Drawing block, markers, counters, division fact cards

3	3	**Quotient and Remainder** • Division with remainder.	• Divide a number of concrete objects into equal groups to discover that sometimes there are objects left over as remainder and write the answer as quotient and remainder	Textbook 3 P78 – 80	Worksheet 3 Workbook 3A P73 – 76	Textbook 3A P79	–
4	4	**Solving Word Problems** • Solve word problems involving the multiplication tables of 6, 7, 8 and 9.	• Use the part-whole and comparison models to illustrate the concepts of multiplication and division and use the models to determine which operation (multiplication and division) to use when solving 1-step word problems • Use the comparison model to reinforce the language of comparison such as “Ali has 3 times as much money as Mary.”	Textbook 3 P81 – 83	Worksheet 4 Workbook 3A P77 – 78	Textbook 3 P81 – 82	Multilink cubes, play money
5	2	**Multiplication Without Regrouping** • Multiply a number (up to 3 digits) by a 1-digit number without regrouping.	• Work in groups using number discs to illustrate the standard algorithms for multiplication up to 3 digits by 1 digit	Textbook 3 P84 – 86	Worksheet 5 Workbook 3A P79 – 80	Textbook 3 P85 – 86	Number discs
6	3	**Multiplication With Regrouping** • Multiply a number (up to 3 digits) by a 1-digit number with regrouping.	• Work in groups using number discs to illustrate the standard algorithms for multiplication up to 3 digits by 1 digit	Textbook 3 P87 – 89	Worksheet 6 Workbook 3A P81 – 82	Textbook 3 P87, 89	Number discs
7	3	**Multiplying Three Numbers** • Multiply three 1-digit numbers.	• Work in groups to discuss whether the order of multiplying three numbers matters.	Textbook 3 P90 − 91	Worksheet 7 Workbook 3A P83	Textbook 3 P91	Dot cards, number discs, mini whiteboards, markers
8	2	**Dividing Without Regrouping** • Divide a number (up to 3 digits) by a 1-digit number without regrouping.	• Work in groups using number discs to illustrate the standard algorithms for multiplication up to 3 digits by 1 digit	Textbook 3 P92 – 95	Worksheet 8 Workbook 3A P84 – 87	Textbook 3 P94	Number discs

9	5	**Dividing With Regrouping** • Divide a number (up to 3 digits) by a 1-digit number with regrouping.	• Work in groups using number discs to illustrate the standard algorithms for multiplication up to 3 digits by 1 digit	Textbook 3 P96 – 101	Worksheet 9 Workbook 3A P88 – 91	Textbook 3 P100	Number discs
10	2	**Finding Doubles** • Double 2-digit and 3-digit numbers.	• Work in groups to discuss the different methods of finding doubles.	Textbook 3 P102 − 103	Worksheet 10 Workbook 3A P92 − 95	Textbook 3 P103	Number discs, mini whiteboards, markers
11	2	**Finding Halves** • Half 2-digit and 3-digit numbers.	• Work in groups to discuss the different methods of finding halves.	Textbook 3 P104 − 105	Worksheet 11 Workbook 3A P96 − 99	Textbook 3 P105	Number discs, mini whiteboards, markers
12	9	**More Word Problems** • Solve up to 2-step word problems involving the 4 operations.	• Use the part-whole and comparison models to illustrate the concepts of multiplication and division and use the models to determine which operation (multiplication and division) to use when solving 1-step word problems • Use the comparison model to reinforce the language of comparison such as “Ali has 3 times as much money as Mary.” • Use a table to record all possible combinations to solve correspondence problems.	Textbook 3 P106 – 108	Worksheet 12A Workbook 3A P100 – 103	–	–
				Textbook 3 P109 – 111	Worksheet 12B Workbook 3A P104 – 106	–	–
				Textbook 3 P111 − 114	Worksheet 12C Workbook 3A P107 − 109	Textbook 3 P112 − 113	Toy cars, toy figures, number cards, marbles
–	4	**Problem Solving, Maths Journal and Pupil Review**	• Work in groups to create 2-step word problems involving the 4 operations for other groups to solve • Solve non-routine problems using heuristics such as ‘act it out’ and ‘draw a diagram’ and share their ideas	–	Review 3 Workbook 3A P111 – 116	Textbook 3 P115 Workbook 3A P110	Toothpicks

CHAPTER 4
Length

Estimated number of periods: 15

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	4	**Length in Metres and Centimetres** • Measure length in metres (m) and centimetres (cm). • Convert length from m and cm to cm, and vice versa.	• Work in groups to estimate and measure – length of more than 1 m using measuring tapes • Work in groups to produce a foldable metre rule for measuring lengths of everyday objects	Textbook 3 P116 – 119	Worksheet 1 Workbook 3A P1 – 2	Textbook 3 P119	Measuring tape, vanguard sheet, scissors, fastener, hole puncher
2	4	**Length in Kilometres and Metres** • Measure length in kilometres (km). • Convert length from km and m to m, and vice versa.	• Develop a sense of how far 1 km is by relating it to the distance between two familiar landmarks or identifying a spot which is 1 km from the school • Pupils to estimate a long distance by running 50 to 100 m on the field	Textbook 3 P121 – 124	Worksheet 2 Workbook 3A P129 – 132	Teacher's Resource Book P114	Trundle wheel, mini whiteboard, markers
3	4	**Solving Word Problems** • Solve word problems involving length (addition and subtraction). • Solve word problems involving length (multiplication and division).	–	Textbook 3 P125 – 130	Worksheet 3 Workbook 3A P133 – 137	–	–
–	3	**Problem Solving, Maths Journal and Pupil Review**	–	–	Review 4 Workbook 3A P139 – 142	Textbook 3 P130 – 131 Workbook 3A P138	–

CHAPTER 5
Mass

Estimated number of periods: 12

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	4	**Mass in Kilograms and Grams** • Measure mass in kilograms (kg) and grams (g). • Convert mass from kg and g to g, and vice versa.	• Work in groups to estimate and measure mass of more than 1 kg using various weighing scales	Textbook 3 P132 – 137	Worksheet 1 Workbook 3A P143 – 148	Textbook 3 P136	Various types of weighing scales
2	4	**Solving Word Problems** • Solve word problems involving mass (addition and subtraction). • Solve word problems involving mass (multiplication and division).	–	Textbook 3 P138 – 141	Worksheet 2 Workbook 3A P149 – 153	–	–
–	4	**Problem Solving, Maths Journal and Pupil Review**	–	–	Review 5 Workbook 3A P155 – 160	Textbook 3 P141 – 142 Workbook 3A P154	–

CHAPTER 6
Volume

Estimated number of periods: 15

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	3	**Volume in Millilitres** • Measure volume of liquid in millilitres (ml).	• Work in groups to measure the volume of liquid in millilitres using cough syrup spoons and measuring beakers	Textbook 3 P143 – 148	Worksheet 1 Workbook 3A P161 – 162	Textbook 3 P147	Dropper, teaspoon, containers, beakers, markers
2	4	**Volume in Litres and Millilitres** • Measure volume of liquids in litres and millilitres. • Convert litres and millilitres to millilitres, and vice versa.	• Work in groups to estimate and measure volume/capacity of more than 1 litre using various measuring jars and beakers	Textbook 3 P149 – 153	Worksheet 2 Workbook 3A P163 – 166	Textbook 3 P152	Containers, beakers
3	4	**Solving Word Problems** • Solve word problems involving volume and capacity.	–	Textbook 3 P154 – 156	Worksheet 3 workbook 3A P167 – 169	–	–
–	4	**Problem Solving, Maths Journal and Pupil Review**	–	–	Review 6 Workbook 3A P171 – 174	Textbook 3 P156 – 157 Workbook 3A P170	–

CHAPTER 7
Dollars, Cents and Rupees

Estimated number of periods: 15

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	4	**Adding Money** • Count money in sets of notes and coins. • Add money in decimal notation.	• Discuss the value of $1000, and use play money to illustrate that $1000 is 10 times $100 • Use play money to illustrate the addition algorithm and make connections between the algorithms for money and for whole numbers • Use a variety of strategies for adding money	Textbook 3 P158 – 165	Worksheet 1 Workbook 3B P1 – 4	Textbook 3 P160, 163	Play money
2	4	**Subtracting Money** • Subtract money in decimal notation.	• Use play money to illustrate the subtraction algorithm and make connections between the algorithms for money and for whole numbers • Use a variety of strategies for subtracting money	Textbook 3 P166 – 171	Worksheet 2 Workbook 3B P5 – 10	Textbook 3 P169 – 170	Play money, real-life objects with price tags
3	4	**Solving Word Problems** • Solve word problems (up to 2-step word problems) involving addition or subtraction of money in decimal notation.	• Work in groups to solve problems in real-world situations such as shopping and budgeting	Textbook 3 P172 – 177	Worksheet 3 Workbook 3B P11 – 17	Textbook 3 P176	Markers, mini whiteboard, newspapers, play money
–	3	**Problem Solving, Maths Journal and Pupil Review**	–	–	Review 7 Workbook 3B P19 – 24	Textbook 3 P177 Workbook 3B P18	–

CHAPTER 8
Bar Graphs

Estimated number of periods: 12

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	8	**Reading Bar Graphs** • Read and interpret bar graphs. • Solve problems using information from bar graphs.	• Work in groups to discuss how to collect data, e.g. through interview or survey, and how to represent the data in a bar graph • Construct a bar graph using a spreadsheet e.g. Excel, and make a story using information from the graph • Discuss real-world examples of data presented in bar graphs found in newspapers and magazines	Textbook 3 P178 – 189	Worksheet 1 Workbook 3B P25 – 33	Textbook 3 P185	Magnetic square tiles
–	4	**Problem Solving, Maths Journal and Pupil Review**	–	–	Review 8 Workbook 3B P35 – 38	Textbook 3 P188 Workbook 3B P34	–

CHAPTER 9
Fractions

Estimated number of periods: 24

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	6	**Equivalent Fractions** • Find and list equivalent fractions. • Write a fraction in its simplest form.	• Use paper folding or build fraction wall with fraction bars to show equivalent fractions • Represent fractions as numbers on number lines • Use fraction discs or part-whole model to represent two equivalent fractions and explain why they are equal and how one can be obtained from the other • Make a list of the first 8 equivalent fractions of a given fraction and use this method to compare two unlike fractions • Achieve mastery of equivalent fractions and fraction comparison through playing card games and digital games	Textbook 3 P190 – 193	Worksheet 1A Workbook 3B P39 – 40	–	Paper strips
				Textbook 3 P194 – 198	Worksheet 1B Workbook 3B P41 – 44	Textbook 3 P197 – 198	Fraction discs, fraction cards
2	6	**Comparing and Ordering Fractions** • Compare and order fractions.	• Work in groups to compare fractions using different strategies and explain the strategies used • Achieve mastery of fraction comparison through playing games using fraction cards and digital games	Textbook 3 P199 – 204	Worksheet 2 Workbook 3B P45 – 50	Textbook 3 P203	–

3	4	**Adding Fractions** • Adding two related fractions within a whole.	• Use fraction discs to illustrate addition of related fractions within one whole • Work in groups to make addition stories involving like fractions/related fractions	Textbook 3 P205 – 207	Worksheet 3 Workbook 3B P51 – 54	Textbook 3 P206	Fraction discs or fraction bars
4	4	**Subtracting Fractions** • Subtracting two related fractions within a whole.	• Use fraction discs to illustrate subtraction of related fractions within one whole • Work in groups to make subtraction stories involving like fractions/ related fractions	Textbook 3 P208 – 211	Worksheet 4 Workbook 3B P55 – 57	Textbook 3 P210	Fraction cards, fraction discs
–	4	**Problem Solving, Maths Journal and Pupil Review**	–	–	Review 9 Workbook 3B P59 – 62	Textbook 3 P211 – 212 Workbook 3B P58	–

CHAPTER 10
Time

Estimated number of periods: 14

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	**Telling Time to the Minute** • Tell time to the minute. • Use 'past' and 'to' to tell time.	• Observe the movement of the hour and minute hands on a real / geared clock • Develop a sense of duration of 1 minute, and describe what can be done in a duration of 1 minute, e.g. number of squares drawn in 1 minute	Textbook 3 P213 – 219	Worksheet 1 Workbook 3B P63 – 66	Textbook 3 P218	Stopwatch, wristwatch
2	4	**Duration of Time** • Measure time in hours and minutes. • Find the starting time, finishing time or duration given two other quantities.	• Represent given information such as starting time, finishing time and duration of activity on a timeline, and use it to solve problems	Textbook 3 P220 – 225	Worksheet 2 Workbook 3B P67 – 70	Textbook 3 P221	Geared clock
3	2	**Conversion of Hours and Minutes** • Convert time in hours and minutes to minutes, and vice versa.	–	Textbook 3 P226 – 228	Worksheet 3 Workbook 3B P71 – 72	–	–

4	4	**Solving Word Problems** • Solve problems involving time in hours and minutes.	• Work in groups to create word problems involving time in hours and minutes for other groups to solve.	Textbook 3 P229 – 233	Worksheet 4 Workbook 3B P73 – 77	Textbook 3 P232	Pen, paper
–	2	**Problem Solving, Maths Journal and Pupil Review**	• Practise telling and writing time using everyday examples such as TV programmes, bus schedules, train operating hours and exam timetables. • Represent given information such as starting time, finishing time and duration of activity on a timeline, and use it to solve problems	–	Review 10 Workbook 3B P79 – 84	Textbook 3 P233 – 234 Workbook 3B P78	–

CHAPTER 11
Angles

Estimated number of periods: 10

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	4	**Angles** • Associate angles as an amount of turning. • Identify angles in the environment. • Identify angles in two-dimensional shapes.	• Make an angle with angle strips and illustrate the size of an angle as the amount of turning	Textbook 3 P235 – 239	Worksheet 1 Workbook 3B P99 – 100	Textbook 3 P238	Rubber bands, geoboards
2	4	**Right Angles** • Identify right angles. • Compare the size of an angle as equal to, greater than or smaller than a right angle.	• Find angles in the environment and use a 'paper right angle' to identify right angles, angles greater than a right angle and angles smaller than a right angle • Use language such as 'acute angle' and 'obtuse angle' to describe angles	Textbook 3 P240 – 244	Worksheet 2 Workbook 3B P101 – 103	Textbook 3 P243	Strips of cardboard, fasteners, right-angle tester
–	2	**Problem Solving, Maths Journal and Pupil Review**	–	–	Review 11 Workbook 3B P105 – 106	Textbook 3 P89 – 90 Workbook 3B P104	–

CHAPTER 12
Perpendicular and Parallel Lines

Estimated number of periods: 18

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	**Perpendicular Lines** • Identify and name perpendicular lines.	• Hands-on experience to explore and visualise perpendicular lines in 2D figures and the environment	Textbook 3 P246 – 249	Worksheet 1 Workbook 3B P107 – 108	–	Square grid paper
2	3	**Drawing Perpendicular Lines** • Draw perpendicular lines using a ruler and a set square. • Draw perpendicular lines on square grids.	• Work in pairs to explore how to construct perpendicular lines using a ruler and a set square • Work in pair to explore how different pairs of perpendicular lines can be drawn on square grid	Textbook 3 P250 – 254	Worksheet 2 Workbook 3B P109 – 112	Textbook 3 P253	Square grid paper, Pencil, ruler, set square
3	2	**Parallel Lines** • Identify and name perpendicular lines.	• Hands-on experience to explore and visualise parallel lines in 2D figures and the environment	Textbook 3 P255 – 257	Worksheet 3 Workbook 3B P113 – 114	–	Square grid paper
4	3	**Drawing Parallel Lines** • Draw parallel lines using a ruler and a set square. • Draw parallel lines on square grids.	• Work in pairs to explore how to construct parallel lines using a ruler and a set square • Work in pairs to explore how different pairs of parallel lines can be drawn on square grid	Textbook 3 P258 – 261	Worksheet 4 Workbook 3B P115 – 118	Textbook 3 P260	Square grid paper Pencil, ruler, set square

5	2	**Vertical and Horizontal Lines** • Identify vertical and horizontal lines.	• Provide real-life examples for pupils to make connections with perpendicular and parallel lines and to recognise that two vertical lines are parallel, and that a horizontal line and a vertical line are perpendicular	Textbook 3 P262 – 263	Worksheet 5 Workbook 3B P119	Textbook 3 P263	Square grid paper, Plumb line
6	3	**Grid References** • Read grid references. • Describe the position of an object using a grid reference.	• Describe the column and row of the grid reference which an object is located on.	Textbook 3 P264 − 266	Worksheet 6 Workbook 3B P120 − 121	Textbook 3 P265	Ruler
–	3	**Problem Solving, Maths Journal and Pupil Review**	–	–	Review 12 Workbook 3B P121 – 122	Textbook 3 P266 – 267 Workbook 3B P122	–

CHAPTER 13
Area and Perimeter

Estimated number of periods: 18

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	**Perimeter** • Find the perimeter of a plane figure.	–	Textbook 3 P268 – 272	Worksheet 1 Workbook 3B P125 – 128	Textbook 3 P272	String
2	4	**Area in Square Units** • Measure the area of a plane figure in square units.	• Compare and measure the areas of rectangles using different non-standard units • Work in groups to make different rectangles and squares using square tiles, study the relationship between the area / perimeter and length(s) of each side and observe that shapes with same area can have different perimeters and shapes with same perimeter can have different areas	Textbook 3 P273 – 277	Worksheet 2 Workbook 3B P129 – 132	Textbook 3 P276	Square tiles
3	6	**Area in cm^2 and m^2** • Measure the area of a plane figure in cm^2 and m^2.	• Visualise the sizes of 1 cm^2 and 1 m^2 • Work in pairs to find the area of squares and rectangles drawn on square grid by counting and by formula	Textbook 3 P278 – 283	Worksheet 3A Workbook 3B P133 – 134	Textbook 3 P279, 282	Scissors, square grid paper, coloured tape, metre ruler
				Textbook 3 P284 – 289	Worksheet 3B Workbook 3B P135 – 138	–	–
4	4	**More on Area and Perimeter** • Solve problems related to finding the area and perimeter of a rectangle or square.	–	Textbook 3 P290 – 292	Worksheet 4 Workbook 3B P139– 141	–	–
–	2	**Problem Solving, Maths Journal and Pupil Review**	• Use real-life examples to explain the concepts of area and perimeter and compare the sizes of rectangles / squares using area	–	Review 13 Workbook 3B P143 – 148	Textbook 3 P292 – 293 Workbook 3B P142	Square grid paper

SYLLABUS MATCHING GRID
CAMBRIDGE PRIMARY MATHEMATICS STAGE 3

Learning Objective	Reference
1. Number	
Numbers and the number system	
Recite numbers 100 to 200 and beyond.	Chapter 1
Read and write numbers to at least 1000.	Chapter 1
Count on and back in ones, tens and hundreds from two- and three-digit numbers.	Chapter 1
Count on and back in steps of 2, 3, 4 and 5 to at least 50.	Chapter 1
Understand what each digit represents in three-digit numbers and partition into hundreds, tens and units.	Chapter 1
Find 1, 10, 100 more/less than two- and three-digit numbers.	Chapter 1
Multiply two-digit numbers by 10 and understand the effect.	Book 4 Chapter 2
Round two-digit numbers to the nearest 10 and round three-digit numbers to the nearest 100.	Book 4 Chapter 1
Compare three-digit numbers, use < and > signs, and find a number in between.	Book 2 Chapter 1
Order two- and three-digit numbers.	Book 2 Chapter 1
Give a sensible estimate of a number as a range (e.g. 30 to 50) by grouping in tens.	Chapter 1
Find half of odd and even numbers to 40, using notation such as $13\frac{1}{2}$.	Chapter 3
Understand and use fraction notation recognising that fractions are several parts of one whole, e.g. $\frac{3}{4}$ is three quarters and $\frac{2}{3}$ is two thirds.	Chapter 9
Recognise equivalence between $\frac{1}{2}$, $\frac{2}{4}$, $\frac{4}{8}$ and $\frac{5}{10}$ using diagrams.	Chapter 9
Recognise simple mixed fractions, e.g. $1\frac{1}{2}$ and $2\frac{1}{4}$.	Book 4 Chapter 3
Order simple or mixed fractions on a number line, e.g. using the knowledge that comes half way between $\frac{1}{4}$ and $\frac{3}{4}$, and that $1\frac{1}{2}$ comes half way between 1 and 2.	Chapter 9
Begin to relate finding fractions to division.	Book 4 Chapter 3
Find halves, thirds, quarters and tenths of shapes and numbers (whole number answers).	Book 2 Chapter 13
2. Calculation	
Mental strategies	
Know addition and subtraction facts for all numbers to 20.	Chapter 2
Know the following addition and subtraction facts: – multiples of 100 with a total of 1000 – multiples of 5 with a total of 100	Chapter 2
Know multiplication/division facts for 2×, 3×, 5×, and 10× tables.	Book 2 Chapter 3
Begin to know 4× table.	Book 2 Chapter 5
Recognise two- and three-digit multiples of 2, 5 and 10.	Book 2 Chapter 3
Work out quickly the doubles of numbers 1 to 20 and derive the related halves.	Chapter 3
Work out quickly the doubles of multiples of 5 (< 100) and derive the related halves.	Chapter 3
Work out quickly the doubles of multiples of 50 to 500.	Chapter 3

Addition and Subtraction	
Add and subtract 10 and multiples of 10 to and from two- and three-digit numbers.	Book 2 Chapter 2
Add 100 and multiples of 100 to three-digit numbers.	Book 2 Chapter 2
Use the = sign to represent equality, e.g. 75 + 25 = 95 + 5.	Chapter 2
Add several small numbers.	Chapter 2
Add and subtract pairs of two-digit numbers.	Chapter 2
Add three-digit and two-digit numbers using notes to support.	Chapter 2
Re-order an addition to help with the calculation, e.g. 41 + 54, by adding 40 to 54, then 1.	Chapter 2
Add/subtract single-digit numbers to/from three-digit numbers.	Chapter 2
Find 20, 30, … 90, 100, 200, 300 more/less than three-digit numbers.	Chapter 2
Multiplication and division	
Understand the relationship between halving and doubling.	Chapter 3
Understand the effect of multiplying two-digit numbers by 10.	Chapter 3
Multiply single-digit numbers and divide two-digit numbers by 2, 3, 4, 5, 6, 9 and 10.	Chapter 3
Multiply teens numbers by 3 and 5.	Chapter 3
Begin to divide two-digit numbers just beyond 10× tables, e.g. 60 ÷ 5, 33 ÷ 3.	Chapter 3
Understand that division can leave a remainder (initially as ‘some left over’).	Chapter 3
Understand and apply the idea that multiplication is commutative.	Chapter 3
Understand the relationship between multiplication and division and write connected facts.	Chapter 3
3. Geometry	
Shapes and geometric reasoning	
Identify, describe and draw regular and irregular 2D shapes including pentagons, hexagons, octagons and semi-circles.	Book 2 Chapter 11
Classify 2D shapes according to the number of sides, vertices and right angles.	Book 2 Chapter 11
Identify, describe and make 3D shapes including pyramids and prisms; investigate which nets will make a cube.	Book 2 Chapter 12
Classify 3D shapes according to the number and shape of faces, number of vertices and edges.	Book 2 Chapter 12
Draw and complete 2D shapes with reflective symmetry and draw reflections of shapes (mirror line along one side).	Book 2 Chapter 12
Relate 2D shapes and 3D solids to drawings of them.	Book 2 Chapters 11 and 12
Identify 2D and 3D shapes, lines of symmetry and right angles in the environment.	Chapter 11, and Book 2 Chapters 11 and 12
Identify right angles in 2D shapes.	Chapter 11
Position and movement	
Use the language of position, direction and movement, including clockwise and anti-clockwise.	Book 2 Chapter 17
Find and describe the position of a square on a grid of squares where the rows and columns are labelled.	Chapter 12
Use a set square to draw right angles.	Chapter 11
Compare angles with a right angle and recognise that a straight line is equivalent to two right angles.	Chapter 11

4. Measure	
Money	
Consolidate using money notation.	Chapter 7
Use addition and subtraction facts with a total of 100 to find change.	Chapter 7
Length, mass and capacity	
Choose and use appropriate units and equipment to estimate, measure and record measurements.	Chapters 4, 5 and 6
Know the relationship between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres.	Chapters 4, 5 and 6
Read to the nearest division or half division, use scales that are numbered or partially numbered.	Chapters 4, 5 and 6
Use a ruler to draw and measure lines to the nearest centimetre.	Chapter 4
Solve word problems involving measures.	Chapters 4, 5 and 6
Time	
Suggest and use suitable units to measure time and know the relationships between them (second, minute, hour, day, week, month, year).	Chapter 10
Read the time on analogue and digital clocks, to the nearest 5 minutes on an analogue clock and to the nearest minute on a digital clock.	Chapter 10
Begin to calculate simple time intervals in hours and minutes.	Chapter 10
5. Handling data	
Organising, categorising and representing data	
Answer a real-life question by collecting, organising and interpreting data, e.g. investigating the population of mini-beasts in different environments.	Chapter 8
Use tally charts, frequency tables, pictograms (symbol representing one or two units) and bar charts (intervals labelled in ones or twos).	Chapter 8 and Book 2 Chapter 16
6. Problem solving	
Using techniques and skills in solving mathematical problems	
Choose appropriate mental strategies to carry out calculations.	Chapter 2
Begin to understand everyday systems of measurement in length, weight, capacity and time and use these to make measurements as appropriate.	Chapters 4, 5, 6 and 10
Make sense of and solve word problems, single (all four operations) and two-step (addition and subtraction), and begin to represent them, e.g. with drawings or on a number line.	Chapter 2
Check the results of adding two numbers using subtraction, and several numbers by adding in a different order.	Chapter 2
Check subtraction by adding the answer to the smaller number in the original calculation.	Chapter 2
Check multiplication by reversing the order, e.g. checking that 6 × 4 = 24 by doing 4 × 6.	Chapter 3
Check a division using multiplication, e.g. check 12 ÷ 4 = 3 by doing 4 × 3.	Chapter 3
Recognise the relationships between different 2D shapes.	Book 2 Chapter 11
Identify the differences and similarities between different 3D shapes.	Book 2 Chapter 12
Estimate and approximate when calculating, and check working.	Chapter 2
Make a sensible estimate for the answer to a calculation, e.g. using rounding.	Chapter 2
Consider whether an answer is reasonable.	Chapter 2

Using understanding and strategies in solving problems	
Make up a number story to go with a calculation, including in the context of money.	Chapters 2, 3 and 7
Explain a choice of calculation strategy and show how the answer was worked out.	Chapters 2 and 3
Explore and solve number problems and puzzles, e.g. logic problems.	Chapters 1, 2 and 3
Use ordered lists and tables to help to solve problems systematically.	Chapters 1, 2 and 3
Describe and continue patterns which count on or back in steps of 2, 3, 4, 5, 10, or 100.	Chapters 1, 2 and 3
Identify simple relationships between numbers, e.g. each number is three more than the number before it.	Chapters 1, 2 and 3
Identify simple relationships between shapes, e.g. these shapes all have the same number of lines of symmetry.	Chapter 11
Investigate a simple general statement by finding examples which do or do not satisfy it, e.g. when adding 10 to a number, the first digit remains the same.	Chapters 1, 2 and 3
Explain methods and reasoning orally, including initial thoughts about possible answers to a problem.	Chapters 1, 2 and 3

INTRODUCTION

The Teacher's Resource Book has been designed to promote good teaching practices for teachers to effectively implement the Primary Mathematics Curriculum.

This series provides teachers with the flexibility to choose the elements that are right for their learners. The key focus in Lower Primary Mathematics comprise of the following:

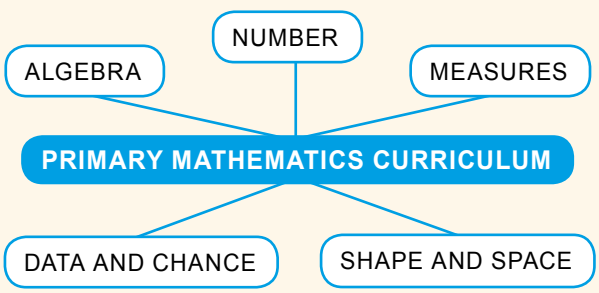
1. pupil-centred learning
2. active participation
3. problem solving
4. critical thinking
5. real-life contextual exercises
6. mathematical communication and reasoning

Teachers must provide a conducive environment for learning Mathematics in the classroom that encourages creativity and enjoyment. When introducing a concept to pupils, teachers need to ensure that pupils are able to relate mathematical activities and problems to relevant and real-life situations. Teaching mathematical concepts in real-life contexts and providing hands-on experience assist pupils to understand the concepts. Therefore, teachers need to provide mathematical contexts that are relevant to the pupils. Pupils need to apply the concepts and skills in various areas of Mathematics to find solutions to problems involving real-life situations. This series engages the pupils to learn by the Concrete-Pictorial-Abstract (C-P-A) approach:

Exploring concepts using **concrete** materials, leading to the use of **pictorial** representations and then, the **abstract**. Using this approach, pupils are first introduced to a concept through real-life examples or hands-on activities. The exercises then progress with the help of pictorial representations. Once they have a good understanding of the concept, mathematical notation; symbols and computations are introduced to achieve mastery in the abstract.

The Teacher's Resource Book provides instructions on the use of resources to help them carry out the abovementioned objectives. If a concept is taught in a comprehensive manner with clear instructions supplemented with hands-on activities and practice, most pupils would be able to achieve the set assessment target. Each pupil has a set pattern and pace of grasping concepts, but the expectation is the plateau of mathematical competency for all. In this regard, the Teacher's Resource Book serves as a support to teachers using this series.

The five main strands of the Primary Mathematics Curriculum are:



The Teacher's Resource Book supports a meaningful and holistic approach to teaching the strands of Mathematics. The buildup of concepts throughout this series is progressive and comprehensive.

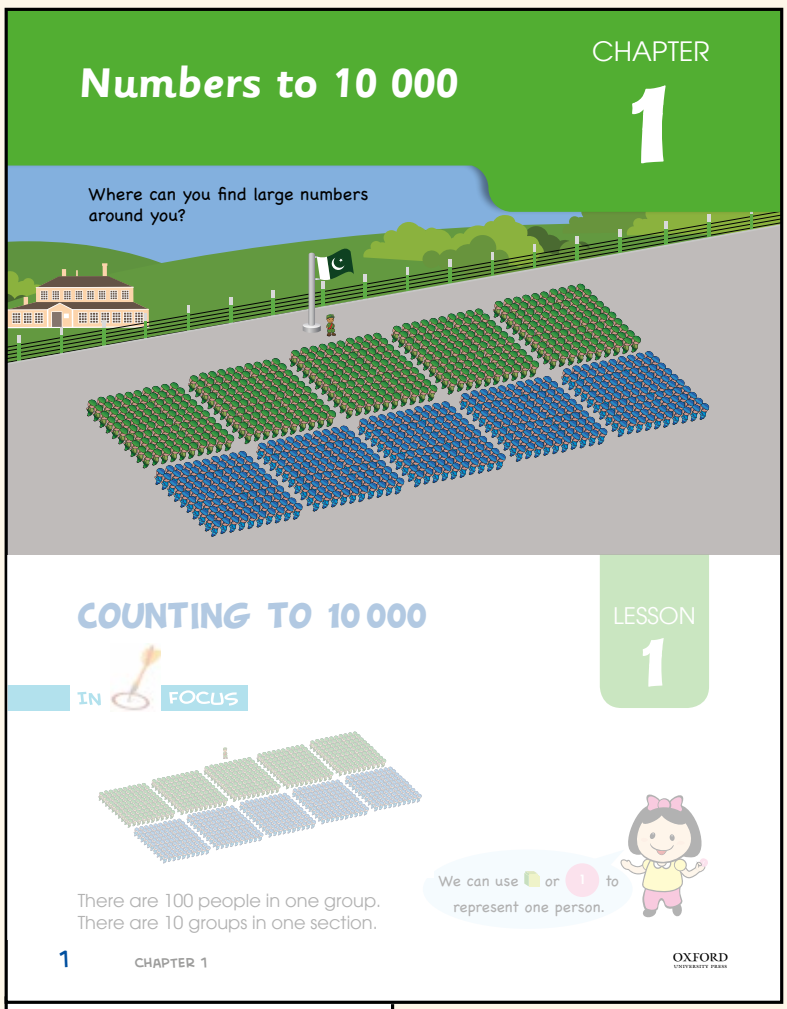
With the implementation of hands-on activities, the learning of a mathematical concept is complemented with experiences that make learning Mathematics enjoyable and give pupils the ownership of independent and group practices. Multiple strategies are implemented through activities in the form of games, model work, standard and non-standard materials and resources. The Teacher's Resource Book facilitates teachers to implement this aspect of the series proficiently. The Teacher's Resource Book provides a structure whereby teachers and coordinators can select, combine and improvise various pedagogical practices for the pupil-centric textbook and workbooks.

In this regard, the Teacher's Resource Book provides the following elements:

- **Scheme of Work** - A tabulated guide showing a breakdown of each lesson's learning objectives, learning experiences, page references of relevant resources, concrete materials required and suggested number of periods required to conduct the lesson, keeping in mind the level of difficulty of the content.
- **Syllabus Matching Grid** - A tabulated guide referring the chapters in this series to the learning objectives of the Cambridge Primary Mathematics curriculum.
- **Exposition of Lessons** - A guide for teachers to prepare and conduct lessons.
- **Answers** - Solutions to questions in the textbook and workbook are provided, along with detailed steps where required.
- **Activities** - Additional activities to assist teachers to support struggling learners and challenge advanced learners.
- **Lesson Plans** - Detailed lesson plans for the lessons to formalise the teaching approach for the teachers. It encompasses prior learning, pre-emptive pitfalls, introduction, problem solving and mathematical communication support.
- **Navigating through the Assessment Activities and Exercises** - An essay explaining to teachers how to use the resources provided effectively when conducting the lessons. The resources include formative and progressive exercises, activities and assessments provided in the textbook and workbook.
- **Activity Handbook** - Activity templates and worksheets for pupils to use when carrying out activities and to supplement the lessons.

NUMBERS TO 10 000

CHAPTER 1



Textbook 3 P1

Related Resources
NSPM Textbook 3 (P1 – 19)
NSPM Workbook 3A (P1 – 18)

Materials
Number discs, paper clips, two similar transparent containers, place-value cards, place-value chart, bag, mini whiteboards, markers

Lesson

Lesson 1	Counting to 10 000
Lesson 2	Place Value
Lesson 3	Comparing and Ordering Numbers
Lesson 4	Number Patterns

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

Pupils have learnt how to count in hundreds up to 1000 in Grade 2. The goals of this chapter are to enable pupils to count the number of objects in a set in hundreds and thousands; to read and write a number in numerals and in words; to compare the number of objects in two or more sets and finally to identify and complete patterns in number sequences.

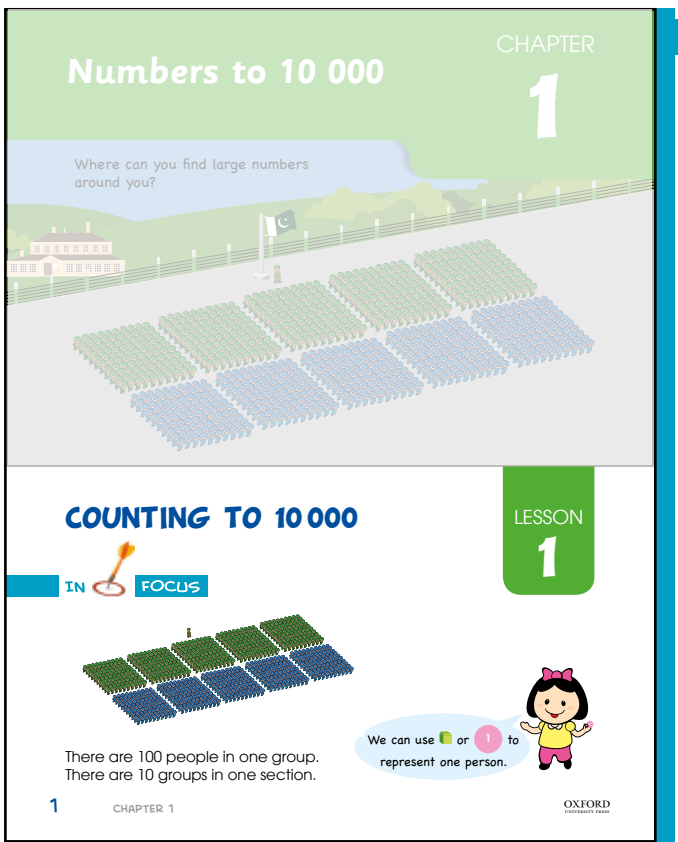
To help pupils make sense of big numbers (in thousands), they can be asked to find examples of such numbers in real life and compare their magnitude to that of smaller numbers. Pupils could also be given the opportunity to use number discs or play money to count and compare values.

LESSON 1

COUNTING TO 10 000

LEARNING OBJECTIVE

1. Count in thousands, hundreds, tens and ones.



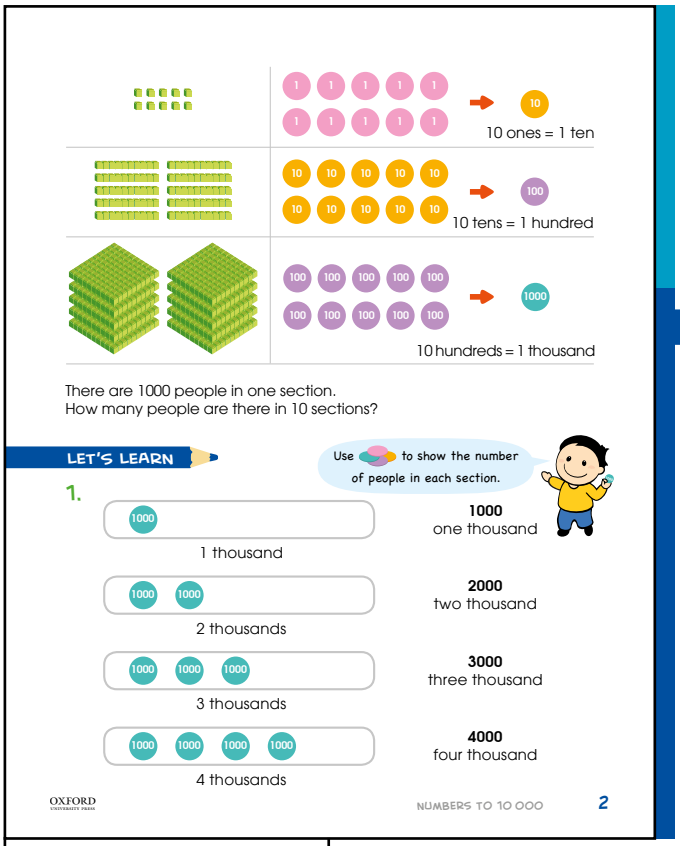
Textbook 3 P1

IN FOCUS

Use the chapter opener (P1) to elicit real life examples of large numbers from pupils (e.g. prices of electronic devices, electrical appliances, etc.).

Ask the following questions to help them count the number of people in the picture:

- How many people are there in each row?
- How many people are there in each group?
  Let us count in tens to find out.
- How many people are there altogether?
  Let us count in hundreds to find out.



Textbook 3 P2

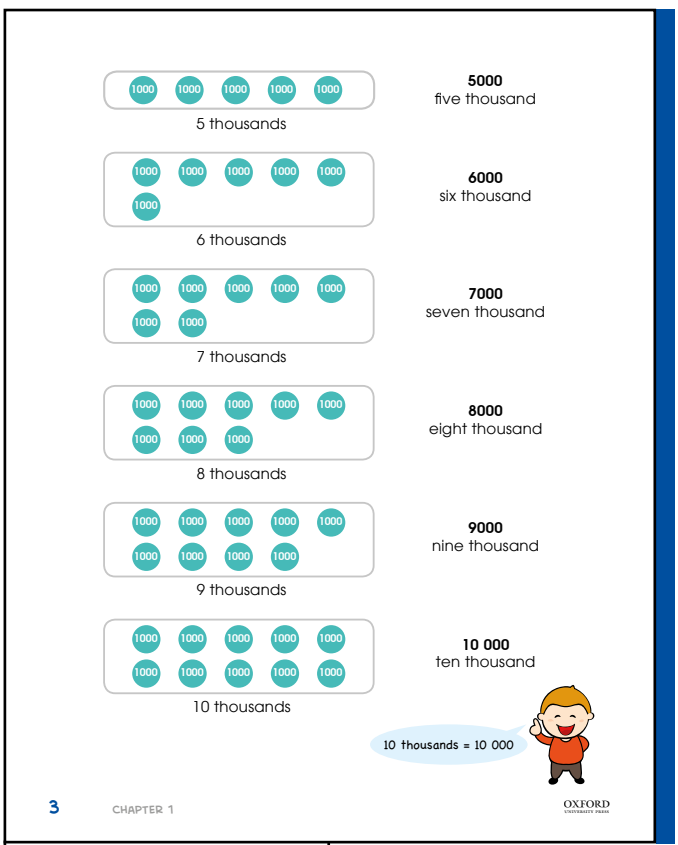
Write **10 hundreds = 1 thousand** on the whiteboard.

Next, ask the following questions to help pupils count in thousands:

- There are 1000 people in one section. How do we find out how many people there are in 10 sections?
- Should we count in hundreds to find out?
- How do we count in thousands?

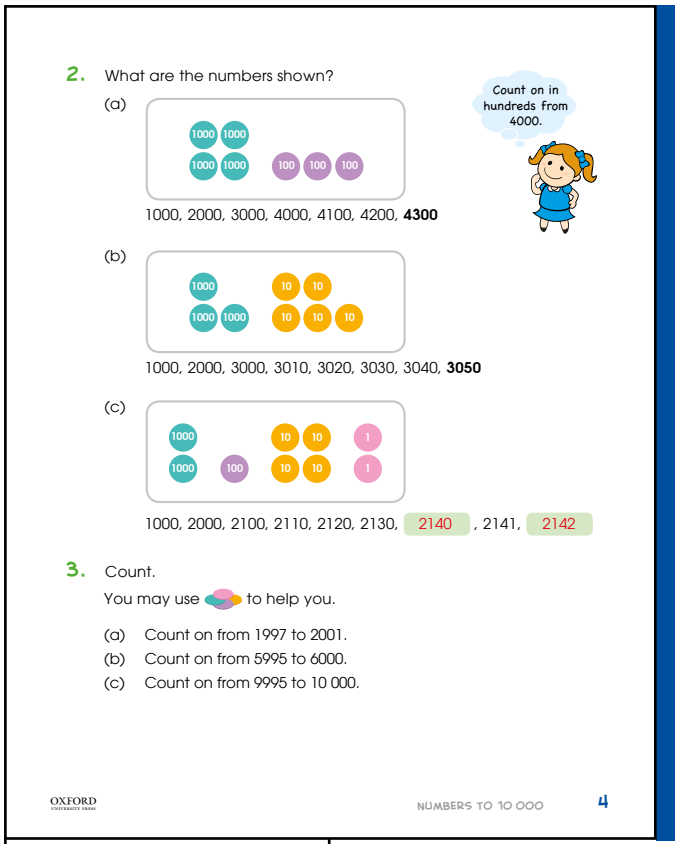
LET'S LEARN

Give pupils number discs to help them count the number of people in 10 sections. Get them to count in thousands as they arrange the discs as shown in the textbook.



Textbook 3 P3

Get pupils to continue arranging the number discs until they reach 10 000. Ask the pupils how many thousands make 10 000.



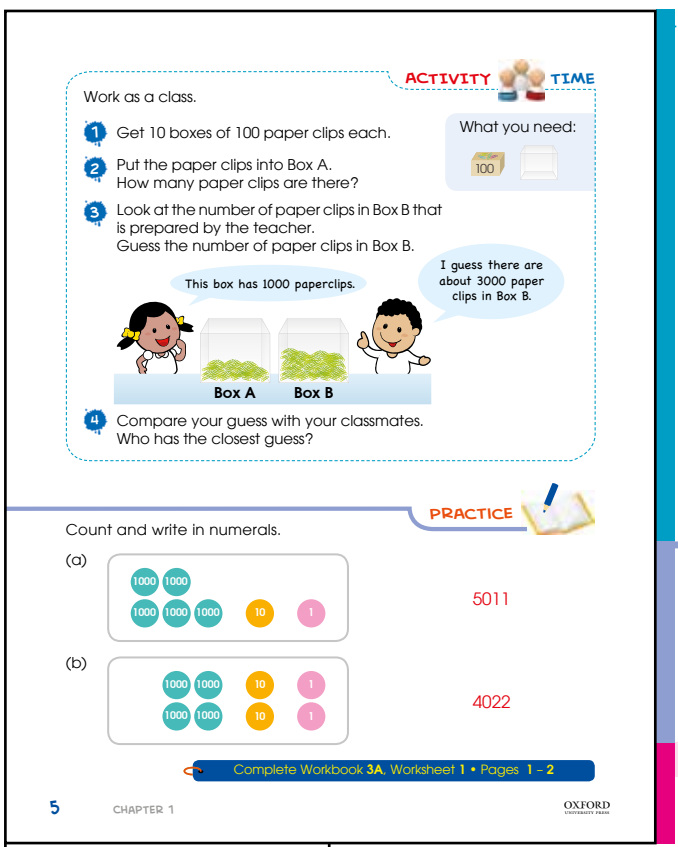
Textbook 3 P4

For Let's Learn 2, allow pupils to continue using number discs to represent what they see in parts (a) to (c). Lead pupils to see that they should count the thousands first, followed by the hundreds, tens and ones.

For Let's Learn 3(a), get pupils to show 1997 with the number discs (1 thousands disc, 9 hundreds discs, 9 tens discs and 7 ones discs). After which, add ones discs as they count on.

When pupils reach 2000, they would have 1 thousands disc, 9 hundreds discs and 10 ones discs. Guide them to see that 10 ones discs can be replaced by 1 tens disc, 10 tens discs can be replaced by 1 hundred disc and 10 hundreds discs can be replaced by 1 thousand discs. Therefore, the number 2000 can be represented with 2 thousands discs.

Repeat this procedure with the Let's Learn 3(b) and 3(c).



Textbook 3 P5

ACTIVITY TIME

Before the activity, prepare two similar transparent containers. One of which should be kept empty (labelled as Box A) and the other containing more than 1000 paper clips (labelled as Box B).

Show 10 boxes of paper clips, each containing 100 paper clips, to the pupils. Pour the paper clips into Box A. Pupils are then required to guess the number of paper clips in Box B.

This activity allows pupils to have a sense of how large 1000 is and also to estimate the number of items by comparing quantities in identical containers.

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 1** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 3A P1 – 2).

Answers Worksheet 1 (Workbook 3A P1 – 2)

1.

Number of discs	Numerals	Words
	2000	two thousand
		
		
		
		

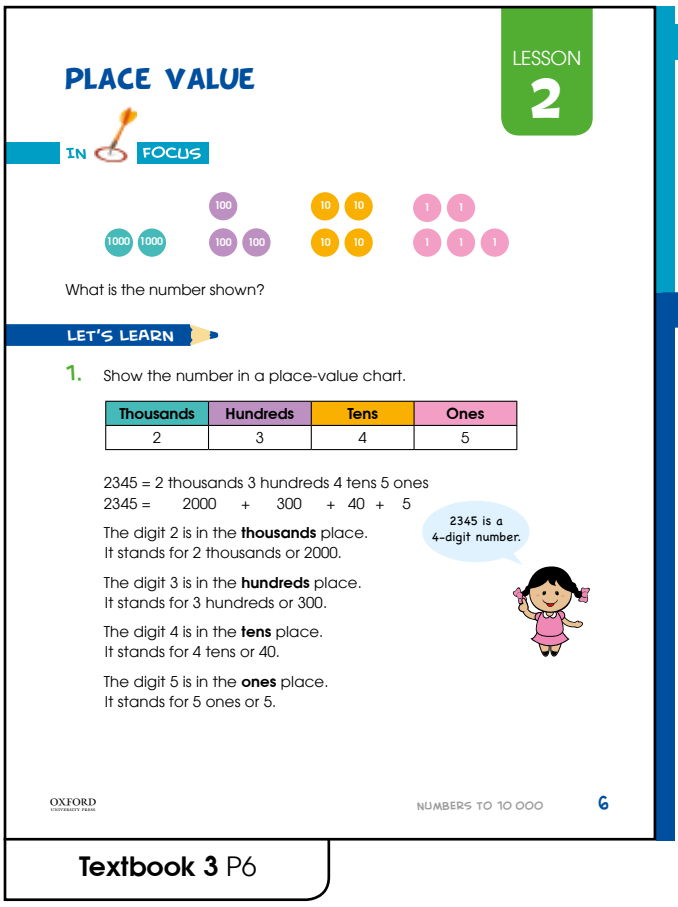
2. (a) 2010
   (b) 7003
   (c) 5199

LESSON 2

PLACE VALUE

LEARNING OBJECTIVES

1. Represent numbers within 10 000 in thousands, hundreds, tens and ones.
2. State the values of the digits in a given number up to 10 000.
3. Read and write numbers to 10 000 in numerals and in words.



PLACE VALUE

LESSON 2

IN FOCUS

What is the number shown?

LET'S LEARN

1. Show the number in a place-value chart.

Thousands	Hundreds	Tens	Ones
2	3	4	5

2345 = 2 thousands 3 hundreds 4 tens 5 ones
2345 = 2000 + 300 + 40 + 5

The digit 2 is in the **thousands** place.
It stands for 2 thousands or 2000.

The digit 3 is in the **hundreds** place.
It stands for 3 hundreds or 300.

The digit 4 is in the **tens** place.
It stands for 4 tens or 40.

The digit 5 is in the **ones** place.
It stands for 5 ones or 5.

2345 is a 4-digit number.

OXFORD UNIVERSITY PRESS NUMBERS TO 10 000 6

Textbook 3 P6

IN FOCUS

Discuss with pupils how the number shown should be read. Assist the pupils by asking the following questions:

- How should we read the number shown?
- Should we start reading from the greatest place value, or from the smallest place value?

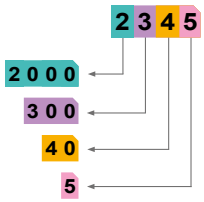
LET'S LEARN

Display a blank place-value chart on the whiteboard or the visualiser.

Guide the pupils in filling the place-value chart. Ask them how many thousands, hundreds, tens and ones there are in the number shown in In Focus.

Write down each digit in the appropriate places on the chart. Go through the meaning of place values and the value of each digit with pupils.

We can also use place-value cards to show the number.



The value of the digit 2 is 2000.
The value of the digit 3 is 300.
The value of the digit 4 is 40.
The value of the digit 5 is 5.
We write 2345 as **two thousand, three hundred and forty-five** in words.

2. Show 7028 using and .

Thousands	Hundreds	Tens	Ones
7	0	2	8

7028 = 7 thousands 0 hundreds 2 tens 8 ones

7028 = 7000 + 0 + 20 + 8

The digit 7 is in the thousands place.

The value of the digit 7 is 7000.

The digit 0 is in the hundreds place.

The value of the digit 0 is 0.

We write 7028 as seven thousand and twenty-eight in words.

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Textbook 3 P7

Next, use place-value cards to represent 2345. Individual cards can be used to show the value of each digit.

Show how 2345 can be written in words by starting from the thousands place, then going on to the hundreds place, the tens place and the ones place.

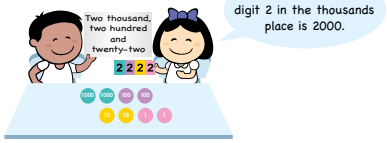
For Let's Learn 2, use number discs and place-value cards to guide pupils in filling the blanks.

ACTIVITY TIME

Work in pairs.

1. Use number discs to show a 4-digit number.
2. Get your partner to use to show the number and to tell the value of each digit in the number.
3. Write the number in words.
4. Switch roles and repeat 1 to 3.

What you need:



PRACTICE

1. Find the missing numbers.

7914 = 7000 + 900 + 10 + 4

The digit 9 is in the hundreds place.

The value of the digit 1 is 10.

2. Write in words.

(a) 3992 three thousand, nine hundred and ninety-two (b) 5730 five thousand, seven hundred and thirty

(c) 6408 six thousand, four hundred and eight (d) 9011 nine thousand and eleven

Complete Workbook **3A**, Worksheet **2** • Pages **3 – 8**

OXFORD UNIVERSITY PRESS NUMBERS TO 10 000 8

Textbook 3 P8

ACTIVITY TIME

Assign pupils to work in pairs. Provide pupils with number discs and place-value cards. Allow them to spend about 10 minutes on this activity.

Demonstrate the activity with a pupil for the class to get a better understanding of the activity.

An accompanying worksheet or blank paper can be given to pupils to record their answers.

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 2** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 3A P3 – 8).

Answers Worksheet 2 (Workbook 2A P8 – 9)

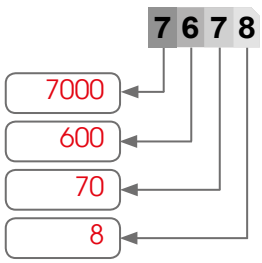
1. (a)

Thousands	Hundreds	Tens	Ones

(b)

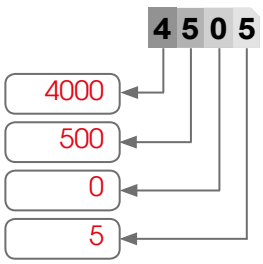
Thousands	Hundreds	Tens	Ones

2. (a)



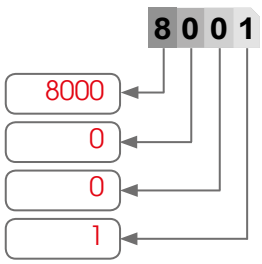
Seven thousand, six hundred and seventy-eight

(b)



Four thousand, five hundred and five

(c)



Eight thousand and one

3. (a) thousands
2000
(b) hundreds
600
(c) tens
40
(d) ones
8

4. (a) 4
(b) 5
(c) 200
(d) 0

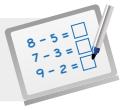
5. (a) 1
(b) 6
(c) hundreds
(d) 9

6. (a) 1000
(b) 200
(c) 900
(d) 30
(e) 0, 800

7. (a) One thousand, nine hundred and twenty-three
(b) Three thousand, six hundred and nine
(c) Two thousand and fifteen
(d) Four thousand and six hundred

8. (a) 3650
(b) 6009
(c) 7102
(d) 1030

LESSON PLAN



Specific Learning Focus

- Count in thousands, hundreds, tens and ones.
- Represent numbers within 10 000 in thousands, hundreds, tens and ones.
- State the values of the digits in a given number up to 10 000.
- Read and write numbers to 10 000 in numerals and in words.

Suggested Duration

Lesson 1: 2 periods
Lesson 2: 2 periods

Prior Learning

Pupils should be well versed in numeric skills in numbers to 1000. In Grade 3, pupils are required to learn numbers to 10 000.

Pre-emptive Pitfalls

Making smaller numbers tangible is less challenging. As the number of digits of a number goes up to 5, visualising and connecting with real-life experiences will be difficult for some pupils. Linking it with 100s and emphasising that 10 thousands make 10 000 using number discs will be beneficial.

Introduction

Start the lesson by going through 'In Focus' (Textbook 3 P1) to show ones, tens, hundreds and thousands. Use concrete material like base-ten blocks to revisit the place value of ones, tens, hundreds and thousands. Lead pupils to see that 10 ones = 1 ten, 10 tens = 1 hundred, 10 hundreds = 1 thousand, and 10 thousands = 10 000. Use number discs to represent numbers from 1000 to 10 000 (Activity Handbook 3 P4). The expanded form of a four-digit number is covered in Let's Learn 2. Use different coloured discs for each place value and ask pupils to work independently on Let's Learn 2 and 3 (Textbook 3 P4) and 'Practice' (Textbook 3 P5).

Problem Solving

In Let's Learn 3 (Textbook 3 P4) , counting from 1997 to 2001 creates a better understanding of the numerals. Pupils tend to rote count and ask them to count from the middle within a given range, makes them get a grip of the numbers.

Activities

10 or more boxes of 100 paper clips each is a good resource to make the pupils understand the concept of 1000s. Halving the number of paper clips in one of the boxes or permutating numbers like 9050 or 9100 etc. could be beneficial for the pupils. Repeat this activity with different numbers.

Resources

- number discs (Activity Handbook 3 P4)
- two similar transparent containers
- 10 or more boxes of 100 paper clips each or any other small real-life objects

Mathematical Communication Support

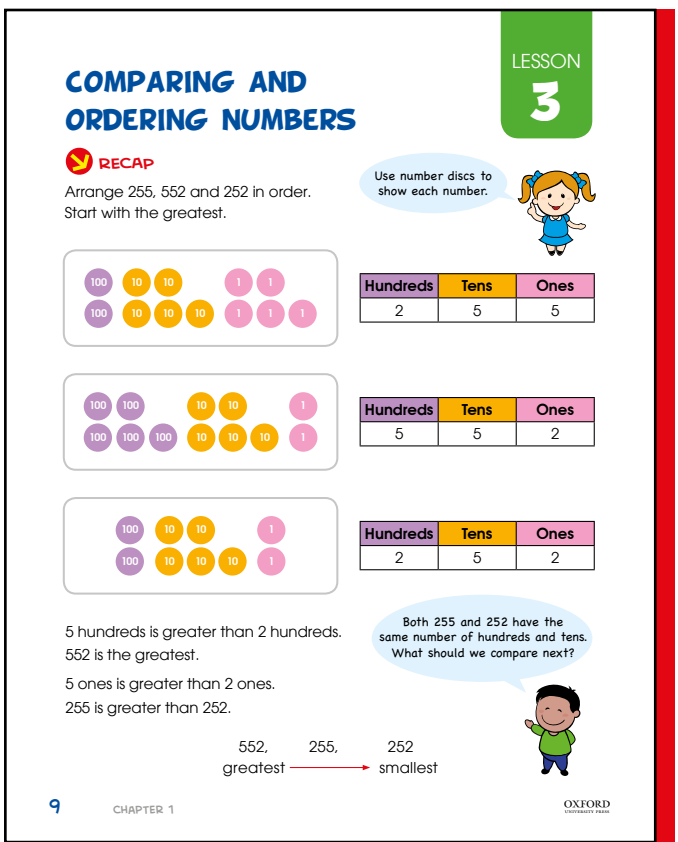
Write a 4-digit number on the board and draw number discs to represent the number. In addition, encourage pupils to answer questions like the following individually:
(i) How many ones, tens, hundreds and thousands are there in each number?
(ii) What is the value of the number if the digit in the hundreds place is halved?
(iii) What is the number that comes after 9999?
(iv) What number, when added to 998, will make a thousand?
Ask for real-life scenarios where 4-digit numbers are used (e.g. the distance, in miles, travelled by an aeroplane from Karachi to Lahore; or the total number of days in 5 years (365 × 5 = 1825)).

LESSON 3

COMPARING AND ORDERING NUMBERS

LEARNING OBJECTIVE

1. Compare and order numbers within 10 000.



COMPARING AND ORDERING NUMBERS

LESSON 3

RECAP

Arrange 255, 552 and 252 in order.
Start with the greatest.

Use number discs to show each number.

Hundreds	Tens	Ones
2	5	5

Hundreds	Tens	Ones
5	5	2

Hundreds	Tens	Ones
2	5	2

5 hundreds is greater than 2 hundreds.
552 is the greatest.

5 ones is greater than 2 ones.
255 is greater than 252.

Both 255 and 252 have the same number of hundreds and tens. What should we compare next?

552, greatest → 255, → 252 smallest

9 CHAPTER 1 OXFORD

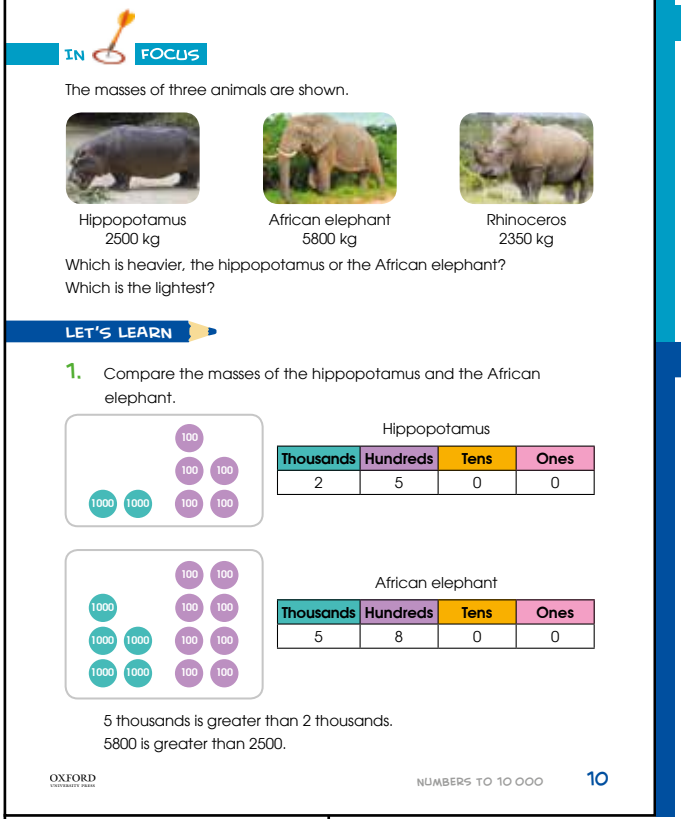
Textbook 3 P9

RECAP

When reviewing the comparison of three 3-digit numbers, ask the following questions:

- What should we compare first, the hundreds, the tens or the ones?
- What happens if the digits in the hundreds place are the same?

Remind pupils to start comparing from the largest place value.



IN FOCUS

The masses of three animals are shown.

Hippopotamus
2500 kg

African elephant
5800 kg

Rhinoceros
2350 kg

Which is heavier, the hippopotamus or the African elephant?
Which is the lightest?

LET'S LEARN

1. Compare the masses of the hippopotamus and the African elephant.

Hippopotamus

Thousands	Hundreds	Tens	Ones
2	5	0	0

African elephant

Thousands	Hundreds	Tens	Ones
5	8	0	0

5 thousands is greater than 2 thousands.
5800 is greater than 2500.

Textbook 3 P10

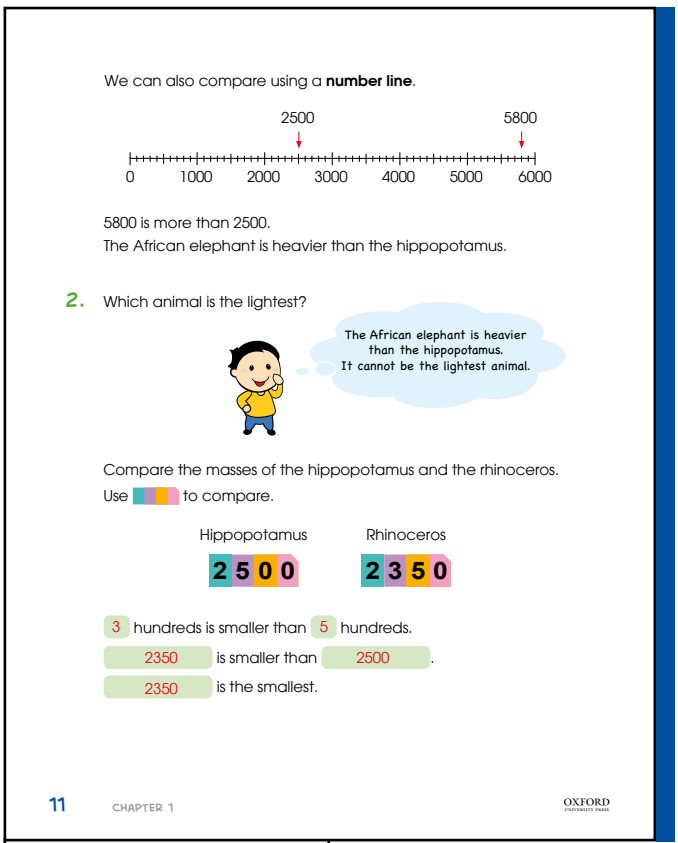
IN FOCUS

Using the given context, discuss with pupils how to compare the masses. Ask the following questions for the discussion.

- Recall how we compared the 3-digit numbers. What do you think we should do to compare the masses of the hippopotamus and the African elephant?
- Which place value should we start comparing from?

LET'S LEARN

Write down the numbers 2500 and 5800 on two empty place-value charts. Ask pupils which place value they should compare first. Remind pupils to start with the greatest place value.



We can also compare using a **number line**.

5800 is more than 2500.
The African elephant is heavier than the hippopotamus.

2. Which animal is the lightest?

Compare the masses of the hippopotamus and the rhinoceros.
Use to compare.

Hippopotamus 2500
Rhinoceros 2350

3 hundreds is smaller than 5 hundreds.
2350 is smaller than 2500.
2350 is the smallest.

Textbook 3 P11

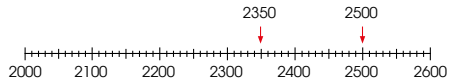
Introduce the number line to pupils. Ask them where 2500 and 5800 should be placed on a number line, based on the digit in the thousands place. Ask pupils how they compare using a number line.

To help the pupils find out which is the lightest animal, ask them the following questions:

- Since the African elephant is heavier than the hippopotamus, can the African elephant be the lightest animal?
- Which two masses should be compared to find out which is the lightest animal?

Use place-value cards and the number line to compare the masses of the hippopotamus and the rhinoceros. The pupils may also compare using number discs. Start from the thousands place, then proceed to the hundreds place. Ask pupils if it is necessary to compare the tens and ones place.

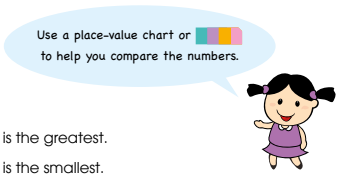
We can also compare using a number line.



2350 is less than 2500.

The rhinoceros is the lightest.

3. Compare the numbers 1081, 1801 and 1018.
Arrange the numbers in order, starting with the greatest.



1801 is the greatest.

1018 is the smallest.

1801, 1081, 1018
greatest → smallest

Textbook 3 P12

For Let's Learn 3, pupils can be given a choice of whether to use the place-value chart or place-value cards to help them compare the numbers. If time permits, get pupils to explain how they get their answer.

ACTIVITY TIME

Play in groups of 3 to 4.

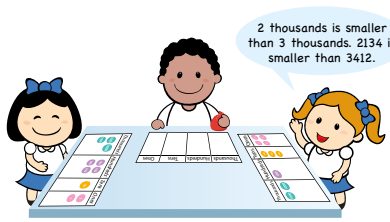
1. Put the in the bag.
2. Take turns to take 10 from the bag without looking.
3. Arrange the on the place-value chart.

What you need:

Example

Thousands	Hundreds	Tens	Ones
1000 1000	100	10 10 10	1 1 1 1

4. Compare the numbers using **greater**, **greatest**, **smaller**, **smallest** and **the same as**.



The player with the greatest number gets 1 point.

5. Repeat 1 to 4.
The first player to get 5 points wins!

Textbook 3 P13

ACTIVITY TIME

Assign pupils to work in groups of 3 to 4. Provide pupils with number discs, place-value charts and a small empty bag.

Demonstrate the activity with 2 or 3 pupils for the class to get a better understanding of the activity.

Encourage pupils to use the terms given in the activity to compare the numbers.

PRACTICE

1. Compare the numbers.

(a) 6048 6804

6804 is greater than 6048.

6048 is smaller than 6804.

(b) 3910 3901 3091

3910 is the greatest.

3091 is the smallest.

2. Mount Everest and K2 are the two tallest mountains in the world. Which is taller, Mount Everest or K2? Mount Everest

Mount Everest
8848 m

K2
8611 m

3. Arrange the numbers in order, starting with the greatest.

(a) 2350, 5320, 5023 5320, 5023, 2350

(b) 940, 9400, 9040, 4090 9400, 9040, 4090, 940

4. Arrange the numbers in order, starting with the smallest.

(a) 1028, 2810, 2801 1028, 2801, 2810

(b) 1324, 1234, 1423, 1342 1234, 1324,1342,1423

Complete Workbook 3A, Worksheet 3 • Pages 9 – 12

OXFORD UNIVERSITY PRESS NUMBERS TO 10 000 14

Textbook 3 P14

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 3** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 3A P9 – 12).

Answers Worksheet 3 (Workbook 2A P9 – 12)

1. (a) [2] hundreds is greater than [1] hundred.
   [206] is greater than [196].
   [Ann] has more stamps.

   (b) [1] ten is smaller than [2] tens.
   [315] is smaller than [325].
   The book is cheaper in Shop [B].

2. (a) 135, 535, 553
   (b) 887, 878, 788

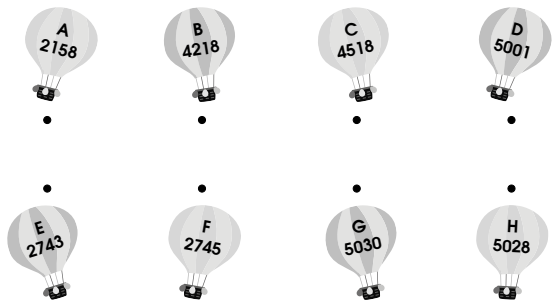
3. (a) [8998] is smaller than [9889].
   (b) [1256] is greater than [1248].
   (c) [3117] is smaller than [3171].

4. (a) [6871] is the greatest.
   [6718] is the smallest.
   (b) [9535] is the greatest.
   [9355] is the smallest.

5. (a) [2213] [2313] [2113]
   (b) [4849] [4809] [4889]
   (c) [5421] [5221] [5321]
   (d) [1406] [641] [1460]

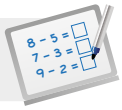
6. (a) ⬡5307 ⬡5317 ⬡5370
   (b) ⬡7732 ⬡7723 ⬡7273
   (c) ⬡1351 ⬡1315 ⬡531
   (d) ⬡9202 ⬡927 ⬡9205

7. (a) 2651, 2516, 1562, 1265
   (b) 8045, 4805, 4580, 854

8. 

   The letter on the balloon with the greatest number is [G].

LESSON PLAN



Specific Learning Focus

- Compare and order numbers within 10 000.

Suggested Duration

2 periods

Prior Learning

Pupils have learnt to compare and order numbers within 1000 in ascending or descending order. In this lesson, they are required to do that for numbers within 10 000.

Pre-emptive Pitfalls

This lesson should be relatively less challenging as pupils have been comparing and ordering 2- and 3-digit numbers. It is important to remind them that when we compare numbers, we start comparing from the largest place value. If the digits in the largest place value are the same, we move on to compare the next place value. In other words, we compare the place value from left to right of a number.

Introduction

Comparing numbers can be done with the help of number discs, place-value charts and number lines. Recapitulate the concept of comparing and ordering 3-digit numbers before proceeding to 4-digit numbers. Real-life examples, as mentioned in Textbook 3 P10, can be used to make numbers more tangible. Encourage pupils to come up with other real-life examples that require the comparing and ordering of 4-digit numbers. Emphasise that in comparing 4-digit numbers, the digits in the thousands place are compared first and if the digits are the same, proceed to compare the digits in the hundreds place.

Problem Solving

Referring to 'In Focus' (Textbook 3 P10), ask pupils individually how they decide if the elephant is heavier or lighter than the hippopotamus. Ask them which method they used. Encourage individual responses of their preferred method (e.g. number line or place-value chart).

Activities

Distribute place-value charts (Activity Handbook 3 P1) to the pupils in groups of 4 to carry out the activity in 'Activity Time' (Textbook 3 P13). Encourage the use of key terms like 'greater', 'greatest', 'smaller', 'smallest', 'equal to' and 'the same as'.

Resources

- number discs (Activity Handbook 3 P4)
- place-value chart (Activity Handbook 3 P1)
- place-value cards (Activity Handbook 3 P2 – 3)
- bag

Mathematical Communication Support

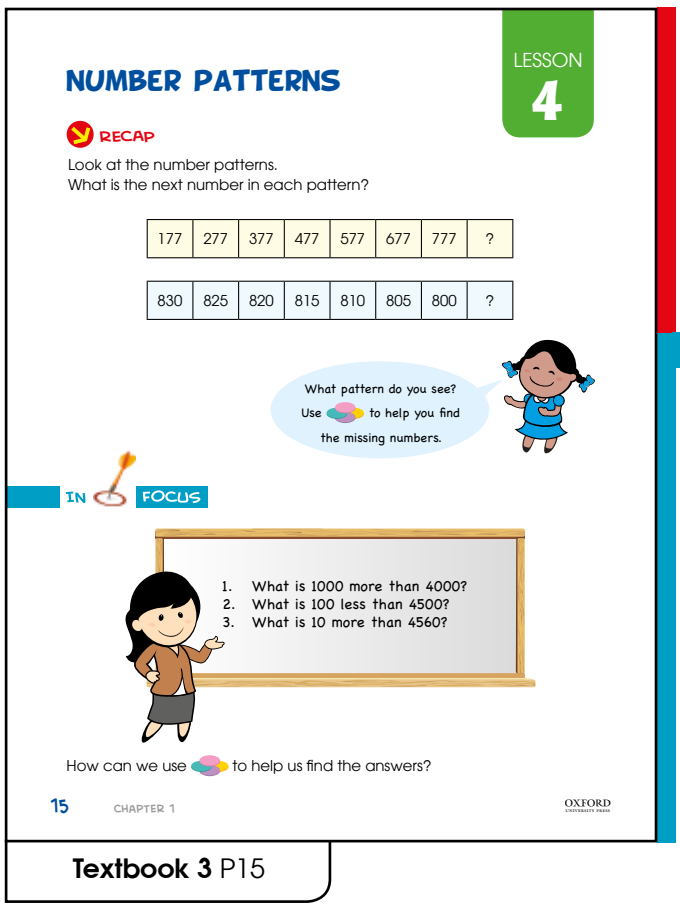
'Maths Journal' (Textbook 3 P19 and Workbook 3A P16) show the application of comparing and ordering numbers in real-life situations. Have pupils link the concepts learnt using place-value chart to compare and order the cost of laptops in descending order (from the most expensive to the least expensive). Encourage pupils to bring newspaper advertisements showing prices of three similar type of products but of different brands (e.g. television) and get pupils to work in groups to discuss which product they would choose to buy. Encourage mathematical reasoning and discussion. Apart from comparing money, heights are also compared (Textbook 3 P14).

LESSON 4

NUMBER PATTERNS

LEARNING OBJECTIVE

1. Recognise and complete number patterns.


NUMBER PATTERNS

LESSON 4

RECAP

Look at the number patterns.
What is the next number in each pattern?

177	277	377	477	577	677	777	?

830	825	820	815	810	805	800	?

What pattern do you see?
Use to help you find the missing numbers.

IN FOCUS

1. What is 1000 more than 4000?
2. What is 100 less than 4500?
3. What is 10 more than 4560?

How can we use to help us find the answers?

15 CHAPTER 1 OXFORD

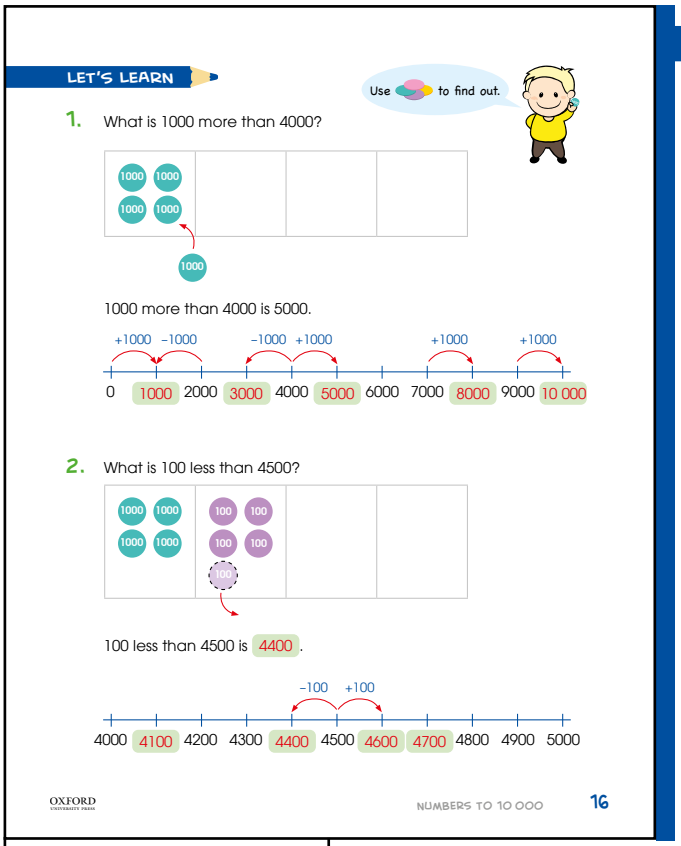
Textbook 3 P15

RECAP

Review with pupils what they have learnt in Grade 2 using the examples given. Give pupils number discs to work on the examples. Get pupils to describe the pattern they see.

IN FOCUS

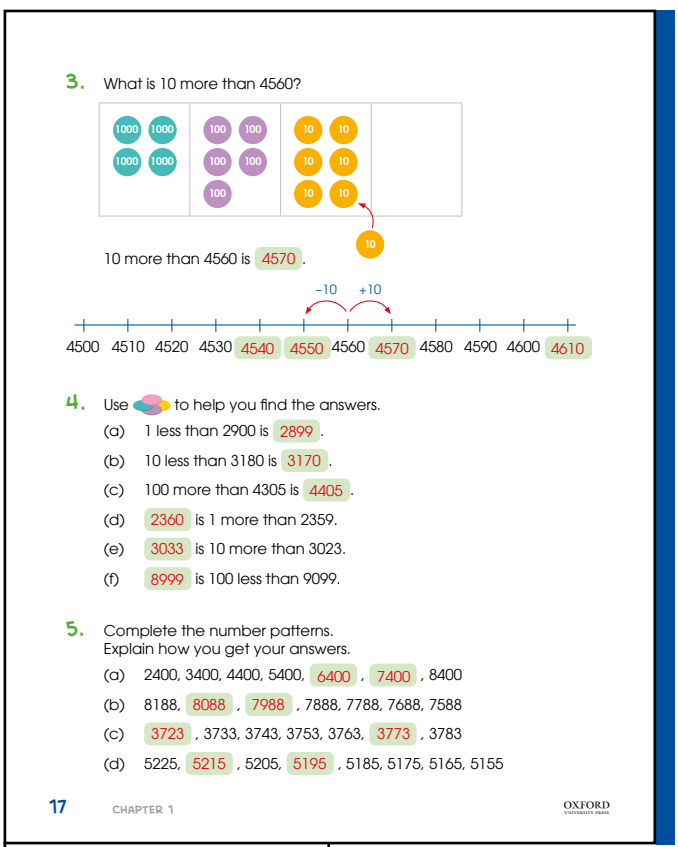
Use number discs to guide pupils in answering the questions presented in In Focus.



Textbook 3 P16

LET'S LEARN

Use number discs to demonstrate the patterns in Let's Learn 1 to 3. Show pupils how to find the missing values on the number lines.

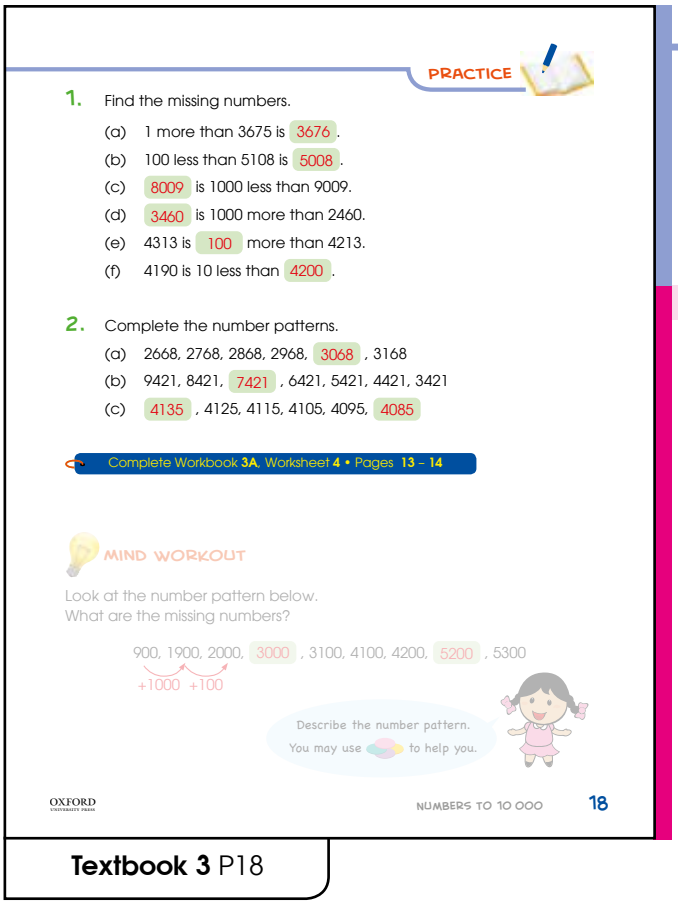


Textbook 3 P17

Distribute number discs to pupils for Let's Learn 4.

For Let's Learn 5, give pupils some time to complete the number patterns and explain verbally how they obtain their answers.

On top of the number patterns given in the textbook, allow pupils to explore more by creating their own number patterns for their classmates to solve.
They can present their number patterns to the class.



PRACTICE

1. Find the missing numbers.

(a) 1 more than 3675 is 3676.
(b) 100 less than 5108 is 5008.
(c) 8009 is 1000 less than 9009.
(d) 3460 is 1000 more than 2460.
(e) 4313 is 100 more than 4213.
(f) 4190 is 10 less than 4200.

2. Complete the number patterns.

(a) 2668, 2768, 2868, 2968, 3068, 3168
(b) 9421, 8421, 7421, 6421, 5421, 4421, 3421
(c) 4135, 4125, 4115, 4105, 4095, 4085

Complete Workbook 3A, Worksheet 4 • Pages 13 – 14

MIND WORKOUT

Look at the number pattern below.
What are the missing numbers?

900, 1900, 2000, 3000, 3100, 4100, 4200, 5200, 5300
+1000 +100

Describe the number pattern.
You may use to help you.

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NUMBERS TO 10 000 18

Textbook 3 P18

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 4** and work these out with the pupils.

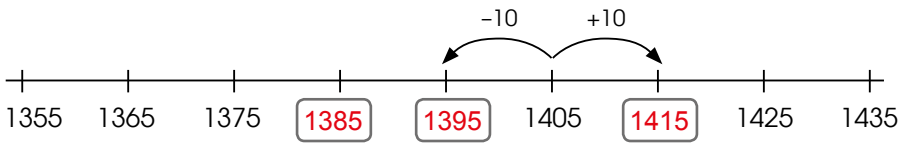
Independent seatwork

Assign pupils to complete Worksheet 4 (Workbook 3A P13 – 14).

Answers Worksheet 4 (Workbook 2A P13 – 14)

1. (a) 1693
   (b) 6001
   (c) 6225
   (d) 7293
   (e) 1000
   (f) 100
   (g) 5001

2. (a)

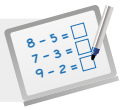


10 less than 1405 is [1395].

100 more than 7039 is [7139].

3. (a) 977, 967, 957, 947, [937], 927
   (b) 122, [222], 322, 422, 522, 622
   (c) 1689, 1789, 1889, 1989, [2089], [2189], 2289
   (d) 9532, 9522, 9512, 9502, [9492], 9482, [9472], 9462
   (e) 8088, [8098], [8108], 8118, 8128, 8138, 8148
   (f) [3470], 4470, 5470, 6470, 7470, [8470], 9470
   (g) [5013], 4913, [4813], 4713, 4613, 4513, 4413
   (h) 7022, 6022, [5022], 4022, 3022, 2022, 1022, [22]
   *(i) 5500, 5600, 6600, 6700, 7700, 7800, 8800, [8900], [9900], 10 000

LESSON PLAN



Specific Learning Focus

- Recognise and complete number patterns.

Suggested Duration

2 periods

Prior Learning

Pupils should be well versed with describing and then completing number patterns in the earlier grades. In this lesson, they will deal with 4-digit numbers, where the format of describing and completing number pattern remains the same no matter how many digits the numbers have. A quick recap using 3-digit numbers (Textbook 3 P15) will help them recall what they have learnt. Ask them questions like whether the number pattern is increasing or decreasing, how would they find the difference between two consecutive numbers in the pattern, and whether the difference is the same for every two consecutive numbers in the pattern. Encourage individual responses while revising the concept of describing number patterns.

Pre-emptive Pitfalls

Since pupils should be familiar with comparing 4-digit numbers as learnt in Lesson 3, describing and predicting a number pattern should not be challenging for most pupils.

Introduction

In Let's Learn 1 and 2 (Textbook 3 P16), get pupils to use number discs (Activity Handbook 3 P4) and number lines. Emphasise to pupils that in completing a number pattern, once they have identified the 'jump' from one number to the next consecutive number, they can either skip count, add or subtract to find the missing number in the pattern.

Problem Solving

Facilitate the pupils in coming to the conclusion of the pattern or jump between two consecutive numbers, by asking them to round off the numbers uniformly to find the difference easily.

Activities

Have pupils work in pairs and ask one pupil to make their own number pattern on their mini whiteboards while the partner describes the pattern and then completes it. Get them to exchange roles and give them about 5 minutes to complete at least 2 rounds of the activity. Allow them to use place-value cards to help them.

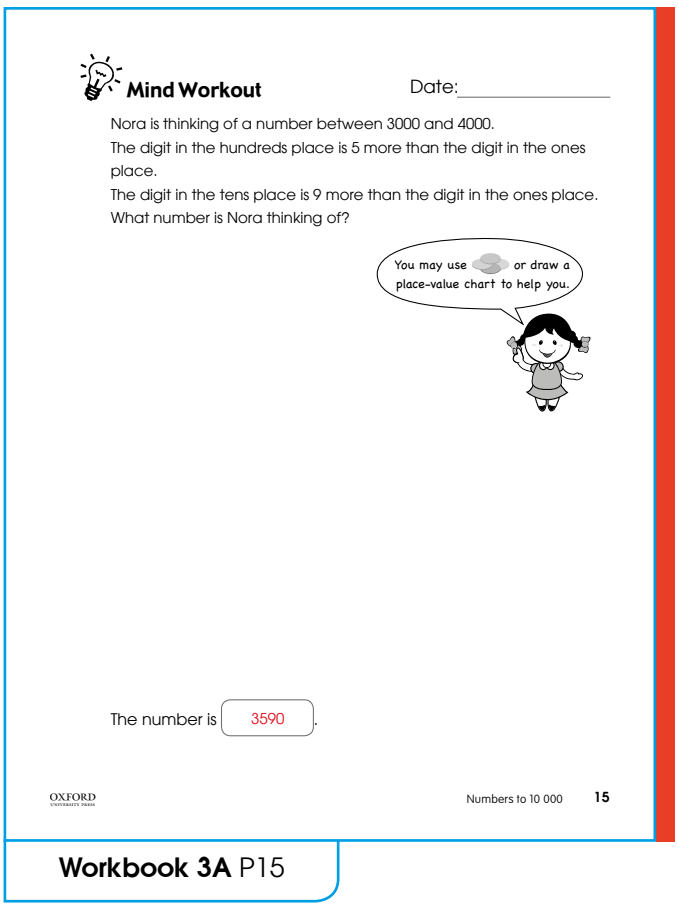
Resources

- mini whiteboards
- markers
- place-value chart (Activity Handbook 3 P1)

Mathematical Communication Support

Elicit the pupils' thinking by writing a number pattern on the board and then asking pertinent questions that lead them to complete the number pattern. Ask them the following questions 'Do you see an increasing or decreasing pattern? What is the difference between two consecutive numbers in the pattern? What number will you add to or subtract from a number in the pattern? Do you see a uniform difference between every two consecutive numbers? Is that the pattern? Can you describe and then complete the pattern by adding or subtracting the difference? How will you check your answer? Would you subtract to find the difference between the number that you found and the preceding number to check if the difference is correct?'

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout Date:_____

Nora is thinking of a number between 3000 and 4000.
The digit in the hundreds place is 5 more than the digit in the ones place.
The digit in the tens place is 9 more than the digit in the ones place.
What number is Nora thinking of?

The number is 3590.

Workbook 3A P15

Mind Workout

If pupils have difficulties in finding the answer, facilitate by asking the following questions:

- What must the digit in the thousands place be?
- If the digit in the tens place is 9 more than the digit in the ones place, what must the digit in the ones place be?
- Once you have found out the digit in the ones place, can you find out the digits in the tens place and hundreds place?

Maths Journal Date: _____

Some food items and the amount of calories they contain are shown.
Which item has the most calories?
Explain your answer.

Peanut butter
1520 calories per cup

Chocolate ice cream
286 calories per cup

Macadamia nuts
959 calories per cup

A cup of ( ) has the most calories.

_____
_____
_____
_____
_____

16 Chapter 1 OXFORD

Workbook 3A P16

Maths Journal

Allow pupils time to work out the answer, then explain their answers. If pupils are having difficulty in answering the question, facilitate by asking pupils to compare the three numbers using a place-value chart.

PRACTICE

1. Find the missing numbers.
   (a) 1 more than 3675 is 3676.
   (b) 100 less than 5108 is 5008.
   (c) 8009 is 1000 less than 9009.
   (d) 3460 is 1000 more than 2460.
   (e) 4313 is 100 more than 4213.
   (f) 4190 is 10 less than 4200.

2. Complete the number patterns.
   (a) 2668, 2768, 2868, 2968, 3068, 3168
   (b) 9421, 8421, 7421, 6421, 5421, 4421, 3421
   (c) 4135, 4125, 4115, 4105, 4095, 4085

Complete Workbook 3A, Worksheet 4 • Pages 13 – 14

MIND WORKOUT

Look at the number pattern below.
What are the missing numbers?

900, 1900, 2000, 3000, 3100, 4100, 4200, 5200, 5300
+1000 +100

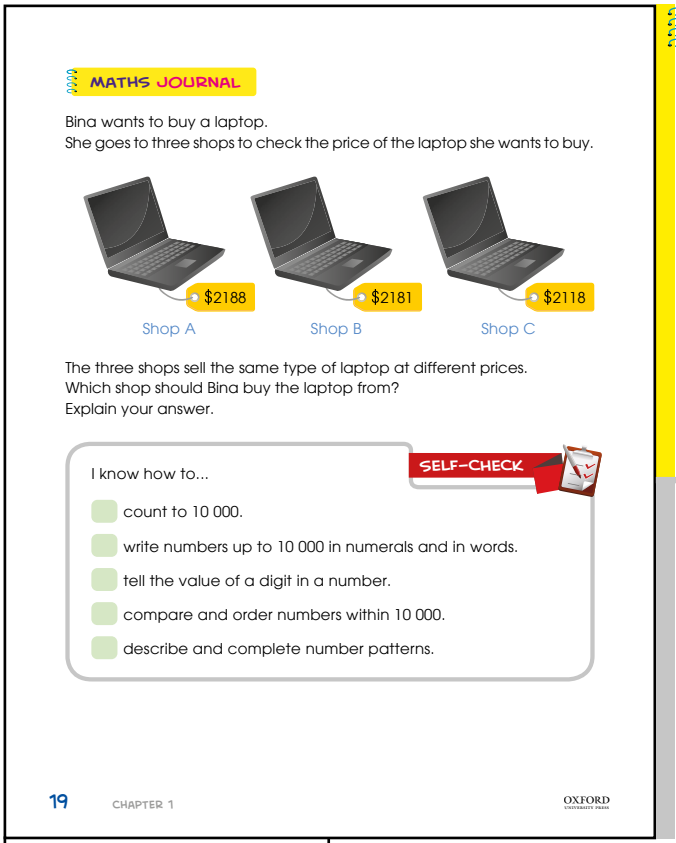
OXFORD NUMBERS TO 10 000 18

Textbook 3 P18

MIND WORKOUT

If pupils have difficulties in solving the number pattern, facilitate by asking the following questions:

- What is the difference between 900 and 1900? How about 1900 and 2000?
- What is the difference between 3100 and 4100? How about 4100 and 4200?
- Do you see a pattern? Can you describe the pattern?
- After filling in the missing numbers, how can you check your answers?



MATHS JOURNAL

Bina wants to buy a laptop.
She goes to three shops to check the price of the laptop she wants to buy.

$2188 Shop A
$2181 Shop B
$2118 Shop C

The three shops sell the same type of laptop at different prices.
Which shop should Bina buy the laptop from?
Explain your answer.

SELF-CHECK

I know how to...

- count to 10 000.
- write numbers up to 10 000 in numerals and in words.
- tell the value of a digit in a number.
- compare and order numbers within 10 000.
- describe and complete number patterns.

19 CHAPTER 1 OXFORD

Textbook 3 P19

MATHS JOURNAL

Before giving pupils time to answer the question, get them to understand that the three laptops are the same and hence, it is best to buy the laptop with the lowest price.

Allow pupils time to work out the answer, then explain their answers.

If pupils are having difficulty in answering the question, facilitate by asking pupils to compare the three numbers using a place-value chart.

SELF-CHECK

Before the pupils do the self check, review the important concepts once more by asking for examples learnt for each objective.

This self check can be done after pupils have completed **Review 1** (Workbook 3A P17 – 18) as consolidation of understanding for the chapter.

Answers Review 1 (Workbook 3A P17 – 18)

1. (a) 1950, One thousand, nine hundred and fifty
   1905, One thousand, nine hundred and five
   5019, Five thousand and nineteen
   5910, Five thousand, nine hundred and ten
   (b) the greatest number : 5910
   the smallest number : 1590

2. (a) 8000
   (b) tens
   (c) 4
   (d) 3

3. (a) 8000
   (b) 6403
   (c) 0
   (d) 2380

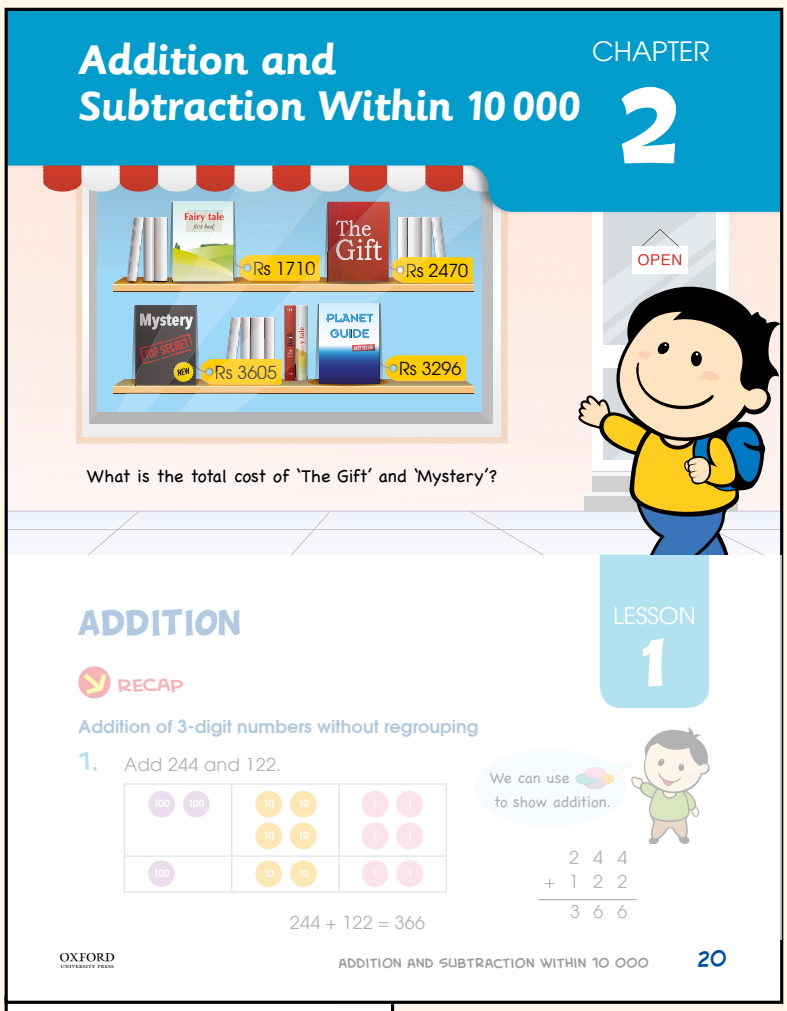
4. (a) 3002, 2300, 2030, 2003
   (b) 4164, 4641, 6144, 6414

5. (a) 3800, 4800, 5800, 6800, 7800 , 8000
   (b) 5800, 5900, 6000, 6100, 6200, 6300
   (c) 7002, 7001, 7000, 6999, 6998, 6997, 6996
   (d) 9220, 9210, 9200, 9190, 9180, 9170, 9160, 9150

ADDITION AND SUBTRACTION WITHIN 10 000

CHAPTER

2



Textbook 3 P20

Related Resources
NSPM Textbook 3 (P20 – 53)
NSPM Workbook 3A (P19 – 52)

Materials
Number discs, drawing block, markers, scissors, newspapers, magazines, catalogues

Lesson

Lesson 1	Addition
Lesson 2	Subtraction
Lesson 3	Solving Word Problems

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

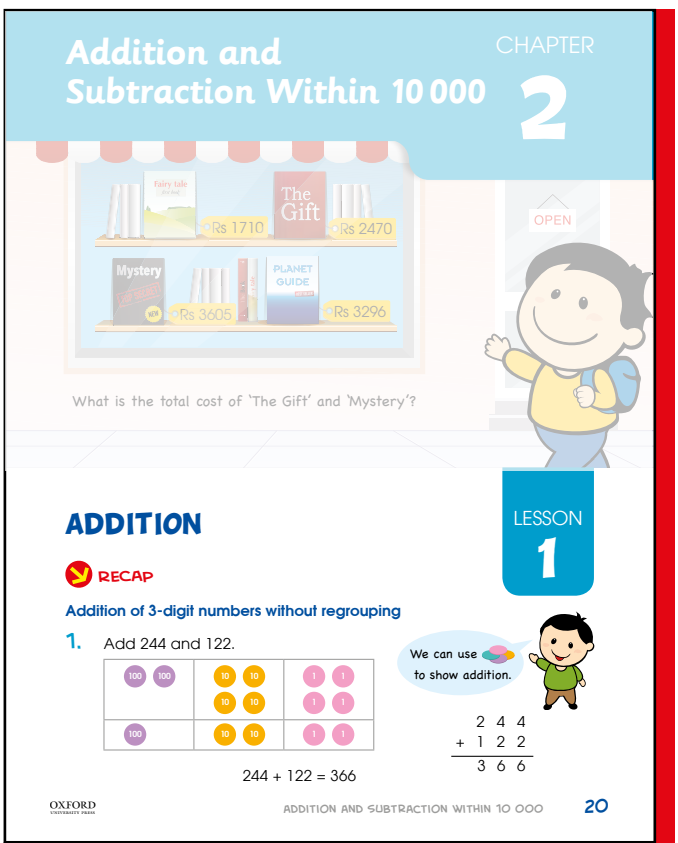
In this chapter, pupils learn how to add and subtract numbers within 10 000. As they have already learnt how to add and subtract numbers up to 3 digits in Grade 2, teachers can use the same procedures and mathematical language to teach this topic. For example, pupils start adding and subtracting from the ones place and regroup whenever necessary.

LESSON 1

ADDITION

LEARNING OBJECTIVES

1. Perform the addition algorithm for up to 4-digit numbers.
2. Mentally add two 2-digit numbers.


Addition and Subtraction Within 10 000
CHAPTER 2
Rs 1710
The Gift
Rs 2470
Mystery
Rs 3605
PLANET GUIDE
Rs 3296
OPEN
What is the total cost of 'The Gift' and 'Mystery'?
ADDITION
LESSON 1
RECAP
Addition of 3-digit numbers without regrouping
1. Add 244 and 122.
We can use to show addition.
244 + 122 = 366
2 4 4
+ 1 2 2
3 6 6
OXFORD
ADDITION AND SUBTRACTION WITHIN 10 000 20

Textbook 3 P20

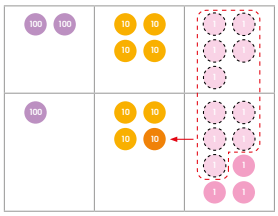
RECAP

Use the chapter opener (P20) to recap the concept of addition and adding of two 2-digit numbers.

Using the examples given, recap the addition of 3-digit numbers without and with regrouping, using number discs if necessary.

Addition of 3-digit numbers with regrouping

2. Add 245 and 138.



$$\begin{array}{r} 2\ 4\ 5 \\ +\ 1\ 3\ 8 \\ \hline 3\ 8\ 3 \end{array}$$

245 + 138 = 383

IN FOCUS

What does it mean to find the sum of two numbers?

Textbook 3 P21

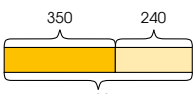
IN FOCUS

Introduce the word **sum** to pupils. Tell pupils that sum means to add up or to find the total of given numbers.

LET'S LEARN

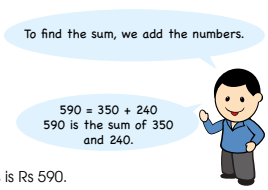
The Meaning of Sum

1.



350 + 240 = 590

The **sum** of 350 and 240 is 590.
The total cost of the two books is Rs 590.

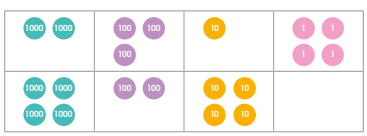


2. Find the sum of each pair of numbers.

(a) 58 and 39 — 97
(b) 341 and 438 — 779
(c) 462 and 248 — 710

Addition without regrouping

3. Find the sum of 2314 and 4240.



$$\begin{array}{r} 2\ 3\ 1\ 4 \\ +\ 4\ 2\ 4\ 0 \\ \hline 6\ 5\ 5\ 4 \end{array}$$

Step 1 Add the ones.
4 ones + 0 ones = 4 ones

Step 2 Add the tens.
1 ten + 4 tens = 5 tens

Step 3 Add the hundreds.
3 hundreds + 2 hundreds = 5 hundreds

Step 4 Add the thousands.
2 thousands + 4 thousands = 6 thousands

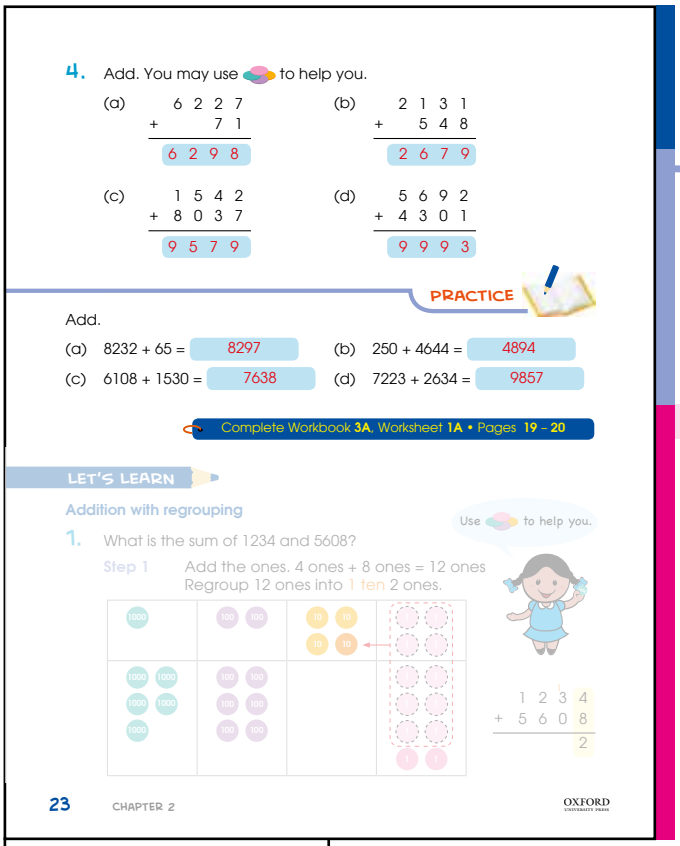
2314 + 4240 = 6554

Textbook 3 P22

LET'S LEARN

Give pupils some time to work on Let's Learn 2, after which discuss the answers with the class.

Demonstrate Let's Learn 3 using number discs. Go through the steps with pupils. Emphasise alignment of digits in the addition algorithm (ones must align with ones, tens with tens, etc.).



4. Add. You may use to help you.

(a) 6227 + 71 = 6298

(b) 2131 + 548 = 2679

(c) 1542 + 8037 = 9579

(d) 5692 + 4301 = 9993

PRACTICE

Add.

(a) 8232 + 65 = 8297

(b) 250 + 4644 = 4894

(c) 6108 + 1530 = 7638

(d) 7223 + 2634 = 9857

Complete Workbook 3A, Worksheet 1A • Pages 19 – 20

LET'S LEARN

Addition with regrouping

Use to help you.

1. What is the sum of 1234 and 5608?

Step 1 Add the ones. 4 ones + 8 ones = 12 ones
Regroup 12 ones into 1 ten 2 ones.

1234 + 5608 = 2

23 CHAPTER 2 OXFORD

Textbook 3 P23

Allow pupils to spend some time to work on Let's Learn 4. After which, discuss the answers with the class.

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 1A** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1A (Workbook 3A P19 – 20).

Answers Worksheet 1A (Workbook 3A P19 – 20)

1. (a) 2306 + 93 = 2399

(b) 48 + 8250 = 8298

(c) 3020 + 910 = 3930

(d) 5413 + 575 = 5988

(e) 4301 + 5692 = 9993

(f) 4234 + 1162 = 5396

2. (a) 4836

(b) 9854

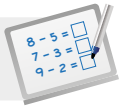
(c) 4487

3. (a) 9195

(b) 3724

(c) 7888

LESSON PLAN



Specific Learning Focus

- Perform the addition algorithm for up to 4-digit numbers.
- Mentally add two 2-digit numbers.

Suggested Duration

10 periods

Prior Learning

Pupils have learnt to perform the addition algorithm with and without regrouping. In 'Recap' (Textbook 3 P20 − 21), this method is revisited with 3-digit numbers. Ask pupils to use standard algorithm and number discs to add.

Pre-emptive Pitfalls

Emphasise to pupils that although the comparison of numbers requires comparing digits from left to right, addition of numbers is done from right to left. This must be highlighted to the pupils.

Introduction

The term 'sum' has been introduced prior to this lesson and can be used in this lesson during class discussions. Emphasise the importance of aligning the digits according to their place values before performing the addition algorithm. The next step is to start adding the ones, followed by adding the tens, hundreds and lastly the thousands. Write the sum of the digits in each place value. The teacher may want to encourage pupils to write the letter representing each place value on top of the digits (e.g.

	Th	H	T	O
	1	5	4	2
+	8	0	3	7

). This will help pupils when regrouping is required. Get pupils to work on the questions in Worksheet 1A (Workbook 3A P19 – 20) for additional practice before working on the questions in 'Practice' (Textbook 3 P23). Write a few sums on the board and encourage individual responses before asking them to work on them independently on their exercise books.

Problem Solving

It is equally important to emphasise multiple strategies of adding using mental arithmetic, number discs and standard algorithm. Reinforce that the alignment of digits is extremely important when using standard algorithm. When adding mentally, number bonds can be used (Textbook 3 P29). Distribute number bond templates (Activity Handbook 3 P6) to the pupils so that they can use them initially and then continue working on the problems mentally without using them. Use Let's Learn 9 (Textbook 3 P29) to show that using a number bond, addition can be made easier by taking 1 from 232 to add to 199 to make 200.

Activities

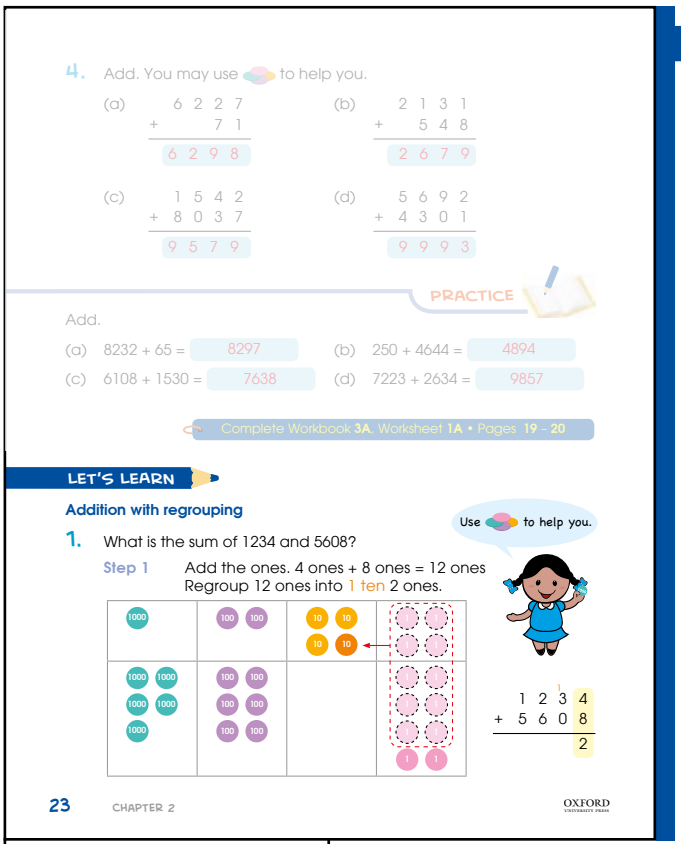
Have pupils work in pairs and get each pair to work on the sums provided in Let's Learn 12 (Textbook 3 P30). Encourage the use of number bonds and number lines alternately.

Resources

- number bond template (Activity Handbook 3 P6)
- number line template (Activity Handbook 3 P5)
- number discs (Activity Handbook 3 P4)

Mathematical Communication Support

Go through the answers to the questions in 'Practice' (Textbook 3 P30 − 31) in class. Discuss the mental strategies and standard algorithm method with the pupils. Encourage individual responses of their preferred method. Discuss how regrouping is done using the standard algorithm method.



4. Add. You may use to help you.

(a) 6227 + 71 = 6298

(b) 2131 + 548 = 2679

(c) 1542 + 8037 = 9579

(d) 5692 + 4301 = 9993

PRACTICE

Add.

(a) 8232 + 65 = 8297

(b) 250 + 4644 = 4894

(c) 6108 + 1530 = 7638

(d) 7223 + 2634 = 9857

Complete Workbook 3A, Worksheet 1A • Pages 19 – 20

LET'S LEARN

Addition with regrouping

Use to help you.

1. What is the sum of 1234 and 5608?

Step 1 Add the ones. 4 ones + 8 ones = 12 ones
Regroup 12 ones into 1 ten 2 ones.

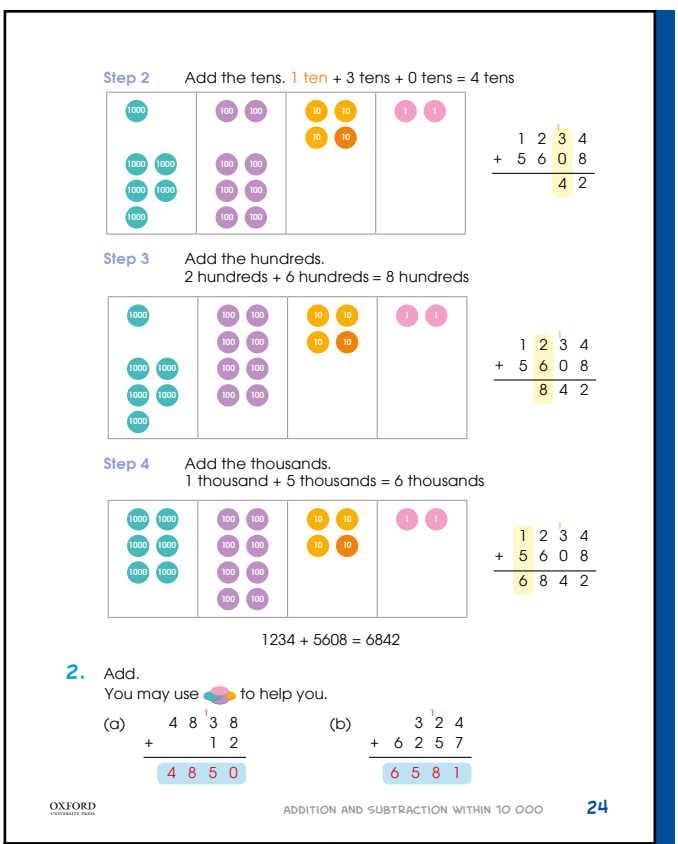
$$\begin{array}{r} {}^{1}\,{}^{1}\,{}^{1}\,{}^{0} \\ 1\,2\,3\,4 \\ +\ 5\,6\,0\,8 \\ \hline 2 \end{array}$$

23 CHAPTER 2 OXFORD UNIVERSITY PRESS

Textbook 3 P23

LET'S LEARN

Let's Learn 1 involves regrouping ones into tens and ones. Demonstrate the example using number discs.



Step 2 Add the tens. 1 ten + 3 tens + 0 tens = 4 tens

$$\begin{array}{r} {}^{1}\,{}^{1}\,{}^{1}\,{}^{0} \\ 1\,2\,3\,4 \\ +\ 5\,6\,0\,8 \\ \hline 4\,2 \end{array}$$

Step 3 Add the hundreds.
2 hundreds + 6 hundreds = 8 hundreds

$$\begin{array}{r} {}^{1}\,{}^{1}\,{}^{1}\,{}^{0} \\ 1\,2\,3\,4 \\ +\ 5\,6\,0\,8 \\ \hline 8\,4\,2 \end{array}$$

Step 4 Add the thousands.
1 thousand + 5 thousands = 6 thousands

$$\begin{array}{r} {}^{1}\,{}^{1}\,{}^{1}\,{}^{0} \\ 1\,2\,3\,4 \\ +\ 5\,6\,0\,8 \\ \hline 6\,8\,4\,2 \end{array}$$

1234 + 5608 = 6842

2. Add.
You may use to help you.

(a) 4838 + 12 = 4850

(b) 324 + 6257 = 6581

OXFORD UNIVERSITY PRESS ADDITION AND SUBTRACTION WITHIN 10 000 24

Textbook 3 P24

Go through the steps taken for the addition with pupils.

For Let's Learn 2, emphasise the alignment of digits according to the place values. Demonstrate more examples if necessary, then allow pupils time to find the sums using number discs.

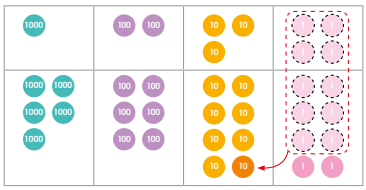
Go through the answers with the pupils once they have completed the questions.

(c) $2\,1\,{}^{1}3\,9 + 4\,0\,5\,6 = 6\,1\,9\,5$

(d) $5\,1\,{}^{1}1\,6 + 3\,7\,2\,8 = 8\,8\,4\,4$

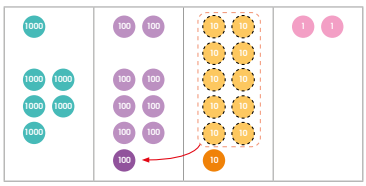
3. Add 5678 to 1234.

Step 1 Add the ones. 4 ones + 8 ones = 12 ones
Regroup 12 ones into 1 ten 2 ones.



$$1\,2\,{}^{1}3\,4 + 5\,6\,7\,8 = \ldots\,2$$

Step 2 Add the tens. 1 ten + 3 tens + 7 tens = 11 tens
Regroup 11 tens into 1 hundred 1 ten.

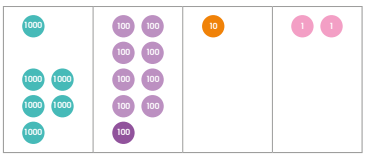


$$1\,{}^{1}2\,{}^{1}3\,4 + 5\,6\,7\,8 = \ldots\,1\,2$$

Textbook 3 P25

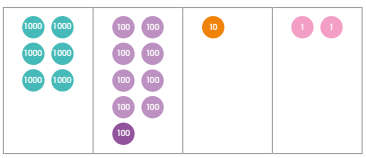
Demonstrate Let's Learn 3 using number discs. Go through the steps with pupils. This example involves regrouping the ones into tens and ones, and tens into hundreds and tens.

Step 3 Add the hundreds.
1 hundred + 2 hundreds + 6 hundreds = 9 hundreds



$$1\,{}^{1}2\,{}^{1}3\,4 + 5\,6\,7\,8 = \ldots\,9\,1\,2$$

Step 4 Add the thousands.
1 thousand + 5 thousands = 6 thousands



$$1\,{}^{1}2\,{}^{1}3\,4 + 5\,6\,7\,8 = 6\,9\,1\,2$$

1234 + 5678 = 6912

4. Add.
You may use to help you.

(a) $5\,{}^{1}0\,{}^{1}9\,9 + 3\,4\,8 = 5\,4\,4\,7$

(b) $1\,{}^{1}2\,{}^{1}3\,7 + 4\,5\,9\,6 = 5\,8\,3\,3$

(c) $2\,{}^{1}1\,{}^{1}6\,4 + 3\,3\,5\,8 = 5\,5\,2\,2$

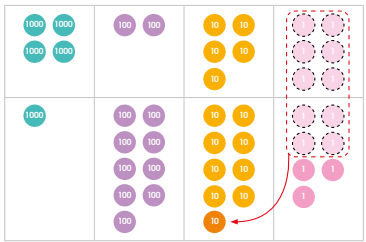
(d) $3\,{}^{1}0\,{}^{1}9\,6 + 6\,0\,2\,5 = 9\,1\,2\,1$

Textbook 3 P26

For Let's Learn 4, emphasise alignment of place values. Demonstrate more examples if necessary, then allow pupils to spend some time to find the sums using number discs. Go through the answers with the pupils once they have completed the questions.

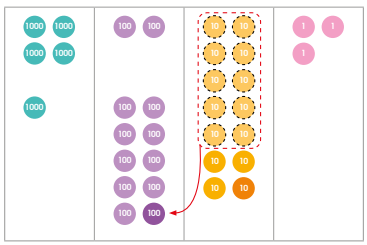
5. Add 4256 and 1987.

Step 1 Add the ones. 6 ones + 7 ones = 13 ones
Regroup 13 ones into 1 ten 3 ones.



$$\begin{array}{r} {}^{1}4\ 2\ 5\ 6 \\ +\ 1\ 9\ 8\ 7 \\ \hline 3 \end{array}$$

Step 2 Add the tens. 1 ten + 5 tens + 8 tens = 14 tens
Regroup 14 tens into 1 hundred 4 tens.

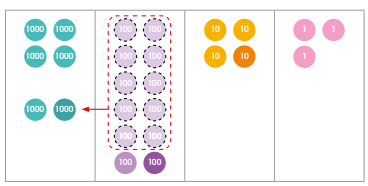


$$\begin{array}{r} 4\ {}^{1}2\ {}^{1}5\ 6 \\ +\ 1\ 9\ 8\ 7 \\ \hline 4\ 3 \end{array}$$

Textbook 3 P27

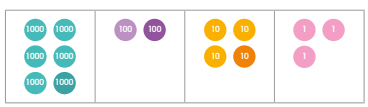
Demonstrate Let's Learn 5 using number discs. Go through the steps with pupils. This example involves regrouping the ones into tens and ones, tens into hundreds and tens and hundreds into thousands and hundreds.

Step 3 Add the hundreds.
1 hundred + 2 hundreds + 9 hundreds = 12 hundreds
Regroup 12 hundreds into 1 thousand 2 hundreds.



$$\begin{array}{r} {}^{1}4\ {}^{1}2\ {}^{1}5\ 6 \\ +\ 1\ 9\ 8\ 7 \\ \hline 2\ 4\ 3 \end{array}$$

Step 4 Add the thousands.
1 thousand + 4 thousands + 1 thousand = 6 thousands



$$\begin{array}{r} {}^{1}4\ {}^{1}2\ {}^{1}5\ 6 \\ +\ 1\ 9\ 8\ 7 \\ \hline 6\ 2\ 4\ 3 \end{array}$$

4256 + 1987 = 6243

6. Add.
You may use to help you.

(a) $\begin{array}{r} {}^{1}5\ {}^{1}8\ {}^{1}3\ 6 \\ +\ \ 7\ 6\ 4 \\ \hline 6\ 6\ 0\ 0 \end{array}$

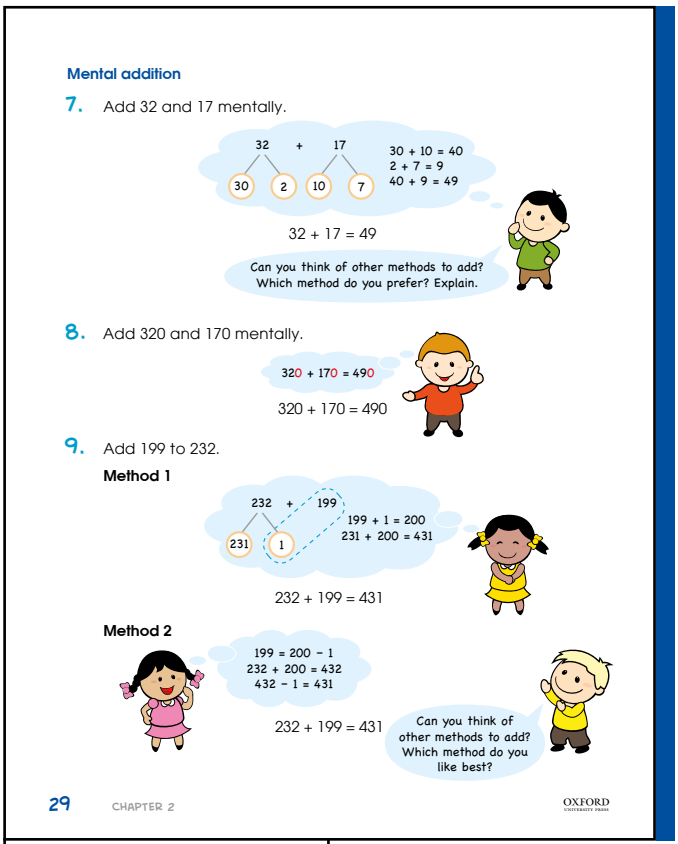
(b) $\begin{array}{r} {}^{1}1\ {}^{1}5\ {}^{1}3\ 9 \\ +\ 4\ 6\ 9\ 6 \\ \hline 6\ 2\ 3\ 5 \end{array}$

(c) $\begin{array}{r} {}^{1}3\ {}^{1}8\ {}^{1}4\ 5 \\ +\ 3\ 9\ 8\ 5 \\ \hline 7\ 8\ 3\ 0 \end{array}$

(d) $\begin{array}{r} {}^{1}2\ {}^{1}3\ {}^{1}5\ 7 \\ +\ 1\ 6\ 8\ 4 \\ \hline 4\ 0\ 4\ 1 \end{array}$

Textbook 3 P28

For Let's Learn 6, emphasise alignment of place values. Demonstrate more examples if necessary, then allow pupils to spend some time to find the sums using number discs. Go through the answers with the pupils once they have completed the questions.



Mental addition

7. Add 32 and 17 mentally.

32 + 17 = 49

Can you think of other methods to add? Which method do you prefer? Explain.

8. Add 320 and 170 mentally.

320 + 170 = 490

9. Add 199 to 232.

Method 1

232 + 199 = 431

Method 2

232 + 199 = 431

Can you think of other methods to add? Which method do you like best?

29 CHAPTER 2 OXFORD

Textbook 3 P29

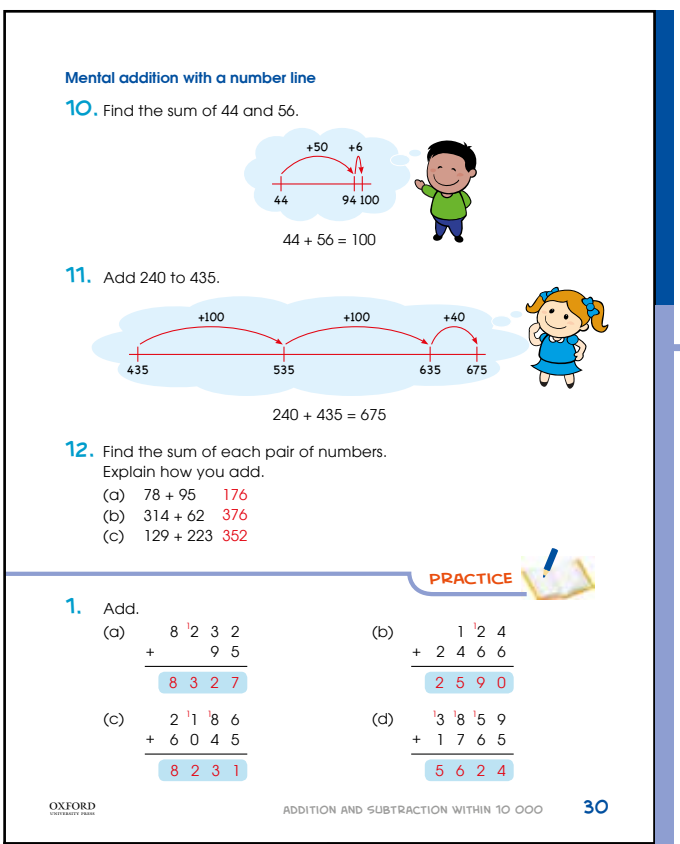
For Let's Learn 7, go through the method given to add 32 and 17 mentally. Elicit more methods from pupils.

Possible methods include:

$$32 + 8 + 9$$
$$17 + 3 + 29$$
$$32 + 20 - 3$$

For Let's Learn 8, lead pupils to see that the sum of 320 and 170 is ten times the sum of 32 and 17.

For Let's Learn 9, go through the listed methods to add 199 and 232. Elicit more methods from pupils. Possible methods include:
190 + 230 + 9 + 2 = 420 + 11
232 + 8 + 191



Mental addition with a number line

10. Find the sum of 44 and 56.

44 + 56 = 100

11. Add 240 to 435.

240 + 435 = 675

12. Find the sum of each pair of numbers. Explain how you add.
(a) 78 + 95 176
(b) 314 + 62 376
(c) 129 + 223 352

PRACTICE

1. Add.

(a) 8 12 3 2 + 9 5 = 8 3 2 7

(b) 1 12 4 + 2 4 6 6 = 2 5 9 0

(c) 2 11 18 6 + 6 0 4 5 = 8 2 3 1

(d) 13 18 15 9 + 1 7 6 5 = 5 6 2 4

OXFORD ADDITION AND SUBTRACTION WITHIN 10 000 30

Textbook 3 P30

For Let's Learn 10 and 11, go through the method of finding the sums with a number line. Prompt pupils by asking them why the additions were carried out in the steps shown.

For example 10, allow pupils to spend some time to find the sums. Encourage pupils to verbally explain how they add.

PRACTICE

Work with pupils on the practice questions.

Encourage pupils to explain verbally how they obtain their answers.

For better understanding, select items from **Worksheet 1B** and work these out with the pupils.

2. Find the sum of each pair of numbers.

(a) 1032 and 48 1080
(b) 3147 and 64 3211
(c) 5230 and 88 5318
(d) 1189 and 230 1419
(e) 279 and 8623 8902
(f) 6145 and 989 7134
(g) 2345 and 5876 8221
(h) 4018 and 3234 7252

3. Add mentally.

(a) 40 + 28

40 + 20 = 60
60 + 8 = 68
40 + 28 = 68

(b) 150 + 62

40 + 60 = 100
110 + 100 = 210
210 + 2 = 212
150 + 62 = 212

4. Add mentally.

(a) 60 + 44 104
(b) 215 + 13 228
(c) 327 + 156 483
(d) 189 + 198 387

Complete Workbook **3A**, Worksheet **1B** • Pages **21 – 24**

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Textbook 3 P31

Independent seatwork

Assign pupils to complete Worksheet 1B (Workbook 3A P21 – 24).

Answers Worksheet 1B (Workbook 3A P21 – 24)

1. (a)
$$\begin{array}{r} 7\ 2\ {}^{1}0\ 2 \\ +\quad\ \ 4\ 9 \\ \hline 7\ 2\ 5\ 1 \end{array}$$

(b)
$$\begin{array}{r} 5\ {}^{1}2\ {}^{1}9\ 7 \\ +\quad\ \ 7\ 3 \\ \hline 5\ 3\ 7\ 0 \end{array}$$

(c)
$$\begin{array}{r} 2\ {}^{1}2\ {}^{1}9\ 3 \\ +\quad\ 4\ 6\ 9 \\ \hline 2\ 7\ 6\ 2 \end{array}$$

(d)
$$\begin{array}{r} {}^{1}4\ {}^{1}4\ 3\ 1 \\ +\quad\ 9\ 7\ 8 \\ \hline 5\ 4\ 0\ 9 \end{array}$$

(e)
$$\begin{array}{r} 5\ {}^{1}3\ {}^{1}7\ 7 \\ +\ 2\ 4\ 3\ 5 \\ \hline 7\ 8\ 1\ 2 \end{array}$$

(f)
$$\begin{array}{r} {}^{1}2\ {}^{1}3\ 9\ 0 \\ +\ 3\ 9\ 3\ 6 \\ \hline 6\ 3\ 2\ 6 \end{array}$$

(g)
$$\begin{array}{r} {}^{1}6\ {}^{1}1\ {}^{1}4\ 5 \\ +\ 1\ 9\ 6\ 5 \\ \hline 8\ 1\ 1\ 0 \end{array}$$

(h)
$$\begin{array}{r} {}^{1}4\ 5\ {}^{1}0\ 4 \\ +\ 3\ 5\ 8\ 6 \\ \hline 8\ 0\ 9\ 0 \end{array}$$

2. (a) 2176 + 74 = 2250

$$\begin{array}{r} 2\ {}^{1}1\ {}^{1}7\ 6 \\ +\ \square\ \square\ 7\ 4 \\ \hline 2\ 2\ 5\ 0 \end{array}$$

(b) 3076 + 993 = 4069

$$\begin{array}{r} {}^{1}3\ {}^{1}0\ 7\ 6 \\ +\ \square\ 9\ 9\ 3 \\ \hline 4\ 0\ 6\ 9 \end{array}$$

(c) 5414 + 2587 = 8001

$$\begin{array}{r} {}^{1}5\ {}^{1}4\ {}^{1}1\ 4 \\ +\ 2\ 5\ 8\ 7 \\ \hline 8\ 0\ 0\ 1 \end{array}$$

(d) 2379 + 5902 = 8281

$$\begin{array}{r} {}^{1}2\ 3\ {}^{1}7\ 9 \\ +\ 5\ 9\ 0\ 2 \\ \hline 8\ 2\ 8\ 1 \end{array}$$

3. (a) 6635
(b) 4427
(c) 8775
(d) 6416
(e) 8030
(f) 8281

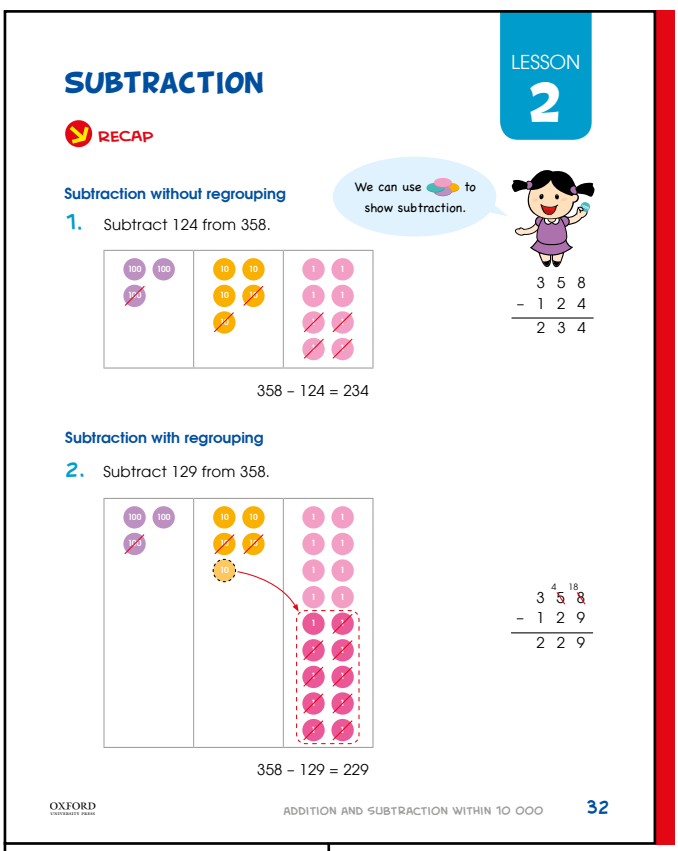
4. (a) 79
(b) 60
(c) 238
(d) 431
(e) 632
(f) 1300

LESSON 2

SUBTRACTION

LEARNING OBJECTIVES

1. Perform the subtraction algorithm for up to 4-digit numbers.
2. Mentally subtract a 2-digit number from another 2-digit number.



SUBTRACTION

LESSON 2

RECAP

Subtraction without regrouping

1. Subtract 124 from 358.

We can use to show subtraction.

$$\begin{array}{r} 3\ 5\ 8 \\ -\ 1\ 2\ 4 \\ \hline 2\ 3\ 4 \end{array}$$

358 − 124 = 234

Subtraction with regrouping

2. Subtract 129 from 358.

$$\begin{array}{r} 3\ \overset{4}{5}\ \overset{18}{8} \\ -\ 1\ 2\ 9 \\ \hline 2\ 2\ 9 \end{array}$$

358 − 129 = 229

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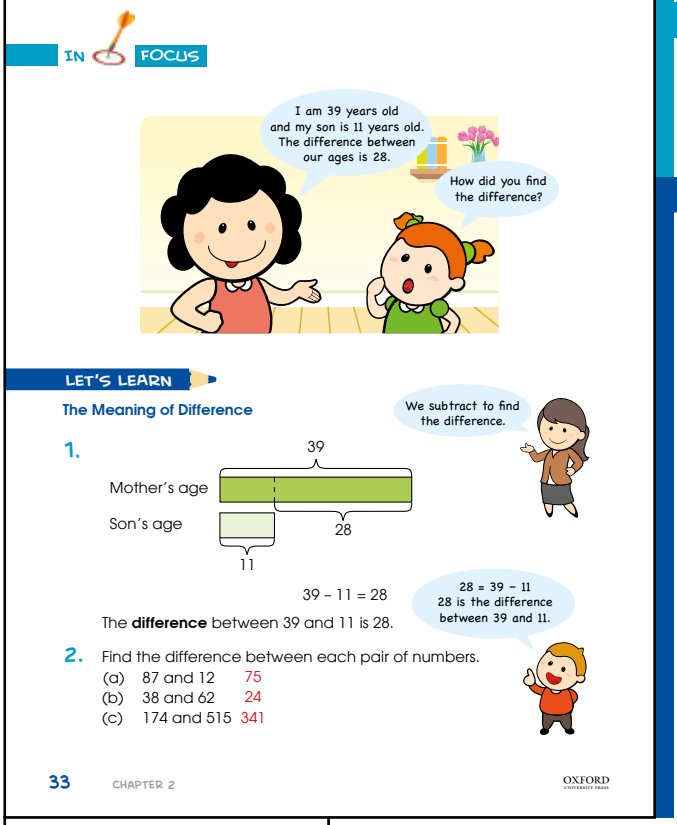
ADDITION AND SUBTRACTION WITHIN 10 000 32

Textbook 3 P32

RECAP

Recap the subtraction of 3-digit numbers without and with regrouping, using number discs if necessary.



IN FOCUS

I am 39 years old and my son is 11 years old. The difference between our ages is 28.

How did you find the difference?

LET'S LEARN

The Meaning of Difference

We subtract to find the difference.

1.

39

Mother's age

Son's age

28

11

39 − 11 = 28

28 = 39 − 11
28 is the difference between 39 and 11.

The **difference** between 39 and 11 is 28.

2. Find the difference between each pair of numbers.

(a) 87 and 12 75

(b) 38 and 62 24

(c) 174 and 515 341

33 CHAPTER 2 OXFORD UNIVERSITY PRESS

Textbook 3 P33

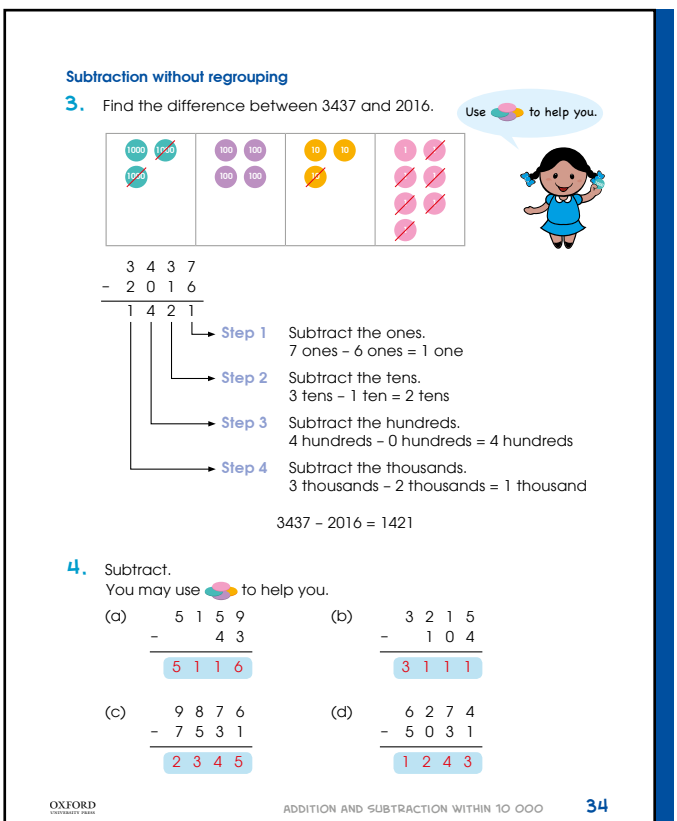
IN FOCUS

Introduce to pupils the word **difference**. Tell pupils that difference means to subtract.

LET'S LEARN

Go through the comparison model and show pupils that in order to find the difference, 11 is subtracted from 39.

Allow pupils to spend some time to work on Let's Learn 2. Discuss the answers with the pupils once they are done.



Subtraction without regrouping

3. Find the difference between 3437 and 2016.

Use to help you.

3	4	3	7
− 2	0	1	6
1	4	2	1

Step 1 Subtract the ones.
7 ones − 6 ones = 1 one

Step 2 Subtract the tens.
3 tens − 1 ten = 2 tens

Step 3 Subtract the hundreds.
4 hundreds − 0 hundreds = 4 hundreds

Step 4 Subtract the thousands.
3 thousands − 2 thousands = 1 thousand

3437 − 2016 = 1421

4. Subtract.
You may use to help you.

(a) 5 1 5 9 − 4 3 = 5 1 1 6

(b) 3 2 1 5 − 1 0 4 = 3 1 1 1

(c) 9 8 7 6 − 7 5 3 1 = 2 3 4 5

(d) 6 2 7 4 − 5 0 3 1 = 1 2 4 3

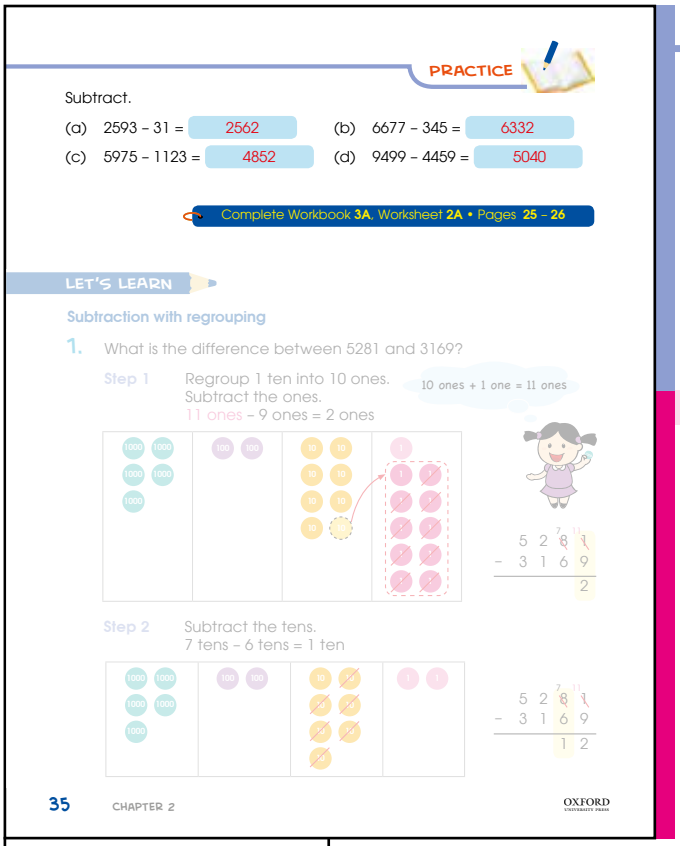
OXFORD UNIVERSITY PRESS ADDITION AND SUBTRACTION WITHIN 10 000 34

Textbook 3 P34

Demonstrate Let's Learn 3 using number discs. Go through the steps with pupils.

Emphasise the alignment of place values in the subtraction algorithm (ones must align with ones, tens with tens, etc.).

Allow pupils to spend some time to work on Let's Learn 4. Go through the answers with the pupils once they have completed the questions.



PRACTICE

Subtract.

(a) 2593 – 31 = 2562 (b) 6677 – 345 = 6332

(c) 5975 – 1123 = 4852 (d) 9499 – 4459 = 5040

Complete Workbook 3A, Worksheet 2A • Pages 25 – 26

LET'S LEARN

Subtraction with regrouping

1. What is the difference between 5281 and 3169?

Step 1 Regroup 1 ten into 10 ones.
Subtract the ones.
11 ones – 9 ones = 2 ones

10 ones + 1 one = 11 ones

Step 2 Subtract the tens.
7 tens – 6 tens = 1 ten

35 CHAPTER 2 OXFORD

Textbook 3 P35

PRACTICE

Work with pupils on the practice questions.

Encourage pupils to explain verbally how they obtain their answers.

For better understanding, select items from **Worksheet 2A** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 2A (Workbook 3A P25 – 26).

Answers Worksheet 2A (Workbook 3A P21 – 24)

1. (a) 8502
   (b) 9523
   (c) 5084
   (d) 6161
   (e) 4865
   (f) 4243

2. (a) 3642
   (b) 9300
   (c) 4302

PRACTICE

Subtract.

(a) 2593 – 31 = 2562 (b) 6677 – 345 = 6332

(c) 5975 – 1123 = 4852 (d) 9499 – 4459 = 5040

Complete Workbook 3A, Worksheet 2A • Pages 25 – 26

LET'S LEARN

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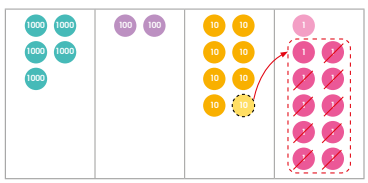
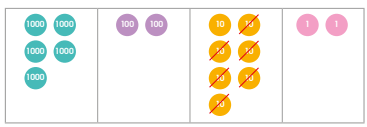


10 ones + 1 one = 11 ones

$$\begin{array}{r} 5\ 2\ {}^{7}\!\not{8}\ {}^{11}\!\not{1} \\ -\ 3\ 1\ 6\ 9 \\ \hline \qquad\quad 2 \end{array}$$

Step 2 Subtract the tens.
7 tens – 6 tens = 1 ten



$$\begin{array}{r} 5\ 2\ {}^{7}\!\not{8}\ {}^{11}\!\not{1} \\ -\ 3\ 1\ 6\ 9 \\ \hline \qquad 1\ 2 \end{array}$$

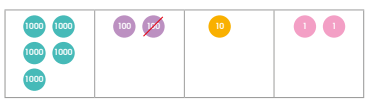
35 CHAPTER 2 OXFORD UNIVERSITY PRESS

Textbook 3 P35

LET'S LEARN

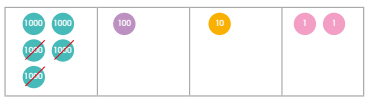
Demonstrate Let's Learn 1 using number discs.
Go through the steps with pupils.

Step 3 Subtract the hundreds.
2 hundreds – 1 hundred = 1 hundred



$$\begin{array}{r} 5\ 2\ {}^{7}\!\not{8}\ {}^{11}\!\not{1} \\ -\ 3\ 1\ 6\ 9 \\ \hline \qquad 1\ 1\ 2 \end{array}$$

Step 4 Subtract the thousands.
5 thousands – 3 thousands = 2 thousands



$$\begin{array}{r} 5\ 2\ {}^{7}\!\not{8}\ {}^{11}\!\not{1} \\ -\ 3\ 1\ 6\ 9 \\ \hline 2\ 1\ 1\ 2 \end{array}$$

5281 – 3169 = 2112

2. Subtract.
You may use  to help you.

(a) $\begin{array}{r} 8\ 3\ {}^{6}\!\not{7}\ {}^{12}\!\not{2} \\ -\qquad 4\ 6 \\ \hline 8\ 3\ 2\ 6 \end{array}$

(b) $\begin{array}{r} 5\ 6\ {}^{7}\!\not{8}\ {}^{17}\!\not{7} \\ -\ 2\ 4\ 9 \\ \hline 5\ 4\ 3\ 8 \end{array}$

(c) $\begin{array}{r} 2\ 8\ {}^{4}\!\not{5}\ {}^{14}\!\not{4} \\ -\ 1\ 3\ 0\ 9 \\ \hline 1\ 5\ 4\ 5 \end{array}$

(d) $\begin{array}{r} 6\ 2\ {}^{8}\!\not{9}\ {}^{15}\!\not{5} \\ -\ 4\ 1\ 7\ 8 \\ \hline 2\ 1\ 1\ 7 \end{array}$

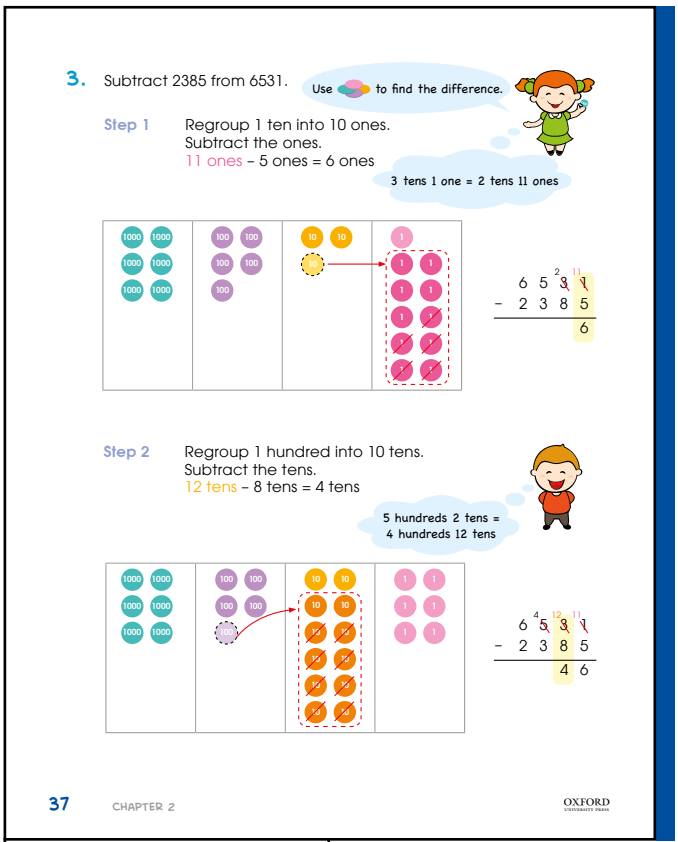
OXFORD UNIVERSITY PRESS ADDITION AND SUBTRACTION WITHIN 10 000 36

Textbook 3 P36

For Let's Learn 2, emphasise the alignment of place values in the subtraction algorithm (ones must align with ones, tens with tens, etc.).

Demonstrate more examples if necessary, then allow pupils to spend some time to work on the questions. Provide number discs for pupils to aid them in finding the answers.

Go through the answers with the pupils once they have completed the questions.



3. Subtract 2385 from 6531.

Use to find the difference.

Step 1 Regroup 1 ten into 10 ones.
Subtract the ones.
11 ones – 5 ones = 6 ones

3 tens 1 one = 2 tens 11 ones

$$\begin{array}{r} 6\ 5\ {}^{2}\!\not{3}\ {}^{11}\!\not{1} \\ -\ 2\ 3\ 8\ 5 \\ \hline \qquad\quad 6 \end{array}$$

Step 2 Regroup 1 hundred into 10 tens.
Subtract the tens.
12 tens – 8 tens = 4 tens

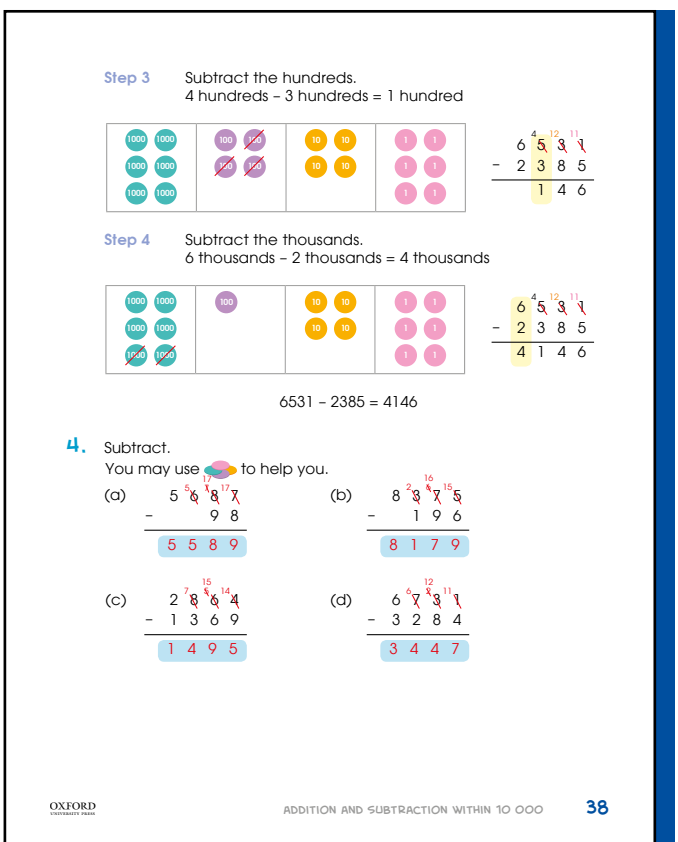
5 hundreds 2 tens = 4 hundreds 12 tens

$$\begin{array}{r} 6\ {}^{4}\!\not{5}\ {}^{12}\!\not{3}\ {}^{11}\!\not{1} \\ -\ 2\ 3\ 8\ 5 \\ \hline \qquad 4\ 6 \end{array}$$

37 CHAPTER 2 OXFORD UNIVERSITY PRESS

Textbook 3 P37

Demonstrate Let's Learn 3 using number discs. Go through the steps with pupils.



Step 3 Subtract the hundreds.
4 hundreds – 3 hundreds = 1 hundred

$$\begin{array}{r} 6\ {}^{4}\!\not{5}\ {}^{12}\!\not{3}\ {}^{11}\!\not{1} \\ -\ 2\ 3\ 8\ 5 \\ \hline \qquad 1\ 4\ 6 \end{array}$$

Step 4 Subtract the thousands.
6 thousands – 2 thousands = 4 thousands

$$\begin{array}{r} 6\ {}^{4}\!\not{5}\ {}^{12}\!\not{3}\ {}^{11}\!\not{1} \\ -\ 2\ 3\ 8\ 5 \\ \hline 4\ 1\ 4\ 6 \end{array}$$

6531 – 2385 = 4146

4. Subtract.
You may use to help you.

(a) $\begin{array}{r} 5\ {}^{5}\!\not{6}\ {}^{17}\!\not{8}\ {}^{17}\!\not{7} \\ -\qquad 9\ 8 \\ \hline 5\ 5\ 8\ 9 \end{array}$

(b) $\begin{array}{r} 8\ {}^{2}\!\not{3}\ {}^{16}\!\not{7}\ {}^{15}\!\not{5} \\ -\ 1\ 9\ 6 \\ \hline 8\ 1\ 7\ 9 \end{array}$

(c) $\begin{array}{r} 2\ {}^{7}\!\not{8}\ {}^{15}\!\not{6}\ {}^{14}\!\not{4} \\ -\ 1\ 3\ 6\ 9 \\ \hline 1\ 4\ 9\ 5 \end{array}$

(d) $\begin{array}{r} 6\ {}^{5}\!\not{7}\ {}^{12}\!\not{3}\ {}^{11}\!\not{1} \\ -\ 3\ 2\ 8\ 4 \\ \hline 3\ 4\ 4\ 7 \end{array}$

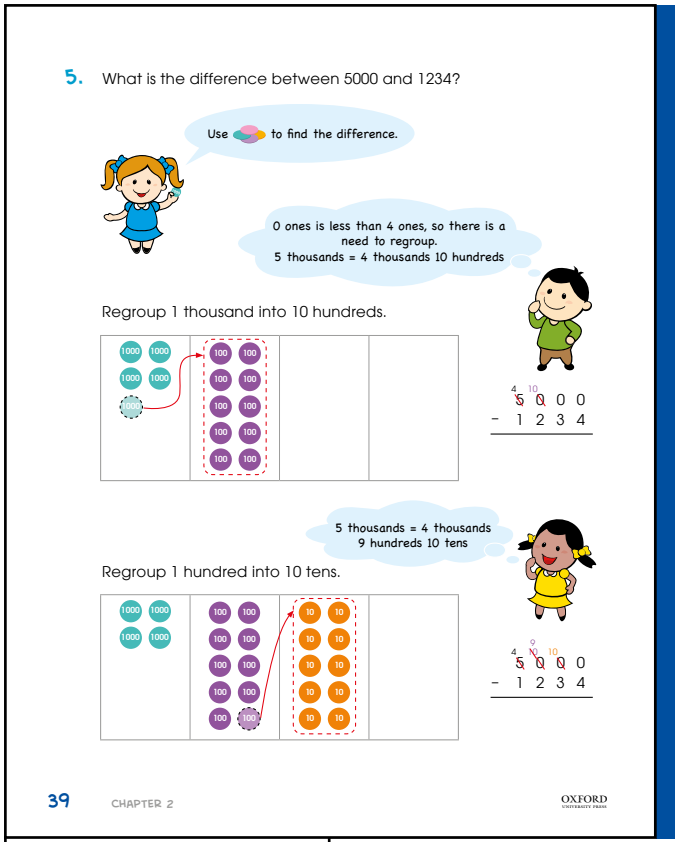
OXFORD UNIVERSITY PRESS ADDITION AND SUBTRACTION WITHIN 10 000 38

Textbook 3 P38

For Let's Learn 4, emphasise the alignment of place values in the subtraction algorithm (ones must align with ones, tens with tens, etc.).

Demonstrate more examples if necessary, then allow pupils to spend some time to work on the questions. Provide number discs for pupils to aid them in finding the answers.

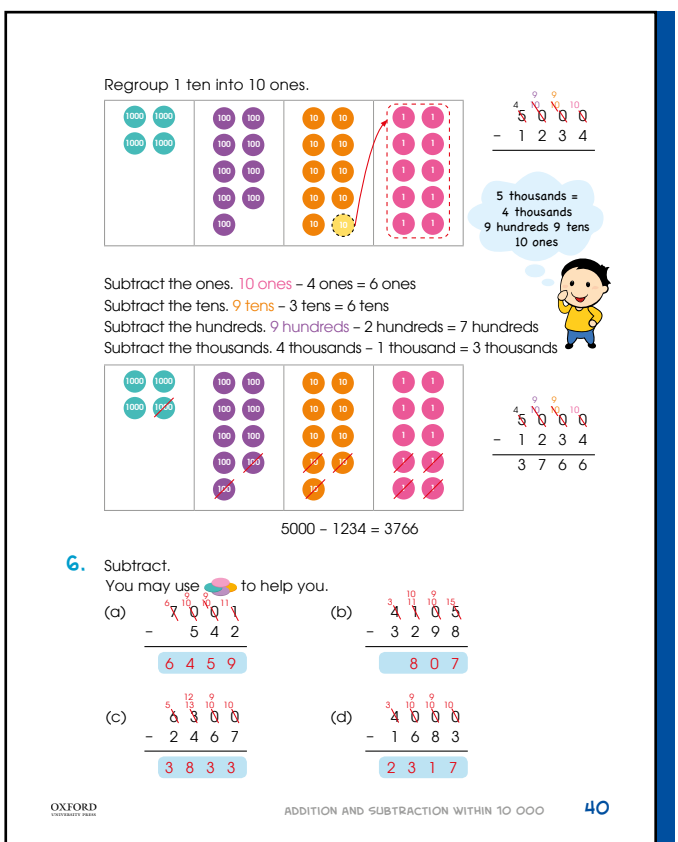
Go through the answers with the pupils once they have completed the questions.



Textbook 3 P39

Demonstrate Let's Learn 5 using number discs.
Go through the steps with pupils.

The number to be subtracted from in this case involves zeroes, and pupils tend to make mistakes in regrouping, so the use of number discs is crucial.



Textbook 3 P40

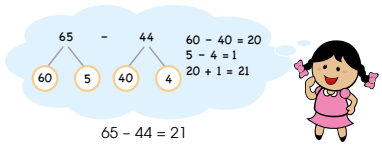
For Let's Learn 6, emphasise the alignment of place values in the subtraction algorithm (ones must align with ones, tens with tens, etc.).

Demonstrate more examples if necessary, then allow pupils to spend some time to work on the questions. Provide number discs for pupils to aid them in finding the answers.

Go through the answers with the pupils once they have completed the questions.

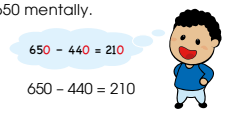
Mental subtraction

7. Subtract 44 from 65 mentally.



65 – 44 = 21

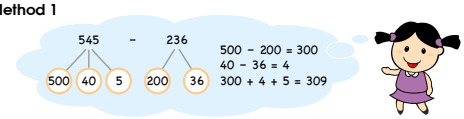
8. Subtract 440 from 650 mentally.



650 – 440 = 210

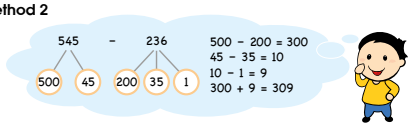
9. What is the difference between 545 and 236?

Method 1



545 – 236 = 309

Method 2



545 – 236 = 309

41 CHAPTER 2 OXFORD UNIVERSITY PRESS

Textbook 3 P41

For Let's Learn 7, go through the listed method to subtract 44 from 65 mentally. Elicit more methods from pupils. Another possible method is:

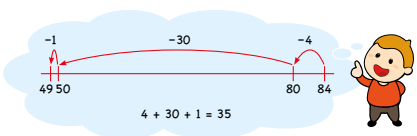
65 – 40 – 4

For Let's Learn 8, lead pupils to see that the subtraction of 440 from 650 is ten times the subtraction of 44 from 65.

For Let's Learn 9, go through the listed methods to subtract 45 from 36. Get pupils to discuss which method they prefer.

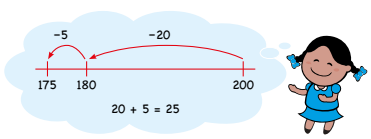
Mental subtraction with a number line

10. Find the difference between 84 and 49.



84 – 49 = 35

11. Subtract 175 from 200.



200 – 175 = 25

12. Subtract mentally.
Explain how you subtract.
(a) 54 – 32 22
(b) 463 – 27 436
(c) 538 – 119 419

PRACTICE

1. Subtract.

(a) $\begin{array}{r} 6\,\overset{3}{\cancel{4}}\,\overset{15}{\cancel{5}} \\ -\quad 1\,8 \\ \hline 6\,3\,2\,7 \end{array}$

(b) $\begin{array}{r} 4\,\overset{5}{\cancel{6}}\,\overset{17}{\cancel{8}}\,\overset{12}{\cancel{2}} \\ -\quad 5\,9\,7 \\ \hline 4\,0\,8\,5 \end{array}$

OXFORD UNIVERSITY PRESS ADDITION AND SUBTRACTION WITHIN 10 000 42

Textbook 3 P42

For Let's Learn 10 and 11, go through the method of finding the subtractions with a number line. Prompt pupils by asking them why the subtractions were carried out in the steps shown.

For Let's Learn 12, give pupils time to find the difference. Encourage pupils to verbally explain how they subtract.

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 2B** and work these out with the pupils.

(c)
$$\begin{array}{r} 5\ 9\ 7\ 5 \\ -\ 1\ 1\ 8\ 6 \\ \hline 4\ 7\ 8\ 9 \end{array}$$

(d)
$$\begin{array}{r} 7\ 1\ 0\ 5 \\ -\ 2\ 6\ 6\ 0 \\ \hline 4\ 4\ 4\ 5 \end{array}$$

(e)
$$\begin{array}{r} 8\ 0\ 0\ 0 \\ -\ 5\ 3\ 4\ 5 \\ \hline 2\ 6\ 6\ 5 \end{array}$$

(f)
$$\begin{array}{r} 3\ 0\ 0\ 1 \\ -\ 2\ 9\ 8\ 4 \\ \hline 1\ 7 \end{array}$$

2. Find the difference between each pair of numbers.

(a) 1994 and 25 1969
(b) 2341 and 29 2312
(c) 4654 and 187 4467
(d) 2164 and 728 1436
(e) 3170 and 1015 2155
(f) 7206 and 3589 3617

3. Subtract mentally.

(a) 195 – 60

90 – 60 = 30
100 + 5 + 30 = 135

195 – 60 = 135

(b) 400 – 205

400 – 200 = 200
200 – 5 = 195

400 – 205 = 195

4. Subtract mentally.

(a) 86 – 25 61
(b) 592 – 18 574
(c) 250 – 131 119
(d) 373 – 144 229

Complete Workbook **3A**, Worksheet **2B** • Pages **27** – **30**

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Textbook 3 P43

Independent seatwork

Assign pupils to complete Worksheet 2B (Workbook 3A P27 – 30).

Answers Worksheet 2B (Workbook 2A P27 – 30)

1. (a) 8840
   (b) 9599
   (c) 7585
   (d) 4258
   (e) 8717
   (f) 4308
   (g) 2299
   (h) 297

2. (a) 6746 – 94 = 6652

	6	7 (6)	14 4	6
–			9	4
	6	6	5	2

   (b) 6571 – 213 = 6358

	6	5	7 (6)	11 1
–		2	1	3
	6	3	5	8

   (c) 5922 – 1744 = 4178

	5	9 (8)	11 2	12 2
–	1	7	4	4
	4	1	7	8

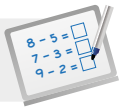
   (d) 4007 – 3689 = 318

	3	10 0 (9)	10 0 (9)	17 7
–	3	6	8	9
		3	1	8

3. (a) 4067
   (b) 9219
   (c) 5277
   (d) 4887
   (e) 2529
   (f) 4035

4. (a) 41
   (b) 542
   (c) 167
   (d) 167
   (e) 855
   (f) 190

LESSON PLAN



Specific Learning Focus

- Perform the subtraction for up to 4-digit numbers.
- Mentally subtract a 2-digit number from another 2-digit number.

Suggested Duration

10 periods

Prior Learning

Pupils should be well-versed with the subtraction operation. Recapitulate subtraction of 3-digit numbers with or without regrouping. Point out that in regrouping, if there are not enough ones, we borrow 1 ten to make 10 ones, and if there are not enough tens, we borrow 1 hundred to make 10 tens.

Pre-emptive Pitfalls

Although pupils should be able to subtract 4-digit numbers based on their knowledge of subtraction of 3-digit numbers, pupils tend to get confused when regrouping is involved in the subtraction of 4-digit numbers. Therefore, the teacher should do the subtraction of 3-digit numbers with regrouping on the board first before proceeding with subtraction of 4-digit numbers with regrouping.

Introduction

The difference between two numbers is the answer that we get from subtracting the two numbers. Comparison bar models help to explain this visually. Pupils should understand that the difference between two numbers refers to how much more or less one number is compared to the other. Similar to addition, when subtracting using the standard algorithm, the teacher may encourage labelling the place values on top of the digits to facilitate regrouping. Number discs help in carrying out subtractions with regrouping. In Let's Learn 5 (Textbook 3 P39), 5000 has 3 zeroes, so lead pupils to see that to perform the subtraction, we first regroup 1 ten to 10 ones so that there are enough ones to subtract '4' in 1234. Continue regrouping which gives subtraction of 3 from 9 in the tens place, 2 from 9 in the hundreds place, and 1 from 4 in the thousands place. Emphasise that all the numbers in the first row of the standard algorithm are big enough to take away the numbers of the second row. For mental subtraction, encourage pupils to partition numbers into parts using number bonds (e.g. In Let's Learn 7 (Textbook 3 P41), it is easy to partition both 65 and 44).

Problem Solving

Discuss the mental strategies while partitioning numbers using number bonds. Encourage individual responses on their preferred method. There is a standard format to follow when carrying out subtraction using the standard algorithm method, and all pupils should follow every step meticulously.

Activities

Play the age game in class. Ask pupils for one of their parent's age and find the difference between their parent's age and their own age. Mini whiteboards can be given to each pupil so that each of them can do their workings and then raise the whiteboards in the air. Similar examples (e.g. difference between weights of pupils) can be given and a pop quiz can be conducted.

Resources

- place-value chart (Activity Handbook 3 P1)
- number discs (Activity Handbook 3 P4)
- mini wihteboards
- markers

Mathematical Communication Support

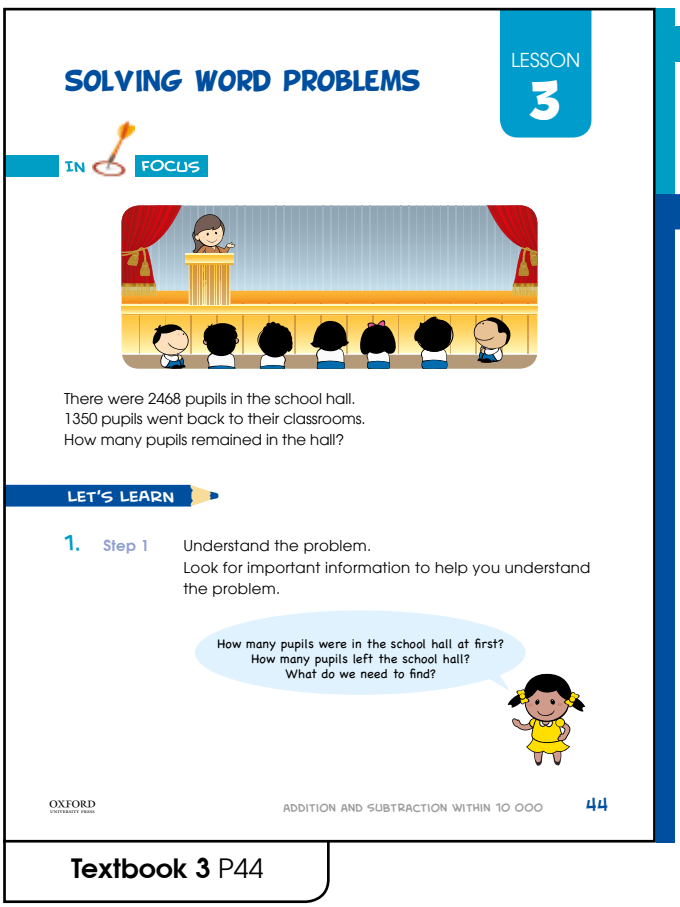
In 'Maths Journal' (Textbook 3 P53), pupils can discuss in groups of twos or the teacher can get two volunteers to come up to the front of the class to roleplay as Raju and Nora and then say their answers. Pupils can then vote for the person they think is correct and give reasons for their answers by doing the sum and difference on the board or by using mental strategies.

LESSON 3

SOLVING WORD PROBLEMS

LEARNING OBJECTIVE

1. Solve 1-step and 2-step word problems involving addition and subtraction.


SOLVING WORD PROBLEMS

LESSON 3

IN FOCUS

There were 2468 pupils in the school hall.
1350 pupils went back to their classrooms.
How many pupils remained in the hall?

LET'S LEARN

1. Step 1 Understand the problem.
Look for important information to help you understand the problem.

How many pupils were in the school hall at first?
How many pupils left the school hall?
What do we need to find?

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ADDITION AND SUBTRACTION WITHIN 10 000 44

Textbook 3 P44

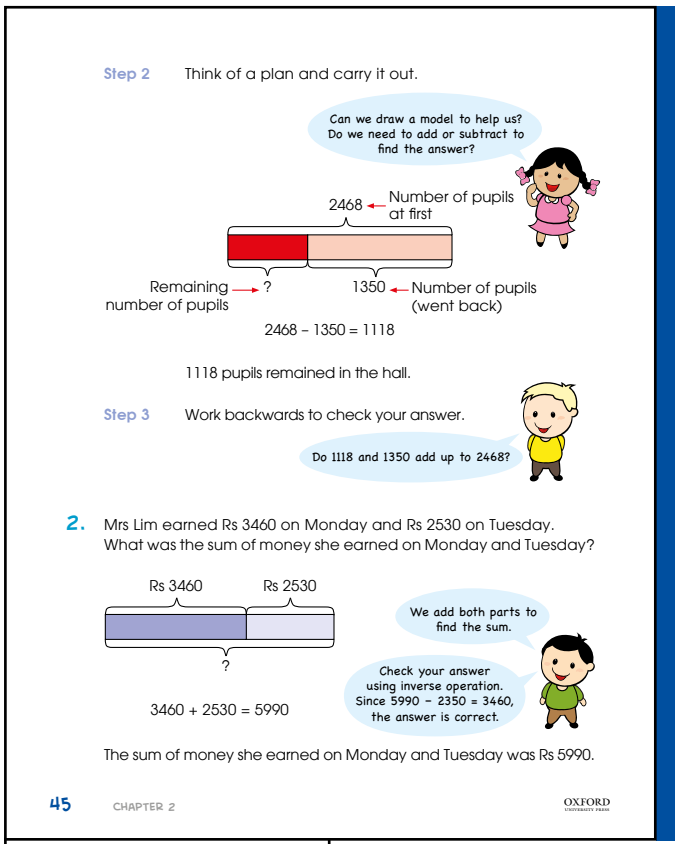
IN FOCUS

Get pupils to discuss how the problem sum can be solved.

LET'S LEARN

Go through the problem solving model with pupils.

In Step 1, get pupils to highlight the important information or make annotations to help them understand the question.



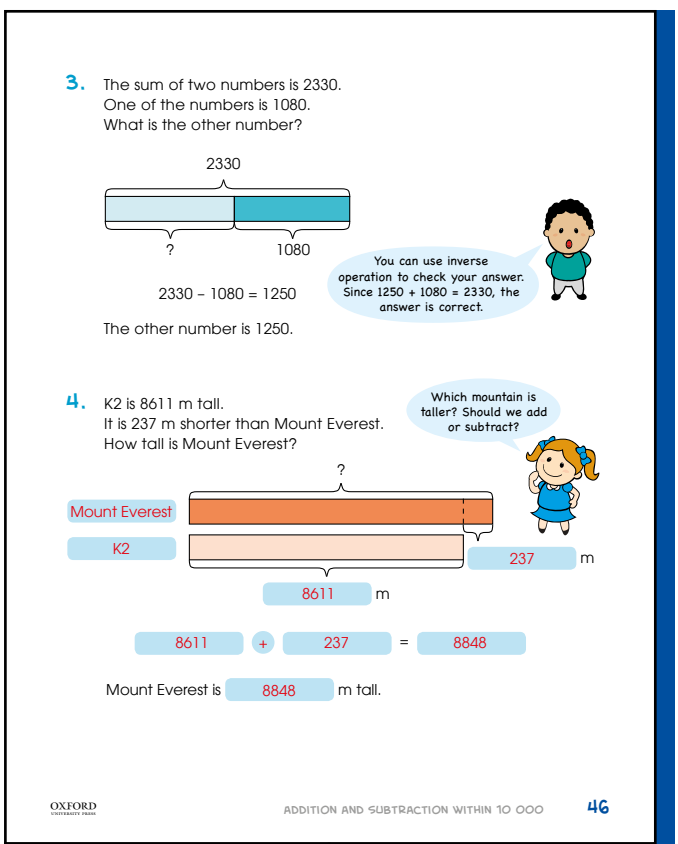
Textbook 3 P45

Go through the part-whole model and show pupils that in order to find the remaining number of pupils, 1350 (part) is subtracted from 2468 (whole).

Demonstrate how pupils can work backwards to check their answers.

Apply the same approach in solving each of the subsequent examples. Begin by getting pupils to identify the important information before proceeding with solving the question.

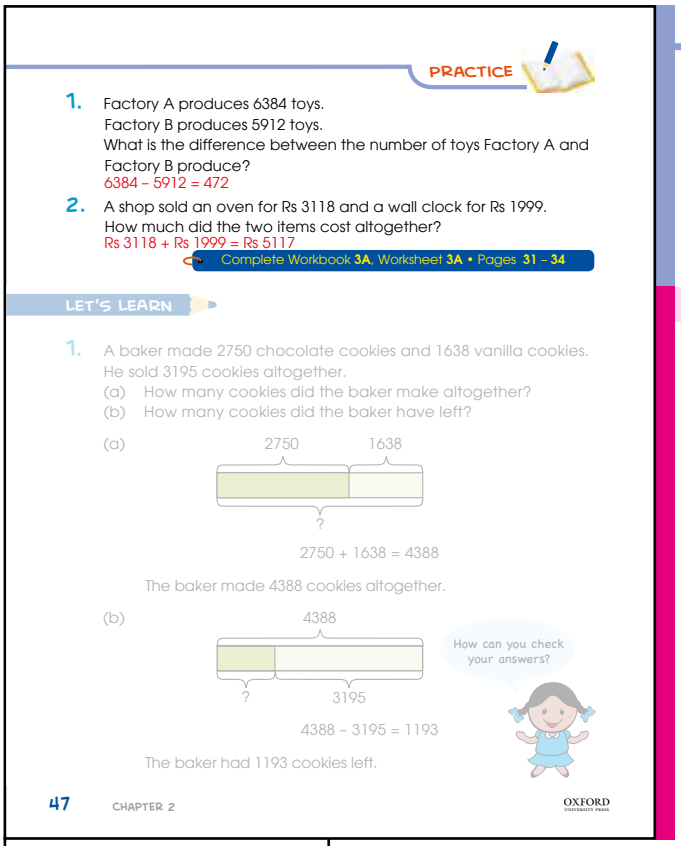
For Let's Learn 2, go through the model and show that both parts are added to find the whole.



Textbook 3 P46

For Let's Learn 3, go through the model and show that one part is subtracted from the whole to find the other part.

For Let's Learn 4, get pupils to identify the important information in the question, then fill in the missing numbers in the model. Ask pupils if they should add or subtract to obtain the answer.



PRACTICE

1. Factory A produces 6384 toys.
Factory B produces 5912 toys.
What is the difference between the number of toys Factory A and Factory B produce?
6384 – 5912 = 472

2. A shop sold an oven for Rs 3118 and a wall clock for Rs 1999.
How much did the two items cost altogether?
Rs 3118 + Rs 1999 = Rs 5117

Complete Workbook 3A, Worksheet 3A • Pages 31 – 34

LET'S LEARN

1. A baker made 2750 chocolate cookies and 1638 vanilla cookies.
He sold 3195 cookies altogether.
(a) How many cookies did the baker make altogether?
(b) How many cookies did the baker have left?

(a) 2750 1638 ?

2750 + 1638 = 4388

The baker made 4388 cookies altogether.

(b) 4388 ? 3195

How can you check your answers?

4388 – 3195 = 1193

The baker had 1193 cookies left.

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Textbook 3 P47

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 3A** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 3A (Workbook 3A P31 – 34).

Answers Worksheet 3A (Workbook 3A P31 – 34)

1. 960 – 849 = 111
111 lots are not occupied.

2. 350 + 490 = 840
The total number of roses the shop ordered was 840.

3. 250 + 134 = 384
The mass of the banana is 384 g.

4. 654 – 338 = 316
Sam has 316 more cards than Kate.

5. 4258
Siti
Junhao
?
2378
4258 – 2378 = 1880
The difference between their scores was 1880.

6. Rs 4328 Rs 1132
?
4328 + 1132 = 5460
She saved Rs 5460 on both days.

7. 7104 – 1809 = 5295
The other number is 5295.

8. 1388 + 499 = 1887
It costs $1887 to fly to London in June.

PRACTICE

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Factory B produces 5912 toys.
What is the difference between the number of toys Factory A and Factory B produce?
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Complete Workbook 3A, Worksheet 3A • Pages 31 – 34

LET'S LEARN

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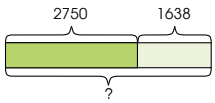
He sold 3195 cookies altogether.
(a) How many cookies did the baker make altogether?
(b) How many cookies did the baker have left?

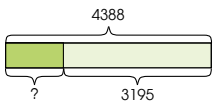
(a)



2750 + 1638 = 4388

The baker made 4388 cookies altogether.

(b)



4388 – 3195 = 1193

The baker had 1193 cookies left.

Textbook 3 P47

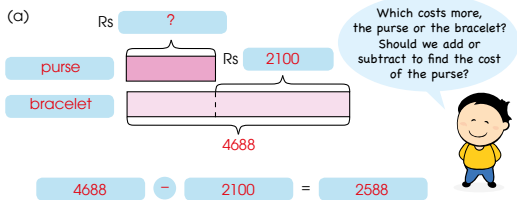
LET'S LEARN

This section consists of 2-part word problems.

For Let's Learn 1, go through the problem solving stages with the pupils. Ask them what important information they can see in the question. Elicit ways they can check their answers. In addition, teach pupils how to check that their answers are reasonable and logical.

2. Mrs Salim bought a purse and a bracelet.
The bracelet cost Rs 4688.
She paid Rs 2100 less for the purse than for the bracelet.
(a) How much did the purse cost?
(b) How much did Mrs Salim pay for the purse and the bracelet altogether?

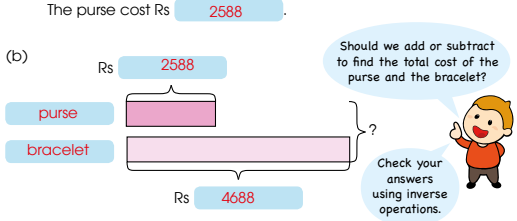
(a)



4688 − 2100 = 2588

The purse cost Rs 2588.

(b)



2588 + 4688 = 7276

Mrs Salim paid Rs 7276 for the purse and the bracelet altogether.

Textbook 3 P48

For Let's Learn 2, go through the problem solving stages with the pupils again. Get pupils to identify the important information in the question and fill in the blanks in the given model. Ask pupils if they should add or subtract to obtain the answer for each part.

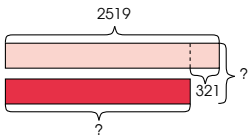
PRACTICE

Kate had 2000 g of flour at first.
She used 450 g of flour to bake some cookies and 280 g of flour to bake some tarts.
(a) How much flour did she use in all? 450 + 280 = 730
(b) How much flour did she have left? 2000 + 780 = 1270

Complete Workbook **3A**, Worksheet **3B** • Pages **35 – 40**

LET'S LEARN

1. The difference between two numbers is 321.
The greater number is 2519.
What is the sum of the two numbers?



2519 – 321 = 2198

The smaller number is 2198.

2519 + 2198 = 4717

The sum of the two numbers is 4717.

49 CHAPTER 2 OXFORD UNIVERSITY PRESS

Textbook 3 P49

PRACTICE

Work with pupils on the practice questions.

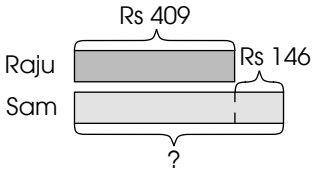
For better understanding, select items from **Worksheet 3B** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 3B (Workbook 3A P35 – 40).

Answers Worksheet 3B (Workbook 3A P35 – 40)

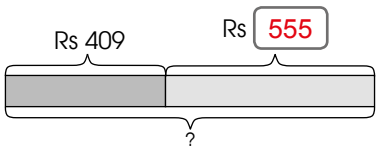
1. (a)



409 (+) 146 = 555

Sam has Rs 555.

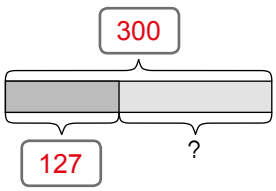
(b)



409 (+) 555 = 964

Raju and Sam have Rs 964 altogether.

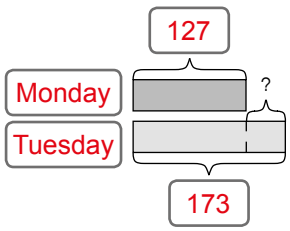
2. (a)



300 (−) 127 = 173

Ann read 173 pages on Tuesday.

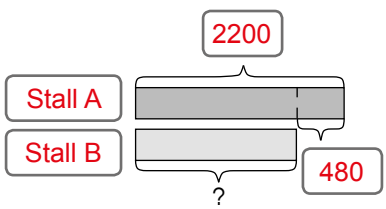
(b)



173 (−) 127 = 46

Ann read 46 more pages on Tuesday than on Monday.

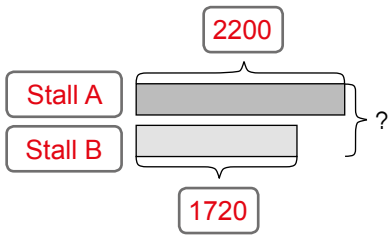
3. (a)



2200 (−) 480 = 1720

Stall B prepares 1720 packets of nasi lemak a day.

(b)



2200 (+) 1720 = 3920

The two stalls prepare 46 packets of nasi lemak altogether.

4. (a) 1285 + 890 = 2175
Mr Smith spent Rs 2175 altogether.

(b) 4000 – 2175 = 1825
Mr Smith had Rs 1825 left.

5. (a) 3680 + 1135 = 4815
The factory assembled 4815 toys in June.

(b) 4815 – 4650 = 165
The factory assembled 165 more toys in June than in April.

6. (a) 5318 – 1039 = 4279
Weiming used 4279 bricks.

(b) 5318 + 4279 = 9597
They used 9597 bricks in total.

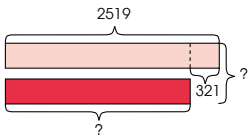
PRACTICE

Kate had 2000 g of flour at first.
She used 450 g of flour to bake some cookies and 280 g of flour to bake some tarts.
(a) How much flour did she use in all? 450 + 280 = 730
(b) How much flour did she have left? 2000 + 780 = 1270

Complete Workbook 3A, Worksheet 3B • Pages 35 – 40

LET'S LEARN

1. The difference between two numbers is 321.
The greater number is 2519.
What is the sum of the two numbers?



2519 – 321 = 2198

Subtract to find the smaller number.

The smaller number is 2198.

2519 + 2198 = 4717

The sum of the two numbers is 4717.

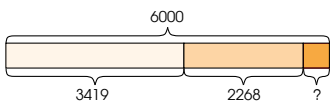
Textbook 3 P49

LET'S LEARN

This section consists of 2-step word problems.

For Let's Learn 1, go through the problem solving stages with pupils. Ask them what important information they can see in the question. Elicit ways they can check their answers. In addition, teach pupils how to check that their answers are reasonable and logical.

2. There were 6000 books for sale at a book fair.
3419 books were sold on the first day and 2268 books were sold on the second day.
How many books were there left at the end of the second day?



Method 1

6000 – 3419 = 2581

There were 2581 books left at the end of the first day.

2581 – 2268 = 313

There were 313 books left at the end of the second day.

Since 3419 + 2268 + 313 = 6000, the answer is correct.

Method 2

3419 + 2268 = 5687

5687 books were sold altogether.

6000 – 5687 = 313

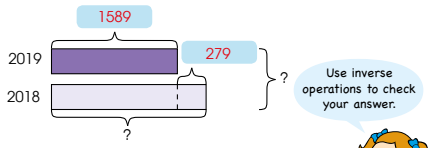
There were 313 books left at the end of the second day.

Which method do you prefer? Why?

Textbook 3 P50

Before looking at the answers given for Let's Learn 2, get pupils to talk about how they can solve the problem. Go through Method 1 and let pupils fill in the missing values for Method 2.

3. There were 1589 participants in a contest in 2019.
In 2018, there were 279 more participants in the contest than in 2019.
What was the total number of participants in the two years?



Use inverse operations to check your answer.

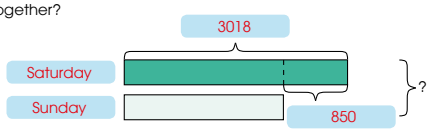
1589 + 279 = 1868

1868 people participated in the contest in 2018.

1589 + 1868 = 3457

The total number of participants in the two years was 3457.

4. On Saturday, 3018 people attended a funfair.
850 more people attended the funfair on Saturday than on Sunday.
How many people attended the funfair on the two days altogether?



3018 − 850 = 2168

2168 people attended the funfair on Sunday.

3018 + 2168 = 5186

5168 people attended the funfair on the two days altogether.

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Textbook 3 P51

For Let's Learn 3, go through the problem solving stages with the pupils again. Get pupils to identify the important information in the question and fill in the blanks in the given model. Ask pupils if they should add or subtract to obtain the answer for each part.

ACTIVITY TIME

Work in groups of 4.

1. Cut out advertisements with prices of items.
2. Make two word problems with the prices shown on the advertisements.

What you need:

Example

Mr Lim went shopping with Rs 9000.
He bought a laptop for Rs 7799 and a wireless mouse for Rs 450.
How much money did he have left?

3. Get another group to draw a model and solve each problem.
4. Check whether the other group solves your problems correctly.

PRACTICE

1. Mrs Lee buys a calculator for Rs 3699 and some notebooks for Rs 260.
She gives the cashier Rs 5000.
How much change will Mrs Lee receive?
3699 + 260 = 3959
5000 − 3959 = 1041

2. A stamp collector has 821 local stamps and 2505 foreign stamps.
He sells 1033 of the stamps.
How many stamps does he have left?
821 + 2505 = 3326
3326 − 1033 = 2293

3. There are 3515 fiction books in a school library.
There are 1150 more fiction books than non-fiction books.
How many fiction and non-fiction books are there in the library altogether?
3515 − 1150 = 2365
3515 + 2365 = 5880

Complete Workbook 3A, Worksheet 3C • Pages 41 – 45

OXFORD UNIVERSITY PRESS ADDITION AND SUBTRACTION WITHIN 10 000 52

Textbook 3 P52

ACTIVITY TIME

Get pupils to bring newspapers, magazines or catalogues to class.

Assign pupils to work in groups of 4.

The pupils are required to create word problems based on advertisements they find in the materials they have brought. After creating the word problems, get the groups to exchange word problems to solve.

PRACTICE

Work with pupils on the practice questions.

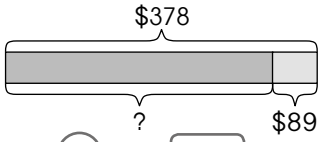
For better understanding, select items from **Worksheet 3C** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 3C (Workbook 3A P41 – 45).

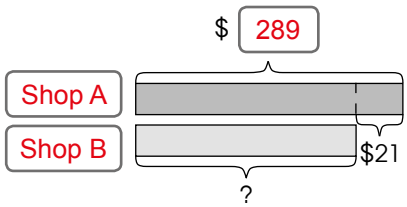
Answers Worksheet 3C (Workbook 3A P41 – 45)

1.



378 − 89 = 289

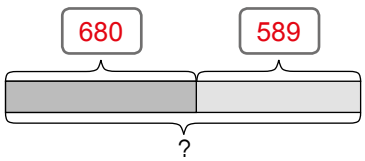
The bag cost $ 289 at Shop A.



289 − 21 = 268

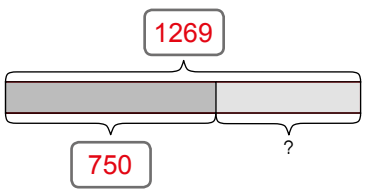
The bag cost $ 268 at Shop B.

2.



680 + 589 = 1269

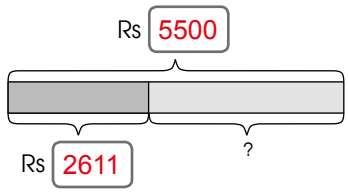
There are 1269 pupils in the school altogether.



1269 − 750 = 519

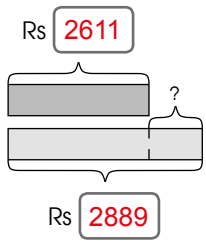
519 pupils do not wear spectacles.

3.



5500 − 2611 = 2889

Bina saved Rs 2889.



2889 − 2611 = 2889

Bina saved Rs 2889 more than she spent.

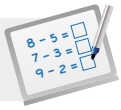
4. 2586 – 219 = 2367
2367 people attended the concert on Sunday.

2586 + 2367 = 4953
4953 people attended the concert on the two days altogether.

5. 539 – 240 = 299
There is an increase of 299 passengers at Station Q.

1248 – 299 = 949
949 passengers were on the train at Station P.

LESSON PLAN



Specific Learning Focus

- Solve 1-step and 2-step word problems involving addition and subtraction.

Suggested Duration

10 periods

Prior Learning

Pupils have learnt the problem solving model and should know how to use the 4-step approach to solve word problems. They have to first extract the information and organise the information using bar models. Once this is done, they are to decide on the mode(s) of operation. After carrying out the operation they should then check their answer using an alternative strategy.

Pre-emptive Pitfalls

Since the word problems involve two steps, some pupils might find it challenging. Similarly, comprehending the word problem and then extracting the information and translating it to a bar model might require a lot of practice and individual attention from the teacher.

Introduction

The bar model works on the concept of part-part-whole. Two parts are added to get a whole or a part is subtracted from a whole to get the other part. Go through the 4-step to problem solving template (Activity Handbook 3 P7). Discuss and then guide them to fill up the template before they carry out the fourth step of carrying out the operation independently. Go through the problem-solving stages multiple times before asking them to work independently. Get pupils to use a highlighter or pen to outline the important information and pause, before they move on to the second step of drawing the bar model and deciding on the operation.

Problem Solving

This lesson enhances their pictorial thinking skills. Their problem-solving skills are sharpened as a clear format is provided to solve a word problem. Encourage them to think of the word problem as a story and then solve it as a sum.

Activities

Encourage role-play for every sum in ‘Let’s Learn’ and ‘Practice’. Elicit pupils to imagine or enact the story sums before carrying out the operation. Provide them with real-life objects to be added or subtracted to make the problem sums even more contextual.

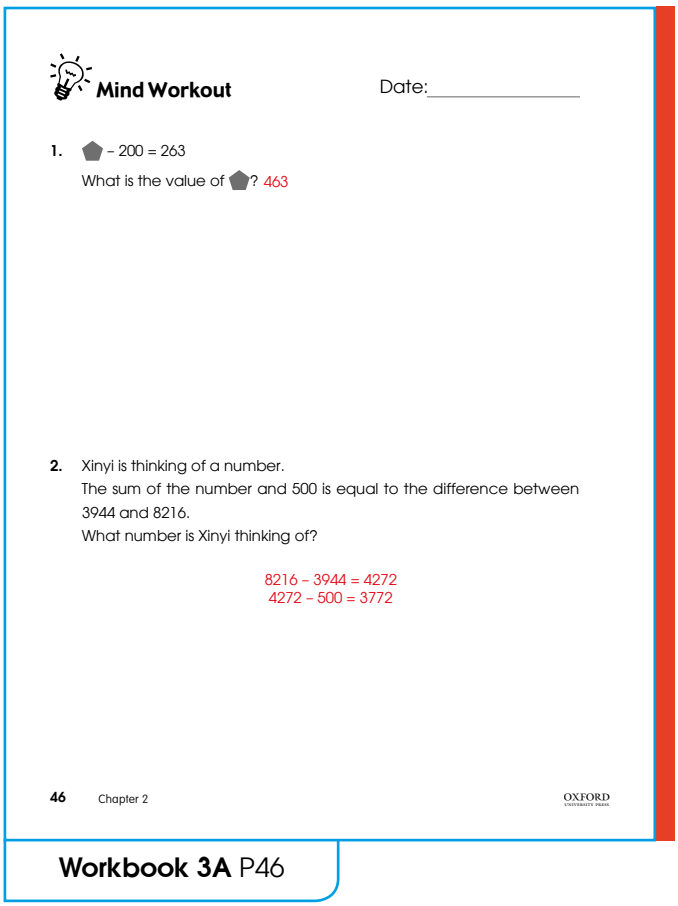
Resources

- 4-step approach to problem solving template (Activity Handbook 3 P7)
- real-life objects
- newspapers
- magazines
- catalogues
- scissors
- drawing block
- markers

Mathematical Communication Support

In ‘Activity Time’ (Textbook 3 P52), have a class discussion and then ask pupils to solve the questions independently on chart paper. Pin the chart papers on the soft board for all to see.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout Date:_____

1. ⬟ – 200 = 263
   What is the value of ⬟? 463

2. Xinyi is thinking of a number.
   The sum of the number and 500 is equal to the difference between 3944 and 8216.
   What number is Xinyi thinking of?

   8216 – 3944 = 4272
   4272 – 500 = 3772

46 Chapter 2 OXFORD UNIVERSITY PRESS

Workbook 3A P46

Mind Workout

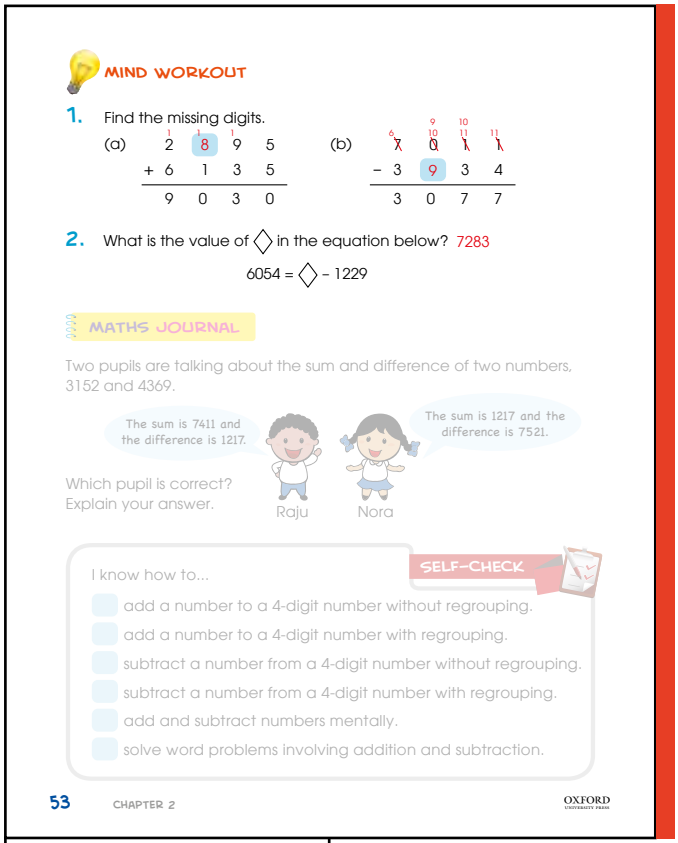
If pupils have difficulties in solving question 1, use a simpler question to help them see that ⬟ = 200 + 263.

For example, write 2 = 5 – 3. Replace 5 with ⬟ (i.e. 2 = ⬟ – 3). In order to find the value of ⬟, 2 has to be added to 3.

If pupils have difficulties in solving question 2, facilitate by asking the following questions:

- What information is given?
- What can you find first?
- What is the difference between 3944 and 8216?

To further help pupils to solve the problem, get them to draw a model using information derived from the questions asked.



MIND WORKOUT

1. Find the missing digits.

(a)
$$\begin{array}{r} 2\ \overset{1}{8}\ 9\ 5 \\ +\ 6\ 1\ 3\ 5 \\ \hline 9\ 0\ 3\ 0 \end{array}$$

(b)
$$\begin{array}{r} \overset{6}{7}\ \overset{9}{0}\ \overset{10}{1}\ \overset{11}{1} \\ -\ 3\ 9\ 3\ 4 \\ \hline 3\ 0\ 7\ 7 \end{array}$$

2. What is the value of ◇ in the equation below? 7283

$$6054 = ◇ - 1229$$

MATHS JOURNAL

Two pupils are talking about the sum and difference of two numbers, 3152 and 4369.

Which pupil is correct?
Explain your answer.

SELF-CHECK

I know how to...

- add a number to a 4-digit number without regrouping.
- add a number to a 4-digit number with regrouping.
- subtract a number from a 4-digit number without regrouping.
- subtract a number from a 4-digit number with regrouping.
- add and subtract numbers mentally.
- solve word problems involving addition and subtraction.

Textbook 3 P53

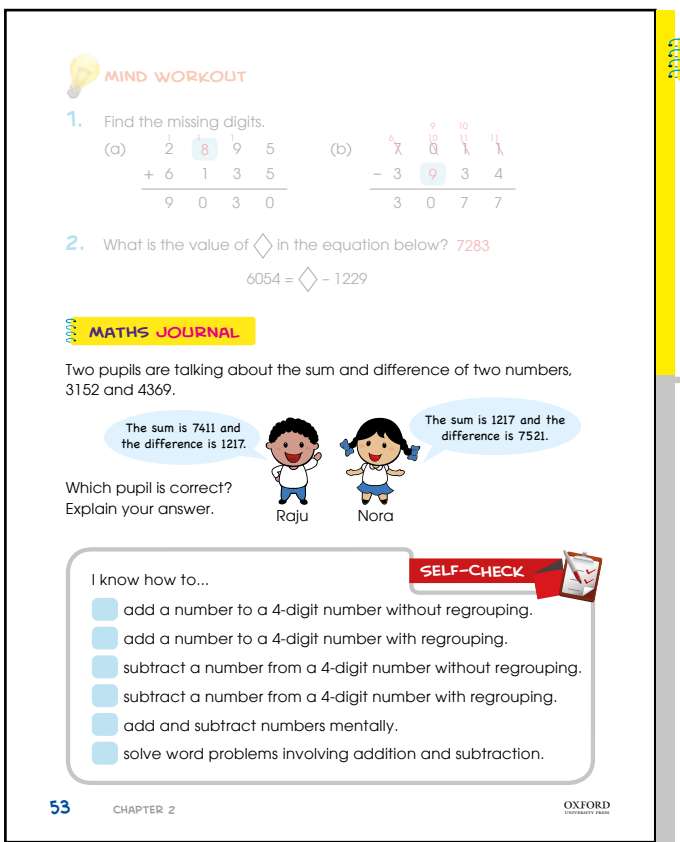
MIND WORKOUT

If pupils have difficulties in solving question 1, facilitate by asking the following questions:

- What can be added to 2 hundreds to give 10 hundreds in (a)?
- What can be subtracted from 9 hundreds to give 0 hundreds in (b)?
- How can you check that your answers are correct?

If pupils have difficulties in solving question 2, use a simpler question to help them see that ✡ = 54 + 29.

For example, write 2 = 5 – 3. Replace 5 with ◇ (i.e. 2 = ◇ – 3). In order to find the value of ◇, 2 has to be added to 3.



MIND WORKOUT

1. Find the missing digits.

(a)
$$\begin{array}{r} 2\ \overset{1}{8}\ 9\ 5 \\ +\ 6\ 1\ 3\ 5 \\ \hline 9\ 0\ 3\ 0 \end{array}$$

(b)
$$\begin{array}{r} \overset{6}{7}\ \overset{9}{0}\ \overset{10}{1}\ \overset{11}{1} \\ -\ 3\ 9\ 3\ 4 \\ \hline 3\ 0\ 7\ 7 \end{array}$$

2. What is the value of ◇ in the equation below? 7283

$$6054 = ◇ - 1229$$

MATHS JOURNAL

Two pupils are talking about the sum and difference of two numbers, 3152 and 4369.

The sum is 7411 and the difference is 1217.
The sum is 1217 and the difference is 7521.
Raju
Nora

Which pupil is correct?
Explain your answer.

SELF-CHECK

I know how to...

- add a number to a 4-digit number without regrouping.
- add a number to a 4-digit number with regrouping.
- subtract a number from a 4-digit number without regrouping.
- subtract a number from a 4-digit number with regrouping.
- add and subtract numbers mentally.
- solve word problems involving addition and subtraction.

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Textbook 3 P53

MATHS JOURNAL

Give pupils time to discuss among themselves.
Go around the class to faciliate the discussion.
Get pupils to draw models if necessary.

SELF-CHECK

Before the pupils do the self check, review the important concepts once more by asking for examples learnt for each objective.

This self check can be done after pupils have completed **Review 2** (Workbook 3A P47 – 52) as consolidation of understanding for the chapter.

Answers Review 2 (Workbook 3A P47 – 52)

1. (a) 37
   (b) 280
   (c) 181
   (d) 578
   (e) 85
   (f) 536
   (g) 146
   (h) 574

2.

4562 + 453 W	9537 − 1112 O	999 + 8139 R	9233 − 1183 K
5015	8425	9138	8050
5786 + 3239 W	7105 − 2769 I	6001 − 2073 T	7915 + 220 H
9025	4336	3928	8135
8000 − 999 C	9764 − 543 A	51 + 7581 R	2987 + 6002 E
7001	9221	7632	8989

WORK WITH CARE

3. (a) 2834
   (b) 6828
   (c) 6615
   (d) 7215

4. 5690 – 1480 = 4210
   Rs 4210 is left in her coin bank.

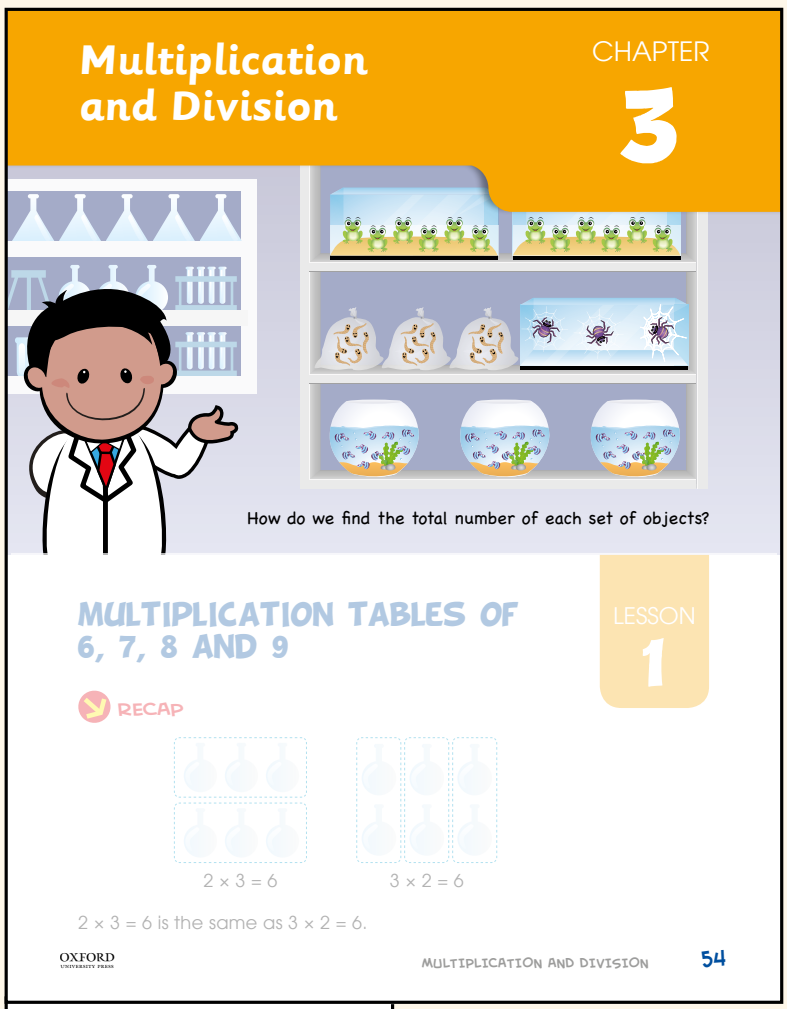
5. 3500 + 3800 = 7300
   The shop ordered 7300 calculators altogether.

6. (a) 3694 – 478 = 3216
   3216 book were sold in December.
   (b) 3694 + 3216 = 6910
   6910 books were sold in the two months altogether.

7. 856 + 587 = 1443
   1443 chickens and ducks were left.
   4000 – 1443 = 2557
   2557 chickens and ducks were sold altogether.

MULTIPLICATION AND DIVISION

CHAPTER 3



Textbook 3 P54

Related Resources
NSPM Textbook 3 (P54 – 115)
NSPM Workbook 3A (P53 – 124)

Materials
Multilink cubes, multiplication cards, counters, drawing block, marker, division cards, dot cards, play money, number discs, toothpicks

Lesson

Lesson 1	Multiplication Tables of 6, 7, 8 and 9
Lesson 2	Dividing by 6, 7, 8 and 9
Lesson 3	Quotient and Remainder
Lesson 4	Solving Word Problems
Lesson 5	Multiplication Without Regrouping
Lesson 6	Multiplication With Regrouping
Lesson 7	Multiplying Three Numbers
Lesson 8	Dividing Without Regrouping
Lesson 9	Dividing With Regrouping
Lesson 10	Finding Doubles
Lesson 11	Finding Halves
Lesson 12	More Word Problems

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

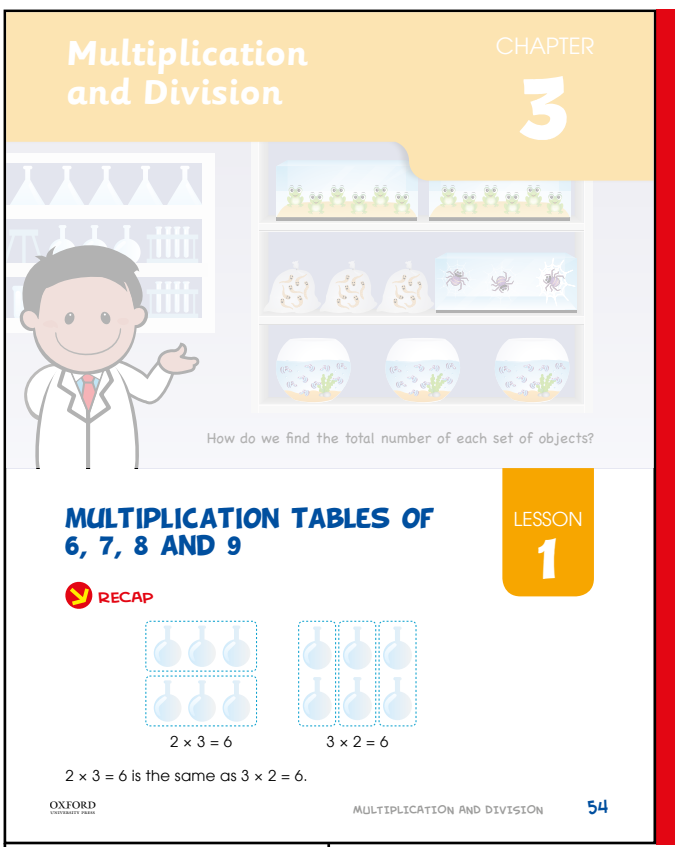
In Grade 2, pupils have memorised the multiplication tables of 2, 3, 4, 5 and 10. In this chapter, they commit the multiplication tables of 6, 7, 8 and 9 to memory. They also learn how to divide within the multiplication tables. Another skill pupils will acquire in this chapter is mental calculation skills involving the multiplication tables. With the mastery of the multiplication tables, pupils are ready to perform division with remainder. They are also introduced to the word quotient. In addition, pupils learn how to perform multiplication and division algorithms up to 3 digits by 1 digit. These skills enable them to solve up to 2-step word problems involving the 4 operations.

LESSON 1

MULTIPLICATION TABLES OF 6, 7, 8 AND 9

LEARNING OBJECTIVE

1. Memorise the multiplication tables of 6, 7, 8 and 9.


Multiplication and Division

CHAPTER 3

How do we find the total number of each set of objects?

MULTIPLICATION TABLES OF 6, 7, 8 AND 9

LESSON 1

RECAP

2 × 3 = 6

3 × 2 = 6

2 × 3 = 6 is the same as 3 × 2 = 6.

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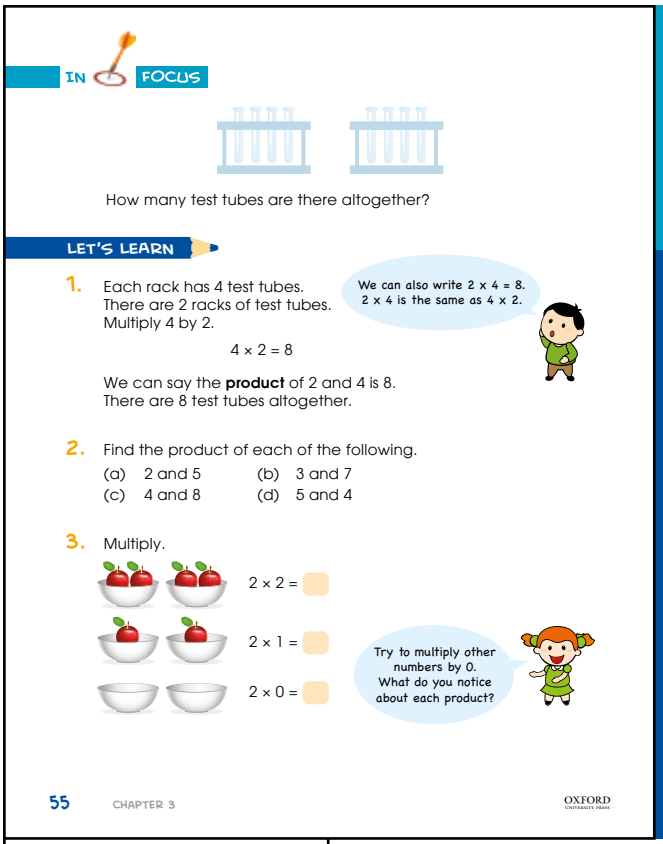
MULTIPLICATION AND DIVISION 54

Textbook 3 P54

RECAP

Recap the commutative property of multiplication using the pictures of the flasks.



Textbook 3 P55

IN FOCUS

Ask pupils to think of ways to count the total number of test tubes. Lead them to count in fours.

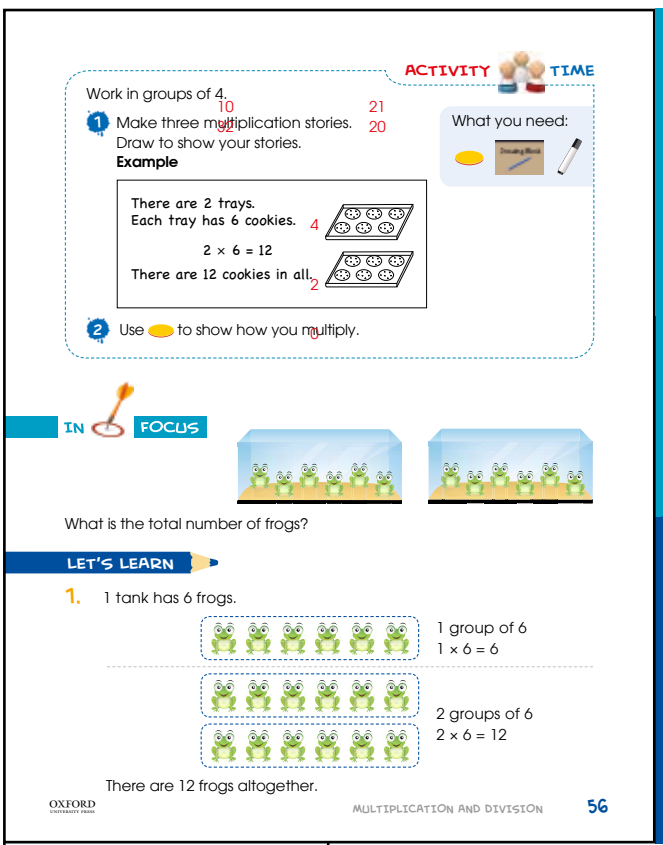
LET'S LEARN

In Let's Learn 1, highlight that 4 + 4 can also be written as 2 × 4, and that 2 × 4 is the same as 4 × 2.

Introduce the word **product**. To find the product means to multiply or times.

In Let's Learn 2, allow pupils to work on the product of each pair of numbers given.

In Let's Learn 3, ask pupils what they notice when a number is multiplied by 0. Lead them to conclude that 0 times any number yields 0.



Textbook 3 P56

ACTIVITY TIME

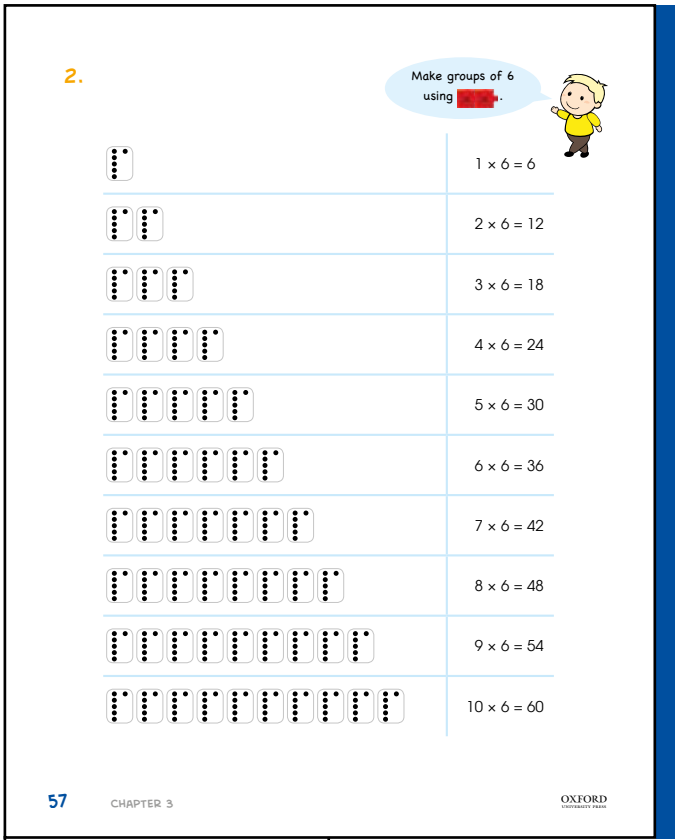
Assign pupils to work in groups of 4 to create multiplication stories. Distribute counters to let pupils demonstrate how the items can be arranged in arrays.

IN FOCUS

Ask pupils to think of ways to count the total number of frogs.

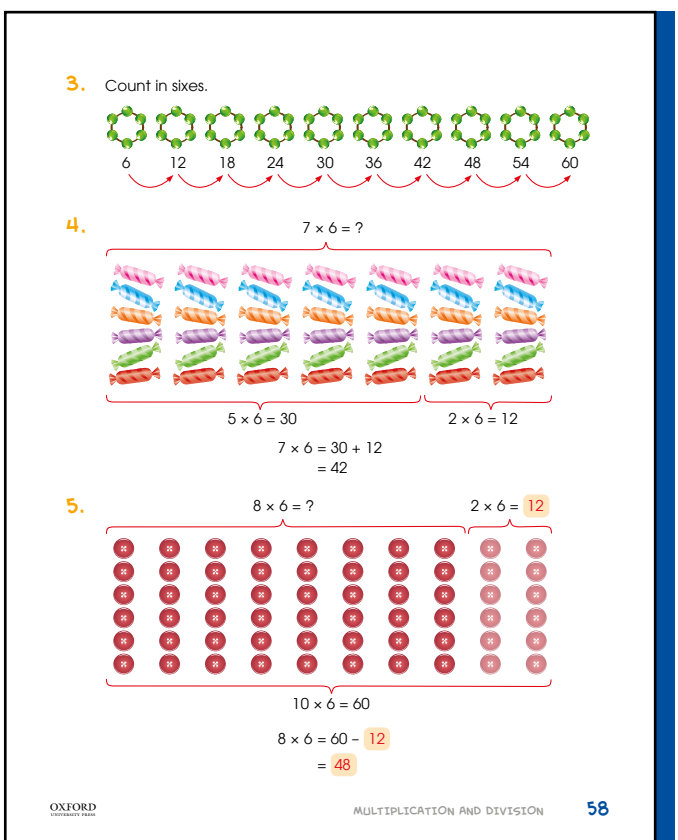
LET'S LEARN

In Let's Learn 1, remind pupils that 1 group of 6 can be written as 1 × 6, 2 groups of 6 can be written as 2 × 6 and so on. The total number of frogs can be obtained by 2 × 6.



Textbook 3 P57

Go through the multiplication tables of 6 using multilink cubes (or other concrete objects) and use terms such as 1 group of 6, 2 groups of 6, etc. to describe the multiplication tables of 6. In addition, get pupils to observe that each successive multiple is 6 more than the previous multiple. Ask pupils to predict what 11 × 6 will be.



Textbook 3 P58

Guide pupils to count in sixes for Let's Learn 3 and ask them to describe the pattern that they see in the multiples of 6.

Possible patterns that can be observed are:
- Each multiple is 6 more than the previous one.
- The digits in the ones place is repeated after every 5 multiples.

In Let's Learn 4, guide pupils to reason that 7 × 6 is 2 sets of 6 more than 5 sets of 6 and that there is no need to start counting from 1 × 6 to obtain 7 × 6. Start off by asking pupils 'Since 5 × 6 = 30, what is 7 × 6?'.

In Let's Learn 5, guide pupils to reason that 8 × 6 is 2 sets of 6 less than 10 sets of 6, so they can subtract 12 from 60 to obtain the answer. There is no need to start counting from 1 × 6 to obtain 8 × 6. Start off by asking pupils 'Since 10 × 6 = 60, what is 8 × 6?'.

PRACTICE

1. A flower has 6 petals.

6 × 8 = 48

8 flowers have 48 petals altogether.

2. Complete the multiplication table.

1 × 6 = 6	6 × 6 = 36
2 × 6 = 12	7 × 6 = 42
3 × 6 = 18	8 × 6 = 48
4 × 6 = 24	9 × 6 = 54
5 × 6 = 30	10 × 6 = 60

3. What are the missing numbers?

6, 12, 18, 24, 30, 36, 42, 48, 54, 60

Complete Workbook **3A**, Worksheet **1A** • Pages **53 – 56**

59 CHAPTER 3 OXFORD UNIVERSITY PRESS

Textbook 3 P59

PRACTICE

Work with pupils on the practice questions.

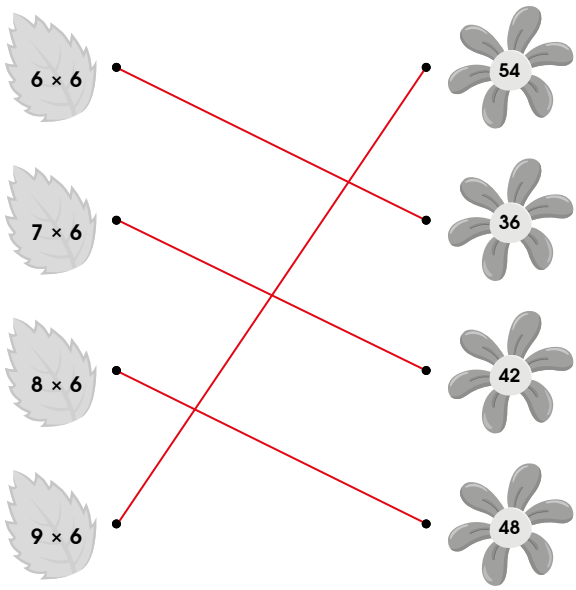
For better understanding, select items from **Worksheet 1A** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1A (Workbook 3A P53 – 56).

Answers Worksheet 1 (Workbook 3A P53 – 56)

1.



2. (a) 2 × 6 = 12
There are [12] rabbits in total.

(b) 5 × 6 = 30
There are [30] eggs altogether.

(c) 6 × 6 = 36
There are [36] pencils in total.

(d) 7 × 6 = 42
There are [42] cookies altogether.

(e) 8 × 6 = 48
There are [48] legs in total.

(f) 9 × 6 = 54
9 boxes of crayons cost $ [54].

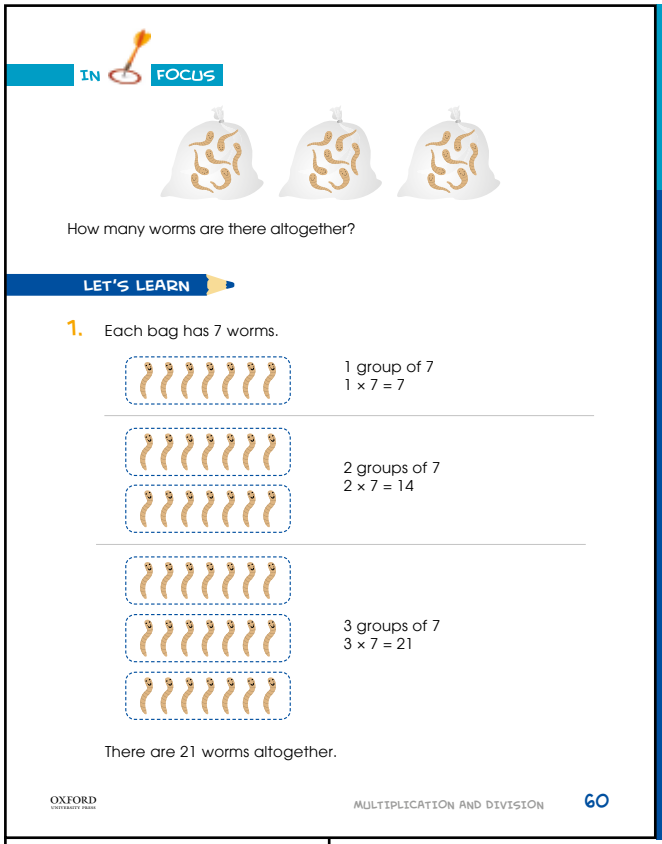
3.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

The 6th to 10th multiples of 6 have the same digits in the ones place as the 1st to 5th multiples of 6.

4. (a) 2 × 6 = 12
6 × 2 = 12

(b) 8 × 6 = 48
6 × 8 = 48



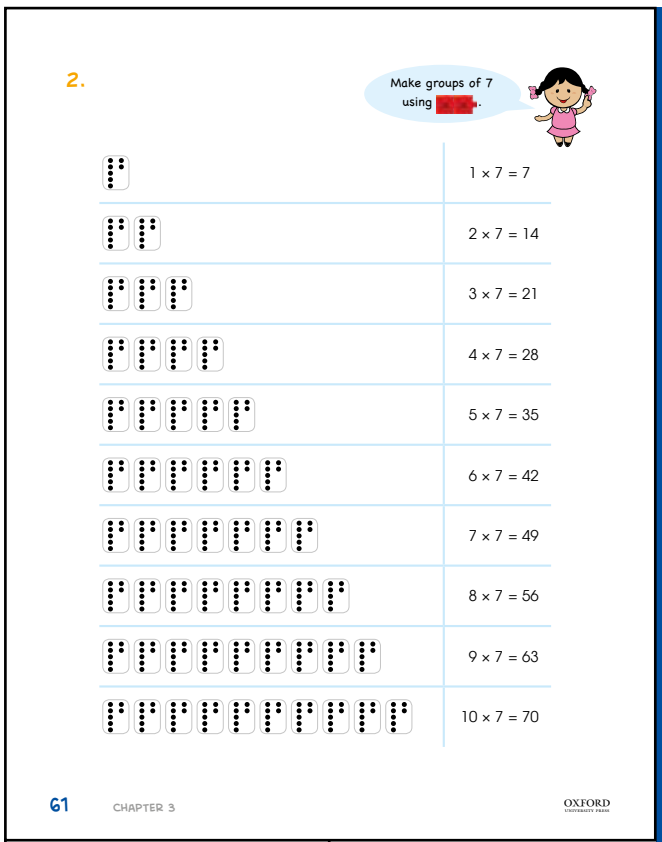
Textbook 3 P60

IN FOCUS

Get pupils to think of ways to count the total number of worms.

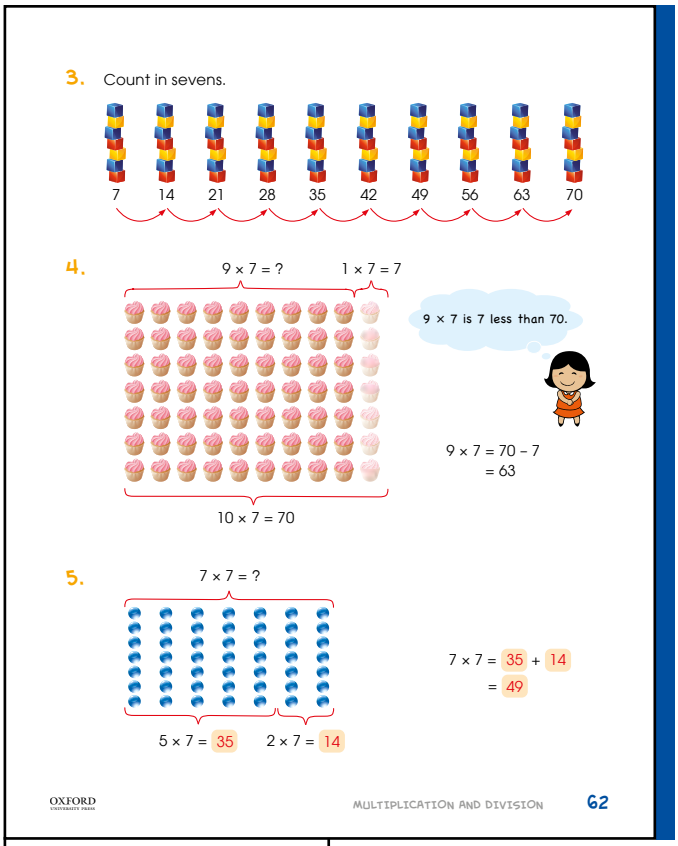
LET'S LEARN

In Let's Learn 1, remind pupils that 1 group of 7 can be written as 1 × 7, 2 groups of 7 can be written as 2 × 7 and so on. The total number of worms can be obtained by 3 × 7.



Textbook 3 P61

Go through the multiplication tables of 7 using the multilink cubes (or other concrete objects) and use terms such as 1 group of 7, 2 groups of 7 etc. to describe the multiplication tables of 7. In addition, get pupils to observe that each successive multiple is 7 more than the previous multiple. Ask pupils to predict what 11 × 7 will be.

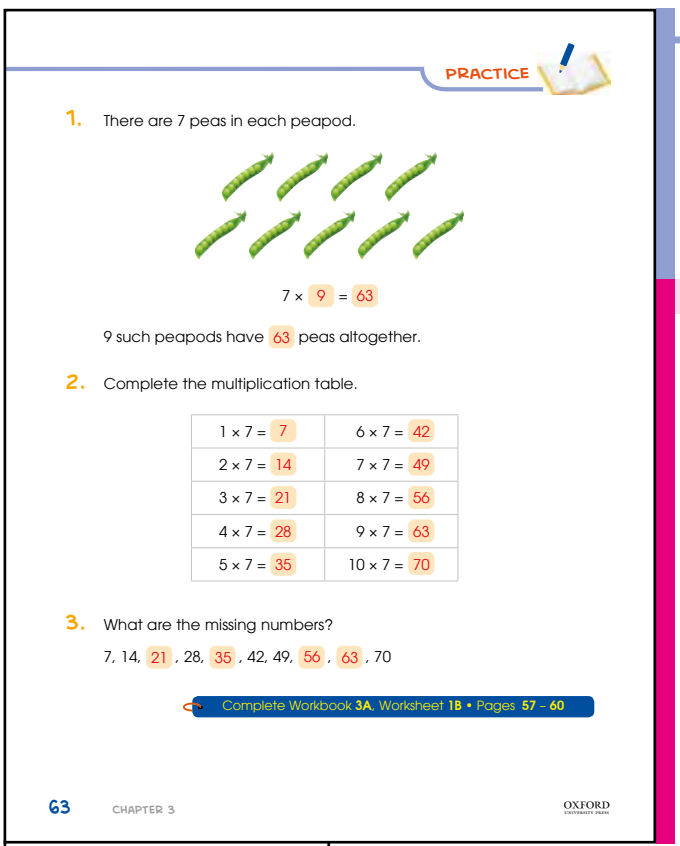


Textbook 3 P62

Guide pupils to count in sevens for Let's Learn 3 and ask them to describe the pattern that they see in the multiples of 7. An observable pattern is that each multiple is 7 more than the previous one.

In Let's Learn 4, guide pupils to reason that 9 × 7 is 7 less than 10 sets of 7, so they can subtract 7 from 70 to obtain the answer to 9 × 7. There is no need to start counting from 1 × 7 to obtain 9 × 7. Start off by asking pupils 'Since 10 × 7 = 70, what is 9 × 7?'.

In Let's Learn 5, guide pupils to reason that 7 × 7 is 2 sets of 7 more than 5 sets of 7, so they can add 2 × 7 to 5 × 7 to obtain the answer. There is no need to start counting from 1 × 7 to obtain 7 × 7. Start off by asking pupils 'Since 5 × 7 = 35, what is 7 × 7?'.



Textbook 3 P63

PRACTICE

Work with pupils on the practice questions.

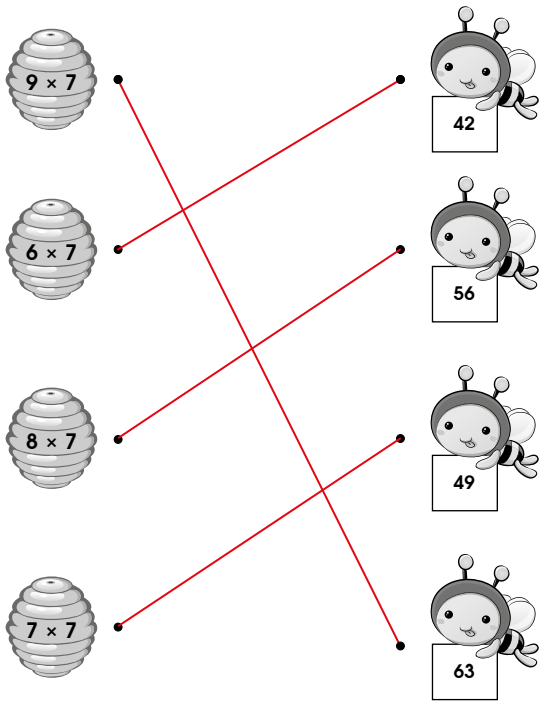
For better understanding, select items from **Worksheet 1B** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1B (Workbook 3A P57 – 60).

Answers Worksheet 1B (Workbook 3A P57 – 60)

1.



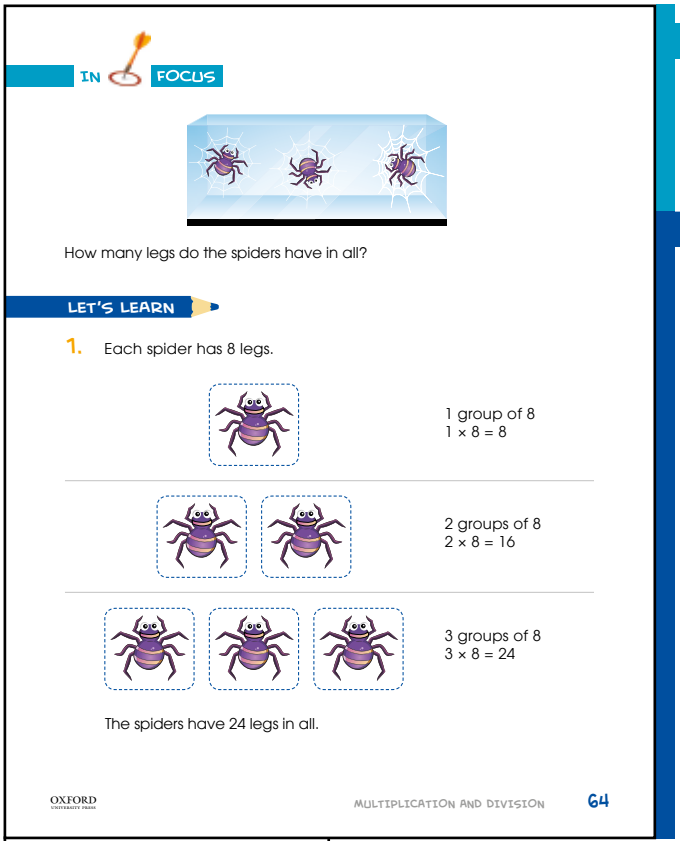
2. (a) 2 × 7 = 14
   There are 14 dumplings in total.
   (b) 3 × 7 = 21
   There are 21 doughnuts in total.
   (c) 4 × 7 = 28
   There are 28 buttons altogether.
   (d) 5 × 7 = 35
   There are 35 ducks in total.
   (e) 6 × 7 = 42
   There are 42 balloons in total.
   (f) 7 × 7 = 49
   There are 49 candles in total.

3.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

The 2nd, 4th and 6th rows each have one shaded box while the 3rd, 5th and 7th rows each have two shaded boxes.

4. (a) 8 × 7 = 56
   7 × 8 = 56
   (b) 3 × 7 = 21
   7 × 3 = 21



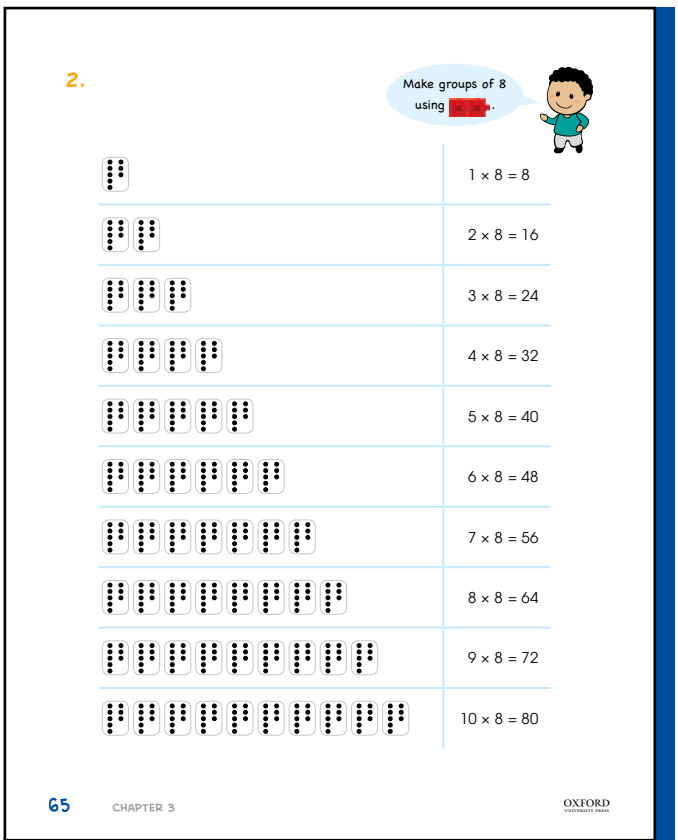
Textbook 3 P64

IN FOCUS

Ask pupils to think of ways to count the total number of legs on the three spiders.

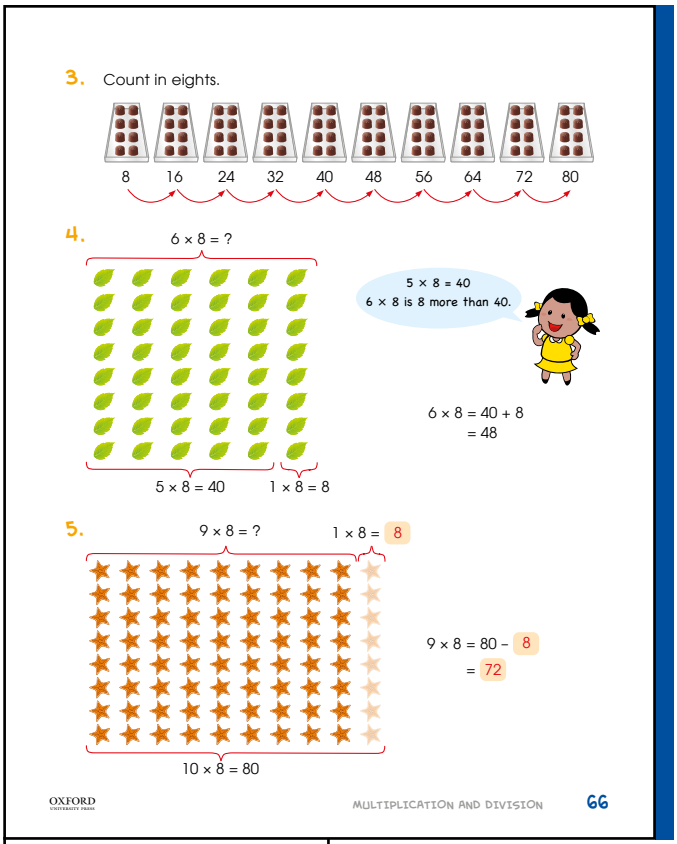
LET'S LEARN

In Let's Learn 1, remind pupils that 1 group of 8 can be written as 1 × 8, 2 groups of 8 can be written as 2 × 8 and so on. The total number of legs can be obtained by 3 × 8.



Textbook 3 P65

Go through the multiplication table of 8 using the multilink cubes (or other concrete objects) and use terms such as 1 group of 8, 2 groups of 8 etc. to describe the multiplication tables of 8. In addition, get pupils to observe that each successive multiple is 8 more than the previous multiple. Next, get pupils to predict what 11 × 8 will be.



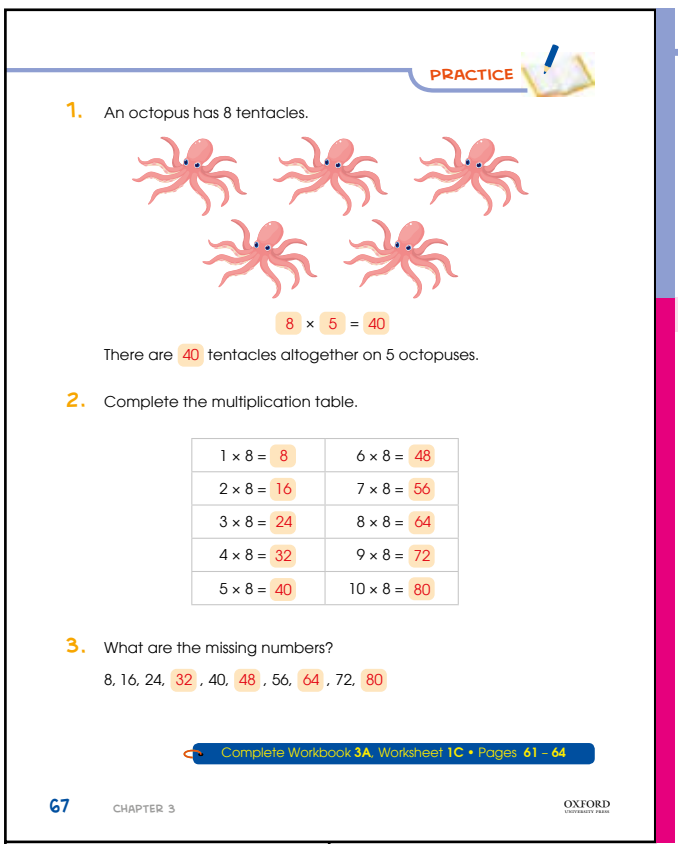
Textbook 3 P66

Guide pupils to count in eights for Let's Learn 3 and ask them to describe the pattern that they see in the multiples of 8.

Possible patterns that can be observed are:
- Each multiple is 8 more than the previous one.
- The digit in the ones place are 8, 6, 4, 2 and 0, and this repeats for every 5 multiples.

In Let's Learn 4, guide pupils to reason that 6 × 8 is 8 more than 5 sets of 8, so they can add to 40 to obtain the answer to 6 × 8. There is no need to start counting from 1 × 8 to obtain 6 × 8. Start off by asking pupils 'Since 5 × 8 = 40, what is 6 × 8?'.

In Let's Learn 5, guide pupils to reason that 9 × 8 is 8 less than 10 sets of 8, so they can subtract 8 from 80 to obtain the answer. There is no need to start counting from 1 × 8 to obtain 9 × 8. Start off by asking pupils 'Since 10 × 8 = 80, what is 9 × 8?'.



Textbook 3 P67

PRACTICE

Work with pupils on the practice questions.

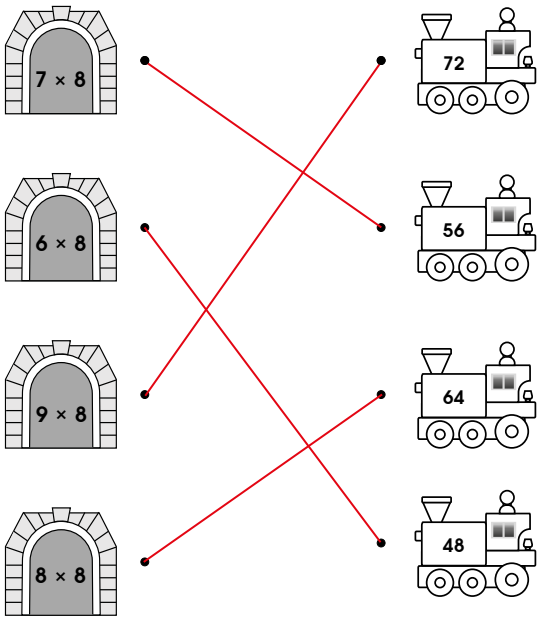
For better understanding, select items from **Worksheet 1C** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1C (Workbook 3A P61 – 64).

Answers Worksheet 1C (Workbook 3A P61 – 64)

1.



2. (a) 2 × 8 = 16
   There are [16] pencils in total.
   (b) 4 × 8 = 32
   There are [32] pieces of clothing in total.
   (c) 5 × 8 = 40
   There are [40] marbles in total.
   (d) 6 × 8 = 48
   There are [48] eggs in total.
   (e) 7 × 8 = 56
   The books cost $ [56] altogether.

3.

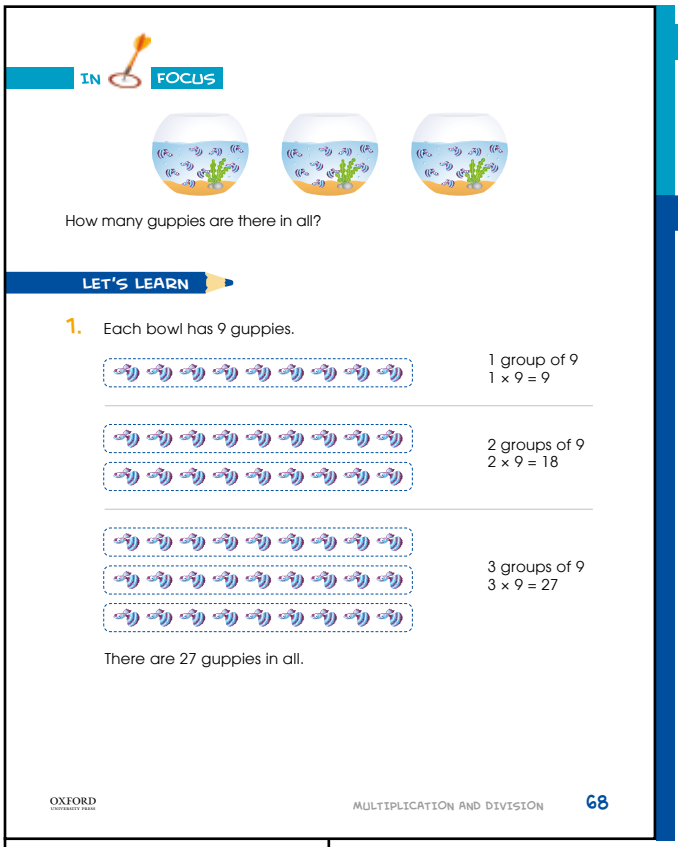
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

Which numbers are coloured in both charts?
8, 16, 24, 32, 40

What can you say about these numbers?
They are multiples of 4 as well as multiples of 8.

4. 9 × 8 = 72
   8 × 9 = 72



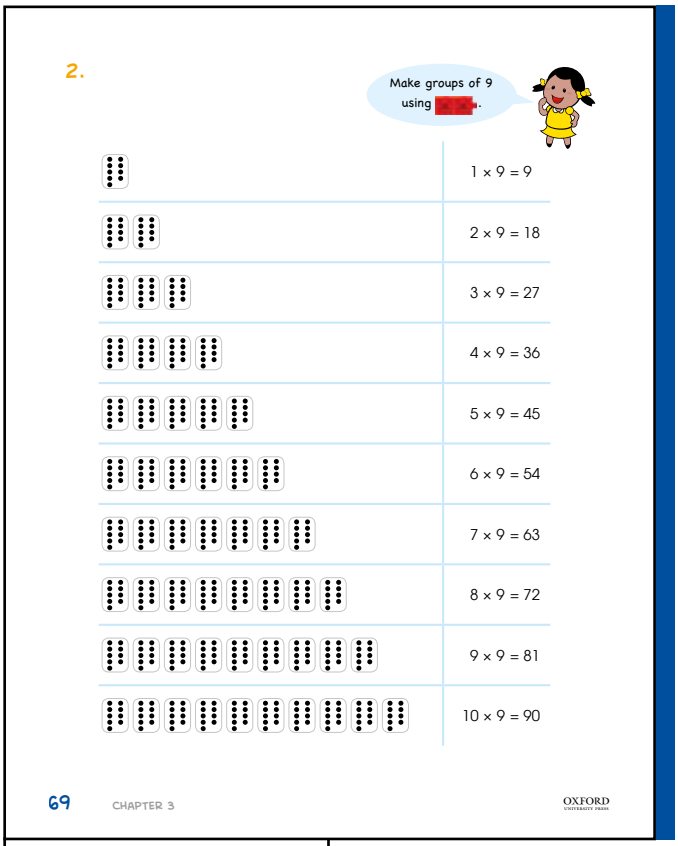
Textbook 3 P68

IN FOCUS

Ask pupils to think of ways to count the total number of guppies.

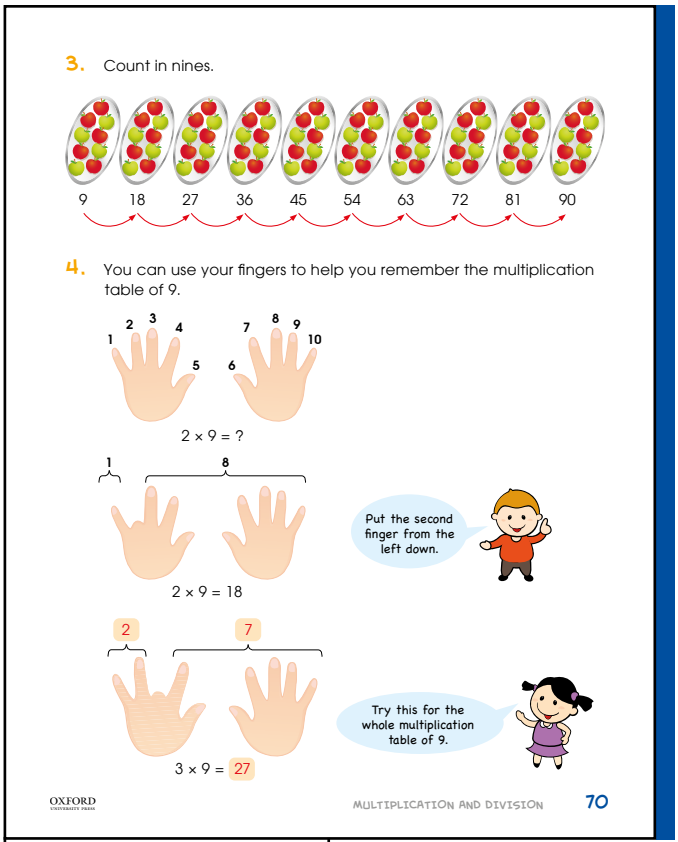
LET'S LEARN

In Let's Learn 1, remind pupils that 1 group of 9 can be written as 1 × 9, 2 groups of 9 can be written as 2 × 9 and so on. The total number of guppies can be obtained by 3 × 9.



Textbook 3 P69

Go through the multiplication table of 9 using the multilink cubes (or other concrete objects) and use terms such as 1 group of 9, 2 groups of 9 etc. to describe the multiplication tables of 9. In addition, get pupils to observe that each successive multiple is 9 more than the previous multiple and get pupils to predict what 11 × 9 will be.



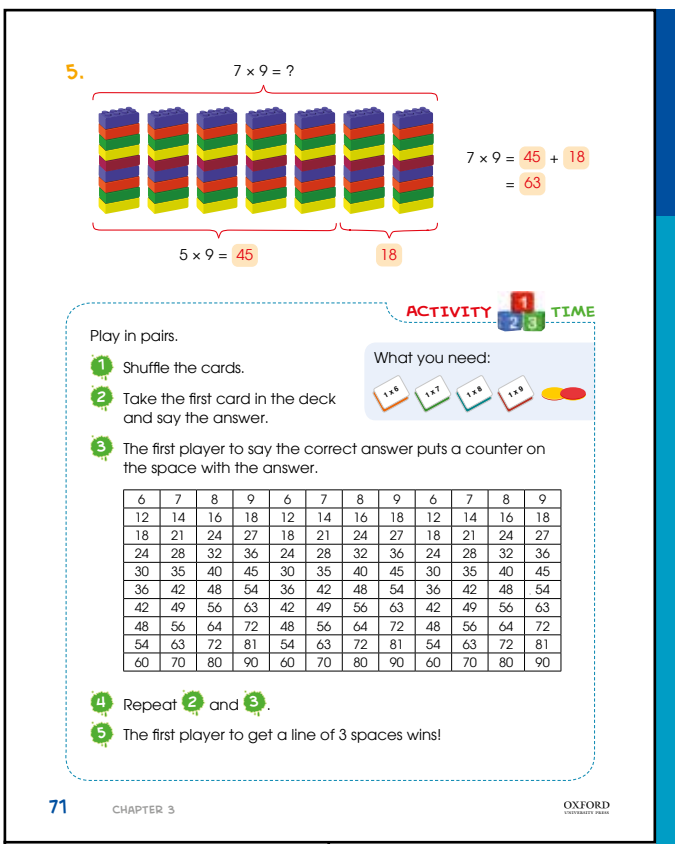
Textbook 3 P70

Guide pupils to count in nines for Let's Learn 3 and ask them to describe the pattern that they see in the multiples of 9.

Possible patterns that can be observed are:

- Each multiple is 9 more than the previous one.
- The sum of the digits in the ones place and the tens place is 9.

In Let's Learn 4, demonstrate to pupils how they can use their fingers to help them remember the multiplication tables of 9. Allow pupils to try reciting the tables of 9 by using their fingers.



6	7	8	9	6	7	8	9	6	7	8	9
12	14	16	18	12	14	16	18	12	14	16	18
18	21	24	27	18	21	24	27	18	21	24	27
24	28	32	36	24	28	32	36	24	28	32	36
30	35	40	45	30	35	40	45	30	35	40	45
36	42	48	54	36	42	48	54	36	42	48	54
42	49	56	63	42	49	56	63	42	49	56	63
48	56	64	72	48	56	64	72	48	56	64	72
54	63	72	81	54	63	72	81	54	63	72	81
60	70	80	90	60	70	80	90	60	70	80	90

Textbook 3 P71

In Let's Learn 5, guide pupils to reason that since 7 × 9 is 2 sets of 9 more than 5 sets of 9, they can add 18 to 45 to obtain the answer rather than to start counting from 1 × 9.

ACTIVITY TIME

This activity consolidates the multiplication tables of 6 to 9.

Assign pupils to play in pairs and give them about 5 minutes to carry out the activity.

Demonstrate how the activity is carried out with a pupil.

ACTIVITY TIME

1. Go to http://www.shinglee.com.sg/StudentResources/NSPM3.
2. Click on 'UFO Invaders'.
3. Shoot all the UFOs before they reach you!

PRACTICE

1. Each box contains 9 caterpillars.

6 × 9 = 54

There are 54 caterpillars altogether.

2. Complete the multiplication table.

1 × 9 = 9	6 × 9 = 54
2 × 9 = 18	7 × 9 = 63
3 × 9 = 27	8 × 9 = 72
4 × 9 = 36	9 × 9 = 81
5 × 9 = 45	10 × 9 = 90

3. What are the missing numbers?

9, 18, 27, 36, 45, 54, 63, 72, 81, 90

Complete Workbook 3A, Worksheet 1D • Pages 65 – 68

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Textbook 3 P72

ACTIVITY TIME

Demonstrate to the class one or two examples. This can be assigned as homework.

PRACTICE

Work with pupils on the practice questions.

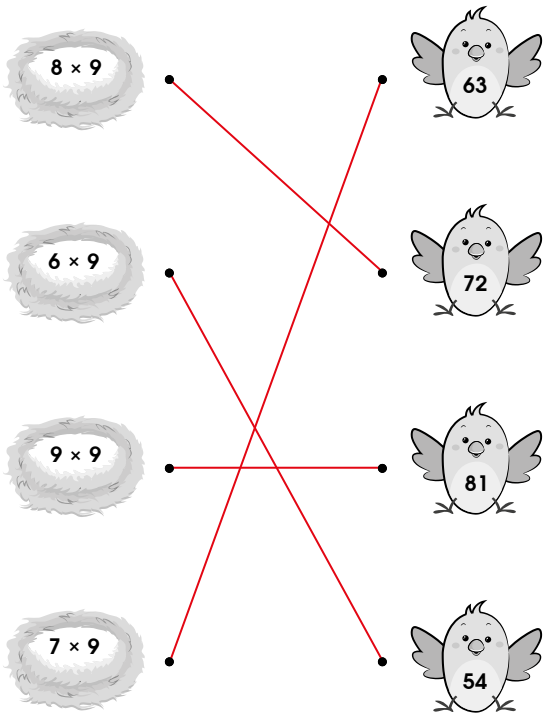
For better understanding, select items from **Worksheet 1D** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1D (Workbook 3A P65 – 68).

Answers Worksheet 3A (Workbook 3A P65 − 68)

1.



2. (a) 3 × 9 = 27
   There are [27] strawberries in total.
   (b) 5 × 9 = 45
   There are [45] candles in total.
   (c) 6 × 9 = 54
   There are [54] chocolates in total.
   (d) 7 × 9 = 63
   There are [63] lollipops altogether.
   (e) 9 × 9 = 81
   There are [81] crayons in all.

3.

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

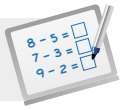
Do you see any pattern? If so, describe it.
From the 1st multiple, the ones digits are 9, 8, 7, 6, 5, 4, 3, 2, 1 and 0, while the tens digits are 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Look at the numbers you have coloured.

What do you notice about the sum of the digits in the numbers?
The sum of the tens digit and the ones digit in each number is always 9.

4. 7 × 9 = 63
   9 × 7 = 63

LESSON PLAN



Specific Learning Focus

- Memorise the multiplication tables of 6, 7, 8 and 9.

Suggested Duration

8 periods

Prior Learning

Pupils have learnt the concept of multiplication as repeated addition of the same number. So three groups of 4 is either 4 + 4 + 4 = 12 or 3 × 4 = 12. Pupils have also memorised the 2, 3, 4, 5 and 10 multiplication tables in Grade 2. In Grade 3, they will be asked to memorise the 6, 7, 8 and 9 multiplication tables.

Pre-emptive Pitfalls

Since it is easier to skip count in 2s, 3s, 4s, 5s and 10s, committing these multiplication tables to memory should have been relatively easy. However, skip counting in 6s, 7s, 8s and 9s gets difficult. Therefore, more effort is likely to be required to memorise these multiplication tables.

Introduction

The term 'product' is introduced as the answer to the multiplication of numbers (in this case, 2 numbers). The commutative property of multiplication is also revisited (e.g. 2 × 4 = 4 × 2 = 8 (Textbook 3 P55)). In 'In Focus' (Textbook 3 P56), it is emphasised that if the set of numbers is recurrent or repeated, then the sum can be solved by multiplication. Hence 2 groups of 6 frogs give a total of 2 × 6 = 12 frogs (6 + 6 = 12). Similarly, real-life examples are used to show groups of 7 (bags of 7 worms) and groups of 8 (an octopus has 8 legs) to introduce the multiplication tables of 6, 7, 8 and 9. Concrete materials like dot cards (Activity Handbook 3 P9) or multilink cubes are used to introduce the multiplication tables. The pupils are then asked to memorise the multiplication tables. The memorisation can be made easier by having oral class quizzes where the teacher can track the number of correct answers each group has in 1 minute. The multiplication table cards can also be used.

Problem Solving

Skip counting in 6s, 7s, 8s and 9s enables us to understand that in a multiplication table of 6, 7, 8 or 9, each product is 6 or 7 or 8 or 9 more than the preceding value (Textbook 3 P58). Similarly, lead pupils to see that the product can be found by addition (e.g. in Let's Learn 4 (Textbook 3 P58), 7 × 6 can be found by adding 5 × 6 = 30 and 2 × 6 = 12). The product can also be found by subtraction (e.g. in Let's Learn 5 (Textbook 3 P58), 8 × 6 can be found by subtracting 2 × 6 = 12 from 10 × 6 = 60).

Activities

Cookies or other real-life objects can be used to make sets to explain the products. 'Activity Time' (Textbook 3 P71) can be played in pairs. Encourage peer checking and prompting. You will need multiplication cards (Activity Handbook 3 P10 – 13) and a number chart from 6 to 90 (Activity Handbook 3 P14) as multiplication tables of 6 to 9 will be used.

Resources

- multilink cubes
- dot cards (Activity Handbook 3 P9)
- real-life objects
- multiplication cards (Activity Handbook 3 P10 – 13)
- number chart from 6 to 90 (Activity Handbook 3 P14)
- counters

Mathematical Communication Support

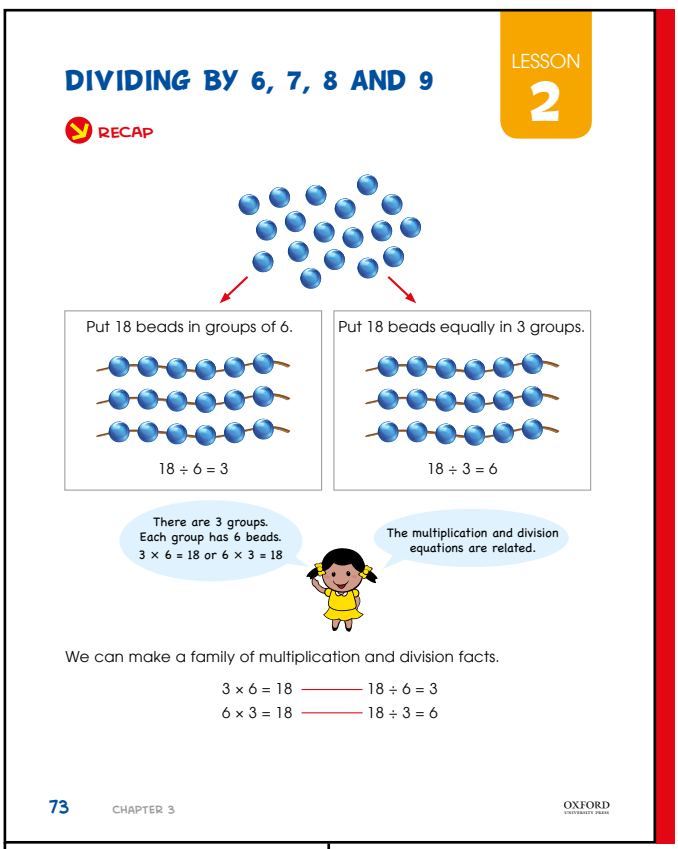
Emphasise the following:
(i) In a multiplication table of *x*, each successive multiple is *x* more than the previous multiple.
(ii) A multiple of 6 will also be a multiple of 2 and 3.
(iii) A multiple of 8 will also be a multiple of 2 and 4.
(iv) For multiples of 9, the sum of the digits in the tens and ones places will always be 9.

LESSON 2

DIVIDING BY 6, 7, 8 AND 9

LEARNING OBJECTIVE

1. Divide within the multiplication tables of 6, 7, 8 and 9.



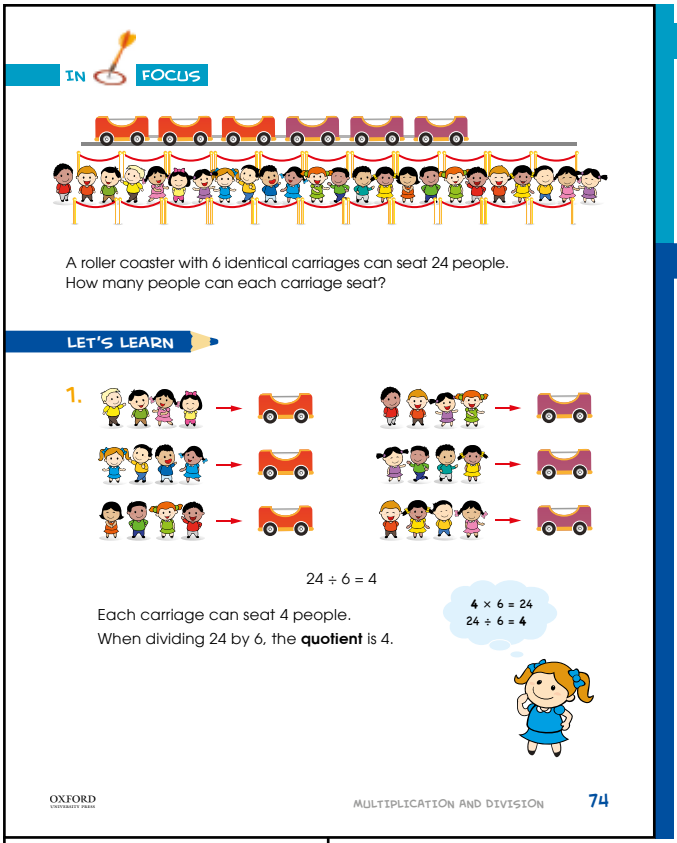
Textbook 3 P73

RECAP

Recap that division can mean sharing or grouping.

Show how multiplication and division are related. Write down the family of multiplication and division facts for the example given.

To check the pupils' understanding, give another multiplication fact and get pupils to write the family of multiplication and division facts.



Textbook 3 P74

IN FOCUS

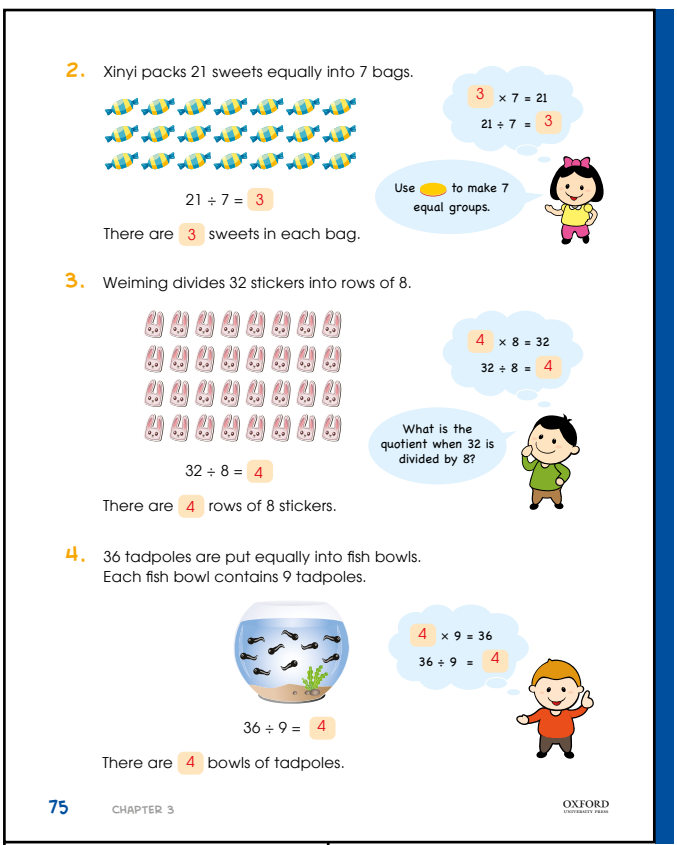
Discuss how many people each carriage can seat if the roller coaster can seat 24 people altogether. Ask some pupils to present their answers.

LET'S LEARN

Teacher can use magnetic buttons to represent the people. Move the buttons to show the distribution of people.

In Let's Learn 1, highlight to pupils that division is used to find out the number of people in each group. Since 24 people are divided equally into 6 groups of 4 people, the division equation can be written as 24 ÷ 6 = 4. Get pupils to read the division equation and remind pupils that division is related to multiplication.

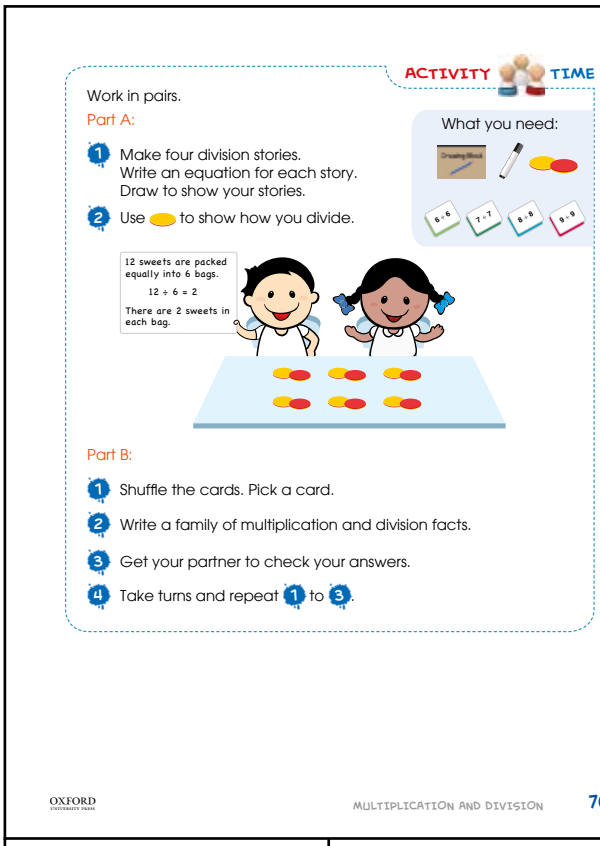
Introduce the word **quotient** to mean the answer derived from division.



Textbook 3 P75

In Let's Learn 2 and 3, ask pupils to circle to show the number of items in each group. Pupils are to fill in the blanks. For weaker pupils, distribute counters to allow a concrete representation of the division. Highlight the relationship between multiplication and division.

In Let's Learn 4, ask pupils which number times 9 gives 36. Lead pupils to see that since 4 × 9 = 36, 36 divided by 9 would yield 4. Allow pupils to use counters if necessary.



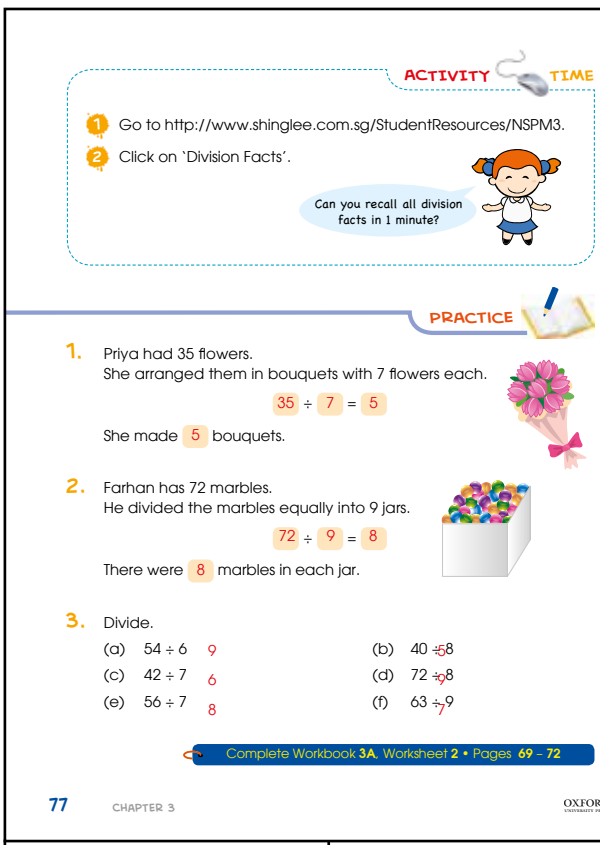
Textbook 3 P76

ACTIVITY TIME

Assign pupils to work in pairs.

For Part A, distribute the counters to pupils. Give them time to write division stories and use counters to show the division.

For Part B, distribute the division fact cards to pupils and demonstrate how the activity should be carried out.



Textbook 3 P77

ACTIVITY TIME

Demonstrate to the class using one or two examples. This activity can be assigned as homework.

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 2** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 3A P69 – 72).

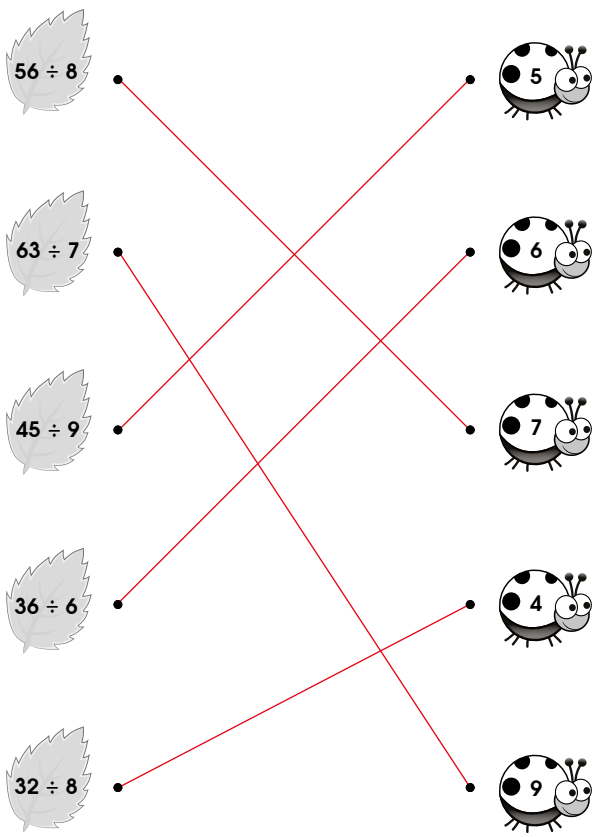
Answers Worksheet 2 (Workbook 3A P69 – 72)

1. $30 \div 6 = 5$
   There are [5] basketballs in each basket.

2. $42 \div 7 = 6$
   There are [6] flowers in each bouquet.

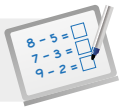
3. $64 \div 8 = 8$
   There are [8] octagons in total.

4. $54 \div 9 = 6$
   There are [6] passengers in each boat.

5. 

6. (a) 4
   (b) 5
   (c) 3
   (d) 6
   (e) 8
   (f) 8
   (g) 9
   (h) 3
   (i) 8
   (j) 9

LESSON PLAN



Specific Learning Focus

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

Suggested Duration

4 periods

Prior Learning

Pupils have learnt the operation of division. If multiplication is the repeated addition of numbers, then division is sharing the number equally. Division and multiplication are inverse operations of each other. This fact can be revised by showing mathematical facts.

Pre-emptive Pitfalls

Pupils might relate division to subtraction. Division is equal sharing of a number of objects. Hence, if dividing 24 sweets among pupils gives each pupil 4 sweets, there are 6 pupils altogether (24 ÷ 4 = 6). If 24 sweets are divided among 4 pupils, each pupil gets 6 sweets (24 ÷ 4 = 6).

Introduction

Use counters or magnetic buttons when introducing division facts of 6, 7, 8 and 9. Show the equal distribution using pupils and real-life objects. Revise the multiplication tables before introducing division facts of 6, 7, 8 and 9. Introduce the term ‘quotient’ as the answer derived when a number is divided by another number.

Problem Solving

The inverse relationship between multiplication and division should be emphasised by doing repeated divisions on the board. Go to the website (Textbook 3 P77) and click on ‘Division facts’ for more practice.

Activities

In ‘Activity Time’ (Textbook 3 P76), division stories can be drawn on the board and the division facts can then be written by pupils on blank cards handed to them (Activity Handbook 3 P20).

Resources

- counters
- division cards (Activity Handbook 3 P15 – 18)
- drawing block
- markers

Mathematical Communication Support

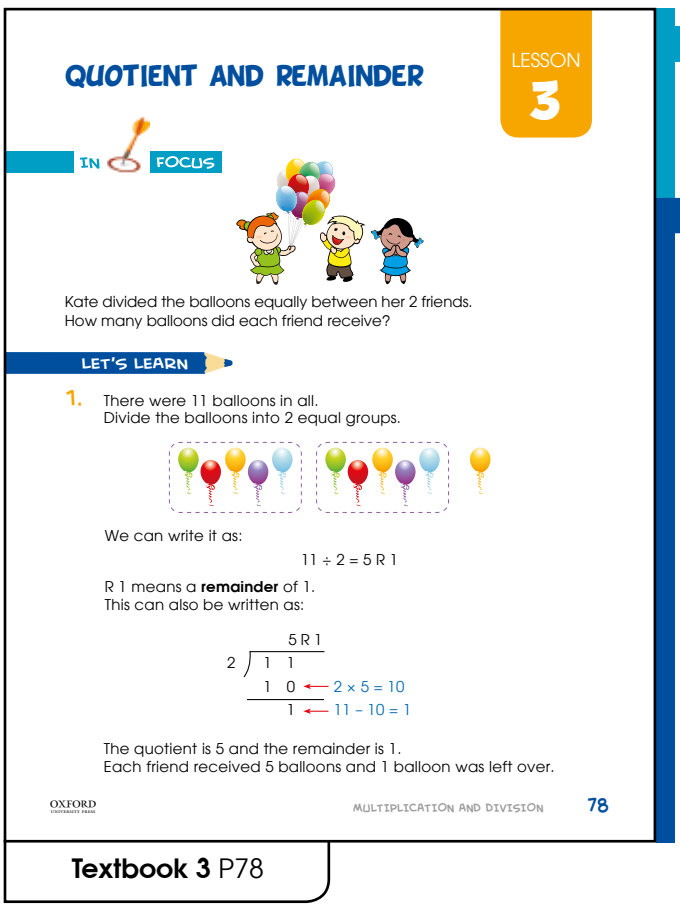
Encourage individual responses while writing division facts on the board. Correlate multiplication facts with division facts. Key terms like ‘multiples’, ‘quotient’ and ‘product’ should be used during class discussions.

LESSON 3

QUOTIENT AND REMAINDER

LEARNING OBJECTIVE

1. Division with remainder.



QUOTIENT AND REMAINDER

LESSON 3

IN FOCUS

Kate divided the balloons equally between her 2 friends.
How many balloons did each friend receive?

LET'S LEARN

1. There were 11 balloons in all.
Divide the balloons into 2 equal groups.

We can write it as:

$11 \div 2 = 5 \text{ R } 1$

R 1 means a **remainder** of 1.
This can also be written as:

$$\begin{array}{r} 5\text{ R }1 \\ 2\overline{)\,1\;1} \\ -\;1\;0 \quad \leftarrow 2 \times 5 = 10 \\ \hline 1 \quad \leftarrow 11 - 10 = 1 \end{array}$$

The quotient is 5 and the remainder is 1.
Each friend received 5 balloons and 1 balloon was left over.

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MULTIPLICATION AND DIVISION 78

Textbook 3 P78

IN FOCUS

Get pupils to count the number of balloons there are. Ask pupils how they think the problem can be solved.

LET'S LEARN

Use magnetic buttons to represent the balloons and show the division to the class on the whiteboard. Move the buttons to represent the distribution of the balloons. When 1 button is left over, ask pupils if the balloon can be distributed equally between the 2 friends. Highlight that the remaining balloon cannot be further distributed and that this is called the **remainder**.

Show how the division algorithm is written and explain what each number means. Review the meaning of quotient and ask pupils what the quotient for this division is.

2. 13 custard tarts were put equally on 4 plates.

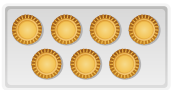
13 ÷ 4 = 3 R 1

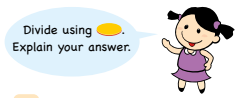
$$4\overline{)13}\quad 3,\ 12,\ 1$$

There were 3 custard tarts on each plate.

1 custard tart was left.

3. Meiling has 23 cookies.
She places 7 cookies onto each tray.





23 ÷ 7 = 3 R 2

She needs a total of 4 trays to place all the cookies.

4.

Set A		
4	6	8
16	32	54

Set B		
5	7	9
17	33	55

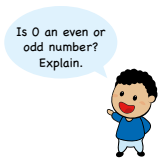
Set A is made up of even numbers and Set B is made up of odd numbers.

Divide the numbers in each set by 2.

In each set, what do you notice about

(a) the remainder?

(b) the digits in the ones place?



Textbook 3 P79

In Let's Learn 2, use magnetic buttons to represent the tarts.

Show pupils that each plate has 3 tarts and where the number 3 should be written in the division algorithm.

Show pupils that 3 × 4 = 12 and that 12 tarts have been placed on plates. Show pupils where 12 should be written in the division algorithm.

Show pupils that 1 tart was left over and where 1 should be written in the division algorithm.

In Let's Learn 3, distribute counters (or other concrete materials) to pupils to perform the division. Encourage pupils to write the division algorithm.

In Let's Learn 4, encourage pupils to write the division algorithm for each division. Guide pupils to identify that when even numbers are divided by 2, there is no remainder; when odd numbers are divided by 2, there is a remainder of 1.

PRACTICE

1. Find the quotient and remainder.

(a) 66 ÷ 7 = 9 R 3 (b) 58 ÷ 9 = 6 R 4

2. Nora puts 39 apples equally into 4 baskets.

39 ÷ 4 = 9 R 3

There are 9 apples in each basket.

3 apples are left.

3. 67 children are going for a school trip by minivan.
Each minivan can seat 8 children.

67 ÷ 8 = 8 R 3

The smallest number of minivans needed to seat the 67 children is 9.

4. Ahmad has $46.
He wants to buy some chocolate bars.

46 ÷ 6 = 7 R 4

The greatest number of chocolate bars Ahmad can buy is 7.

Complete Workbook 3A, Worksheet 3 • Pages 73 – 76

Textbook 3 P80

PRACTICE

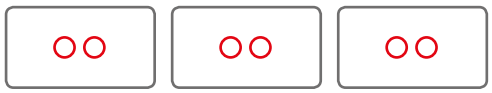
Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 3** and work these out with the pupils.

Independent seatwork

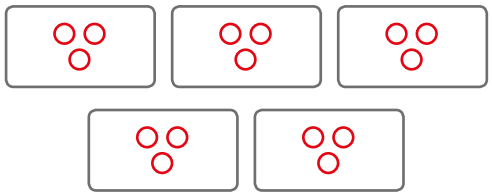
Assign pupils to complete Worksheet 3 (Workbook 3A P73 – 76).

Answers Worksheet 3 (Workbook 3A P73 – 76)

1. (a) 

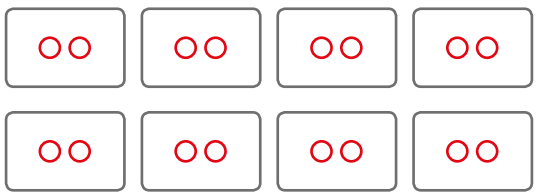
Remainder: ○ ○

8 ÷ 3 = 2 R 2

(b) 

Remainder: ○

16 ÷ 5 = 3 R 1

(c) 

Remainder: ○ ○ ○

19 ÷ 8 = 2 R 3

2. (a) 49 ÷ 6 = 8 R 1

Quotient = 8

Remainder = 1

(b) 39 ÷ 4 = 9 R 3

Quotient = 9

Remainder = 3

(c) 56 ÷ 7 = 8

3. 46 ÷ 7 = 6 R 4

Each child received 6 pies.

4 pies were left over.

4. 45 ÷ 6 = 7 R 3

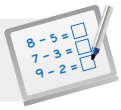
Siti sticks 7 stickers on each card.

3 stickers are left over.

5. 66 ÷ 8 = 8 R 2

The smallest number of trays the farmer needs is 9.

LESSON PLAN



Specific Learning Focus

- Division with remainder.

Suggested Duration

3 periods

Prior Learning

Pupils have learnt that a number is divided or shared equally in groups. However, this chapter takes this concept further to remainders, which is the remaining number of objects left over after distributing the objects equally.

Pre-emptive Pitfalls

The division operation is formally introduced in this lesson. Pupils have learnt the standard algorithm method of addition and subtraction. Emphasise to pupils that in the division algorithm, the alignment of the divisor, dividend, quotient and remainder is very important in order to get the correct answer.

Introduction

Try to bring in at least one real-life object in class used in 'In Focus' and 'Let's Learn' (Textbook 3 P78 – 79). Explain to pupils that in a division algorithm, the number to be divided equally (dividend) is placed inside and the number (divisor) that the dividend is to be divided by, is placed outside. Since 11 balloons cannot be equally distributed amongst 2 pupils, there will be 1 left which is called a remainder. Emphasise that not all numbers are divisible by a particular divisor. For example, when even numbers are divided by 2, there will be no remainder, while dividing odd numbers by 2 will give a remainder. Another fact to be pointed out is that when multiples of the multiplication table of x are divided by x, there will not be a remainder (e.g. 48 is a multiple of 6 and when 48 is divided by 6, there will not be a remainder. On the other hand, 52, which is not a multiple of 6, when divided by 6, there will be a remainder of 4 since the closest multiple of 6 before 52 is 48).

Problem Solving

Emphasise that when multiples in a multiplication table of *x* is divided by *x*, there will not be a remainder. There will be a remainder when a number (dividend) cannot be grouped into equal sets. The alignment of the quotient is also very important as it should be written directly above the digit it is dividing.

Activities

Go through 'Let's Learn' and 'Practice' (Textbook 3 P78 – 80) by bringing balloons, tarts and apples to the classroom, and divide the items among pupils. Trays and baskets can be used to represent groups to show the remainder concept clearly.

Resources

- real-life objects
- magnetic buttons
- Set of Even Numbers and Set of Odd Numbers (Activity Handbook 3 P21)

Mathematical Communication Support

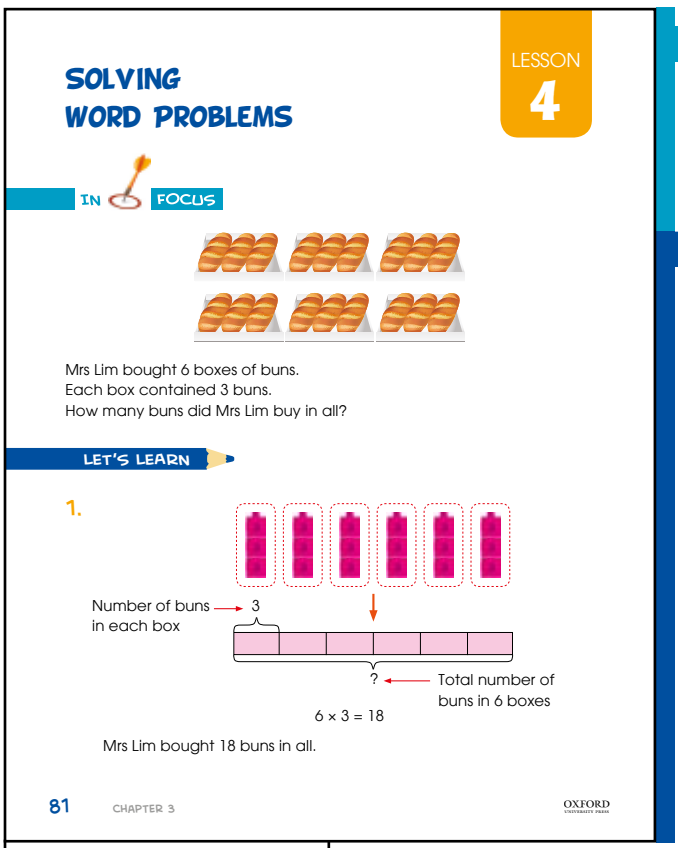
Ask pupils questions about multiples. Ask them if a division will give a remainder even before they perform the division. In Let's Learn 4 (Textbook 3 P79), lead pupils to see that when odd numbers (i.e. 1, 3, 5, 7, 9 and for 2-digit odd numbers, numbers with any of these 5 digits in the ones place) are divided by 2, there is a remainder of 1. Provide each pupil with a card (Activity Handbook 3 P21) and ask pupils to strike out the numbers that would not give a remainder when divided by 2.

LESSON
4

SOLVING WORD PROBLEMS

LEARNING OBJECTIVE

1. Solve word problems involving the multiplication tables of 6, 7, 8 and 9.


SOLVING WORD PROBLEMS

LESSON 4

IN FOCUS

Mrs Lim bought 6 boxes of buns.
Each box contained 3 buns.
How many buns did Mrs Lim buy in all?

LET'S LEARN

1.

Number of buns in each box → 3

? ← Total number of buns in 6 boxes

6 × 3 = 18

Mrs Lim bought 18 buns in all.

81 CHAPTER 3 OXFORD

Textbook 3 P81

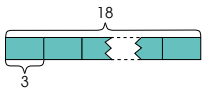
IN FOCUS

Ask pupils how the problem can be solved. Pupils should be relatively familiar with such problems at this stage.

LET'S LEARN

Use multilink cubes to represent the buns. Show how the model can be drawn to represent the information.

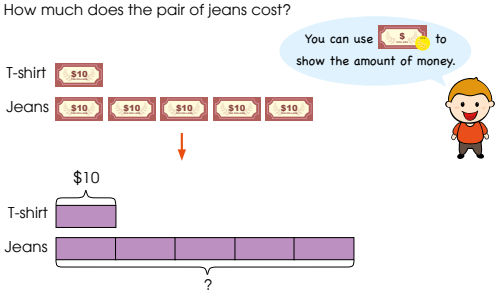
2. Mrs Tan gave away 18 chocolates to some children.
Each child received 3 chocolates.
How many children received the chocolates?



18 ÷ 3 = 6

6 children received the chocolates.

3. A T-shirt costs $10.
A pair of jeans costs 5 times as much as the T-shirt.
How much does the pair of jeans cost?



10 × 5 = 50

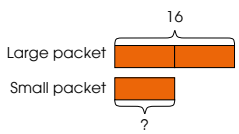
The pair of jeans costs $ 50 .

Textbook 3 P82

For Let's Learn 2, go through the problem solving model. Guide pupils to see that 18 represents the total number of chocolates and 3 represents the number of chocolates each child has. Therefore to find the number of children, 18 is divided by 3. Show pupils how the broken model is drawn. Finally, show pupils how to check their answers by using multiplication.

For Let's Learn 3, show pupils that boxes can be drawn to represent the $10 notes. Guide pupils to write the equation and check their answers for reasonableness.

4. A large packet of sweets contained 16 sweets.
It contained twice as many sweets as a small packet of sweets.
How many sweets were there in a small packet?



16 ÷ 2 = 8

There were 8 sweets in a small packet.

PRACTICE

Solve.

1. Siti has 8 stickers.
Kate has 3 times as many stickers as Siti.
How many stickers does Kate have? 8 × 3 = 24

2. Raju had 23 marbles.
He gave an equal number of marbles to each of his 3 brothers and had some marbles left. 23 ÷ 3 = 7 R 2
(a) How many marbles did each brother receive? 7
(b) How many marbles did Raju have left? 2

3. Mrs Raju places 46 muffins into some trays.
Each muffin tray can hold 6 muffins.
What is the smallest number of trays Mrs Raju needs to hold all the muffins? 46 ÷ 6 = 7 R 4
Smallest number of trays = 8

Complete Workbook **3A**, Worksheet **4** • Pages **77 – 78**

Textbook 3 P83

For Let's Learn 4, show pupils how the model is drawn. Get pupils to explain how the answer can be obtained.

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 4** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 4 (Workbook 3A P77 – 78).

Answers Worksheet 4 (Workbook 3A P77 − 78)

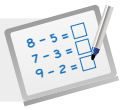
1. $6 \times 4 = 24$
   Nora has 24 marbies.

2. $9 \times 2 = 18$
   Bina has to pay $18 for the pens.

3. $20 \div 6 = 3$ R 2
   (a) There are 3 sweets in each box.
   (b) 2 sweets are left over.

4. $30 \div 4 = 7$ R 2
   The greatest number of packets of cookies Mrs Lim can buy is 7.

LESSON PLAN



Specific Learning Focus

- Solve word problems involving the multiplication tables of 6, 7, 8 and 9.

Suggested Duration

4 periods

Prior Learning

Pupils have learnt division and the usage of division algorithm to divide. They have also learnt to predict if there will be a remainder in a division.

Pre-emptive Pitfalls

This lesson is a continuation of Lesson 3. Pupils will be able to relate to the word problems as they involve real-life scenarios and they can role-play such that the word problems become less challenging.

Introduction

Emphasise the use of the problem-solving model. Use the 4-step approach to problem solving template (Activity Handbook 3 P7). While organising the information in the word problem, identify the dividend. Once the division is carried out after drawing the bar models, ask them to check their answers by performing the inverse operation, in this case, multiplication. In Let's Learn 4 (Textbook 3 P83), the dividend and divisor are not given, so pupils are required to make use of the information '16 sweets' and 'twice as many' to draw the bar models. From the bar models, we can tell that 16 divided by 2 gives us the number of sweets in the small packet.

Problem Solving

Assign pupils to work on the questions in Workbook 3A (P77 – 78) to understand, organise and draw the word problem. Once this is done, they can then decide the mode of operation (× or ÷). Emphasise the format of division algorithm, where the alignment of the digits is crucial.

Activities

All questions can be carried out using magnetic buttons, multilink cubes and real-life objects. In the formative stage of understanding the word problems of multiplication and division, get pupils to work in pairs and then take turns in drawing the bar models on the worksheet. Encourage discussions while deciding on the mode of operation.

Resources

- magnetic buttons
- multilink cubes
- 4-step approach to problem solving template (Activity Handbook 3 P7)
- markers

Mathematical Communication Support

The questions in 'Practice' (Textbook 3 P83) can be discussed in class. Read out each question and ask the following questions:

(i) What information is given in the word problem?
(ii) What are we supposed to find?
(iii) How should we draw the bar models?
(iv) What method should we apply?
(v) How do we check our answer?

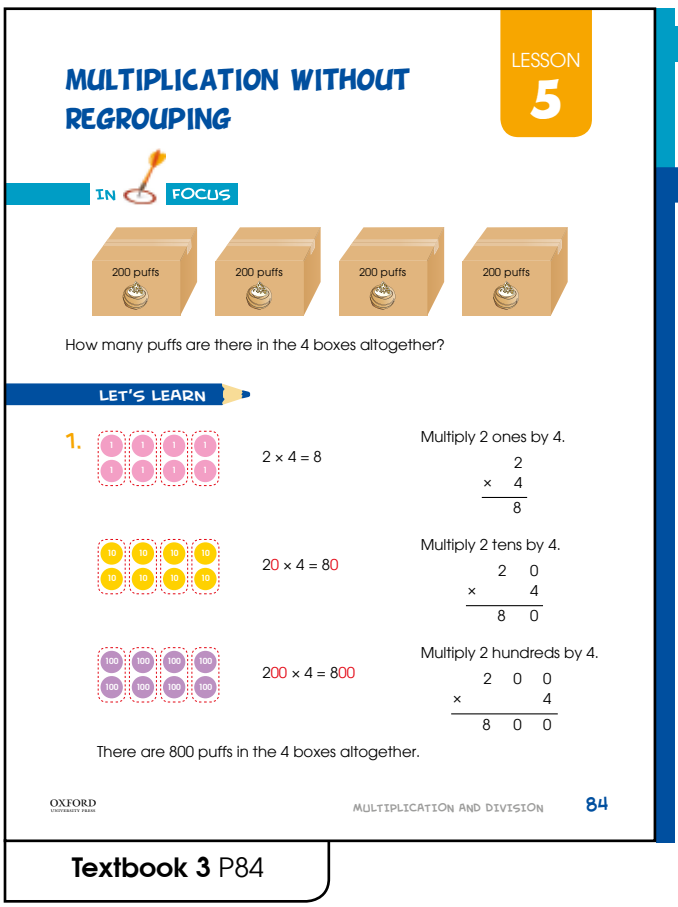
In Question 2 (Textbook 3 P83), after they have decided on the operation, ask them if 23 is a multiple of 3, and if not, then what is the closest multiple of 3 to 23 and then subtract to find the remainder. Then use the division algorithm to check if the remainder worked out mentally was correct.

LESSON 5

MULTIPLICATION WITHOUT REGROUPING

LEARNING OBJECTIVE

1. Multiply a number (up to 3 digits) by a 1-digit number without regrouping.



MULTIPLICATION WITHOUT REGROUPING

LESSON 5

IN FOCUS

200 puffs | 200 puffs | 200 puffs | 200 puffs

How many puffs are there in the 4 boxes altogether?

LET'S LEARN

1. 2 × 4 = 8

Multiply 2 ones by 4.

$$\begin{array}{r} 2 \\ \times\ 4 \\ \hline 8 \end{array}$$

20 × 4 = 80

Multiply 2 tens by 4.

$$\begin{array}{r} 2\ 0 \\ \times\ \ 4 \\ \hline 8\ 0 \end{array}$$

200 × 4 = 800

Multiply 2 hundreds by 4.

$$\begin{array}{r} 2\ 0\ 0 \\ \times\ \ \ 4 \\ \hline 8\ 0\ 0 \end{array}$$

There are 800 puffs in the 4 boxes altogether.

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MULTIPLICATION AND DIVISION 84

Textbook 3 P84

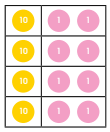
IN FOCUS

Ask pupils how they think the problem can be solved.

LET'S LEARN

Relate 200 × 4 to 2 hundreds × 4. Show pupils how the multiplication algorithm is presented.

2. Find the product of 12 and 4.

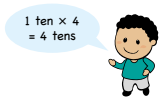


Step 1 Multiply the ones by 4.

$$\begin{array}{r} 1\ 2 \\ \times\quad 4 \\ \hline 8 \end{array}$$

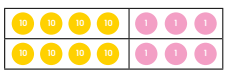
Step 2 Multiply the tens by 4.

$$\begin{array}{r} 1\ 2 \\ \times\quad 4 \\ \hline 4\ 8 \end{array}$$



12 × 4 = 48

3. Multiply 43 by 2.



Step 1 Multiply the ones by 2.

$$\begin{array}{r} 4\ 3 \\ \times\quad 2 \\ \hline 6 \end{array}$$

Step 2 Multiply the tens by 2.

$$\begin{array}{r} 4\ 3 \\ \times\quad 2 \\ \hline 8\ 6 \end{array}$$

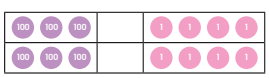
43 × 2 = 86

Textbook 3 P85

Show the multiplication in Let's Learn 2 and 3 with number discs.

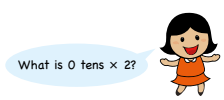
Relate the multiplication algorithm to the grouping of the discs. Verbalise the steps to the pupils.

4. What is 304 × 2?



$$\begin{array}{r} 3\ 0\ 4 \\ \times\quad\quad 2 \\ \hline 6\ 0\ 8 \end{array}$$

304 × 2 = 608



PRACTICE

1. Multiply.

(a) $\begin{array}{r} 3\ 4 \\ \times\quad 2 \\ \hline 6\ 8 \end{array}$

(b) $\begin{array}{r} 3\ 1 \\ \times\quad 3 \\ \hline 9\ 3 \end{array}$

(c) $\begin{array}{r} 1\ 4\ 3 \\ \times\quad\quad 2 \\ \hline 2\ 8\ 6 \end{array}$

(d) $\begin{array}{r} 2\ 1\ 2 \\ \times\quad\quad 3 \\ \hline 6\ 3\ 6 \end{array}$

2. Find the product of each of the following pairs of numbers.

(a) 2 and 41 82
(b) 4 and 12 48
(c) 302 and 3 906
(d) 112 and 4 448

Complete Workbook 3A, Worksheet 5 • Pages 79 – 80

Textbook 3 P86

Continue to show the multiplication in Let's Learn 4 with number discs and relate the multiplication algorithm to the grouping of the discs. Verbalise the steps with the pupils.

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 5** and work these out with the pupils.

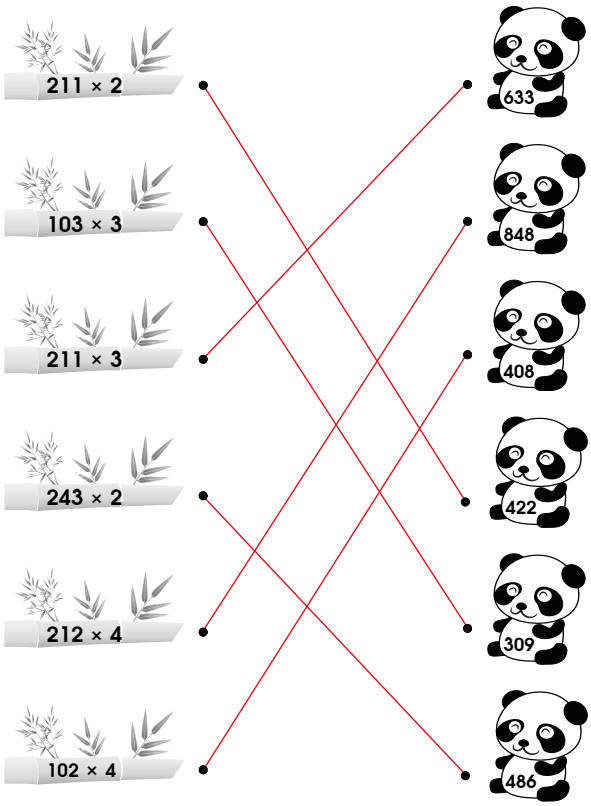
Independent seatwork

Assign pupils to complete Worksheet 5 (Workbook 3A P79 – 80).

Answers Worksheet 5 (Workbook 3A P79 – 80)

1. (a) 84
   (b) 96
   (c) 602
   (d) 848

2. (a) 101 × 7 = 707
   (b) 204 × 2 = 408

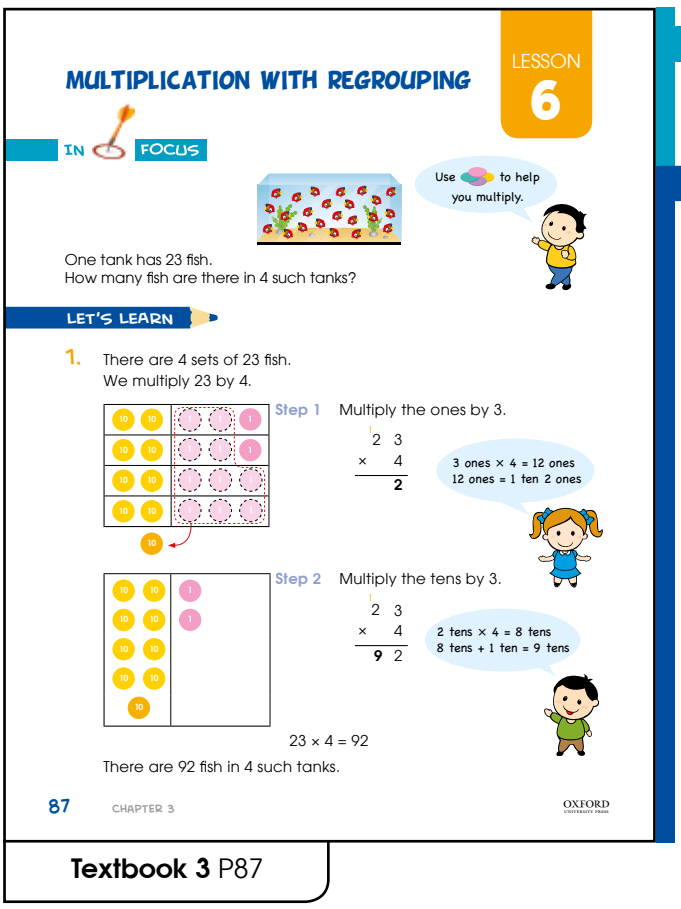
3. 

LESSON 6

MULTIPLICATION WITH REGROUPING

LEARNING OBJECTIVE

1. Multiply a number (up to 3 digits) by a 1-digit number with regrouping.


MULTIPLICATION WITH REGROUPING

LESSON 6

IN FOCUS

Use to help you multiply.

One tank has 23 fish.
How many fish are there in 4 such tanks?

LET'S LEARN

1. There are 4 sets of 23 fish.
We multiply 23 by 4.

Step 1 Multiply the ones by 3.

2 3
× 4
2

3 ones × 4 = 12 ones
12 ones = 1 ten 2 ones

Step 2 Multiply the tens by 3.

2 3
× 4
9 2

2 tens × 4 = 8 tens
8 tens + 1 ten = 9 tens

23 × 4 = 92

There are 92 fish in 4 such tanks.

87 CHAPTER 3 OXFORD

Textbook 3 P87

IN FOCUS

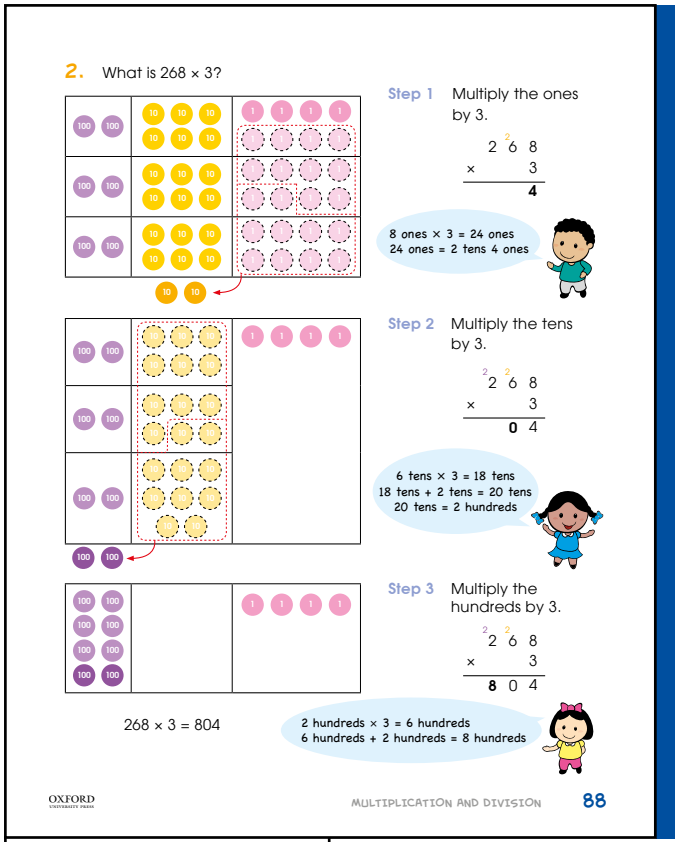
Get pupils to discuss the solution to the problem.

LET'S LEARN

Use number discs to represent 4 sets of 2 tens and 3 ones.

Multiply the ones by 4 and show the regrouping using the number discs. Show how this is represented in the multiplication algorithm.

Next multiply the tens by 4 and add the regrouped ten using the number discs. Show how this is represented in the multiplication algorithm.



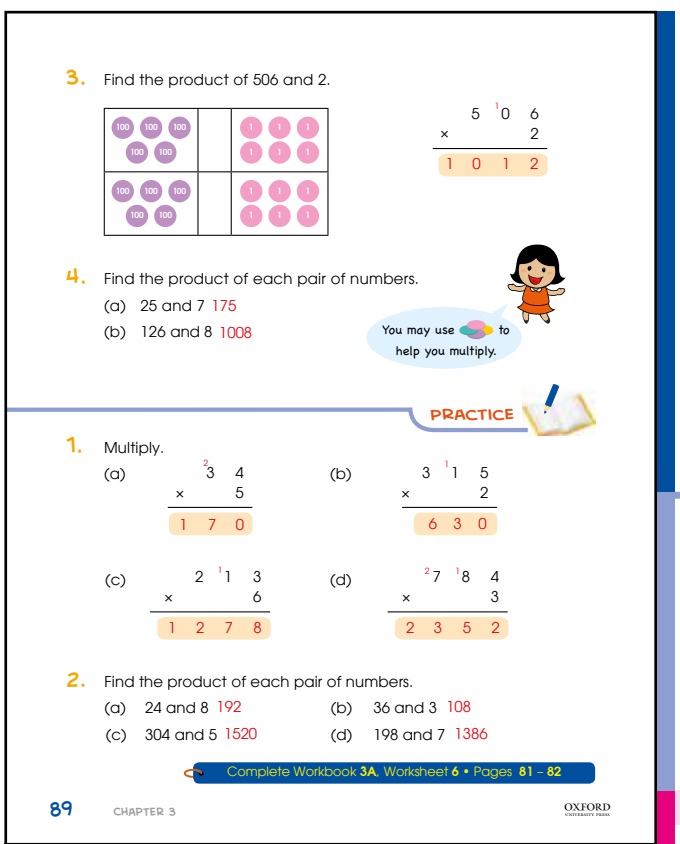
Textbook 3 P88

Use number discs to represent 3 sets of 2 hundreds, 6 tens and 8 ones.

Multiply the ones by 3 and show the regrouping using the number discs. Show how this is represented in the multiplication algorithm.

Multiply the tens by 3 and add the regrouped tens using the number discs. Show how this is represented in the multiplication algorithm.

Multiply the hundreds by 3 and add the regrouped hundreds using the number discs. Show how this is represented in the multiplication algorithm.



Textbook 3 P89

For Let's Learn 3, use number discs to represent 2 sets of 5 hundreds and 6 ones. Multiply the ones by 2 and show the regrouping using number discs. Show how this is represented in the algorithm. Multiply 0 by 2 and add the regrouped ten using number discs. Show how this is represented in the algorithm. Remind pupils that 0 multiplied by any number is still 0. Multiply the hundreds by 2 using number discs. Show how this is represented in the algorithm.

For Let's Learn 4, distribute number discs to pupils and allow them to solve the muliplications with the help of the number discs.

PRACTICE

Work with pupils on the practice questions. Verbalise the steps while going through the questions with the pupils (e.g. multiply the ones by 5, then multiply the tens by 5, etc.).

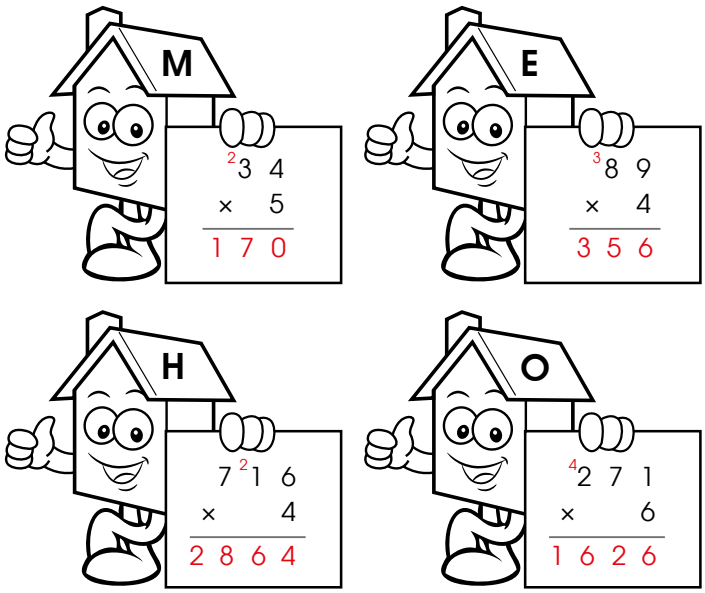
For better understanding, select items from **Worksheet 6** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 6 (Workbook 3A P81 – 82).

Answers Worksheet 6 (Workbook 3A P81 – 82)

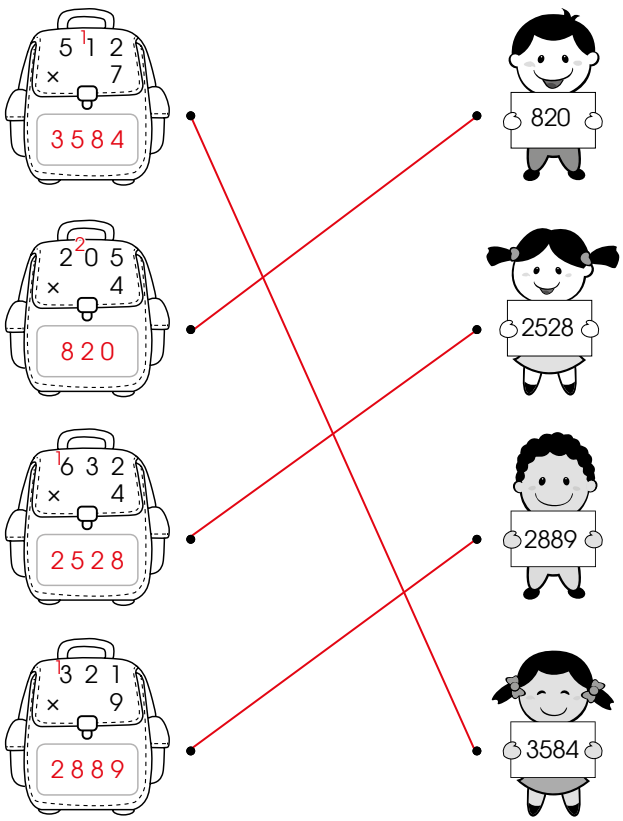
1.



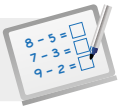
H	O	M	E
2864	1626	170	356

After school, I take the bus home.

2.



LESSON PLAN



Specific Learning Focus

- Multiply a number (up to 3 digits) by a 1-digit number without regrouping.
- Multiply a number (up to 3 digits) by a 1-digit number with regrouping.

Suggested Duration

Lesson 5: 2 periods
Lesson 6: 3 periods

Prior Learning

Pupils should be well-versed with multiplication. In lessons 5 and 6, multiplying using the multiplication algorithm with and without regrouping is introduced.

Pre-emptive Pitfalls

Pupils are now dealing with a formatted method of multiplication and have to follow rules and sequences. They will need to remember the steps for each operation. Doing several practice questions on the board will help them to be well-versed with the steps of the multiplication algorithm.

Introduction

Work on each question using number discs (Activity Handbook 3 P4) and then do the division algorithm on the whiteboard. Verbalise the steps by pointing out the placing of the product under the multiplicand and multiplier. Regrouping is not involved in Lesson 5. Once pupils are comfortable with working on the questions in Lesson 5, move on to Lesson 6. Point out that digits are multiplied from right to left or starting from ones to tens and then to hundreds. Emphasise that in multiplications where the multiplicand is a 2-digit number, when regrouping is involved, 10 ones are regrouped to 1 ten. Partition the 2-digit number into ones and tens, and ask them to write the ones and carry over the tens. Multiply the digits first and then add the regrouped ten to the product (Textbook 3 P87 −88).

Problem Solving

In Let's Learn 3 and question 2(c) (Textbook 3 P89), the multiplicand has a '0', emphasise that when a number is multiplied by 0, we get 0, but if regrouping is involved, the regrouped tens or hundreds will be added to the 0. Similarly, while explaining regrouping, emphasise that the regrouped number, when carried over to the tens place, belongs to the tens place (i.e. the digit of the product will be in the tens place) (e.g. In 268 × 3, see that 3 × 6 gives 18 and then add the 2 that was carried over to give 20).

Activities

Get pupils to work in pairs and distribute number discs to each pair. Ask them to arrange the discs according to the multiplications written on the board. Get them to carry out multiplication with number discs first and then use multiplication algorithm and write it on the chart paper, to be pinned onto the soft board in the classroom later.

Resources

- chart paper
- markers
- number discs (Activity Handbook 3 P4)

Mathematical Communication Support

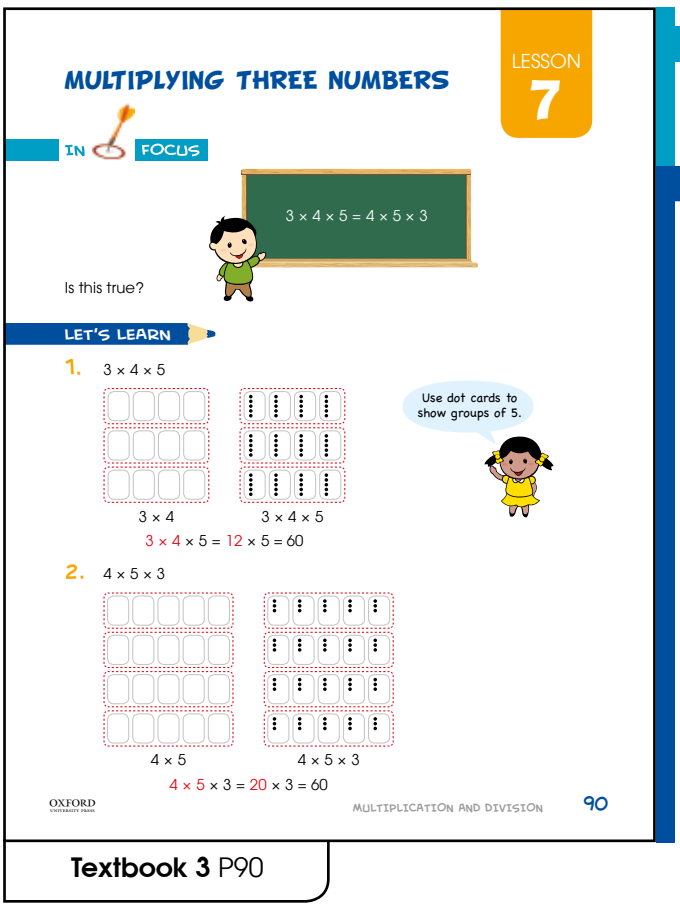
Verbalise each step of multiplication algorithm on the board. Encourage individual responses. Assign pupils to work on the questions in Workbook 3A (P81 – 82) on the board first and encourage class discussions before asking them to work independently.

LESSON 7

MULTIPLYING THREE NUMBERS

LEARNING OBJECTIVE

1. Multiply three 1-digit numbers.



MULTIPLYING THREE NUMBERS

LESSON 7

IN FOCUS

3 × 4 × 5 = 4 × 5 × 3

Is this true?

LET'S LEARN

1. 3 × 4 × 5

Use dot cards to show groups of 5.

3 × 4 3 × 4 × 5

3 × 4 × 5 = 12 × 5 = 60

2. 4 × 5 × 3

4 × 5 4 × 5 × 3

4 × 5 × 3 = 20 × 3 = 60

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MULTIPLICATION AND DIVISION 90

Textbook 3 P90

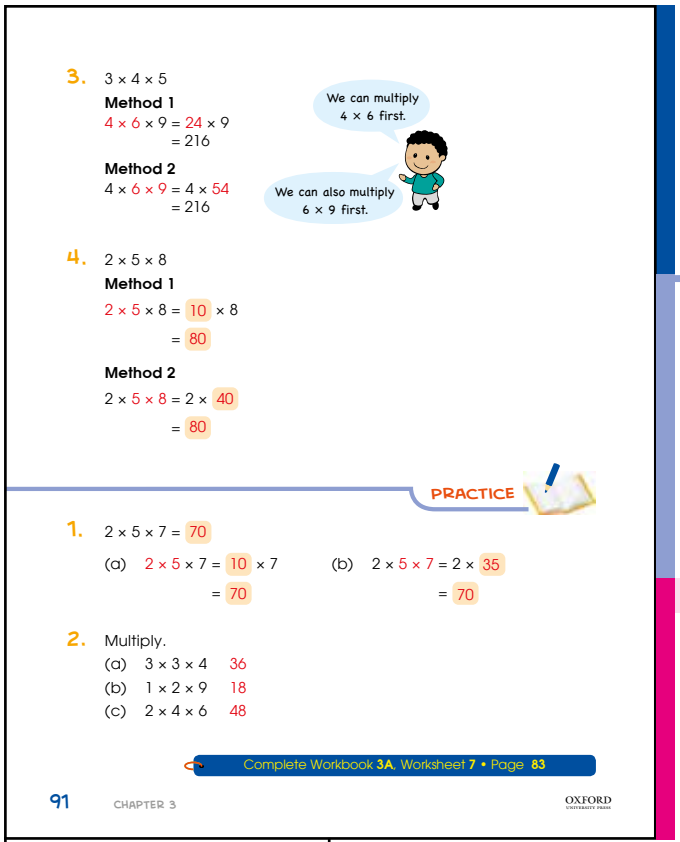
IN FOCUS

Get pupils to discuss whether the multiplications are equal.

LET'S LEARN

Use dot cards to show groups of 5. Multiply 3 and 4 first. Then, multiply the third number.

Repeat the same procedure for Let's Learn 2.



Textbook 3 P91

Ask pupils if the order in which we multiply matters. In Let's Learn 3 and 4, lead pupils to see that there are two methods to multiply three numbers. They should realise that no matter which numbers are multiplied first, the answer will be the same.

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 7** and work these out with the pupils.

Independent seatwork

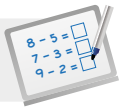
Assign pupils to complete Worksheet 7 (Workbook 3A P83).

Answers Worksheet 7 (Workbook 3A P83)

1. (a) 18, 8
   (b) 3, 18
   (c) 49, 56
   (d) 48, 48

2. (a) 100
   (b) 126
   (c) 36
   (d) 168

LESSON PLAN



Specific Learning Focus

- Multiply three 1-digit numbers.

Suggested Duration

3 periods

Prior Learning

Pupils have learnt to multiply two numbers, where the number has 2 digits or 3 digits. In this lesson, three 1-digit numbers are multiplied.

Pre-emptive Pitfalls

Pupils should not find this lesson challenging. Emphasise to pupils that to multiply three numbers, they should multiply in two steps. They should multiply two of the three numbers first and then multiply this product by the third number.

Introduction

Emphasise that the order of multiplying does not matter as the final product will be the same regardless of the order. Carry out the questions in 'Practice' (Textbook 3 P91) on the board using different order of multiplying to show that the final product is the same (e.g. $2 \times 4 \times 6 = 8 \times 6 = 48$ or $2 \times 4 \times 6 = 2 \times 24 = 48$).

Problem Solving

Reinforce to pupils the commutative property of multiplication (e.g. $3 \times 4 = 4 \times 3$). Similarly, when multiplying three numbers, the order of multiplication does not matter.

Activities

Have pupils work in pairs and ask them to work independently on the questions in Workbook 3A P83. In each pair, have the pupils multiply in different orders and then share their answers with each other to compare.

Resources

- dot cards (Activity Handbook 3 P9)
- number discs (Activity Handbook 3 P4)
- mini whiteboards
- markers

Mathematical Communication Support

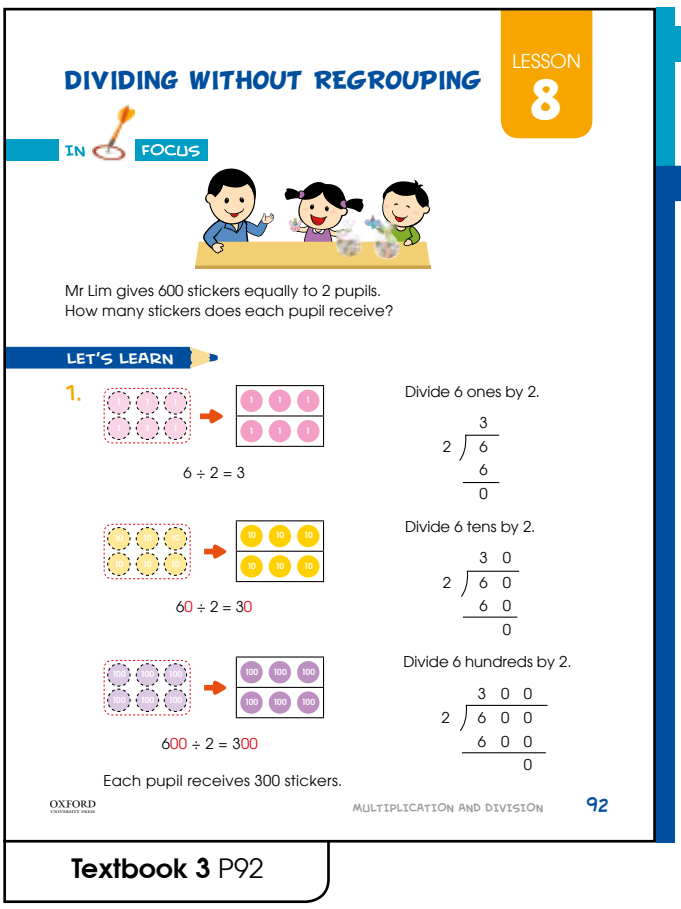
Divide the class into two groups (groups A and B). Write a multiplication equation on the board and get Group A to multiply from left to right and group B to multiply from right to left. Ask each group to prompt the steps and write on the board. Point out that both methods give the same answer.

LESSON 8

DIVIDING WITHOUT REGROUPING

LEARNING OBJECTIVE

1. Divide a number (up to 3 digits) by a 1-digit number without regrouping.



DIVIDING WITHOUT REGROUPING

LESSON 8

IN FOCUS

Mr Lim gives 600 stickers equally to 2 pupils.
How many stickers does each pupil receive?

LET'S LEARN

1.

6 ÷ 2 = 3

Divide 6 ones by 2.

$$\begin{array}{r} 3 \\ 2\overline{)6} \\ \underline{6} \\ 0 \end{array}$$

60 ÷ 2 = 30

Divide 6 tens by 2.

$$\begin{array}{r} 30 \\ 2\overline{)60} \\ \underline{60} \\ 0 \end{array}$$

600 ÷ 2 = 300

Divide 6 hundreds by 2.

$$\begin{array}{r} 300 \\ 2\overline{)600} \\ \underline{600} \\ 0 \end{array}$$

Each pupil receives 300 stickers.

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MULTIPLICATION AND DIVISION 92

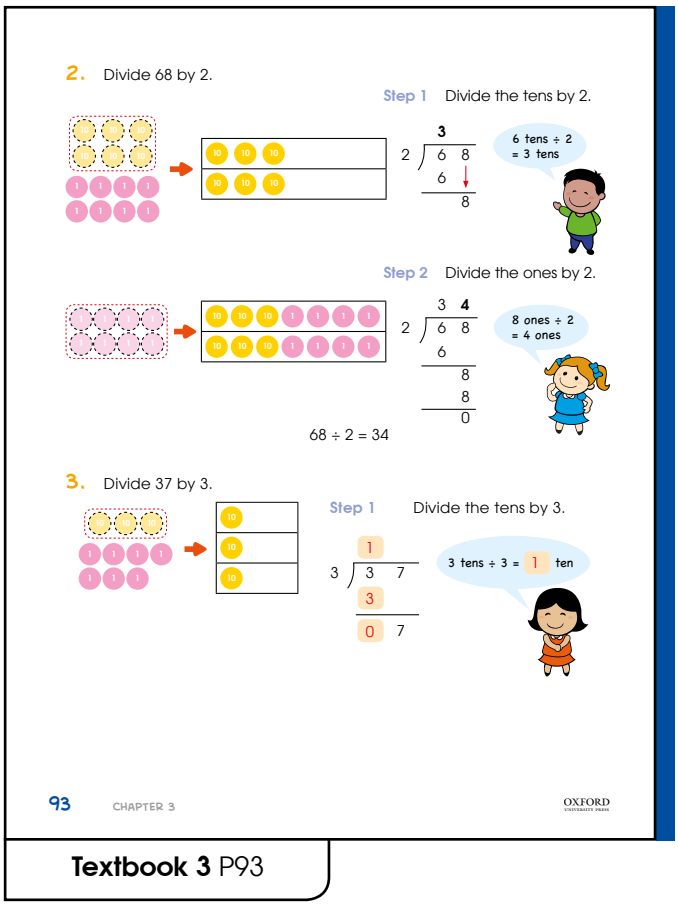
Textbook 3 P92

IN FOCUS

Get pupils to discuss the solution to the problem.

LET'S LEARN

Demonstrate the division to the pupils using number discs. Remind pupils how the division should be represented in the algorithm.



Textbook 3 P93

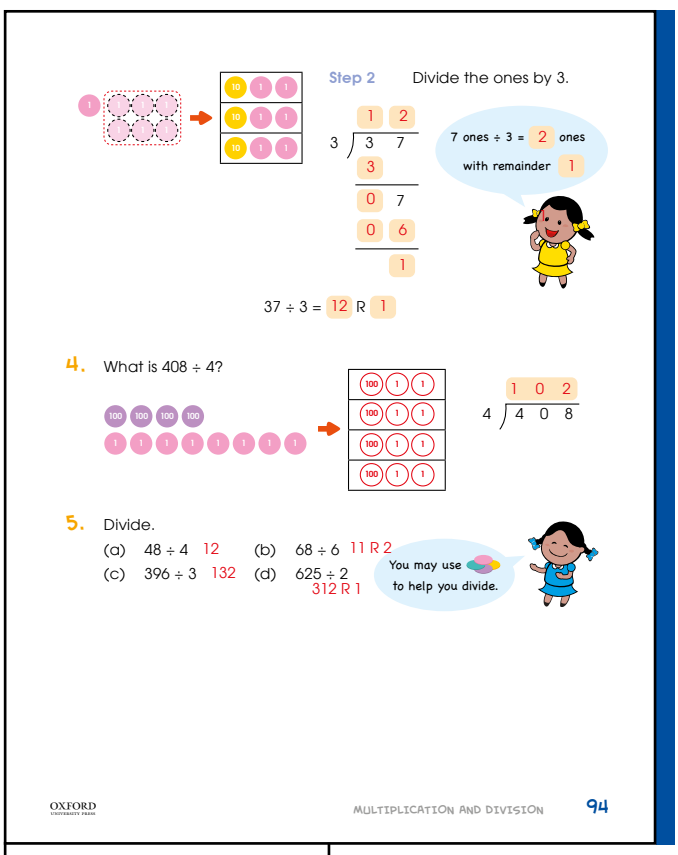
For Let's Learn 2, represent 6 tens 8 ones using number discs.

Show 6 tens divided into 2 equal groups using number discs. Represent the division in the division algorithm.

Show 8 ones divided into 2 equal groups using number discs. Represent the division in the division algorithm.

For Let's Learn 3, represent 3 tens 7 ones using number discs.

Show 3 tens divided into 3 equal groups using number discs. Represent the division in the division algorithm.



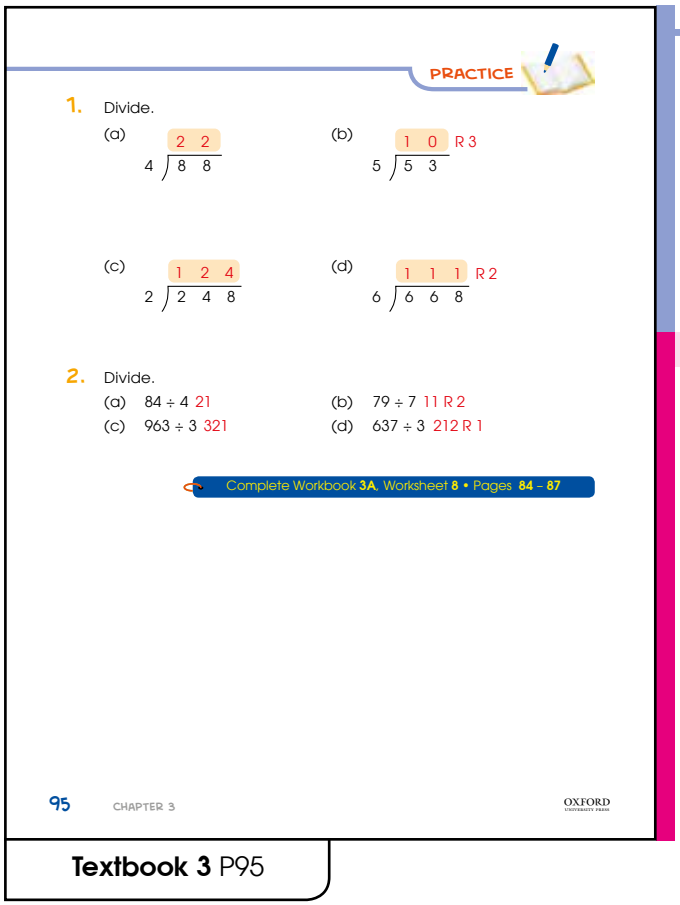
Textbook 3 P94

Show 7 ones divided into 3 equal groups using number discs. Represent the division in the division algorithm.

Show pupils that 7 ones cannot be divided into 3 equal groups and 1 one is left over. The number that is left over is the remainder.

For Let's Learn 4, represent 4 hundreds and 8 ones using number discs. Show 4 hundreds divided into 4 equal groups using number discs. Represent the division in the division algorithm. Show that since there are no tens to be divided, each group gets 0 tens. Show pupils that this is represented by writing a 0 in the tens place in the algorithm. Show 8 ones divided into 4 equal groups using number discs. Represent the division in the division algorithm.

For Let's Learn 5, distribute number discs to pupils and let them work on the four questions.



PRACTICE

1. Divide.

(a) $4 \overline{)88} = 22$

(b) $5 \overline{)53} = 10$ R 3

(c) $2 \overline{)248} = 124$

(d) $6 \overline{)668} = 111$ R 2

2. Divide.

(a) $84 \div 4 = 21$

(b) $79 \div 7 = 11$ R 2

(c) $963 \div 3 = 321$

(d) $637 \div 3 = 212$ R 1

Complete Workbook 3A, Worksheet 8 • Pages 84 – 87

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Textbook 3 P95

PRACTICE

Work with pupils on the practice questions. Verbalise the steps while going through the questions with the pupils (e.g. divide the tens by 4, then divide the ones by 4, etc.).

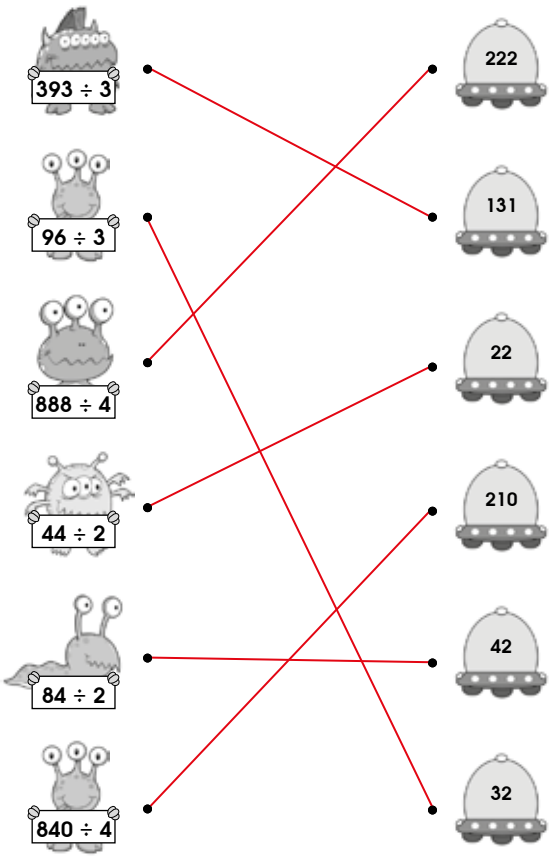
For better understanding, select items from **Worksheet 8** and work these out with the pupils.

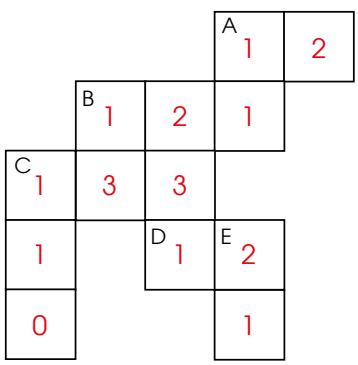
Independent seatwork

Assign pupils to complete Worksheet 8 (Workbook 3A P84 – 87).

Answers Worksheet 8 (Workbook 3A P84 – 87)

1. (a) 33
   (b) 10 R 4
   (c) 121 R 2
   (d) 111
   (e) 110 R 2
   (f) 211 R 1

2. 

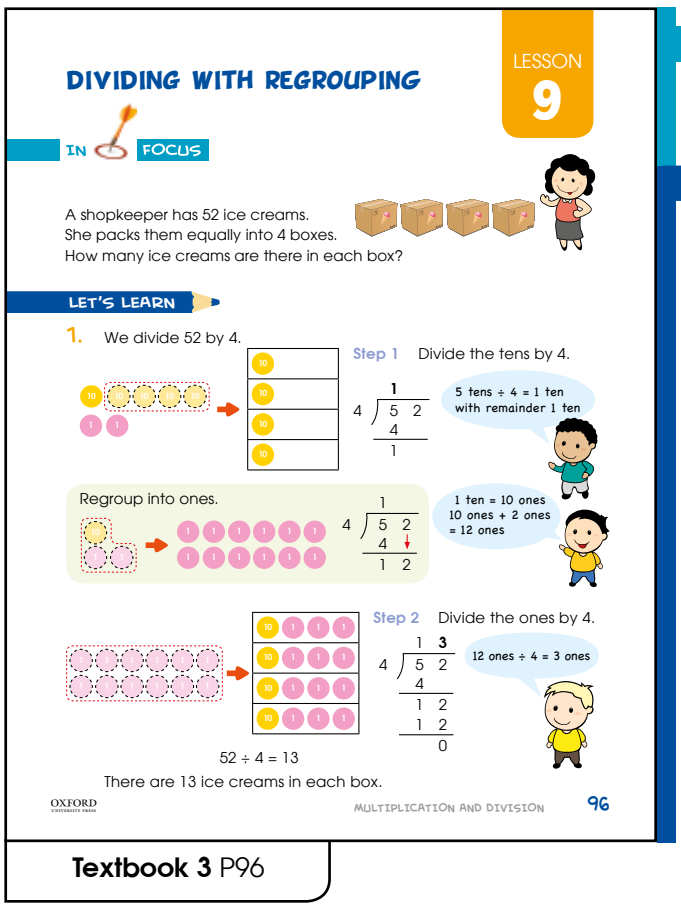
3. 

Across	Down
A. 12	A. 11
B. 121	B. 13
C. 133	C. 110
D. 12	E. 21

LESSON
9
DIVIDING WITH REGROUPING

LEARNING OBJECTIVE

1. Divide a number (up to 3 digits) by a 1-digit number with regrouping.



Textbook 3 P96

IN FOCUS

Get pupils to discuss the solution to the problem.

LET'S LEARN

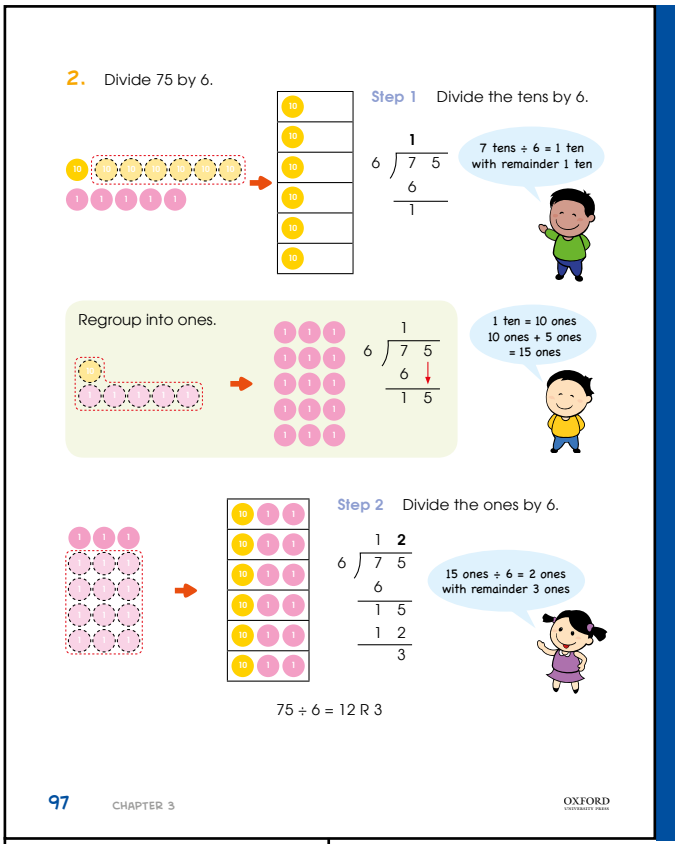
Represent 5 tens and 2 ones using number discs.

Show 5 tens divided into 4 equal groups using number discs. Represent the division in the division algorithm. Each group has 1 ten, with 1 ten remaining.

Regroup the remaining 1 ten into 10 ones using number discs. Add the regrouped ones with 2 ones, show that there are 12 ones in total and represent this information in the algorithm.

Using number discs, show 12 ones divided into 4 equal groups. Each group has 3 ones. Represent this division in the division algorithm.

Show that there are 1 ten and 3 ones in each group, so there are 13 ice creams in each box.



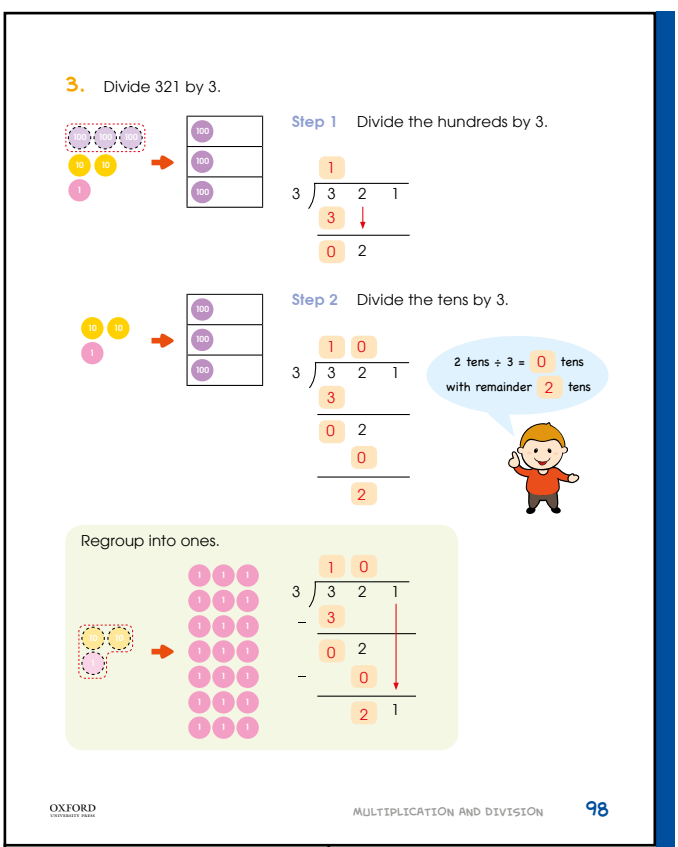
Textbook 3 P97

For Let's Learn 2, represent 7 tens and 5 ones using number discs.

Show 7 tens divided into 6 equal groups. Represent the division in the division algorithm.

As there is 1 ten remaining, it is regrouped into ones. Show the regrouping of 1 ten into 10 ones using number discs. Show that there are 15 ones in total and represent this information in the algorithm.

Show 15 ones divided into 6 equal groups. Since there are 3 ones left over, there is a remainder of 3. Represent this information in the algorithm.



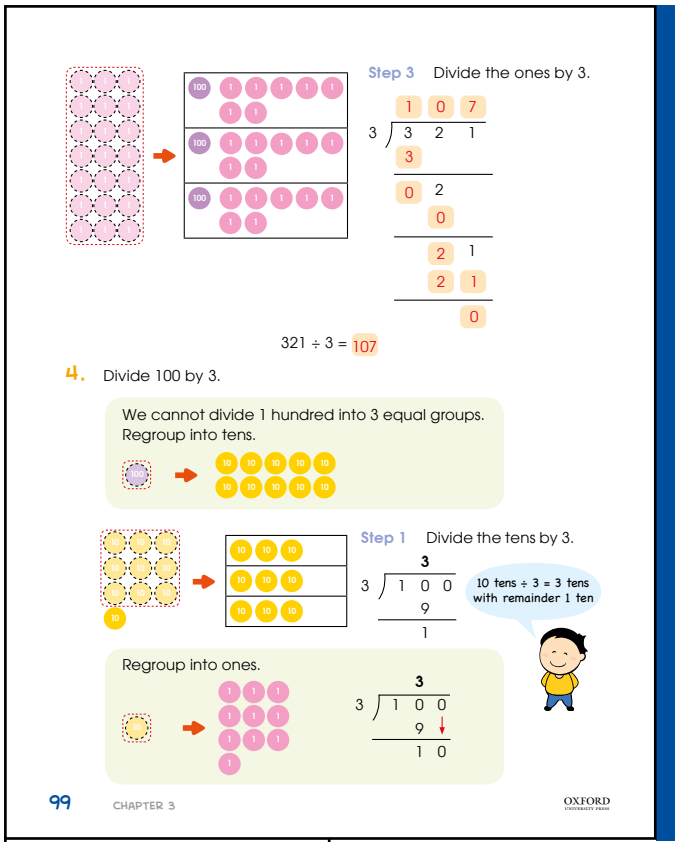
Textbook 3 P98

For Let's Learn 3, represent 3 hundreds, 2 tens and 1 one using number discs.

Show 3 hundreds divided into 3 equal groups using number discs. Represent this division in the division algorithm.

Ask pupils if 2 tens can be divided equally into 3 groups. Since the 2 tens cannot be divided equally, there are 0 tens in each group. Represent this information in the division algorithm.

Show 2 tens being regrouped into 20 ones using number discs. Adding 20 ones to 1 one, there are 21 ones altogether now. Show this information in the division algorithm.

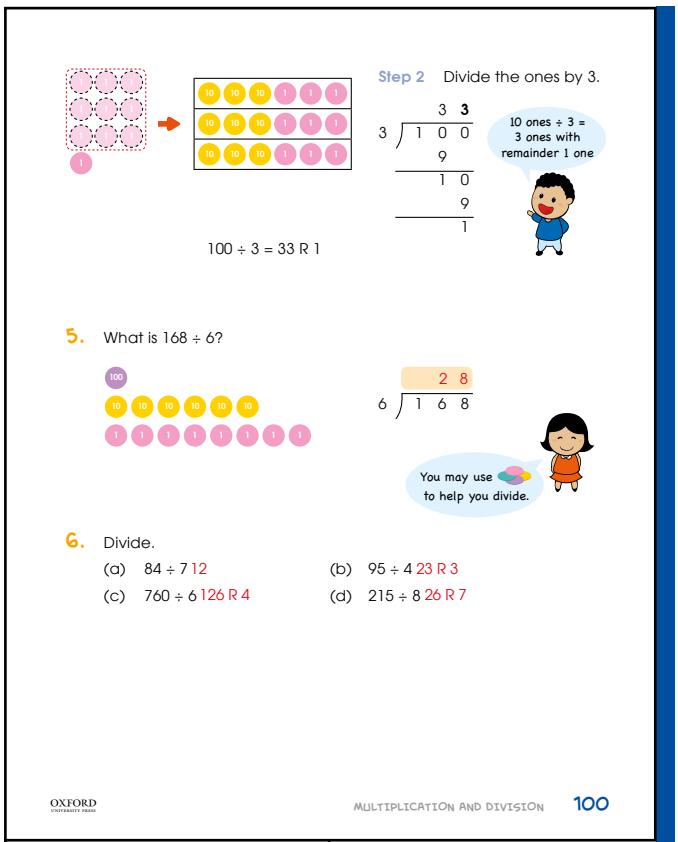


Textbook 3 P99

Finally, divide 21 ones into 3 equal groups. Each group has 7 ones. Represent this information in the division algorithm. Thus, 321 ÷ 3 = 107.

For Let's Learn 4, represent 100 with a number disc. Ask pupils if 1 hundreds disc can be divided equally into 3 groups. Since this is not possible, 1 hundred needs to be regrouped into 10 tens.

Show 1 hundred being regrouped into 10 tens. Divide 10 tens into 3 equal groups. Each group has 3 tens with 1 ten remaining. Show this information in the division algorithm.



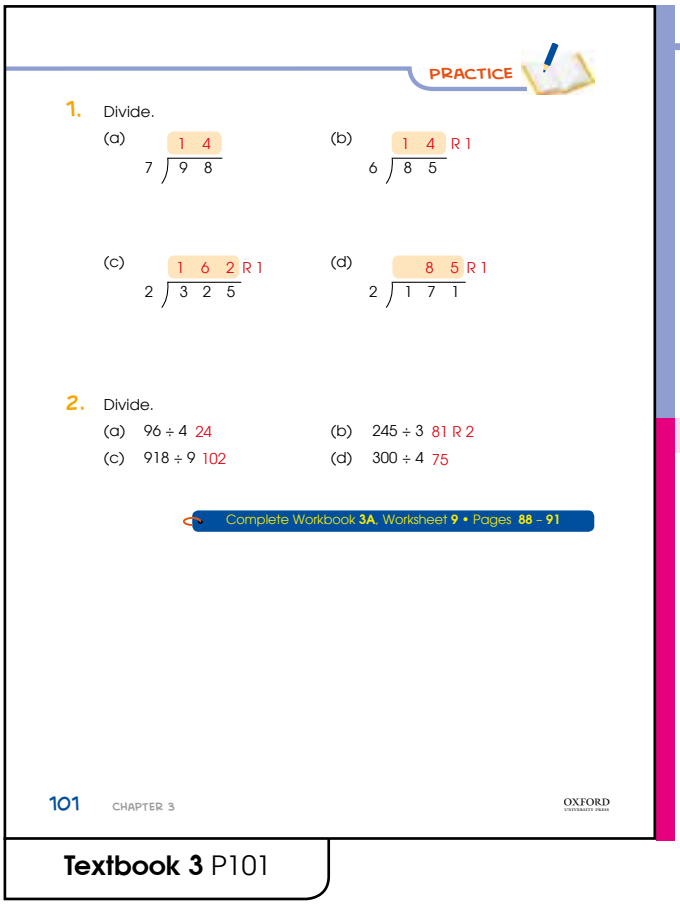
Textbook 3 P100

Since 1 ten cannot be equally divided into 3 equal groups, regroup 1 ten into 10 ones. Divide 10 ones into 3 equal groups. Each group has 3 ones with 1 one remaining. Show this information in the division algorithm.

Hence the answer is 33 R 1.

For Let's Learn 5, use number discs to show 168 ÷ 6 and relate this to the division algorithm.

For Let's Learn 6, distribute number discs to pupils and ask them to perform the division.



PRACTICE

1. Divide.

(a) $7 \overline{)98} = 14$

(b) $6 \overline{)85} = 14$ R 1

(c) $2 \overline{)325} = 162$ R 1

(d) $2 \overline{)171} = 85$ R 1

2. Divide.

(a) $96 \div 4 = 24$

(b) $245 \div 3 = 81$ R 2

(c) $918 \div 9 = 102$

(d) $300 \div 4 = 75$

Complete Workbook 3A, Worksheet 9 • Pages 88 – 91

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Textbook 3 P101

PRACTICE

Work with pupils on the practice questions.

Verbalise the steps while going through the questions with the pupils (e.g. divide the tens by 7, then divide the ones by 7, etc.).

For better understanding, select items from **Worksheet 9** and work these out with the pupils.

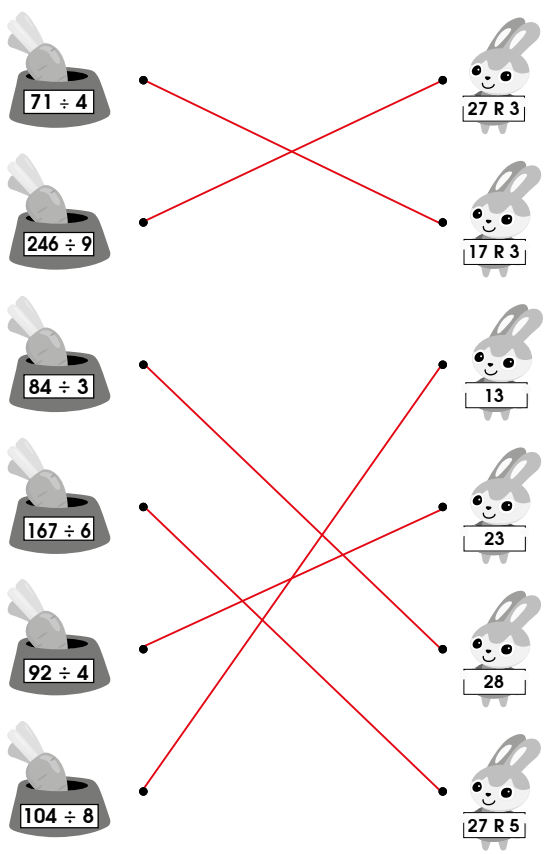
Independent seatwork

Assign pupils to complete Worksheet 9 (Workbook 3A P88 – 91).

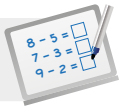
Answers Worksheet 9 (Workbook 3A P88 – 91)

1. (a) 14
   (b) 45 R 1
   (c) 14
   (d) 19
   (e) 18 R 1
   (f) 15 R 2
   (g) 11 R 5
   (h) 34
   (i) 72 R 1
   (j) 136
   (k) 266 R 2

2.



LESSON PLAN



Specific Learning Focus

- Divide a number (up to 3 digits) by a 1-digit number without regrouping.
- Divide a number (up to 3 digits) by a 1-digit number with regrouping.

Suggested Duration

2 periods

Prior Learning

Pupils have learnt the division algorithm.

Pre-emptive Pitfalls

Since division without regrouping was already taught in Lesson 3, Lesson 8 should be less challenging. However, in Lesson 9, where regrouping is involved, the same format and concept of multiplication can be reinforced.

Introduction

In Lesson 8, emphasise the following: (i) vertical alignment, (ii) remainder concept, and (iii) significance of zero.

(1) Ask pupils to place the quotient directly above the dividend in the division algorithm.

(2) Since numbers are placed vertically in their place values, subtracting and deriving the remainder should be quite easy.

(3) 0 divided by any number gives 0. Emphasise the importance of placing the 0 in the quotient.

In Lesson 9, distribute number discs to pupils and ask them to regroup 10 ones to 1 ten and 10 tens to 1 hundred. Let's Learn 2 (Textbook 3 P93) can be done on chart paper with the class divided into pairs. They can paste the cut-outs of the number discs and show each step on chart paper. The division algorithm can be done in their exercise books.

Problem Solving

Verbalise each step of solving the question. For example, in 321 ÷ 3:

(1) 3 hundreds divided by 3 gives 1 hundred with no remainder.

(2) 2 tens divided by 3 gives no quotient and hence '0' is placed on top of '2'.

(3) The 2 tens is then added to 1 one to give 21 which can be divided by 3 to give 7. Hence '7' is placed on top of '1'.

Emphasise the alignment of the respective digits of the quotient with the respective digits of the multiplicand.

In Let's Learn 4 (Textbook 3 P99), the first digit which is 1 cannot be divided by 3, hence it is added to the next digit which gives 10. This number is divided by 3 to give 3 and a remainder of 1. The remainder is then added to the next digit and divided by 3 to give 3 and a remainder of 1. Hence 100 ÷ 3 = 33 R 1. Encourage pupils to check the answer: 33 × 3 = 99 and 100 – 99 = 1.

Activities

Use number discs and mini whiteboards to carry out division algorithm. Encourage peer checking once each question is done. Pupils can swap their whiteboards and correct each other's work. Emphasise the steps verbally.

Resources

- number discs (Activity Handbook 3 P4)
- mini whiteboards
- markers

Mathematical Communication Support

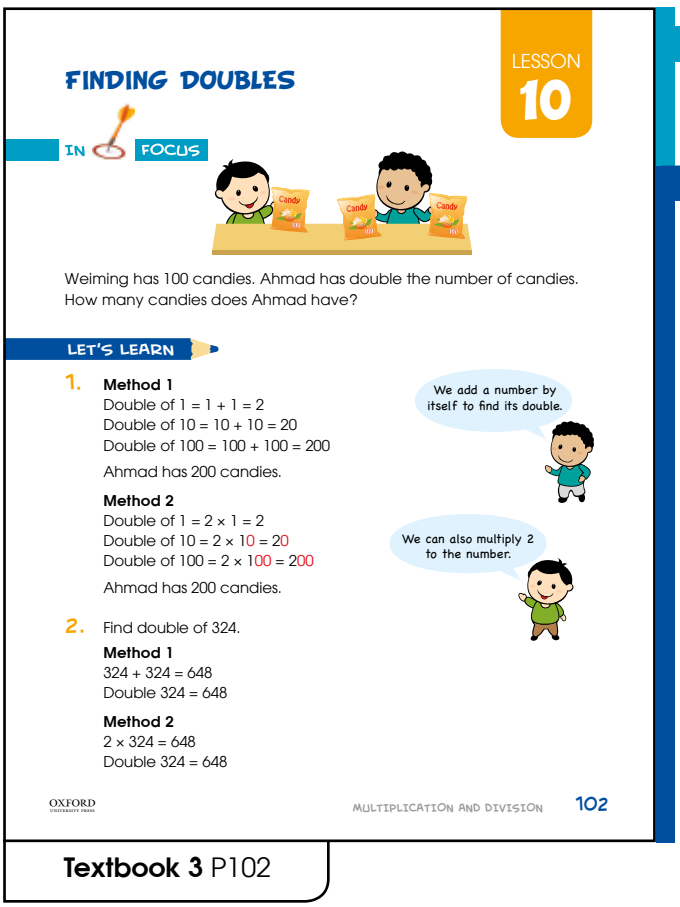
Verbalise each step. Use key terms like 'regroup', 'place value', 'tens', 'ones', 'hundreds', 'quotient' and 'remainder'.

LESSON
10

FINDING DOUBLES

LEARNING OBJECTIVE

1. Double 2-digit and 3-digit numbers.



FINDING DOUBLES

LESSON 10

IN FOCUS

Weiming has 100 candies. Ahmad has double the number of candies. How many candies does Ahmad have?

LET'S LEARN

1. **Method 1**
Double of 1 = 1 + 1 = 2
Double of 10 = 10 + 10 = 20
Double of 100 = 100 + 100 = 200
Ahmad has 200 candies.

Method 2
Double of 1 = 2 × 1 = 2
Double of 10 = 2 × 10 = 20
Double of 100 = 2 × 100 = 200
Ahmad has 200 candies.

We add a number by itself to find its double.

We can also multiply 2 to the number.

2. Find double of 324.
Method 1
324 + 324 = 648
Double 324 = 648

Method 2
2 × 324 = 648
Double 324 = 648

OXFORD UNIVERSITY PRESS MULTIPLICATION AND DIVISION 102

Textbook 3 P102

IN FOCUS

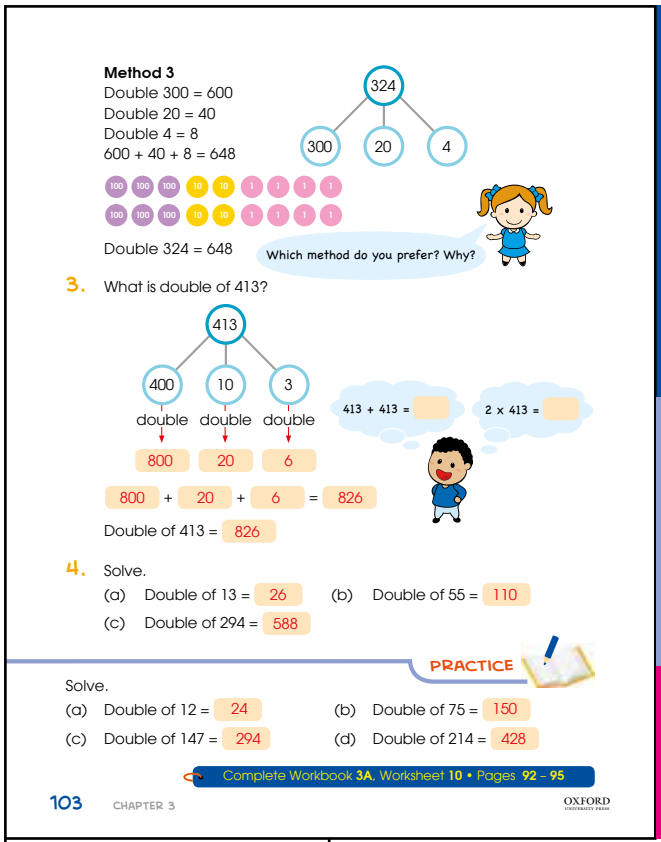
Get pupils to discuss the solution to the problem.

LET'S LEARN

Introduce the term 'double' to pupils.

Go through the two methods of finding doubles. Explain that finding double of a number is adding a number by itself. Show that to find double of a number, we can also multiply 2 to the number.

Repeat the same steps for Let's Learn 2.



Textbook 3 P103

Explain to pupils that the double of a number can also be found by splitting the number into numbers that are easier to work with. Guide pupils to find the double of each number and then add them up. Ask them for their preferred method and explain their choice.

Go through the same method for Let's Learn 3.

In Let's Learn 4, distribute number discs to pupils and ask them to solve the question.

PRACTICE

Work with pupils on the practice questions.
For better understanding, select items from **Worksheet 10** and work these out with the pupils.

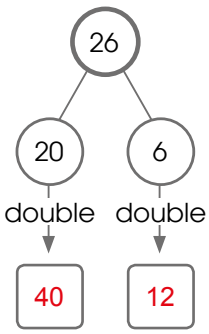
Independent seatwork

Assign pupils to complete Worksheet 10 (Workbook 3A P92 – 95).

Answers Worksheet 10 (Workbook 3A P92 – 95)

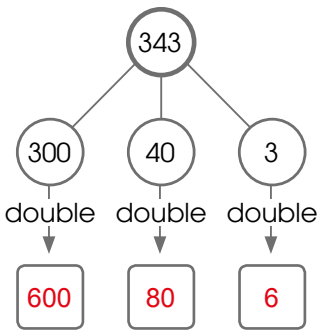
1. (a) 62, 62
   (b) 2 × 56 = 112
   56 + 56 = 112
   (c) 2 × 177 = 354
   177 + 177 = 354

2. (a)



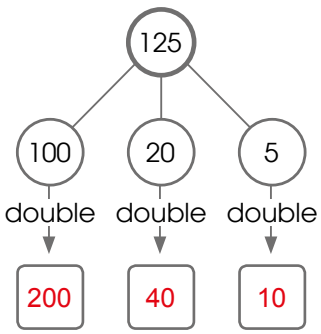
26 + 26 = 52
Double of 26 = 52

(b)



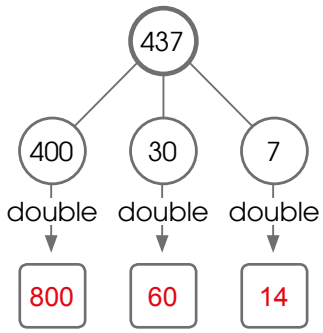
600 + 80 + 6 = 686
Double of 343 = 686

(c)



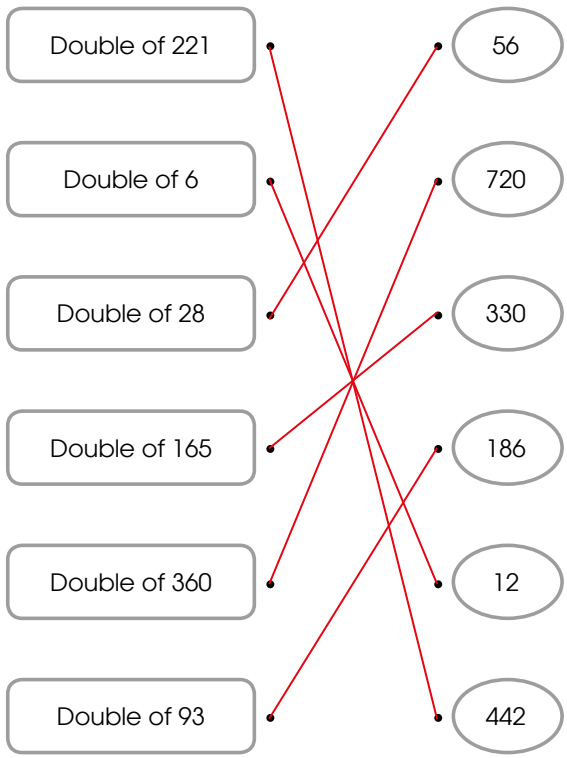
200 + 40 + 10 = 250
Double of 125 = 250

(d)



800 + 60 + 14 = 874
Double of 437 = 874

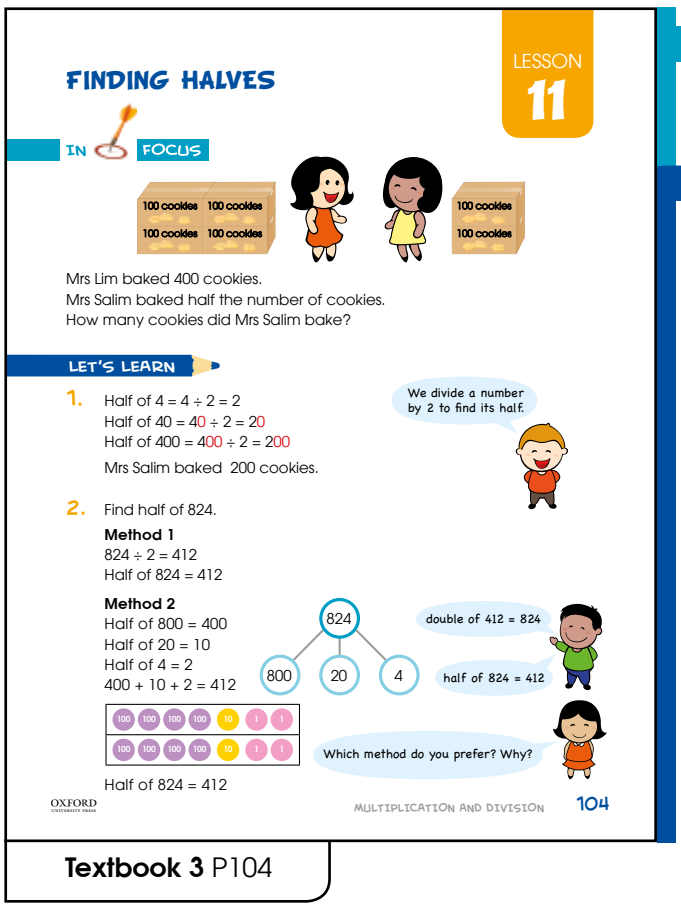
3.



LESSON
11
FINDING HALVES

LEARNING OBJECTIVE

1. Half 2-digit and 3-digit numbers.



FINDING HALVES

LESSON 11

IN FOCUS

100 cookies 100 cookies 100 cookies 100 cookies

100 cookies 100 cookies

Mrs Lim baked 400 cookies.
Mrs Salim baked half the number of cookies.
How many cookies did Mrs Salim bake?

LET'S LEARN

1. Half of 4 = 4 ÷ 2 = 2
Half of 40 = 40 ÷ 2 = 20
Half of 400 = 400 ÷ 2 = 200
Mrs Salim baked 200 cookies.

We divide a number by 2 to find its half.

2. Find half of 824.

Method 1
824 ÷ 2 = 412
Half of 824 = 412

Method 2
Half of 800 = 400
Half of 20 = 10
Half of 4 = 2
400 + 10 + 2 = 412

824
800 20 4

double of 412 = 824

half of 824 = 412

Which method do you prefer? Why?

Half of 824 = 412

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MULTIPLICATION AND DIVISION 104

Textbook 3 P104

IN FOCUS

Get pupils to discuss the solution to the problem.

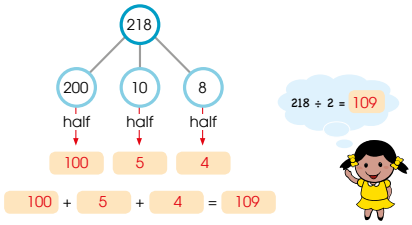
LET'S LEARN

Introduce the term 'half' to pupils.

Explain that finding half of a number is dividing the number by 2.

In Let's Learn 2, show that to find half of a number, we can also use a number bond to split the number to find half of each number and then add them up. Ask them for their preferred method and explain their choice.

3. What is half of 218?



100 + 5 + 4 = 109

Half of 218 = 109

4. Solve.

(a) Half of 58 = 28 (b) Half of 620 = 310

(c) Half of 758 = 379

PRACTICE

Solve.

(a) Half of 82 = 41 (b) Half of 94 = 47

(c) Half of 626 = 313 (d) Half of 172 = 86

Complete Workbook 3A, Worksheet 11 • Pages 96 – 99

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Textbook 3 P105

In Let's Learn 3, get pupils to use the number bond to find the half of 218.

In Let's Learn 4, ask them to solve the question.

PRACTICE

Work with pupils on the practice questions.
For better understanding, select items from **Worksheet 11** and work these out with the pupils.

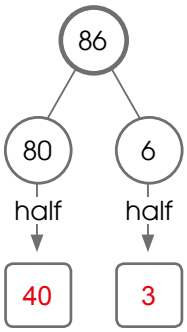
Independent seatwork

Assign pupils to complete Worksheet 11 (Workbook 3A P96 − 99).

Answers Worksheet 11 (Workbook 3A P96 – 99)

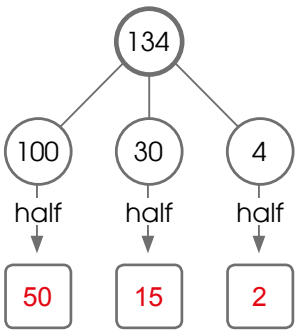
1. (a) 34
   (b) 70 ÷ 2 = 35
   (c) 280 ÷ 2 = 140
   (d) 592 ÷ 2 = 296

2. (a)



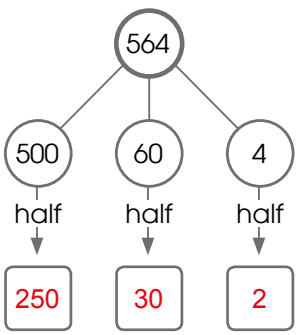
40 + 3 = 43
Half of 86 = 43

(b)



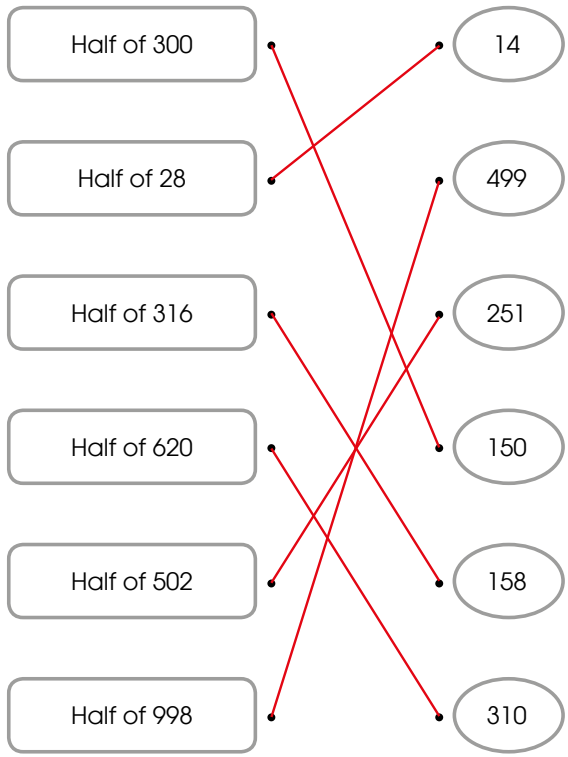
50 + 15 + 2 = 67
Half of 134 = 67

(c)

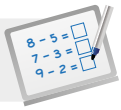


250 + 30 + 2 = 282
Half of 564 = 282

3.



LESSON PLAN



Specific Learning Focus

- Double 2-digit and 3-digit numbers.
- Half 2-digit and 3-digit numbers.

Suggested Duration

Lesson 10: 2 periods
Lesson 11: 2 periods

Prior Learning

Lessons 10 and 11 are extensions of multiplication and division. Multiple strategies are shown to find doubles and halves.

Pre-emptive Pitfalls

Encourage individual responses of their preferred method of finding doubles and halves. However, all methods must be taught in class for each question in the textbook. Questions in the workbook can be done independently with the pupil's preferred method.

Introduction

In Lesson 10, to find double of 324, explain the following:
(i) Finding doubles is adding a number by itself.
(ii) Finding doubles also means multiplying the number by 2.
(iii) Doubles can be found using number bonds, where the number is split into numbers that are easier to work with. Guide pupils to find the double of each number and then add them up.

In Lesson 11, to find half of a number, explain the following:
(i) Finding halves is dividing the number by 2.
(ii) Halves can be found using number bonds, where the number is split into numbers that are easier to work with. Guide pupils to find the half of each number and then add them up.

Problem Solving

Solve all questions in Workbook 3A (P96 – 99) on the board using 3 methods for finding doubles and 2 methods for finding halves. Ask pupils for their preferred method and give reasons. Encourage individual responses.

Activities

Use number discs and mini whiteboards. Have pupils work in pairs and encourage peer checking.

Resources

- mini whiteboard
- marker
- number discs

Mathematical Communication Support

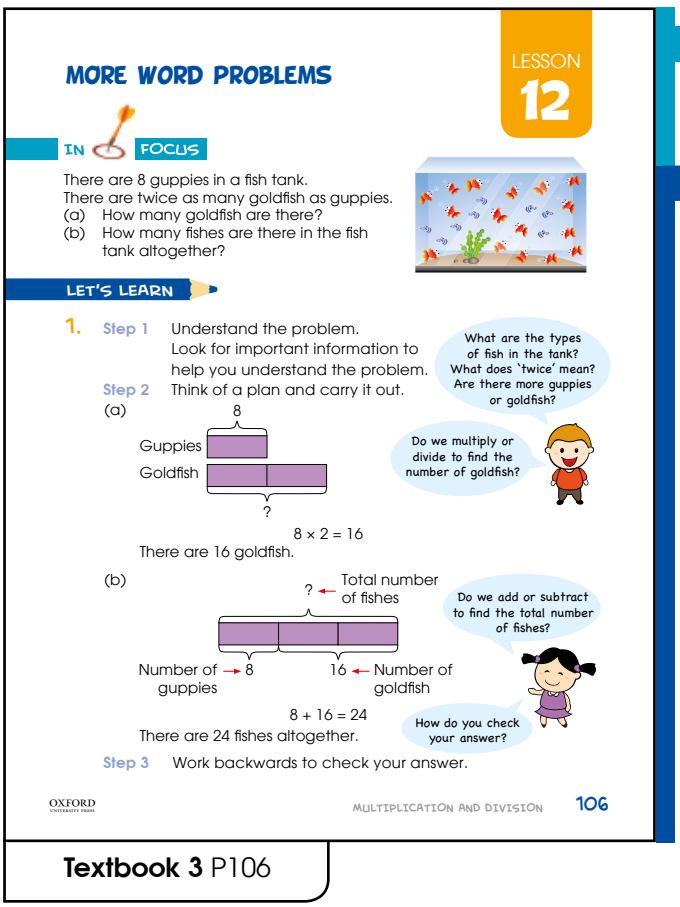
Verbalise each step in every method of finding doubles and halves (Lessons 10 & 11). Elicit individual responses. Use key terms like 'product', 'quotient', 'sum', 'number bond', 'double', 'half' during class discussions. Write the vocabulary words on the board every time it is used for emphasis. Encourage pupils to give mathematical reasoning for their preferred method to find doubles and halves.

LESSON
12

MORE WORD PROBLEMS

LEARNING OBJECTIVE

1. Half 2-digit and 3-digit numbers.



MORE WORD PROBLEMS

LESSON 12

IN FOCUS

There are 8 guppies in a fish tank.
There are twice as many goldfish as guppies.
(a) How many goldfish are there?
(b) How many fishes are there in the fish tank altogether?

LET'S LEARN

1. Step 1 Understand the problem.
Look for important information to help you understand the problem.
Step 2 Think of a plan and carry it out.
(a)

8 × 2 = 16
There are 16 goldfish.

(b)

8 + 16 = 24
There are 24 fishes altogether.

Step 3 Work backwards to check your answer.

OXFORD UNIVERSITY PRESS
MULTIPLICATION AND DIVISION 106

Textbook 3 P106

IN FOCUS

Get pupils to discuss the solution to the problem.

LET'S LEARN

Go through the problem solving model with pupils.

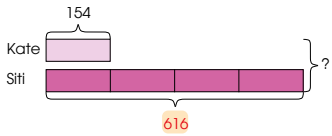
In Step 1, get pupils to highlight the important information or make annotations to help them understand the questions.

In Step 2, pupils draw a model to represent the information and decide on what operation to use.

In Step 3, demonstrate how pupils can work backwards to check their answers.

Working backwards:
From the answer, there are 24 fishes altogether.
If there are 8 guppies, there should be 24 – 8 = 16 goldfish. 16 is twice of 8, so this matches the information given in the problem.

2. Kate has 154 beads.
Siti has 4 times as many beads as Kate.
(a) How many beads does Siti have?
(b) How many beads do Kate and Siti have in all?



Method 1

(a) 154 × 4 = 616

Siti has 616 beads.

(b) 154 + 616 = 770

Kate and Siti have 770 beads in all.

Method 2

(a) 1 unit = 154
4 units = 154 × 4
= 616

Siti has 616 beads.

(b) 5 units = 154 × 5
= 770

Kate and Siti have 770 beads in all.

Textbook 3 P107

Go through the problem solving model with pupils.

Get pupils to highlight important information in the problem and ask them why they think the model is drawn as shown. Go through both methods with pupils.

Tell pupils that to check their answers, they can use an alternative method to check.

3. Nora folded some paper cranes for 6 days.
She folded 32 paper cranes each day.
She needed to fold 250 paper cranes altogether.
How many more paper cranes did she need to fold?

32 × 6 = 192

Nora folded 192 paper cranes in 6 days.

250 − 192 = 58

Nora needed to fold 58 more paper cranes.

PRACTICE

Solve.

1. Ahmad weighs 29 kg.
His father weighs 3 times as heavy as him.
(a) What is his father's mass? 29 × 3 = 87
(b) What is the total mass of Ahmad and his father? 29 + 87 = 116

2. There were 25 boxes of mangoes.
Each box contained 9 mangoes.
54 mangoes were unripe and the remaining mangoes were ripe.
How many ripe mangoes were there? 25 × 9 = 225
225 − 54 = 171

3. Mr Lim bought a printer and a laptop.
The printer cost $129.
The laptop cost 8 times as much as the printer.
How much did Mr Lim pay altogether? 129 × 8 = 1032
129 + 1032 = 1161

Complete Workbook 3A, Worksheet 12A • Pages 100 – 103

Textbook 3 P108

For Let's Learn 3, ask pupils to identify important information in the problem. Ask them what they can find from the quantities given. Lastly, demonstrate to pupils how they can check their answers.

PRACTICE

Work with pupils on the practice questions.

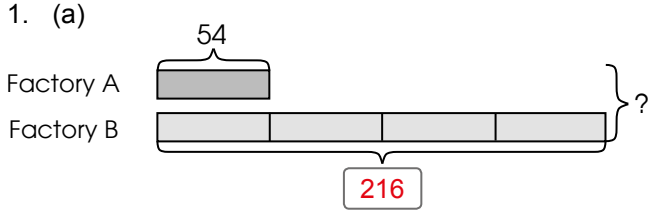
For better understanding, select items from **Worksheet 12A** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 12A (Workbook 3A P100 − 103).

Answers Worksheet 12A (Workbook 3A P100 – 103)

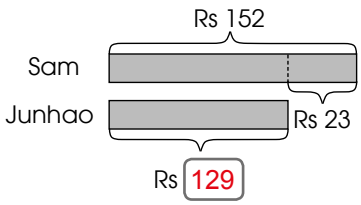
1. (a)



54 × 4 = [216]
Factory B produces [216] pizza crusts in a day.

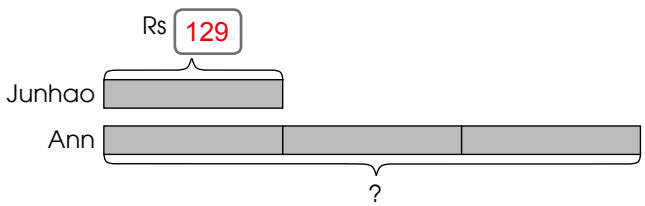
(b) [216] + 54 = [270]
The factories produce [270] pizza crusts altogether.

2. (a)



[152] [−] [23] = [129]
Junhao had Rs [129].

(b)



[129] [×] [3] = [387]
Ann had Rs [387].

3. (a) 3 + 5 = 8
There are 8 plastic shapes in each box.
(b) 372 × 8 = 2976
There are 2976 plastic shapes altogether.

4. 65 × 4 = 260
Mrs Lee takes 260 minutes to prepare 4 trays of cupcakes.
260 + 45 = 305
Mrs Lee takes 305 minutes in all to prepare the cookies and cupcakes.

5. 215 × 2 = 430
Weiming has 430 marbles.
215 + 430 = 645
Weiming and Bala have 645 marbles altogether.

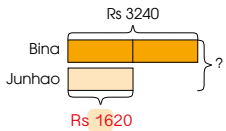
6. 5 + 4 = 9
There are 9 cookies in each box.
546 × 9 = 4914
The bakery sold 4914 cookies altogether.

IN FOCUS

How much money do the children have altogether?

LET'S LEARN

1. Bina has Rs 3240.
She has twice as much money as Junhao.
(a) How much does Junhao have?
(b) How much do the children have altogether?



(a) Rs 3240 ÷ 2 = Rs 1620

Junhao has Rs 1620.

(b) Rs 3240 + Rs 1620 = Rs 4860

The children have Rs 4860 altogether.

Textbook 3 P109

IN FOCUS

Get pupils to try applying the problem solving strategy on their own. Start off by getting pupils to identify important information in the question and sketch a model to solve the problem.

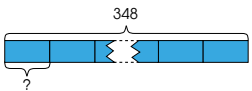
LET'S LEARN

Ask pupils to check the models they have drawn against the model given.

Ask pupils why they divide by 2 to get the answer for (a) and add to get the answer for (b). Ask pupils if there is another way to get the answer for (b).

An alternative to obtaining the answer for (b) is to multiply 1620 by 3.

2. A jar contains 348 sugar cubes.
Mrs Lee uses 3 sugar cubes for a cup of tea.
She makes 2 cups of tea each day.
(a) How many sugar cubes does Mrs Lee use in a day?
(b) How many days does she take to finish all the sugar cubes?



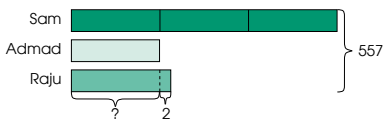
(a) 2 × 3 = 6

Mrs Lee uses 6 sugar cubes in a day.

(b) 348 ÷ 6 = 58

She takes 58 days to finish all the sugar cubes in the jar.

*3. Sam, Ahmad and Raju have 557 marbles altogether.
Sam has 3 times as many marbles as Ahmad.
Ahmad has 2 fewer marbles than Raju.
How many marbles does Ahmad have?



5 units = 557 − 2
= 555

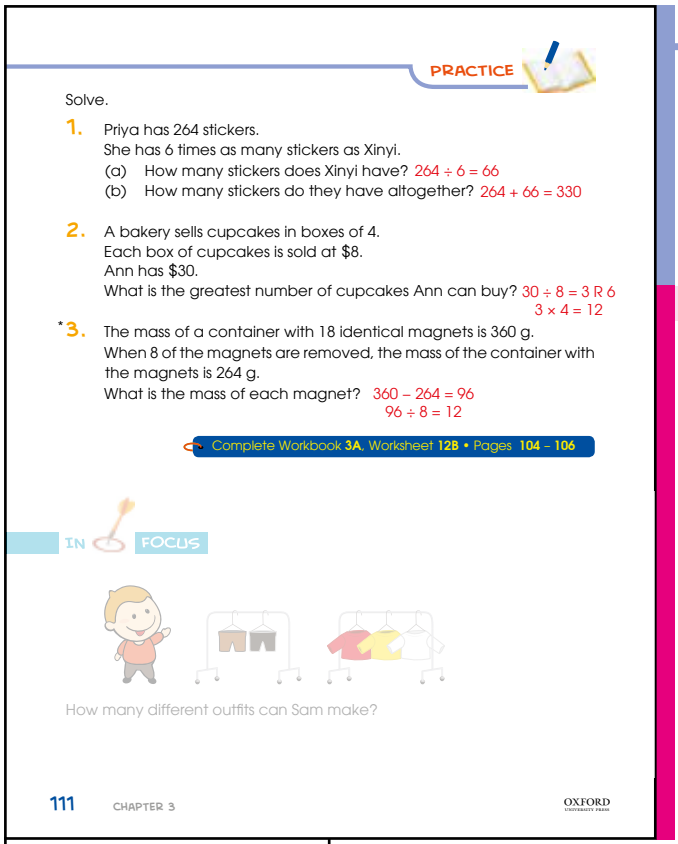
1 unit = 555 ÷ 5
= 111

Ahmad has 111 marbles.

Textbook 3 P110

Go through the problem solving model to help pupils solve Let's Learn 2 and 3.

Demonstrate to pupils how to check their answers for accuracy and reasonableness.



PRACTICE

Solve.

1. Priya has 264 stickers.
She has 6 times as many stickers as Xinyi.
(a) How many stickers does Xinyi have? 264 ÷ 6 = 66
(b) How many stickers do they have altogether? 264 + 66 = 330

2. A bakery sells cupcakes in boxes of 4.
Each box of cupcakes is sold at $8.
Ann has $30.
What is the greatest number of cupcakes Ann can buy? 30 ÷ 8 = 3 R 6
3 × 4 = 12

*3. The mass of a container with 18 identical magnets is 360 g.
When 8 of the magnets are removed, the mass of the container with the magnets is 264 g.
What is the mass of each magnet? 360 – 264 = 96
96 ÷ 8 = 12

Complete Workbook 3A, Worksheet 12B • Pages 104 – 106

IN FOCUS

How many different outfits can Sam make?

111 CHAPTER 3 OXFORD

Textbook 3 P111

PRACTICE

Work with pupils on the practice questions.

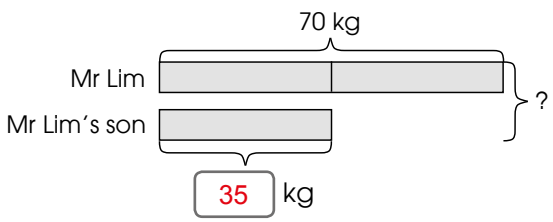
For better understanding, select items from **Worksheet 12B** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 12B (Workbook 3A P104 − 106).

Answers Worksheet 12B (Workbook 3A P104 – 106)

1.



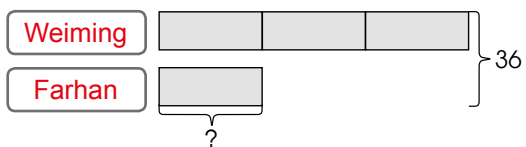
70 ÷ 2 = 35

Mr Lim's son weighs 35 kg.

70 + 35 = 105

Their total mass is 105 kg.

2.



(a) 36 ÷ 4 = 9

Farhan had 9 comic books.

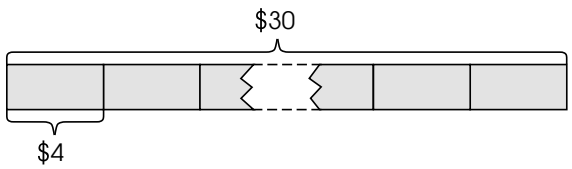
(b) 60 − 9 = 51

Sam had 51 comic books.

3. (a) 125 – 47 = 78
Mr Chua gave 78 chocolate bars to his pupils

(b) 78 ÷ 2 = 39
Mr Chua gave chocolate bars to 39 pupils.

*4.



30 ÷ 4 = 7 R 2

Mrs Tay can buy 7 boxes of egg tarts.

7 × 3 = 21

The greatest number of egg tarts she can buy is 21.

PRACTICE

Solve.

1. Priya has 264 stickers.
She has 6 times as many stickers as Xinyi.
(a) How many stickers does Xinyi have? 264 ÷ 6 = 66
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96 ÷ 8 = 12

Complete Workbook 3A, Worksheet 12B • Pages 104 – 106

IN FOCUS

How many different outfits can Sam make?

111 CHAPTER 3 OXFORD UNIVERSITY PRESS

Textbook 3 P111

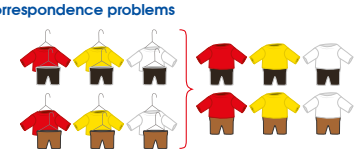
IN FOCUS

Get pupils to discuss the solution to the problem.

LET'S LEARN

Correspondence problems

1.



3 × 2 = 6

Sam can make 6 different outfits.

Top	Bottom
Red	Black
Red	Brown
Yellow	Black
Yellow	Brown
White	Black
White	Brown

2. There are some food and drinks at a cafeteria. Farhan can pair a food with a drink below to make a meal set. Complete the table below to show the possible ways he can make the meal set.

beef pie pizza burger

cola milk water

Food	Drink
beef pie	cola
beef pie	milk
beef pie	water
pizza	cola
pizza	milk
pizza	water
burger	cola
burger	milk
burger	water

3 × 3 = 9

Farhan can make 9 different meal sets.

OXFORD UNIVERSITY PRESS MULTIPLICATION AND DIVISION 112

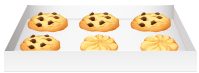
Textbook 3 P112

LET'S LEARN

Go through with pupils all the possible combinations of outfits. Guide pupils to see that there are 2 different colours of bottom and 3 different colours of top. Therefore, 3 different coloured tops can match the black bottom, and 3 different coloured tops can match the brown bottom, giving 6 different outfits.

Repeat the same steps for Let's Learn 2. Ask pupils to come up with all the possible ways to make the meal set. 3 different food and 3 different drinks make 9 different meal sets.

3. A box contains 4 chocolate chip cookies and 2 vanilla cookies. Tom wants 12 chocolate chip cookies. How many boxes of cookies should he buy?



12 ÷ 4 = 3

Tom needs to buy 3 boxes.

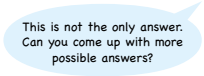
4. There are some people and cats in a cat cafe. There were 200 legs in total. Give a possible combination of number of people and cats.

50 people = 50 × 2 = 100 legs

25 cats = 25 × 4 = 100 legs

Total number of legs = 100 + 100
= 200 legs

There are 50 people and 25 cats.



113 CHAPTER 3 OXFORD UNIVERSITY PRESS

Textbook 3 P113

In Let's Learn 3, guide pupils to see that the focus of the question is on the chocolate chip cookies and not the vanilla cookies. Since each box contains 4 chocolate chip cookies, the number of boxes needed in order to have 12 chocolate chip cookies is found by taking 12 ÷ 4.

In Let's Learn 4, ask pupils how many legs each person and each cat has respectively. Guide pupils to see that the total number of legs of 200 means the sum of the multiplication of the number of people and the number of legs each person has, and the multiplication of the number of cats and the number of legs each cat has must be 200. Ask them to come up with other possible combinations.

PRACTICE

1. There are 2 marbles and 4 number cards.
Nora picks a marble and a number card.
Complete the table below. How many different ways can she do this?

Colour of marble	Number on card
red	1
red	2
red	3
red	4
blue	1
blue	2
blue	3
blue	4

2. A set contains 4 red pens and 7 blue pens. If a teacher wants to have 24 red pens, how many sets should he buy? 24 ÷ 4 = 6

3. Noah watched his animals move into the ark.
At the end of the day, he counted 168 legs.
There were four-legged and two-legged animals.
How many animals could there be altogether?
Give a possible answer.
21 four-legged animals = 21 × 4 = 84 legs
42 two-legged animals = 42 × 2 = 84 legs
Total number of legs = 84 + 84 = 168 legs
There are 21 four-legged animals and 42 two-legged animals.

Complete Workbook 3A, Worksheet 12C • Pages 107 – 109

OXFORD UNIVERSITY PRESS MULTIPLICATION AND DIVISION 114

Textbook 3 P114

PRACTICE

Work with pupils on the practice questions.
For better understanding, select items from **Worksheet 12C** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 12C (Workbook 3A P107 − 109).

Answers Worksheet 12C (Workbook 3A P107 – 109)

1.

Hat	Bag
A	W
A	X
A	Y
A	Z
B	W
B	X
B	Y
B	Z

$2 \times 4 = 8$
He can choose his hat and bag in 8 different ways.

2. red, 3
red, 7
yellow, 3
yellow, 7
blue, 3
blue, 7
green, 3
green, 7
black, 3
black, 7
$5 \times 2 = 10$
There are 10 different combinations.

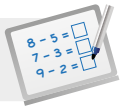
3. (a) $9 \times 12 = 108$
Farhan will have 108 apples.
(b) $9 \times 28 = 252$
Farhan will have 252 fruits in total.

4. (a) $207 \div 9 = 23$
He bought 23 packets of sweet.
(b) $23 \times 6 = 138$
$207 - 138 = 69$
He has 69 fewer strawberry-flavoured sweets than blueberry-flavoured sweets.

5. Number of sides of squares $= 20 \times 4$
$= 80$
Number of sides of triangles $= 5 \times 3$
$= 15$
Total number of sides $= 80 + 15$
$= 95$
There are 20 squares and 5 triangles.

6. Number of bicycle wheels $= 34 \times 2$
$= 68$
Number of tricycle wheels $= 30 \times 3$
$= 90$
Total number of wheels $= 68 + 90 = 158$

LESSON PLAN



Specific Learning Focus

- Solve up to 2-step word problems involving the 4 operations.

Suggested Duration

9 periods

Prior Learning

Pupils have learnt to organise data and draw bar models. Tabulating possible combinations is new to them but the teacher can help pupils grasp this concept well by conducting an interesting lesson.

Pre-emptive Pitfalls

Pupils might get confused while doing correspondence word problems. Explain each word problem on the board before having them to work independently.

Introduction

Use the 4-step approach to problem solving template (Activity Handbook 3 P7) to solve the word problems. Encourage drawing of bar models and give individual attention to each pupil while they fill up the template. Discuss the operations involved and then encourage pupils to check their answers by performing the inverse of the operation. Working on correspondence problems provides an informal introduction to algebra and permutation. It is best explained by listing all the possible combinations in a table (Textbook 3 P112).
Let's Learn 4 (Textbook 3 P113) can be made fun as there are more than one possible or correct answer. There are a few possible combinations: 50 people and 25 cats, 60 people and 20 cats, 70 people and 15 cats, 80 people and 10 cats, etc. For the questions in 'Practice' (Textbook 3 P114), there are multiple possible answers. Say all possible answers and encourage individual responses while writing on the board.

Problem Solving

Explain that multiple combinations can be made. Emphasise that just like 48 can be divided by 2 and also by 4 with no remainder, possible combinations can be made with the same number. The correspondence problem in Let's Learn 2 (Textbook 3 P112) is relatable to real life and pupils will find it fun to role-play, where each pupil can be assigned to come up with a combination.

Activities

Encourage role-playing for Let's Learn 2 (Textbook 3 P112) and bring real-life toys to achieve better understanding of correspondence and combinations.

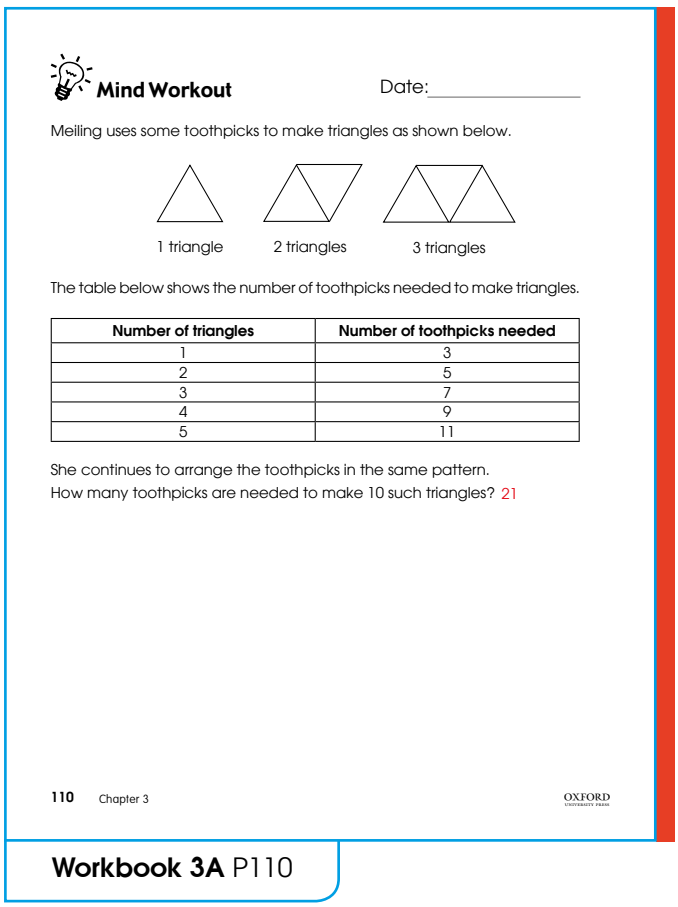
Resources

- toy cars
- toy figures (Let's Learn 4 in Textbook 3 P113)
- marbles

Mathematical Communication Support

Encourage class discussion and make it fun by filling up the tables on the board by eliciting individual responses. Ask pupils to draw bar models on their mini whiteboards and raise them in the air for all to see once completed.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout Date: _____

Meiling uses some toothpicks to make triangles as shown below.

1 triangle 2 triangles 3 triangles

The table below shows the number of toothpicks needed to make triangles.

Number of triangles	Number of toothpicks needed
1	3
2	5
3	7
4	9
5	11

She continues to arrange the toothpicks in the same pattern.
How many toothpicks are needed to make 10 such triangles? 21

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Workbook 3A P110

Mind Workout

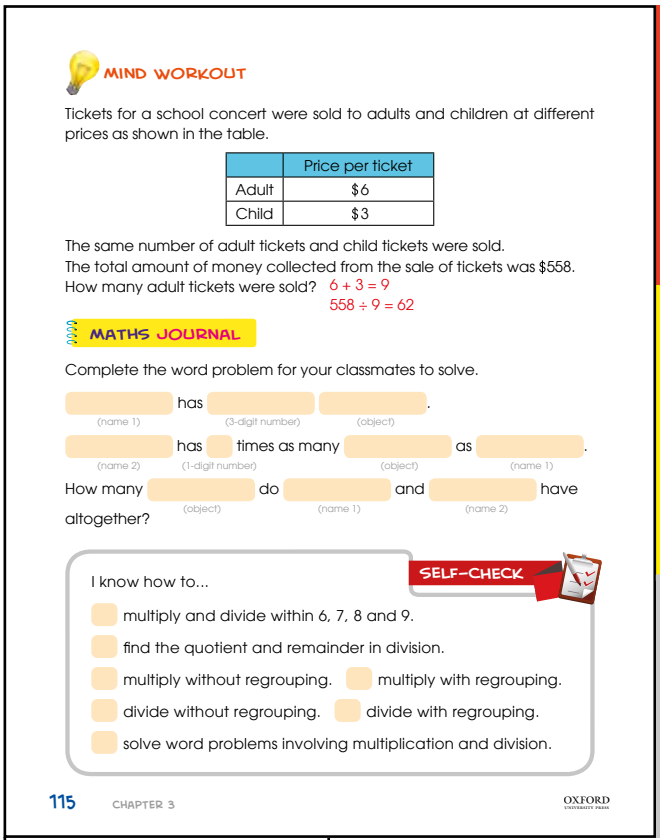
Demonstrate how the triangles are made with the toothpicks. Alternatively, toothpicks can be distributed to the class for the pupils to work with on their own.

Ask pupils questions such as:

- How many toothpicks are added each time we make a new triangle?
- How many times have you added 2 toothpicks to make 10 triangles?
- 3 toothpicks are used for the first triangle. How many toothpicks are used altogether for 10 triangles?

Show pupils that it is possible to use listing to solve this problem.

For high-ability pupils, get them to work with a larger number of triangles. In this case, tell pupils that it is faster to identify a pattern and find an equation to solve the problem.



MIND WORKOUT

Tickets for a school concert were sold to adults and children at different prices as shown in the table.

	Price per ticket
Adult	$6
Child	$3

The same number of adult tickets and child tickets were sold.
The total amount of money collected from the sale of tickets was $558.
How many adult tickets were sold? 6 + 3 = 9
558 ÷ 9 = 62

MATHS JOURNAL

Complete the word problem for your classmates to solve.

_____ (name 1) has _____ (3-digit number) _____ (object).

_____ (name 2) has _____ (1-digit number) times as many _____ (object) as _____ (name 1).

How many _____ (object) do _____ (name 1) and _____ (name 2) have altogether?

SELF-CHECK

I know how to...

- multiply and divide within 6, 7, 8 and 9.
- find the quotient and remainder in division.
- multiply without regrouping.
- multiply with regrouping.
- divide without regrouping.
- divide with regrouping.
- solve word problems involving multiplication and division.

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Textbook 3 P115

MIND WORKOUT

If pupils have difficulty approaching the problem, get them to view an adult ticket and a child ticket as one group. Ask them to find the number of groups of $9 in $558.

MATHS JOURNAL

Give an example of how the blanks can be filled. Give pupils time to create their own word problem, after which they can exchange word problems with each other to solve. Remind pupils that the numbers chosen must be logical.

SELF-CHECK

Before the pupils do the self check, review the important concepts once more by asking for examples learnt for each objective.

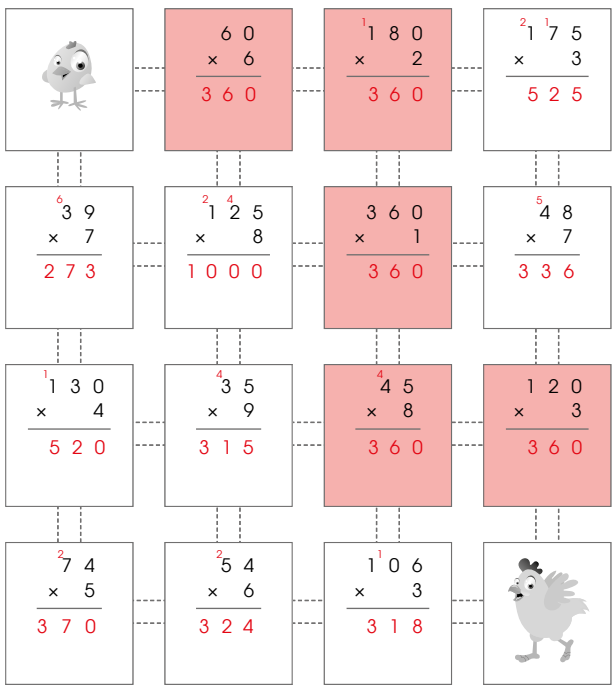
This self check can be done after pupils have completed **Review 3** (Workbook 3A P111 – 116) as consolidation of understanding for the chapter.

Answers Review 3 (Workbook 3A P111 – 116)

1. (a) 24
   (b) 42
   (c) 64
   (d) 72

2. (a) 86
   (b) 288
   (c) 468
   (d) 1224

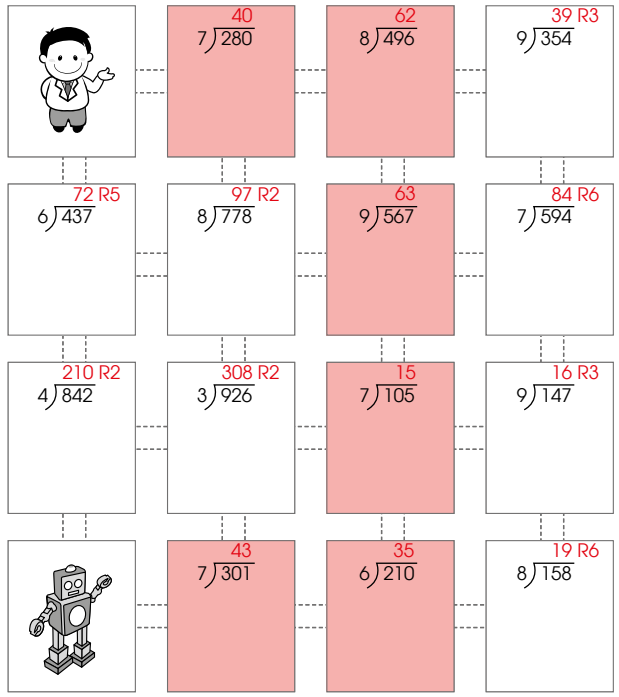
3.



4. S = 103 D = 90
   U = 15 O = 56
   V = 79 F = 71
   N = 47 I = 28

D	I	V	I	S	I	O	N				
90	28	79	28	103	28	56	47				
								I	S	F	U	N	!
								28	103	71	15	47	

5.



6. 12 × 4 = 48
   There are 48 eggs in 4 such egg cartons.

7. 980 ÷ 7 = 140
   The printer costs $140.

8. (a) 78 × 7 = 546
   Bala gave 546 oranges to his neighbours.
   (b) 546 ÷ 6 = 91
   There were 91 oranges in each box.

9. 192 ÷ 8 = 24
   She bought 24 boxes.

10. 189 + 115 = 304
    There were 304 pupils altogether.
    304 ÷ 8 = 38
    There would be 38 pupils in each class.

Answers Revision 1A (Workbook 3A P117 – 120)

1. (a) 1002
   (b) 5460

2. (a) Three thousand, four hundred and twenty
   (b) Seven thousand, six hundred and eighty-three

3. (a) 400
   (b) 4000
   (c) 6

4. (a) 1101, 1011, 1001
   (b) 1827, 1782, 1287, 1278

5. (a) 1526, 1536, 1546, 1556, 1566, 1576, 1586
   (b) 3908, 4008, 4108, 4208, 4308, 4408, 4508
   (c) 7001, 6991, 6981, 6971, 6961, 6951, 6941

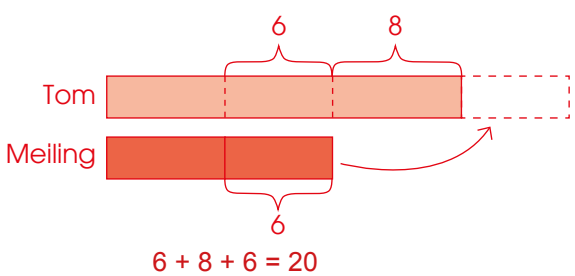
6. 2511

7. (a) 100
   (b) 6902
   (c) 4609
   (d) 10

8. Rs 2570 + Rs 300 = Rs 2870
   A T-shirt and a pair of shorts cost Rs 2870.
   Rs 2870 – Rs 2270 = Rs 600
   The pair of shorts costs Rs 600.

9. 1764 – 268 = 1496
   Mr Lee sold 1496 tarts on Monday.
   1764 + 1496 = 3260
   Mr Lee sold 3260 tarts altogether.

*10



Answers Revision 1B (Workbook 3A P121 – 124)

1. (a) 24
   (b) 56
   (c) 216
   (d) 56
   (e) 6
   (f) 7
   (g) 330
   (h) 476

2. 24 × 2

3. 50 ÷ 9 = 5 R 5
   Xinyi can buy [5] diaries with $50.

4. 379 ÷ 8 = 47 R 3
   3 biscuits were left over.

5. 36 – 4 = 32
   32 ÷ 2 = 16
   There were 16 girls in the class.

6. 64 × 3 = 192
   Sam folded 192 paper cranes.
   64 + 192 = 256
   Priya and Sam folded 256 paper cranes altogether.

7.

drink	snack
cola	hotdog
cola	nachos
cola	popcorn
cola	fried chicken
cola	french fries
ice lemon tea	hotdog
ice lemon tea	nachos
ice lemon tea	popcorn
ice lemon tea	fried chicken
ice lemon tea	french fries

   2 × 5 = 10
   There are 10 different ways.

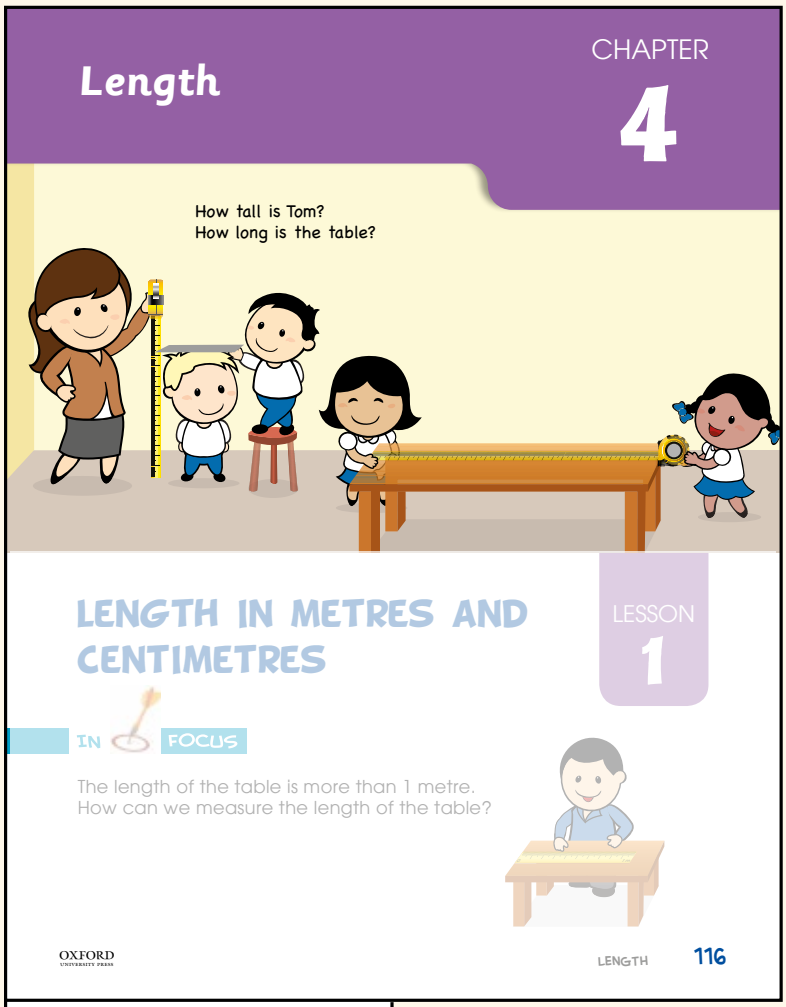
8. 6 ÷ 2 = 3
   Siti bought 3 boxes of pens.
   3 × 10 = 30
   Siti bought 30 pens.

*9. 3 + 5 = 8
   A regular drink and a large drink cost $8 altogether.
   56 ÷ 8 = 7
   Miss Nair bought 7 large cups of drinks.

*10. 27 ÷ 3 = 9
   Rs 850 × 9 = Rs 7650
   She had to pay Rs 7650.

LENGTH

CHAPTER
4



Textbook 3 P116

Related Resources
NSPM Textbook 3 (P116 – 131)
NSPM Workbook 3A (P125 – 142)

Materials
Measuring tape, metre ruler, paper, scissors, fasteners, hole puncher, mini whiteboard, markers, vanguard sheet

Lesson

Lesson 1	Length in Metres and Centimetres
Lesson 2	Length in Kilometres and Metres
Lesson 3	Solving Word Problems

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

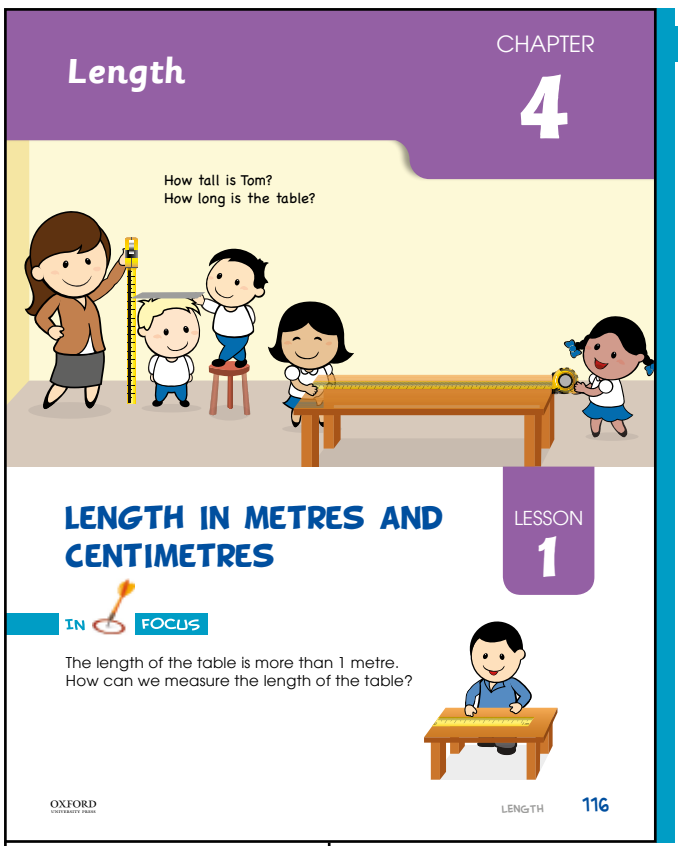
Pupils have learned in Grade 2 how to measure and compare lengths using the standard units metre (m) and centimetre (cm). At Grade 3, the unit kilometre (km) is introduced for measuring long distances. Also for the first time, conversion of units is introduced and measurement in compound units (metres and centimetres; kilometres and metres) is reinforced. It is important that the pupils are given practical experience in using the measuring tape to estimate and read the length of everyday objects around them that are more than a metre and express the measurement in compound units of m and cm. For long distances of 1 km or more, visualisation is used with examples of familiar landmarks on maps of neighbourhood scenes for pupils to have a sense of this measure. 2-step word problems involving length in everyday context enable pupils to understand its application in real life and to select the correct operation in solving them.

LESSON 1

LENGTH IN METRES AND CENTIMETRES

LEARNING OBJECTIVES

1. Measure length in metres (m) and centimetres (cm).
2. Convert length from m and cm to cm, and vice versa.



Textbook 3 P116

IN FOCUS

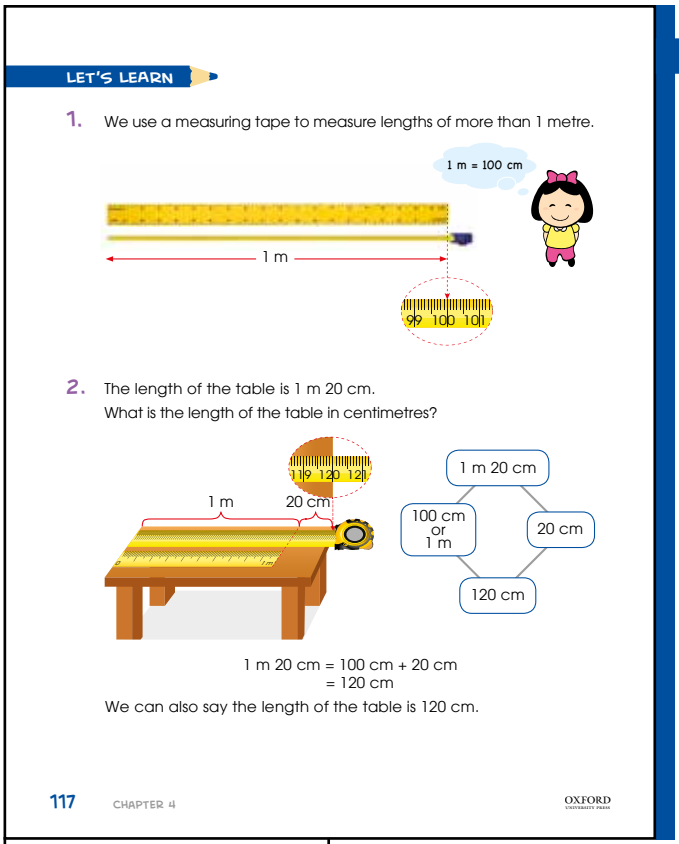
Get pupils to discuss the chapter opener (P116). Ask the following questions to facilitate the class discussion:

- What are the two girls (in the foreground) doing?
- What are the teacher and the pupil doing with Tom?
- Estimate Tom's height and the length of the teacher's table. Do you think they are greater than or less than a metre?

Take a metre ruler and ask the class if they know what it is called.

Invite the tallest pupil in the class and get the pupil to stand beside the metre ruler. Ask the class if the pupil's height is greater than or less than a metre.

Invite another volunteer to compare the length of the teacher's table against the metre ruler. Ask pupils for ways to measure the exact length of the teacher's table.



Textbook 3 P117

LET'S LEARN

Remind pupils that 100 cm make up 1 m.

Split the class into their groups and provide each group with a metre ruler and a measuring tape. Get them to examine the markings on the two tools. Ask them what the unit of measure is in both tools (cm on the ruler, m and cm on the measuring tape).

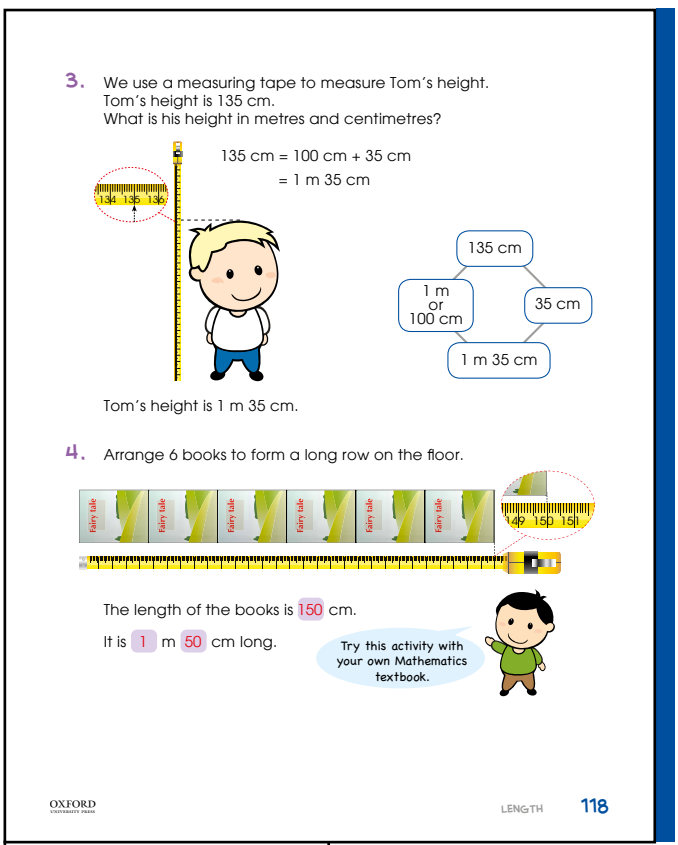
Place the metre ruler and a measuring tape on the visualiser to show the markings on the two measuring tools.

For Let's Learn 2, demonstrate the measuring of the teacher's table.

First measure with the metre ruler and show that the length of the table is slightly more than 1 m. Next, use a measuring tape to find the exact length of the table by measuring the additional 20 cm that cannot be reached by the metre ruler. Write on the whiteboard:

1 m 20 cm = 100 cm + 20 cm
= 120 cm

Recap the conversion 1 m = 100 cm.



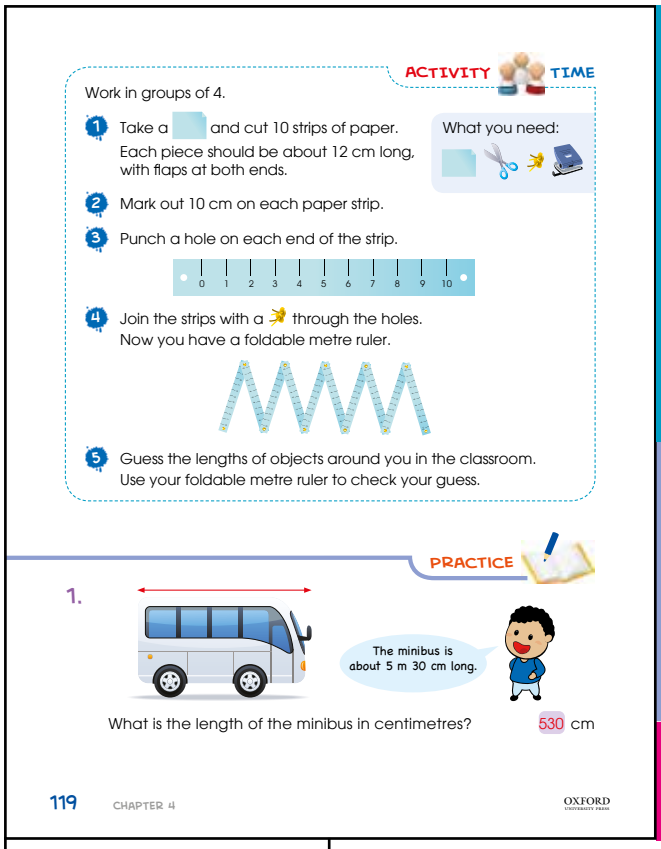
Textbook 3 P118

Show how to use the box diagram to convert from m and cm to cm only and vice versa as in Let's Learn 3. Encourage pupils to read out each measurement in the boxes as they do the conversion.

As an alternative to Let's Learn 3, invite the tallest pupil and measure his/her height using a measuring tape. Using the pupil's height, illustrate the conversion from cm to m and cm.

Use Let's Learn 4 to show pupils how to read the cm marking on a measuring tape and then express the same length in m and cm.

Allows hands-on experience by getting pupils to work in groups to measure the length of 6 books of their choice.



ACTIVITY TIME

Work in groups of 4.

1. Take a [ ] and cut 10 strips of paper.
   Each piece should be about 12 cm long, with flaps at both ends.

What you need:

2. Mark out 10 cm on each paper strip.
3. Punch a hole on each end of the strip.

0 1 2 3 4 5 6 7 8 9 10

4. Join the strips with a [ ] through the holes.
   Now you have a foldable metre ruler.

5. Guess the lengths of objects around you in the classroom.
   Use your foldable metre ruler to check your guess.

PRACTICE

1.

The minibus is about 5 m 30 cm long.

What is the length of the minibus in centimetres? 530 cm

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Textbook 3 P119

ACTIVITY TIME

Assign pupils to work in groups of 4.

Provide each group with a sample of a 10-cm strip for them to cut out copies from a vanguard sheet. This activity involves all pupils in the group to work cooperatively to produce a measuring tool. The pupils have to organise themselves for the various tasks such cutting out 10 strips, marking the scales, punching holes and joining the strips together with fasteners.

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 1** and work these out with the pupils.

Independent seatwork

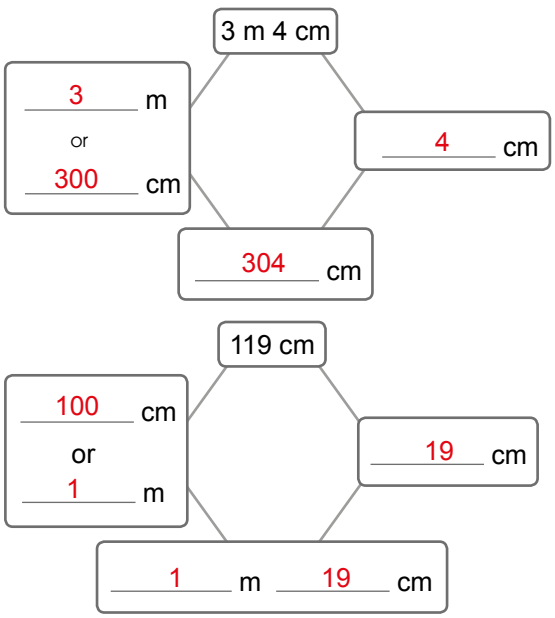
Assign pupils to complete Worksheet 1 (Workbook 3A P 125 – 128).

Answers Worksheet 1 (Workbook 3A P125 – 128)

1. (a) 2 m = 200 cm
   (b) 9 m = 900 cm
   (c) 5 m 60 cm = 500 cm + 60 cm
   = 560 cm
   (d) 7 m 7 cm = 700 cm + 7 cm
   = 707 cm

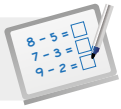
2. (a) 100 cm = 1 m
   (b) 600 cm = 6 m
   (c) 208 cm = 200 cm + 8 cm
   = 2 m 8 cm
   (d) 850 cm = 800 cm + 50 cm
   = 8 m 50 cm

3. (a)



4. (a) 1 m 40 cm = 100 cm + 40 cm
   = 140 cm
   Mr Tan's car is about 140 cm tall.
   (b) 5 m 35 cm = 500 cm + 35 cm
   = 535 cm
   The length of the cobra is about 535 cm.
   (c) 143 cm = 100 cm + 43 cm
   = 1 m 43 cm
   Raju's height is 1 m 43 cm.
   (d) 224 cm = 200 cm + 24 cm
   = 2 m 24 cm
   The blackboard is 2 m 24 cm long.

LESSON PLAN



Specific Learning Focus

- Measure length in metres (m) and centimetres (cm).
- Convert length from m and cm to cm, and vice versa.

Suggested Duration

4 periods

Prior Learning

Pupils have learnt the measurement of length as linear measure. Standard and non-standard units can be used to measure length.

Pre-emptive Pitfalls

Pupils might find the conversion of units a bit challenging. The choice of the unit of measurement will be another challenge that can be explained visually and using spatial reasoning.

Introduction

In this lesson, pupils will learn the conversion of metres to centimetres by understanding that 1 m equals to 100 cm, and that lengths can also be expressed in m and cm. To enable pupils to develop spatial sense so that they are able to choose the correct units for measurements, hands-on experience of using rulers for lengths in cm and measuring tape for lengths in metres are necessary. The use of the 10-cm strip will also be helpful in pupils' development of spatial sense. Explain that when the length is more than 100 cm, it is useful to convert every 100 cm to a metre and the remaining length that is less than 100 cm is still expressed in cm. Hence if an object is 320 cm long, its length can be written as 3 m and 20 cm or 3 m 20 cm.

Problem Solving

Provide pupils with metre ruler and measuring tape, and encourage them to select the correct tool for the measurement of the length of an object. Explain to pupils that sometimes the end of the object might not be exactly aligned to a marking on the ruler or measuring tape. In such cases, the measurement can be rounded off (e.g. if the end of the object is aligned between 2 cm and 3 cm, they can round the measurement off to the nearest ones).

Activities

In 'Activity Time' (Textbook 3 P119), make a foldable metre ruler by cutting ten 10 cm strips and then joining them together with fasteners. Encourage pupils to measure lengths using their foldable metre ruler.

Resources

- metre ruler
- measuring tape
- paper
- scissors
- fasteners
- hole puncher
- vanguard sheet

Mathematical Communication Support

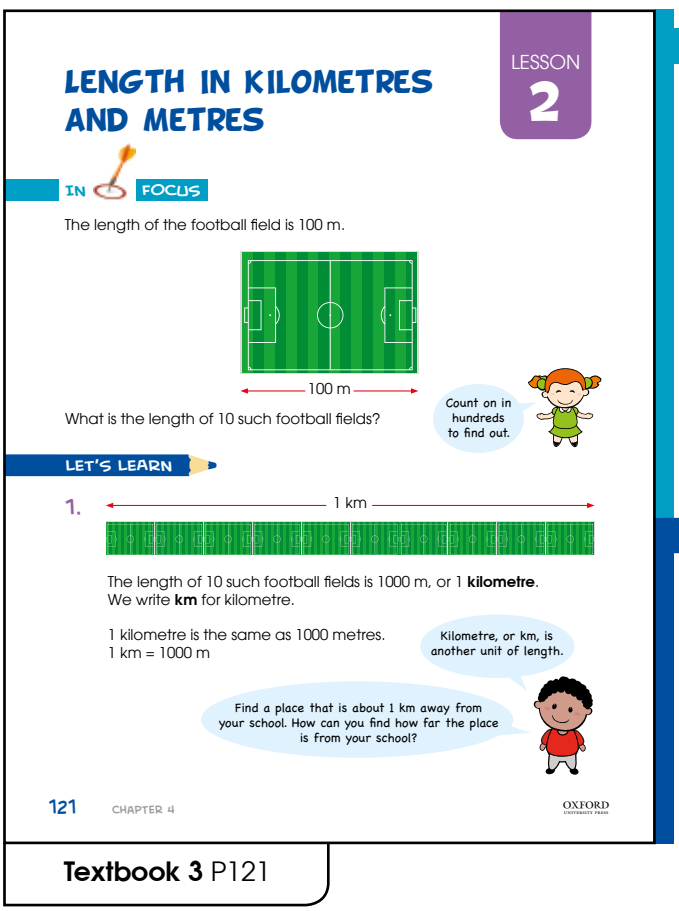
Encourage collaborative group assignments. Ask them to look in groups and emphasise on the use of the correct tool to measure various lengths of objects in the classroom. This is a hands-on lesson and the more they get to physically measure lengths; the more pupils develop spatial sense.

LESSON 2

LENGTH IN KILOMETRES AND METRES

LEARNING OBJECTIVES

1. Measure length in kilometres (km).
2. Convert length from km and m to m, and vice versa.


LESSON 2

LENGTH IN KILOMETRES AND METRES

IN FOCUS

The length of the football field is 100 m.

100 m

What is the length of 10 such football fields?

Count on in hundreds to find out.

LET'S LEARN

1. 1 km

The length of 10 such football fields is 1000 m, or 1 **kilometre**.
We write **km** for kilometre.

1 kilometre is the same as 1000 metres.
1 km = 1000 m

Kilometre, or km, is another unit of length.

Find a place that is about 1 km away from your school. How can you find how far the place is from your school?

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Textbook 3 P121

IN FOCUS

To help pupils get a better idea of how long 100 m is, cite some examples that pupils may have encountered. The following questions can be asked to begin the discussion:

- Do you know the length of a swimming pool from one end to other end? (usually 30 m or 50 m)
- How does it feel to swim 50 m across the pool?
- Have you ever run the length of a football field?

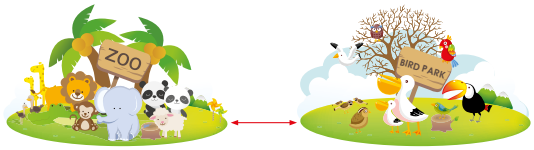
Tell pupils that the length of a football field is usually about 100 m. Get them to imagine what the total length of 10 such football fields will be like.

LET'S LEARN

Use the picture and lead pupils to count on in hundreds to find the total length of 10 football fields. Write 1000 m on the whiteboard, introduce the term **kilometre** and tell pupils that **1000 m = 1 km**. Get pupils to verbalise the units of measure as well.

Ask pupils to think of places that are 1 km away from the school to give pupils a better sense of how far 1 km is. To assist them, show pupils a map that shows these landmarks and their estimated distance.

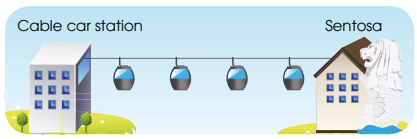
2. What is the distance between the zoo and the bird park?



The distance between the zoo and the bird park is about 19 km.

'Distance' is used to describe the length between one place and another. We use km for long distances.

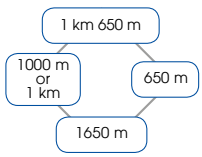
3.



The distance from the cable car station to Sentosa is 1 km 650 m.

The distance is more than 1 km.

1 km 650 m = 1000 m + 650 m
= 1650 m



Textbook 3 P122

With reference to the zoo and the bird park, provide a map or travel guide to show pupils how far these tourist attractions are from each other.

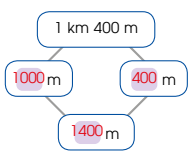
Introduce the term **distance** and tell pupils that the distance between the zoo and the bird park is about 19 km. Explain the usage of the word to pupils.

Go through Let's Learn 3 and express distance in two ways, m or km and m.

4.

(a) What is the distance between Xinyi's home and her school in metres?

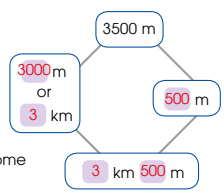
1 km 400 m = 1000 m + 400 m
= 1400 m



The distance between Xinyi's home and her school is 1400 m.

(b) What is the distance between Xinyi's home and the library in kilometres and metres?

3500 m = 3000 m + 500 m
= 3 km 500 m



The distance between Xinyi's home and the library is 3 km 500 m.

Textbook 3 P123

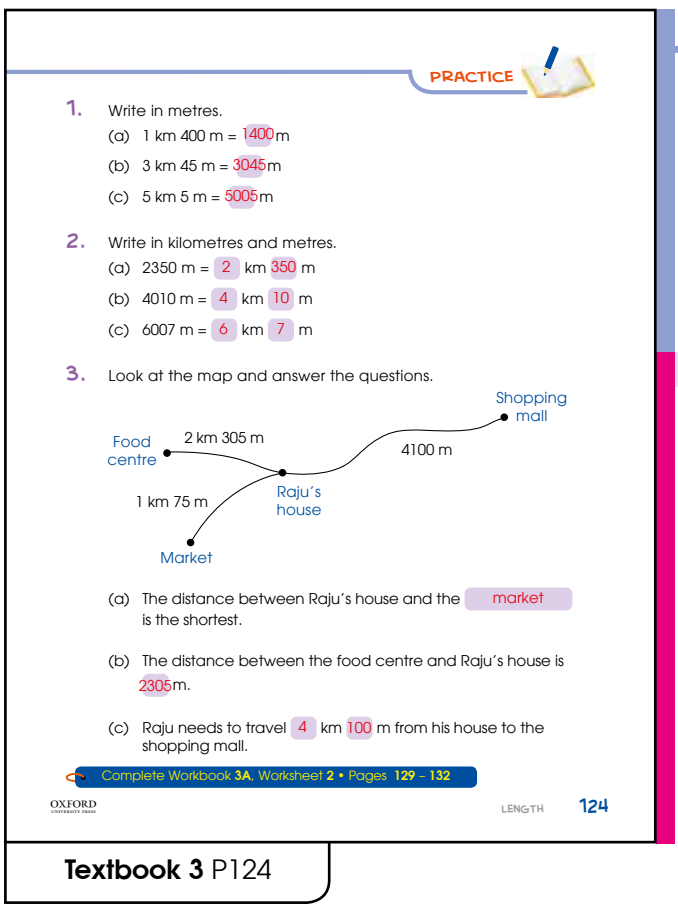
Help pupils to interpret the map. Focus on the box diagrams in helping the weaker pupils to do the conversion.

Activity How long is 50 m?

Materials Trundle wheel (if available)

Procedure

1. Bring the class to the field or any open area.
2. Divide the class into two groups.
3. Get the first group to line up along a start line.
4. At the start signal, all pupils in the first group are to go forward to their best estimate of 50 m.
5. Measure the pupils' results.
6. Repeat steps 3 to 5 with the second group.
7. Determine the first three places based on how close the pupils' estimate is to 50 m.
8. If there is sufficient space, allow pupils to estimate 100 m and then visualise and have a sense of how long 1 km is.



PRACTICE

1. Write in metres.
   (a) 1 km 400 m = 1400 m
   (b) 3 km 45 m = 3045 m
   (c) 5 km 5 m = 5005 m

2. Write in kilometres and metres.
   (a) 2350 m = 2 km 350 m
   (b) 4010 m = 4 km 10 m
   (c) 6007 m = 6 km 7 m

3. Look at the map and answer the questions.

   (a) The distance between Raju's house and the market is the shortest.

   (b) The distance between the food centre and Raju's house is 2305 m.

   (c) Raju needs to travel 4 km 100 m from his house to the shopping mall.

Complete Workbook 3A, Worksheet 2 • Pages 129 – 132

Textbook 3 P124

PRACTICE

Work with pupils on the practice questions.

Help pupils to interpret the map in question 3.

For better understanding, select items from **Worksheet 2** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 3A P129 – 132).

Answers Worksheet 2 (Workbook 3A P129 – 132)

1. (a) cm
   (b) m
   (c) km
   (d) km

2. (a) 7 km = 7000 m
   (b) 1 km 20 m = 1000 m + 20 m
   = 1020 m
   (c) 4 km 8 m = 4000 m + 8 m
   = 4008 m
   (d) 5 km 50 m = 5050 m

3. (a) 1002 m = 1000 m + 2 m
   = 1 km 2 m
   (b) 3048 m = 3000 m + 48 m
   = 3 km 48 m
   (c) 2306 m = 2 km 306 m
   (d) 9900 m = 9 km 900 m

4. (a) The distance between the school and the shopping mall is the greatest.
   (b) The distance between the library and the school is the shortest.
   (c) 2 km 60 m
   = 2000 m + 60 m
   = 2060 m
   The distance from the sports hall to the school is 2060 m.
   (d) The school is 5 km 25 m away from the food centre.

LESSON PLAN

Specific Learning Focus

- Measure length in kilometres (km).
- Convert length from km and m to m, and vice versa.

Suggested Duration

4 periods

Prior Learning

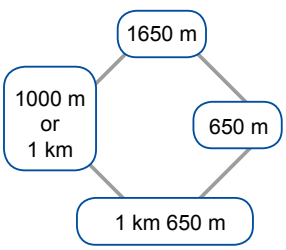
The units metres and centimetres have been introduced to the pupils. They should understand that different units of measurements of lengths are specific for different objects.

Pre-emptive Pitfalls

Pupils might have difficulty in expressing measurements in a combination of two different units (e.g. km and m). Pupils can learn to choose the appropriate unit of measurement through hands-on activities that enhance their spatial and visual sense.

Introduction

Kilometre is a unit of measurement that would be easier for pupils to understand by bringing them out to the fields and roads. Explain that in Lesson 1, lengths in cm and m were used in measurements of short lengths. In this lesson, long lengths or distances are measured in km and m. Break the word kilometres into 'kilo' and 'metres'. Explain that kilo is a prefix denoting thousand, hence 1 km = 1000 m. Use the diagram, such as the one shown below, to convert m to km and m.



Any length less than 1000 m remain expressed in metres and any length more than 1000 m gets converted to kilometres. Hence 3450 m is expressed as 3 km 450 m.

Problem Solving

Visual and spatial sense will enable one to choose the appropriate unit of measurement.

Activities

Encourage peer checking and distribute the conversion of units template to pupils (Activity Handbook 3 P22).

Resources

- mini whiteboard
- markers
- conversion of units template (Activity Handbook 3 P22)
- trundle wheel (if available)

Mathematical Communication Support

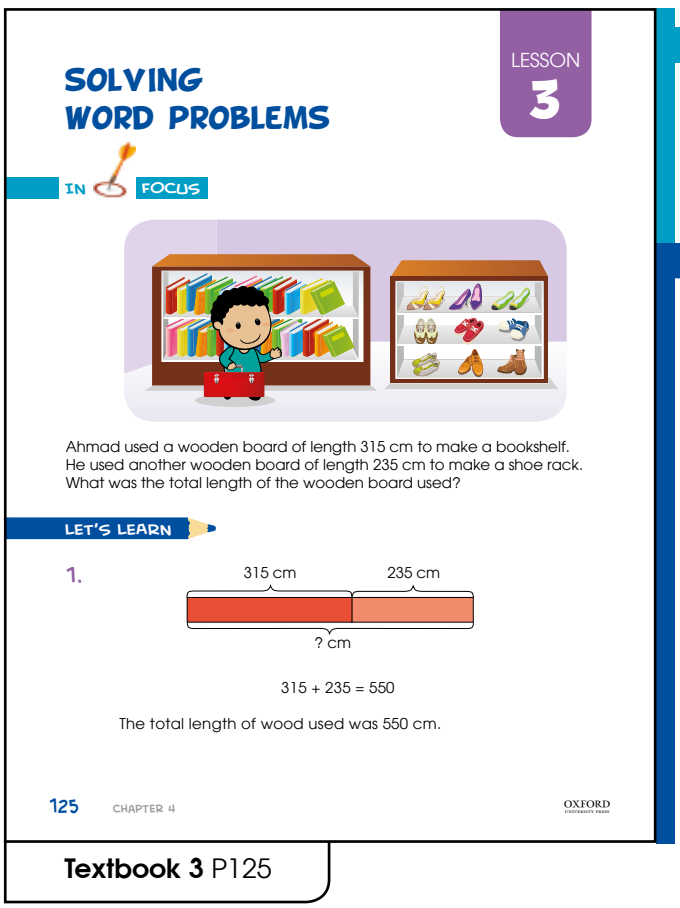
Encourage pupils to think of real-life situations where long distances are measured. Use landmarks (e.g. school, public library, mall, etc.) and maps of the cities to explain distances. Key in a destination in google map and show pupils the calculated distance from their school to the destination. Emphasise the units of measurements used.

LESSON 3

SOLVING WORD PROBLEMS

LEARNING OBJECTIVES

1. Solve word problems involving length (addition and subtraction).
2. Solve word problems involving length (multiplication and division).



SOLVING WORD PROBLEMS

LESSON 3

IN FOCUS

Ahmad used a wooden board of length 315 cm to make a bookshelf. He used another wooden board of length 235 cm to make a shoe rack. What was the total length of the wooden board used?

LET'S LEARN

1.

315 cm | 235 cm

? cm

315 + 235 = 550

The total length of wood used was 550 cm.

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Textbook 3 P125

IN FOCUS

Invite pupils to talk about the picture with focus on the two shelves that Ahmad had constructed. Ask pupils what they know about each shelf and what they need to find to solve the given problem.

LET'S LEARN

Alert to pupils to take note of the units of measurement used in the word problem. This is especially important for the subsequent examples.

Model the four stages of problem solving to guide pupils:

Step 1: Understanding the problem

- Allow silent reading before reading aloud with the class
- Underline the key elements
- Set pupils thinking about the following questions:
  - What do we know?
  - Are all the units the same?
  - What do we have to find?

Step 2: Translate key elements into a model

(Explain to pupils that a model helps them visualise the problem situation.)

- Draw the model
- Label the known and unknown elements

Step 3: Examine the model and write the number equation

- Lead pupils to see the part-part-whole concept in the problem structure.
- What do we need to find the unknown?
- Do we add or subtract to find it?

Step 4: Answer the question

2. Meiling had 5 m of yarn.
She used 74 cm of yarn.
How much yarn did Meiling have left?

5 m = 500 cm

500 − 74 = 426

She had 426 cm of yarn left.

3. A tailor used 3 m of cloth to make a shirt.
He made 47 such shirts and had 7 m of cloth left over.
(a) How much cloth did the tailor use to make the shirts?
(b) How much cloth did the tailor have at first?

(a)

47 × 3 = 141

The tailor used 141 m of cloth to make the shirts.

(b)

141 + 7 = 148

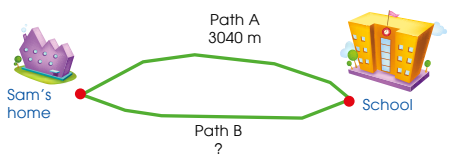
The tailor had 148 m of cloth at first.

Textbook 3 P126

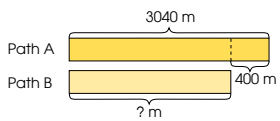
Model the four stages of problem solving to guide pupils.

Take note that in Let's Learn 2, pupils need to convert to a common unit (in this case, m to cm).

4.



There are two ways to travel from Sam's home to the school.
The length of Path A is 3040 m.
Path B is 400 m shorter than Path A.
(a) What is the length of Path B?
(b) Sam goes to school along Path A and returns home along Path B.
What is the total distance that Sam travels?
Give your answer in kilometres and metres.



(a) 3040 − 400 = 2640

The length of Path B is 2640 m.

(b) 3040 + 2640 = 5680

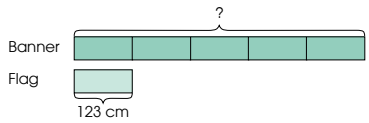
5680 m = 5 km 680 m

Sam travels a total distance of 5 km 680 m.

Textbook 3 P127

Let's Learn 4 is a 2-part word problem. For each part, use the four stages of problem solving to guide pupils.

5. A school banner is 5 times as long as the school flag.
The school flag is 123 cm long.
What is the length of the school banner?
Give your answer in metres and centimetres.

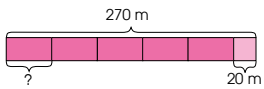


123 × 5 = 615

615 cm = 6 m 15 cm

The school banner is 6 m 15 cm long.

6. Mrs Lee had 270 m of wire.
After making 5 baskets, she had 20 m of wire left.
She used the same length of wire to make each basket.
What was the length of wire she used for each basket?



270 − 20 = 250

Mrs Lee used 250 m of wire to make 5 baskets.

250 ÷ 5 = 50

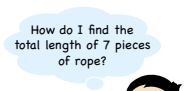
She used 50 m of wire for each basket.

Textbook 3 P128

For Let's Learn 5, elicit from pupils the operation that is appropriate for the problem situation.

Let's Learn 5 and 6 are 2-step word problems. When modelling the four stages of problem solving, help the pupils to see that there is a hidden problem to solve. Do so by asking what they need to find before solving the main problem during the first step of understanding the problem.

7. Mr Ali had 345 m of rope.
He cut the rope into 7 pieces of equal length and had some rope left.
Each piece of rope was 47 m long.
How much rope was left over?



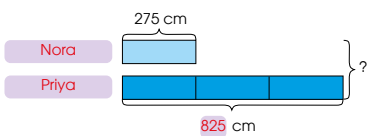
47 × 7 = 329

The total length of the 7 pieces of rope was 329 m.

345 − 329 = 16

16 m of rope was left over.

8. Nora's ribbon is 275 cm long.
Priya's ribbon is 3 times as long as Nora's ribbon.
What is the total length of their ribbons?



275 × 3 = 825

Priya's ribbon is 825 cm long.

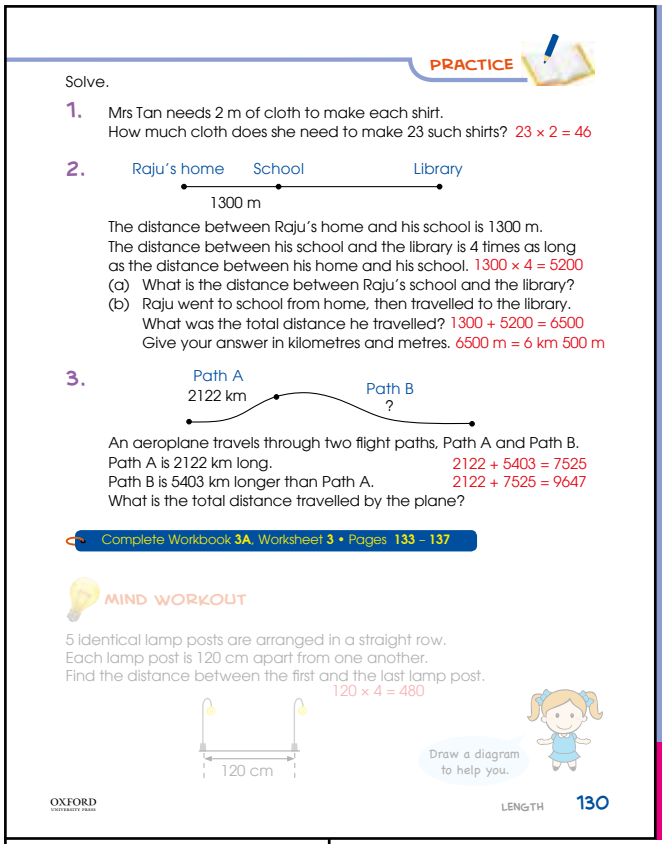
275 + 825 = 1100

The total length of their ribbons is 1100 cm.

Textbook 3 P129

Examples 7 and 8 are 2-step word problems.

When modelling the four stages of problem solving, ask pupils what they need to find before solving the main problem.



PRACTICE

Solve.

1. Mrs Tan needs 2 m of cloth to make each shirt.
How much cloth does she need to make 23 such shirts? 23 × 2 = 46

2. Raju's home — School — Library
1300 m

The distance between Raju's home and his school is 1300 m.
The distance between his school and the library is 4 times as long as the distance between his home and his school. 1300 × 4 = 5200
(a) What is the distance between Raju's school and the library?
(b) Raju went to school from home, then travelled to the library.
What was the total distance he travelled? 1300 + 5200 = 6500
Give your answer in kilometres and metres. 6500 m = 6 km 500 m

3. Path A 2122 km — Path B ?

An aeroplane travels through two flight paths, Path A and Path B.
Path A is 2122 km long. 2122 + 5403 = 7525
Path B is 5403 km longer than Path A. 2122 + 7525 = 9647
What is the total distance travelled by the plane?

Complete Workbook 3A, Worksheet 3 • Pages 133 – 137

MIND WORKOUT

5 identical lamp posts are arranged in a straight row.
Each lamp post is 120 cm apart from one another.
Find the distance between the first and the last lamp post.
120 × 4 = 480

120 cm

Draw a diagram to help you.

OXFORD UNIVERSITY PRESS

LENGTH 130

Textbook 3 P130

PRACTICE

Allow pupils to work in pairs. One of the pupils will solve the question while the other will act as the facilitator.

The facilitator will ask or prompt with the following questions as the other pupil solves the problem.

Step 1: Read the word problem.
- What do you know?
- What do you have to find? Or What do you have to find first?

Step 2: Draw the model and label the known and unknown elements.

Step 3: Which operation would you use? Write the equation.

Step 4: Have you answered the question?

Exchange roles for the next problem.

At the end of the session, select some of the pupils' solutions and share them with the class.

For better understanding, select items from **Worksheet 3** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 3A P133– 137).

Answers Worksheet 3 (Workbook 3A P133 – 137)

1. 1850 + 250 = 2100
2100 m = 2 km 100 m
The distance from Priya's home is 2 km 100 m.

2. 2800 – 2300 = 500
The difference in the distance they travelled is 500 m.

3. 372 × 4 = 1488
1488 m of cloth was used to make the dresses.

4. 630 ÷ 7 = 90
Xinyi uses 90 cm of ribbon for each gift box.

5. (a) 235 – 42 = 193
Path B is 193 km.
(b) 235 + 193 = 428
Mr Tan travelled a total distance of 428 km.

6. (a) 2340 – 1300 = 1040
Raju jogged 1040 m further than Bala.
(b) 2340 + 1300 = 3640
3640 m = 3 km 640 m
Raju and Bala jogged 3 km 640 m in total.

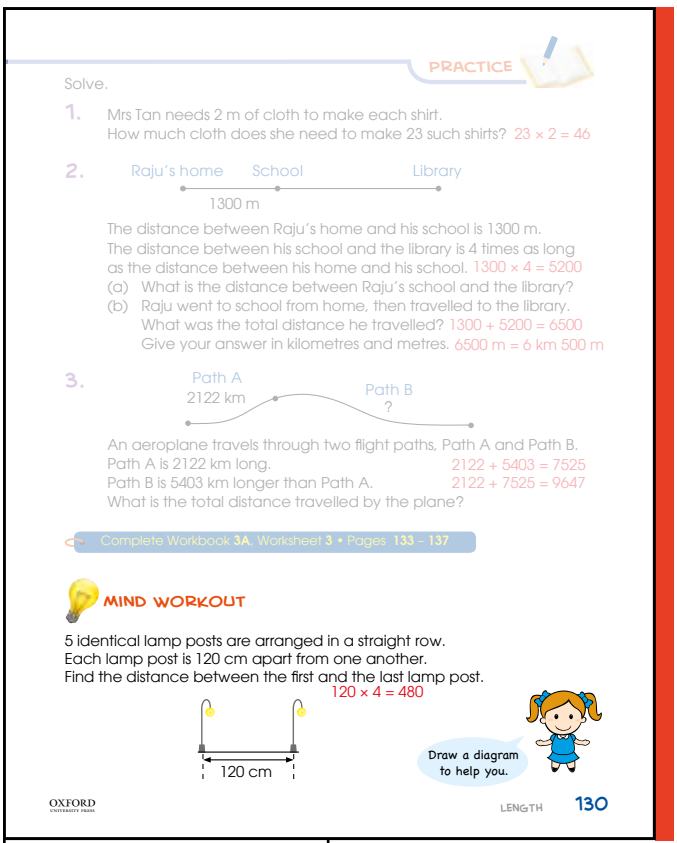
7. (a) 185 × 3 = 555
Mrs Lee needs 555 cm of cloth to make the curtains.
(b) 7 m = 700 cm
700 – 555 = 145
145 cm = 1 m 45 cm
1 m 45 cm of cloth will be left over.

8. 148 – 28 = 120
Meiling used 120 cm of ribbon to make the bows.
120 ÷ 4 = 30
30 cm of ribbon was used to make each bow.

9. 165 × 3 = 495
Mrs Salim used 495 m of yarn to make the blanket.
165 + 495 = 660
Mrs Salim used 660 m of yarn in total to make the blanket and the scarf

10. 400 × 4 = 1600
Junhao jogged 1600 m round the jogging track.
1 km = 1000 m
1000 + 1600 = 2600
2600 m = 2 km 600 m
Junhao ran a total distance of 2 km 600 m.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



PRACTICE

Solve.

1. Mrs Tan needs 2 m of cloth to make each shirt.
How much cloth does she need to make 23 such shirts? 23 × 2 = 46

2. Raju's home — School — Library
1300 m

The distance between Raju's home and his school is 1300 m.
The distance between his school and the library is 4 times as long as the distance between his home and his school. 1300 × 4 = 5200
(a) What is the distance between Raju's school and the library?
(b) Raju went to school from home, then travelled to the library.
What was the total distance he travelled? 1300 + 5200 = 6500
Give your answer in kilometres and metres. 6500 m = 6 km 500 m

3. Path A 2122 km; Path B ?

An aeroplane travels through two flight paths, Path A and Path B.
Path A is 2122 km long. 2122 + 5403 = 7525
Path B is 5403 km longer than Path A. 2122 + 7525 = 9647
What is the total distance travelled by the plane?

Complete Workbook 3A, Worksheet 3 • Pages 133 – 137

MIND WORKOUT

5 identical lamp posts are arranged in a straight row.
Each lamp post is 120 cm apart from one another.
Find the distance between the first and the last lamp post.
120 × 4 = 480

120 cm

Draw a diagram to help you.

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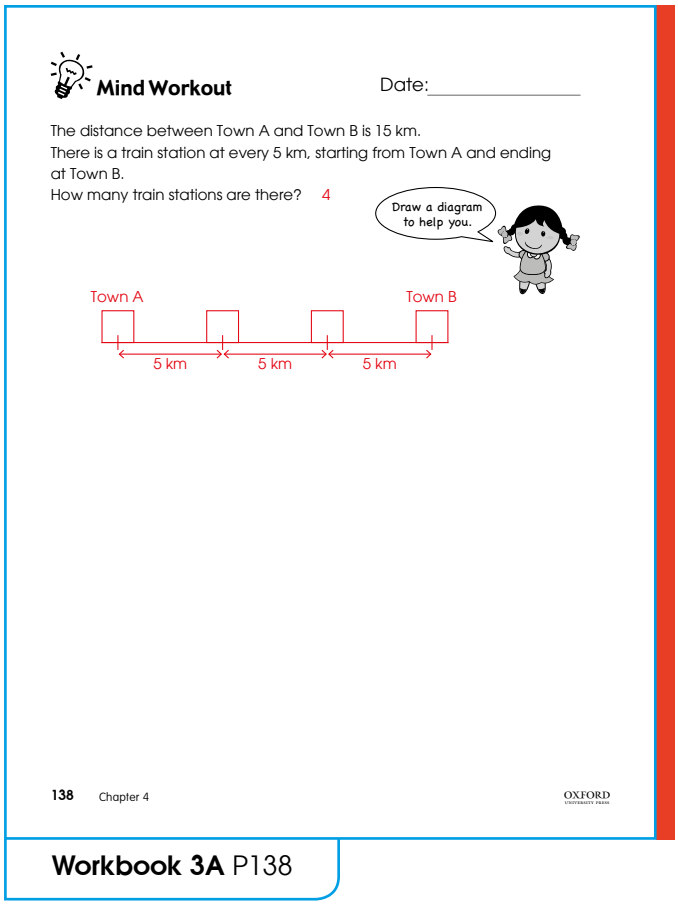
LENGTH 130

Textbook 3 P130

MIND WORKOUT

A common error made by pupils will be to multiply the distance between two lamp posts by the total number of lamp posts (120 × 5) to give the incorrect answer.

Encourage pupils to draw a diagram for the correct solution.



Mind Workout

Date:_____

The distance between Town A and Town B is 15 km.
There is a train station at every 5 km, starting from Town A and ending at Town B.
How many train stations are there? 4

Draw a diagram to help you.

Town A Town B

5 km 5 km 5 km

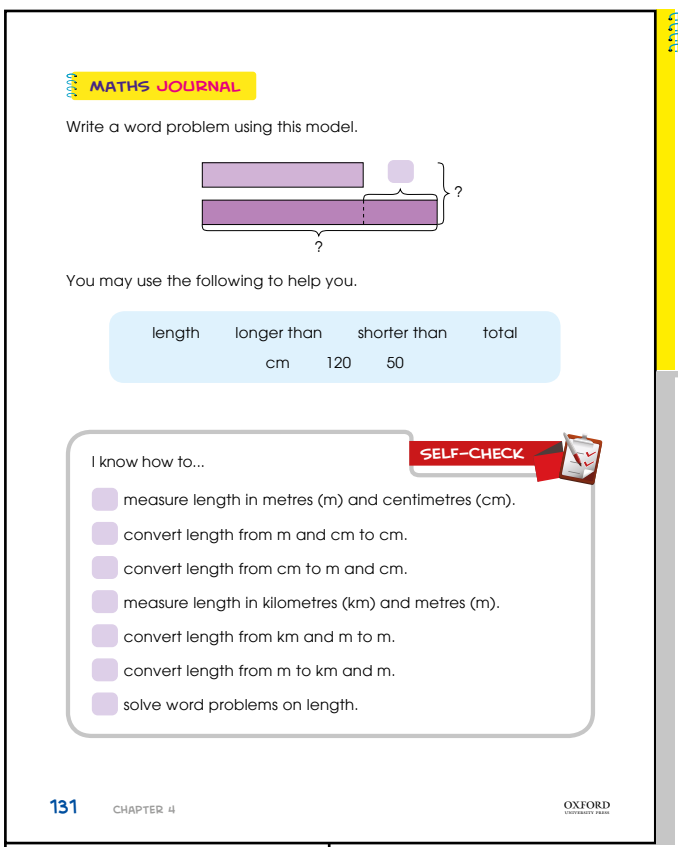
138 Chapter 4 OXFORD

Workbook 3A P138

Mind Workout

A common error made by pupils is to divide the distance between the two towns and the distance between two train stations (15 ÷ 5) to give the incorrect answer.

Encourage pupils to draw a diagram to get the correct solution.



MATHS JOURNAL

Write a word problem using this model.

? ?

You may use the following to help you.

length	longer than	shorter than	total
cm	120	50	

SELF-CHECK

I know how to...

- measure length in metres (m) and centimetres (cm).
- convert length from m and cm to cm.
- convert length from cm to m and cm.
- measure length in kilometres (km) and metres (m).
- convert length from km and m to m.
- convert length from m to km and m.
- solve word problems on length.

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Textbook 3 P131

MATHS JOURNAL

Do a preview with pupils to discuss the model before allowing them to work individually.

Through questioning, lead pupils to see that there are two unknowns (as marked by the question marks) in the model. They could write a 2-step word problem with the given helping words and numbers.

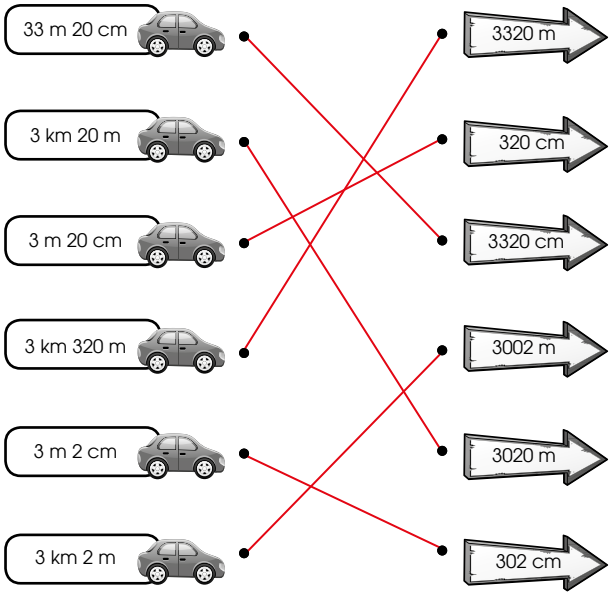
SELF-CHECK

Before the pupils do the self check, review the important concepts once more by asking for examples learnt for each objective.

This self check can be done after pupils have completed **Review 4** (Workbook 3A P139 – 142) as consolidation of understanding for the chapter.

Answers Review 4 (Workbook 3A P139 – 142)

1.



2. (a) 2 m 76 cm = 276 cm
   (b) 4 km 4 m = 4004 m
   (c) 600 cm = 6 m 0 cm
   (d) 7030 m = 7 km 30 m

3. (a) The distance between Kate's house and her school is [2005] m.
   (b) Kate has to travel [3] km from her school to the library.
   (c) Kate has to walk [1] km [130] m to return home from the cinema.
   (d) Kate is meeting her friend for a movie at the cinema after school.
   She has to travel [3] km [40] m from her school to the cinema.

4. 117 × 3 = 351
   351 cm = 3 m 51 cm
   The length of the wire in the second roll is 3 m 51 cm.

5. 410 – 5 = 405
   The total length of the pieces of rope was 405 cm.
   405 ÷ 9 = 45
   Each piece of rope was 45 cm long.

6. (a) 20 ÷ 4 = 5
   The distance between the 1st plant and the 2nd plant is 5 m.
   (b) 7 × 5 = 35
   The distance between the 1st plant and the 8th plant is 35 m.

MASS

CHAPTER
5

Textbook 3 P132

Related Resources
NSPM Textbook 3 (P132 – 142)
NSPM Workbook 3A (P143 – 160)

Materials
Various types of weighing scales (1 kg to 5 kg), everyday objects for weighing, markers

Lesson
Lesson 1 Mass in Kilograms and Grams
Lesson 2 Solving Word Problems
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

In Grade 2, pupils have learnt kilogram (kg) and gram (g) as standard units of measure of mass for light and heavy objects. In Grade 3, pupils learn that 1 kg = 1000 g and they deal with measurement of mass in compound units (kg and g). Conversion of units from kilograms and grams to grams, and vice versa, is introduced here for the first time. It is important that the pupils are given practical experience in reading various weighing scales and measuring mass in compound units. Pupils should make sense of mass in kg and g by making an estimate before carrying out the measurement. 2-step word problems involving mass in everyday context enable pupils to understand its applications in real life and to select the correct operation in solving them.

LESSON 1

MASS IN KILOGRAMS AND GRAMS

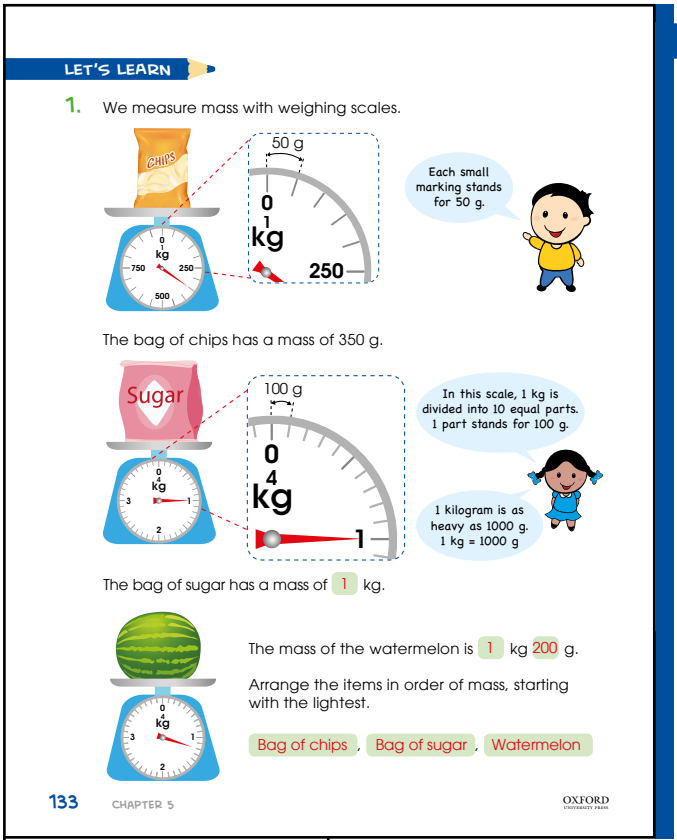
LEARNING OBJECTIVES

1. Measure mass in kilograms (kg) and grams (g).
2. Convert mass from kg and g to g, and vice versa.

Textbook 3 P132

IN FOCUS

Use the chapter opener and ask pupils to make a guess and arrange the three objects in order of mass, from the lightest to the heaviest.



Textbook 3 P133

LET'S LEARN

Alert pupils to the weighing scale and the maximum mass it can measure (1 kg).

Guide pupils to interpret the markings on the scale. Some points to highlight are as follows:

- There are 5 equal parts between 0 to 250 g.
- Starting from 0, the markings represent 50 g, 100 g, 150 g, 200 g and 250 g.

Next, guide pupils to read the red pointer on the scale for the mass of the packet of chips. Get pupils to read aloud from 250 g to where the pointer is.

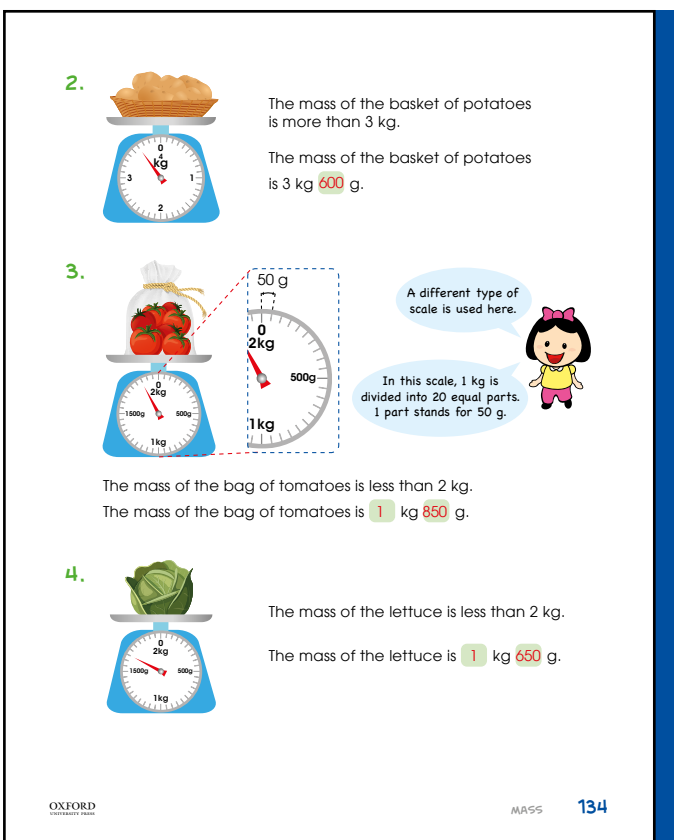
Alert to pupils the different scale used for measuring the mass of the sugar and the maximum mass it can weigh (4 kg).

As before, guide pupils to interpret the markings on the scale. Highlight to pupils:

- 1 kg is divided into 10 equal parts, each part stands for 100 g.
- Read aloud with pupils the markings in hundreds, from 0 to 1000 g (or 1 kg).

Guide pupils to read the red pointer on the scale to find the mass of the bag of sugar.

For the mass of the watermelon, guide pupils to read the point by counting on from 1 kg in compound units (i.e. 1 kg 100 g, 1 kg 200 g, etc.).

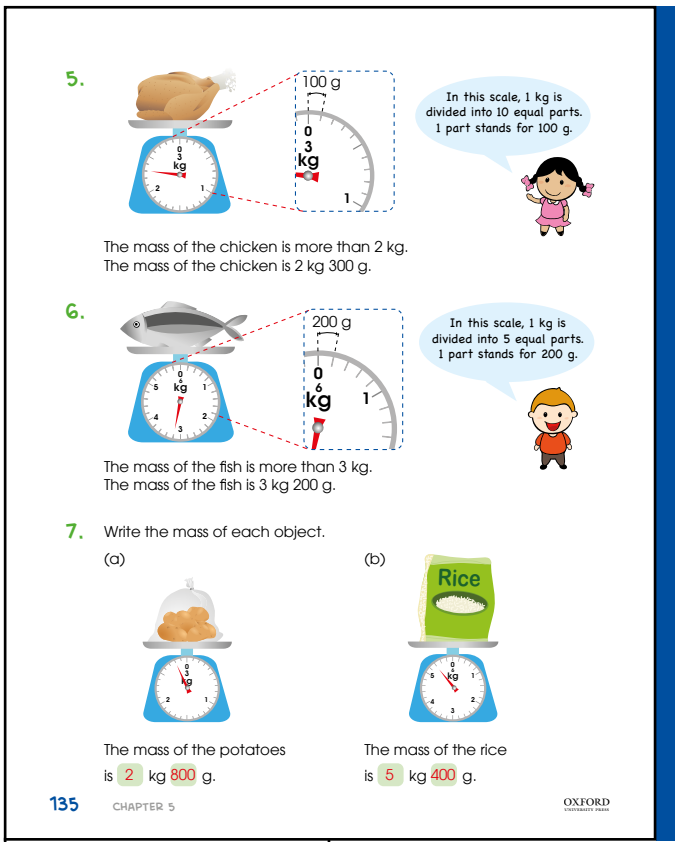


Textbook 3 P134

Reinforce the reading and counting of mass in compound units in Let's Learn 2. Count on with pupils from 3 kg to the red pointer.

Continue to reinforce the reading of mass of objects in compound units from the weighing scales through the following process:

- Draw pupil's attention to the maximum mass that the weighing scale can measure.
- Guide pupils to interpret the markings on the scale based on the division of equal parts.
- Guide pupils to read the mass of the object as shown by the pointer on the scale.
- Get pupils to count the markings out loud in compound units to where the pointer is.
- Finally ask pupils for the mass of the object.



5.

The mass of the chicken is more than 2 kg.
The mass of the chicken is 2 kg 300 g.

6.

The mass of the fish is more than 3 kg.
The mass of the fish is 3 kg 200 g.

7. Write the mass of each object.

(a)

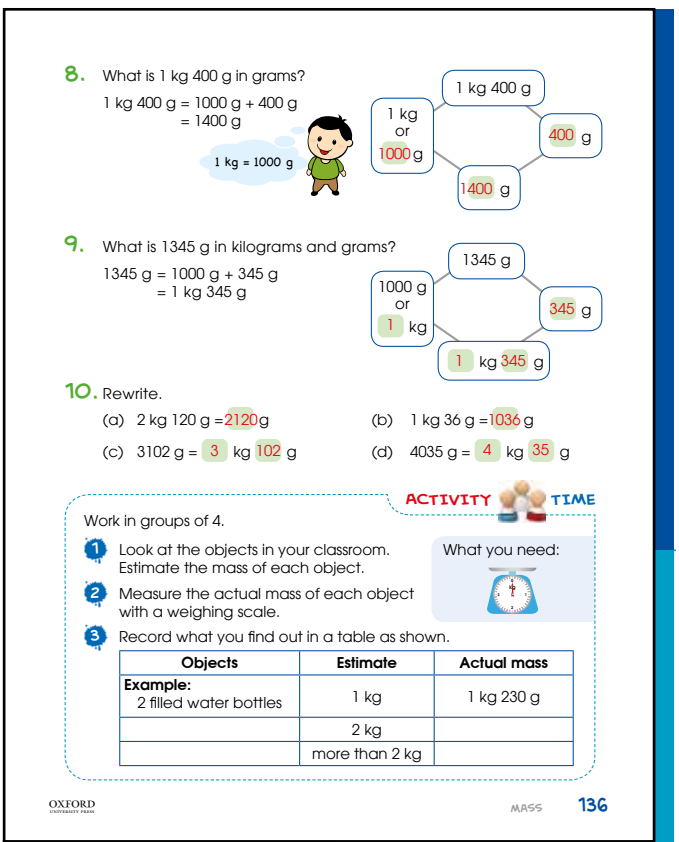
The mass of the potatoes is 2 kg 800 g.

(b)

The mass of the rice is 5 kg 400 g.

Textbook 3 P135

Continue to practice reading off the weighing scale in compound units for Let's Learn 5 to 7.



8. What is 1 kg 400 g in grams?

1 kg 400 g = 1000 g + 400 g
= 1400 g

9. What is 1345 g in kilograms and grams?

1345 g = 1000 g + 345 g
= 1 kg 345 g

10. Rewrite.

(a) 2 kg 120 g = 2120 g
(b) 1 kg 36 g = 1036 g
(c) 3102 g = 3 kg 102 g
(d) 4035 g = 4 kg 35 g

ACTIVITY TIME

Work in groups of 4.

1. Look at the objects in your classroom. Estimate the mass of each object.
2. Measure the actual mass of each object with a weighing scale.
3. Record what you find out in a table as shown.

What you need:

Objects	Estimate	Actual mass
Example: 2 filled water bottles	1 kg	1 kg 230 g
	2 kg	
	more than 2 kg	

Textbook 3 P136

Let's Learn 8 involves the conversion of units with the help of a box diagram. Highlight to the class that the mass of an item can be expressed in compound units (kg and g) or in simple units (kg or g).

First recap with pupils the conversion of kg to g (1 kg = 1000 g).

If the mass is given in kg and g (such as the case in Let's Learn 8), then we put them in two parts (or boxes) and change the kg to g; then we add them together in g.

If the mass is given in g only (such as the case in Let's Learn 9), we put them into two parts (1000 g and 400 g in this case), change 1000 g to 1 kg and then put them together as kg and g.

In Let's Learn 10, allow pupils to work in pairs. Get pupils to draw the box diagram and do the conversion by filling the boxes. Get pupils to check each other's work.

ACTIVITY TIME

Assign pupils to work in groups of 4.

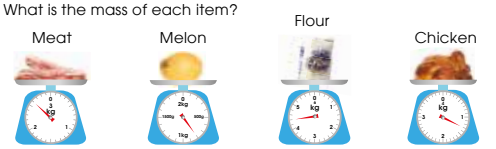
If possible, provide each group with two different weighing scales and ask pupils to observe the differences.

Pupils are to select an object based on their estimate, followed by finding the actual mass with the weighing scales provided.

Observe and listen to pupils as they read the scale in compound units.

PRACTICE

1. Read the scales.
What is the mass of each item?



2 kg 600 g | 0 kg 800 g | 4 kg 400 g | 1 kg 300 g

Arrange the objects in order of mass.
Start with the heaviest.

Flour, Meat, Chicken, Melon

2. Write in grams.

(a) 1 kg 570 g = 1570 g
(b) 5 kg 835 g = 5835 g
(c) 9 kg 21 g = 9021 g
(d) 3 kg 7 g = 3007 g

3. Write in kilograms and grams.

(a) 6709 g = 6 kg 709 g
(b) 4010 g = 4 kg 10 g
(c) 8316 g = 8 kg 316 g
(d) 3006 g = 3 kg 6 g

Complete Workbook 3A, Worksheet 1 • Pages 143 – 148

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Textbook 3 P137

PRACTICE

Go through Question 1 with the class. Get individual pupils to answer and ask them to explain how they read the scale to get the mass.

For questions 2 and 3, get pupils to work on the conversion on their mini whiteboards. Get pupils to show how they use the box diagram for the conversion.

For better understanding, select items from **Worksheet 1** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 3A P143 – 148).

Answers Worksheet 1 (Workbook 3A P143 – 148)

1. (a) 300 g
   (b) 800 g
   (c) 1 kg 700 g
   (d) 3 kg 600 g
   (e) 2 kg 900 g
   (f) 3 kg 100 g

2. (a) 400 g
   (b) 900 g
   (c) 1 kg 300 g
   (d) 1 kg 600 g

3. (a) 2 kg 100 g
   (b) 2 kg 600 g
   (c) 3 kg 400 g
   (d) 4 kg 800 g

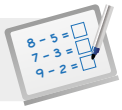
4. (a) 8000 g
   (b) 4000 g
   (c) 3 kg
   (d) 9 kg

5. (a) 1 kg 600 g = 1000 g + 600 g
   = 1600 g
   (b) 3 kg 430 g = 3000 g + 430 g
   = 3430 g
   (c) 8505 g = 8000 g + 505 g
   = 8 kg + 505 g
   (d) 4022 g = 4000 g + 22 g
   = 4 kg + 22 g

6. (a) 5 kg 30 g = 5000 g + 30 g
   = 5030 g
   (b) 9 kg 101 g
   = 9000 g + 101 g
   = 9101 g

7. 2 kg 399 g, 1 kg 880 g, 3 kg 50 g, 1 kg 302 g, 1 kg 100 g

LESSON PLAN



Specific Learning Focus

- Measure mass in kilograms (kg) and grams (g).
- Convert mass from kg and g to g, and vice versa.

Suggested Duration

4 periods

Prior Learning

Pupils have learnt the standard units of measurements for the masses of heavy and light objects. Kilograms and grams have been introduced in Grade 2.

Pre-emptive Pitfalls

In this lesson, pupils learn to express the mass of an item in compound units and to convert mass from kg and g to g, and vice versa. This can be a bit challenging for most pupils.

Introduction

Recap with pupils that 1 kg = 1000 g. Starting from '0' on the weighing scale, explain how much each marking represents. Give pupils lots of hands-on experience to read the scale. Bring light (weighing less than 1 kg) food items and objects to weigh on the scale. Use different ranges of scales to introduce compound units of kg and g (e.g. put a watermelon on the scale). Guide pupils to read off the last kg value and then count the remaining markings in grams.

Problem Solving

Emphasise the markings of a weighing scale. Help pupils interpret the mass each marking represents by dividing into equal parts.

Activities

Use the conversion of units template (Activity Handbook 3 P23) and select objects which are within the range of the weighing scale. Bring in a weighing scale that measures masses up to 4 kg (preferably) to measure the mass of real-life objects which can be expressed in compound units of kg and g.

Resources

- conversion of units template (Activity Handbook 3 P23)
- table of mass of objects (Activity Handbook 3 P24)
- markers
- weighing scale
- real-life objects

Mathematical Communication Support

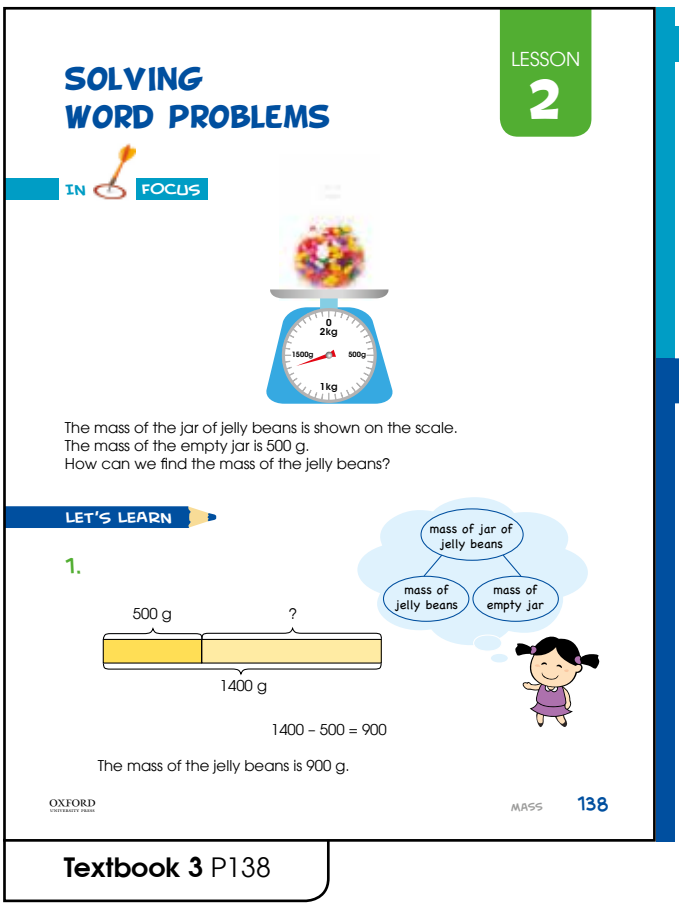
Discuss compound units of measurements in class using questions in Workbook 3A (P143 – 148). Emphasise that in expressing mass in compound units of kg and g, every 1000 g is converted to 1 kg, and the remaining mass of less than 1000 g is expressed in g. Encourage pupils to use the conversion of units template (Activity Handbook 3 P23) to help them.

LESSON 2

SOLVING WORD PROBLEMS

LEARNING OBJECTIVES

1. Solve word problems involving mass (addition and subtraction).
2. Solve word problems involving mass (multiplication and division).


SOLVING WORD PROBLEMS

LESSON 2

IN FOCUS

The mass of the jar of jelly beans is shown on the scale.
The mass of the empty jar is 500 g.
How can we find the mass of the jelly beans?

LET'S LEARN

1.

500 g ? 1400 g

mass of jar of jelly beans
mass of jelly beans
mass of empty jar

1400 – 500 = 900

The mass of the jelly beans is 900 g.

OXFORD

MASS 138

Textbook 3 P138

IN FOCUS

Invite pupils to talk about the jar of jelly beans and the weighing scale.

Get pupils to observe the jar of jelly beans and the weighing scale. Ask pupils what information they can get from the picture (the mass of the jar of jelly beans as indicated by the red pointer).

LET'S LEARN

Model the four stages of problem solving to guide pupils:

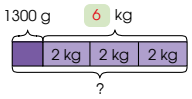
Step 1: Understanding the problem
- Allow silent reading before reading aloud with the class
- Underline the key elements
- Set pupils thinking about the following questions:
  - What do we know?
  - Are all the units the same?
  - What do we have to find?

Step 2: Translate key elements into a model
(Explain to pupils that a model helps them visualise the problem situation.)
- Draw the model
- Label the known and unknown elements

Step 3: Examine the model and write the number equation
- Lead pupils to see the part-part-whole concept in the problem structure.
- What do we need to find the unknown?
- Do we add or subtract to find it?

Step 4: Answer the question

2. Mrs Lee bought a chicken and 3 similar bags of rice.
The mass of the chicken was 1300 g and the mass of each bag of rice was 2 kg.
(a) What was the total mass of the bags of rice?
(b) What was the total mass of the chicken and the bags of rice? Give your answer in kilograms and grams.



(a) 3 × 2 = 6

The mass of the bags of rice was 6 kg.

(b) 6000 + 1300 = 7300

7300 g = 7 kg 300 g

1 kg = 1000 g
6 kg = 6000 g

The total mass of the chicken and the bags of rice was 7 kg 300 g.

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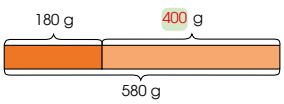
Textbook 3 P139

Work on Let's Learn 2 with the pupils using the four stage process of problem solving.

In this example, draw pupils' attention to the units of measurement used in the word problem. Remind pupils that they need to convert to a common unit of measurement if the given masses do not share the same units.

3. The mass of 3 muffins and 4 doughnuts is 580 g.
The mass of the 3 muffins is 180 g.
The mass of each doughnut is the same.
What is the mass of each doughnut?



580 − 180 = 400

The mass of 4 doughnuts is 400 g.

400 ÷ 4 = 100

The mass of each doughnut is 100 g.

4. The mass of a container with 20 identical metal balls is 480 g.
When 7 balls are removed, the mass of the container and the remaining balls is 417 g.
What is the mass of each ball?

480 − 417 = 63

The mass of 7 balls is 63 g.

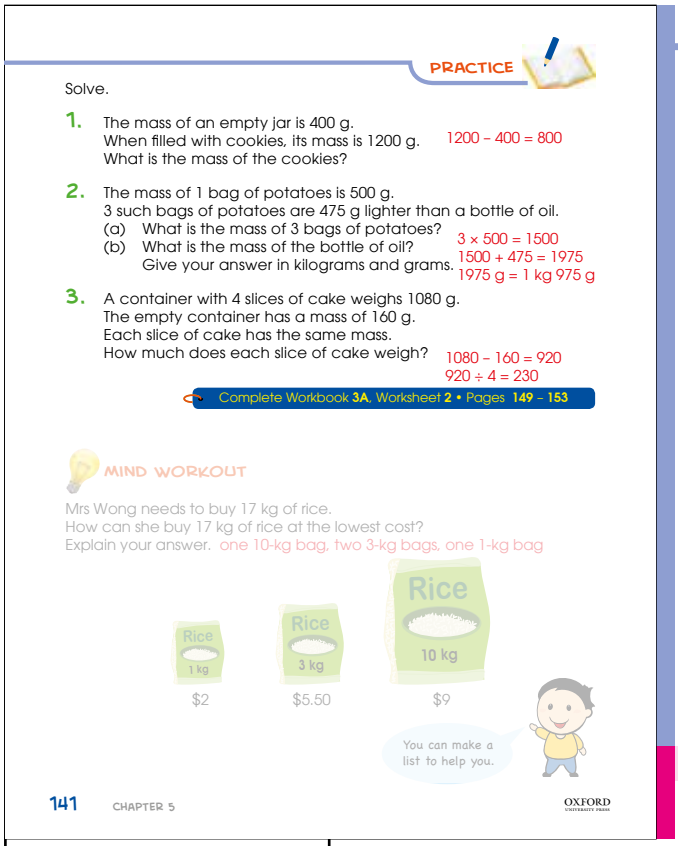
63 ÷ 7 = 9

The mass of each ball is 9 g.

OXFORD UNIVERSITY PRESS MASS 140

Textbook 3 P140

Let's Learn 3 and 4 are 2-step word problems. Get pupils to identify the hidden problem they need to solve before they can work on the main problem. Guide pupils to choose the correct operation based on the part-whole or comparison concepts.



PRACTICE

Solve.

1. The mass of an empty jar is 400 g.
When filled with cookies, its mass is 1200 g.
What is the mass of the cookies?
1200 – 400 = 800

2. The mass of 1 bag of potatoes is 500 g.
3 such bags of potatoes are 475 g lighter than a bottle of oil.
(a) What is the mass of 3 bags of potatoes?
(b) What is the mass of the bottle of oil?
Give your answer in kilograms and grams.
3 × 500 = 1500
1500 + 475 = 1975
1975 g = 1 kg 975 g

3. A container with 4 slices of cake weighs 1080 g.
The empty container has a mass of 160 g.
Each slice of cake has the same mass.
How much does each slice of cake weigh?
1080 – 160 = 920
920 ÷ 4 = 230

Complete Workbook 3A, Worksheet 2 • Pages 149 – 153

MIND WORKOUT

Mrs Wong needs to buy 17 kg of rice.
How can she buy 17 kg of rice at the lowest cost?
Explain your answer. one 10-kg bag, two 3-kg bags, one 1-kg bag

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Textbook 3 P141

PRACTICE

Allow pupils to work in pairs. One of the pupils will solve the question while the other will act as the facilitator.

The facilitator will ask or prompt with the following questions as the other pupil solves the problem.

Step 1: Read the word problem
- What do you know?
- What do you have to find? What do you have to find first?

Step 2: Draw the model and label the known and unknown elements

Step 3: Which operation would you use? Write the equation.

Step 4: Have you answered the question?

Exchange roles for the next problem.

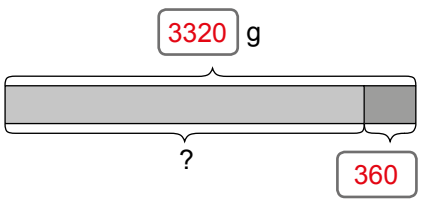
At the end of the session, select some of the pupils' solutions and share them with the class.

For better understanding, select items from **Worksheet 2** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 3A P149 – 153).

Answers Worksheet 2 (Workbook 3A P149 – 153)

1. 

3320 – 360 = 2960
The mass of the sand is 2 kg 960 g.

2. 2800 + 300 = 3100
The total mass of the sugar and the container is 3100 g.

3. 720 ÷ 9 = 80
The mass of salt in each packet is 80 g.

4. (a) 4500 – 1400 = 3100
The sack of rice is 3100 g heavier than the chicken.
(b) 1400 + 4500 = 5900
5900 g = 5 kg 900 g
The total mass of the sack of rice and the chicken is 5 kg 900 g.

5. (a) 37 – 32 = 5
Ahmad's cat has a mass of 5 kg.
(b) 32 – 5 = 27
Ahmad is 27 kg heavier than his cat.

6. 2 × 4 = 8
The total mass of the tins of paint is 8 kg.

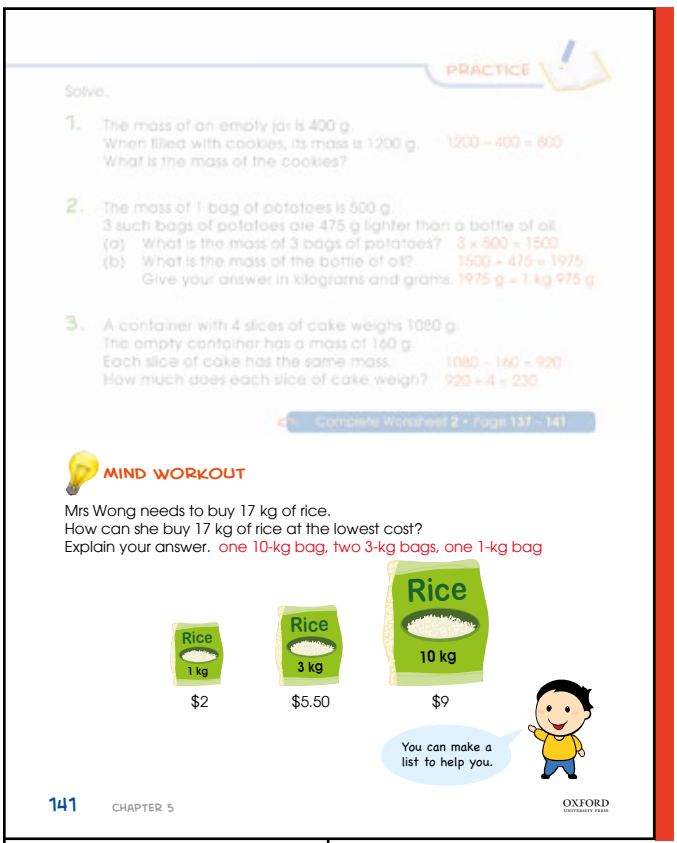
8 kg = 8000 g
8000 + 1100 = 9100
9100 g = 9 kg 100 g

The total mass of the box and the tins of paint is 9 kg 100 g.

7. 650 – 400 = 250
The buns weigh 250 g altogether.
250 ÷ 5 = 50
Each bun has a mass of 50 g.

8. 6 × 500 = 3000
The 6 packets of sugar have a mass of 3000 g.
3000 + 2500 = 5500
The total mass of the sugar and the sack of rice is 5500 g.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



PRACTICE

Solve.

1. The mass of an empty jar is 400 g.
When filled with cookies, its mass is 1200 g. 1200 − 400 = 800
What is the mass of the cookies?

2. The mass of 1 bag of potatoes is 500 g.
3 such bags of potatoes are 475 g lighter than a bottle of oil.
(a) What is the mass of 3 bags of potatoes? 3 × 500 = 1500
(b) What is the mass of the bottle of oil? 1500 + 475 = 1975
Give your answer in kilograms and grams. 1975 g = 1 kg 975 g

3. A container with 4 slices of cake weighs 1080 g.
The empty container has a mass of 160 g.
Each slice of cake has the same mass. 1080 − 160 = 920
How much does each slice of cake weigh? 920 ÷ 4 = 230

Complete Worksheet 2 • Page 137 – 141

MIND WORKOUT

Mrs Wong needs to buy 17 kg of rice.
How can she buy 17 kg of rice at the lowest cost?
Explain your answer. one 10-kg bag, two 3-kg bags, one 1-kg bag

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Textbook 3 P141

MIND WORKOUT

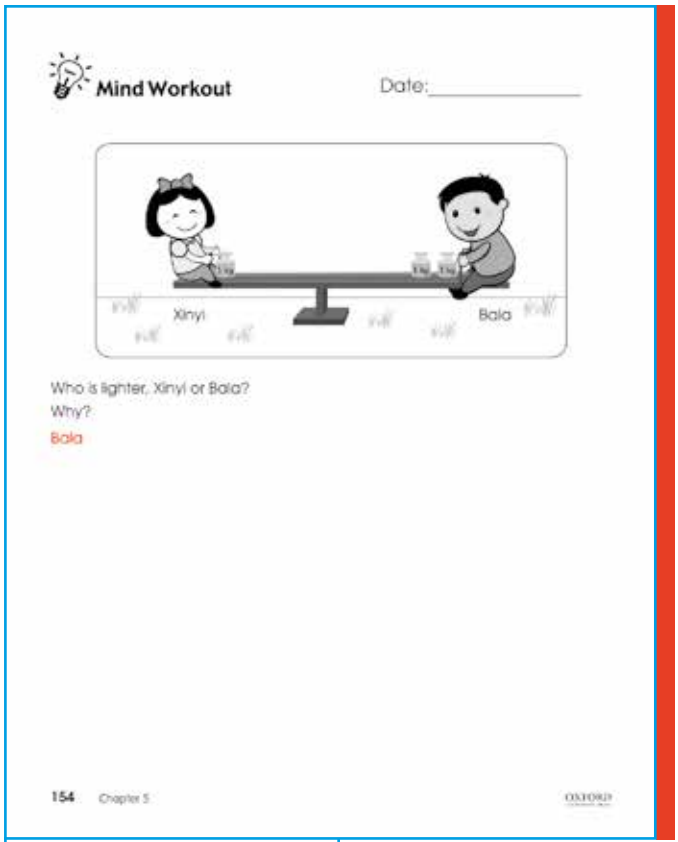
Allow pupils to work in pairs or groups for this problem.

Lead pupils to see that they save more if they buy a bigger pack, for instance, they save 50 cents if they buy one 3-kg pack compared to buying three 1-kg packs.

Pupils can do a listing, starting with the greatest number of 10-kg packs, for example:

Number of 10-kg packs	Number of 3-kg packs	Number of 1-kg packs	Total cost
1	2	1	$22
0	5	2	$31.50
0	6	1	$35
0	0	17	$34

When pupils work out the cost, they will find that the first way as listed in the above table gives them the lowest cost.


Mind Workout

Date:_____

Who is lighter, Xinyi or Bala?

Why?

Bala

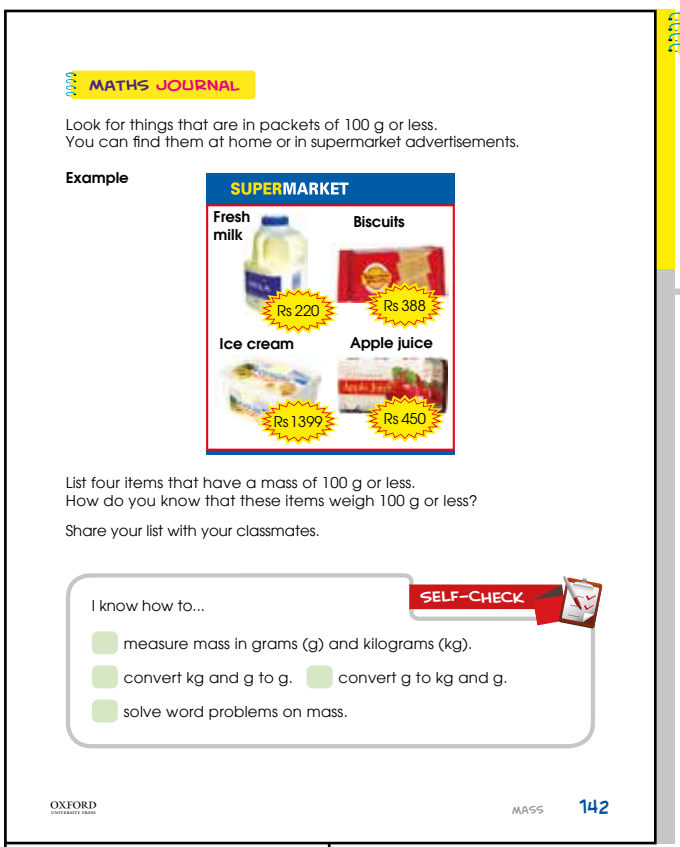
154 Chapter 5

OXFORD

Workbook 3A P154

Mind Workout

Pupils are expected to use logical deduction to explain why Bala is lighter than Xinyi, using the 1-kg masses that they each have.


MATHS JOURNAL

Look for things that are in packets of 100 g or less.
You can find them at home or in supermarket advertisements.

Example

List four items that have a mass of 100 g or less.
How do you know that these items weigh 100 g or less?

Share your list with your classmates.

I know how to...

SELF-CHECK

- measure mass in grams (g) and kilograms (kg).
- convert kg and g to g.
- convert g to kg and g.
- solve word problems on mass.

OXFORD

MASS 142

Textbook 3 P142

MATHS JOURNAL

This activity can be done with parents or guardians at home. When possible, ask pupils to cut the pictures or take photos of the items to bring for a show and tell session in class.

SELF-CHECK

Before the pupils do the self-check, review the important concepts once more by asking for examples learnt for each objective.

This self-check can be done after pupils have completed **Review 5** (Workbook 3A P155– 160) as consolidation of understanding for the chapter.

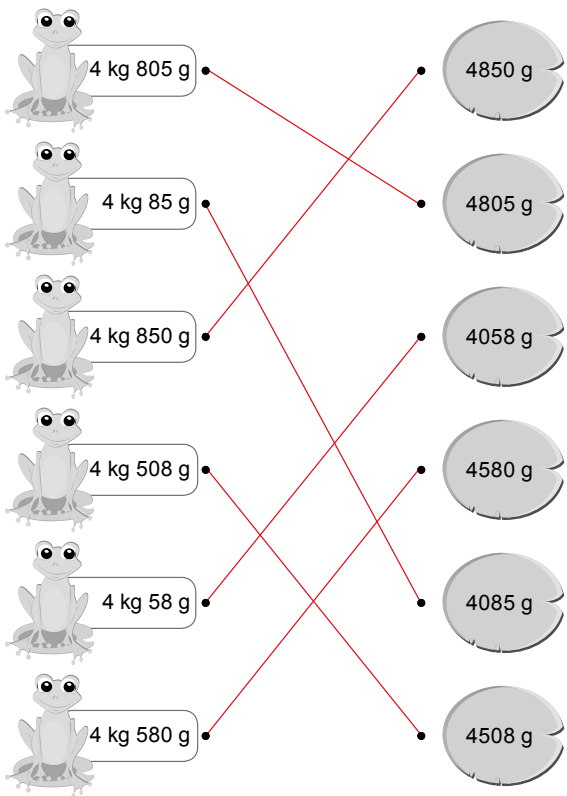
Answers Review 5 (Workbook 3A P155 – 160)

1. (a) 650 g
   (b) 300 g
   (c) 4 kg 800 g
   (d) 1 kg 800 g

2. (a) 1900 g
   (b) 7015 g
   (c) 2002 g
   (d) 3425 g
   (e) 4702 g

3. (a) 1 kg 290 g
   (b) 6 kg 69 g
   (c) 4 kg 4 g
   (d) 8 kg 700 g
   (e) 7 kg 365 g

4.



5. (a) True
   (b) False
   (c) True
   (d) 8480 g
   5500 + 2980 = 8480
   (e) 980 g
   2 kg = 2000 g
   2980 – 2000 = 980

6. 650 + 800 = 1450
   1450 g = 1 kg 450 g

   The total mass of the bag of carrots and the bag of tomatoes is 1 kg 450 g.

7. (a) 420 ÷ 3 = 140
   1 packet of salt has a mass of 140 g.
   (b) 400 + 140 = 540
   The bag of sugar has a mass of 540 g.

8. 97 – 35 = 62
   Siti's mother's mass is 62 kg.
   62 – 35 = 27
   The difference in Siti's mass and her mother's mass is 27 kg.

9. 5 × 600 = 3000
   The total mass of the mangoes is 3000 g.
   2300 + 3000 = 5300
   5300 g = 5 kg 300 g
   The total mass of the mangoes and the watermelon is 5 kg 300 g.

VOLUME

CHAPTER 6

Textbook 3 P143

Related Resources
NSPM Textbook 3 (P143 – 157)
NSPM Workbook 3A (P161 – 174)

Materials
Containers for storing liquids, beakers (100 ml, 500 ml and 1 ℓ), markers

Lesson

Lesson 1	Volume in Millilitres
Lesson 2	Volume in Litres and Millilitres
Lesson 3	Solving Word Problems

Problem Solving, Math Journal and Pupil Review

INTRODUCTION

In Grade 2, pupils have learnt the concept of volume of liquid and the use of litres (ℓ) as a standard unit of measuring liquids. At Grade 3, millilitres (ml) is introduced for measuring small volumes and that 1 ℓ is equivalent to 1000 ml. Pupils also learn the concept of capacity of a container. Compound units in volume and conversion of compound units to simple units (and vice versa) are reinforced. It is important that the pupils are given practical experience in measuring capacities and volumes using 1-ℓ, 500-ml and 100-ml measuring beakers. Other materials like sand or beans could be used as a substitute for liquid in the activities. Word problems involving volume and capacity in everyday context enable pupils to understand its application in real life and to select the correct operation in solving them.

LESSON 1

VOLUME IN MILLILITRES

LEARNING OBJECTIVE

1. Measure volume of liquid in millilitres (ml).


Volume

CHAPTER 6

Which containers contain less than 1 litre of liquid?

VOLUME IN MILLILITRES

LESSON 1

IN FOCUS

The volume of liquid in the jug is 1 litre.
The remaining three containers each contain less than 1 litre of liquid.
How can we find the amount of liquid in each container?

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Textbook 3 P143

IN FOCUS

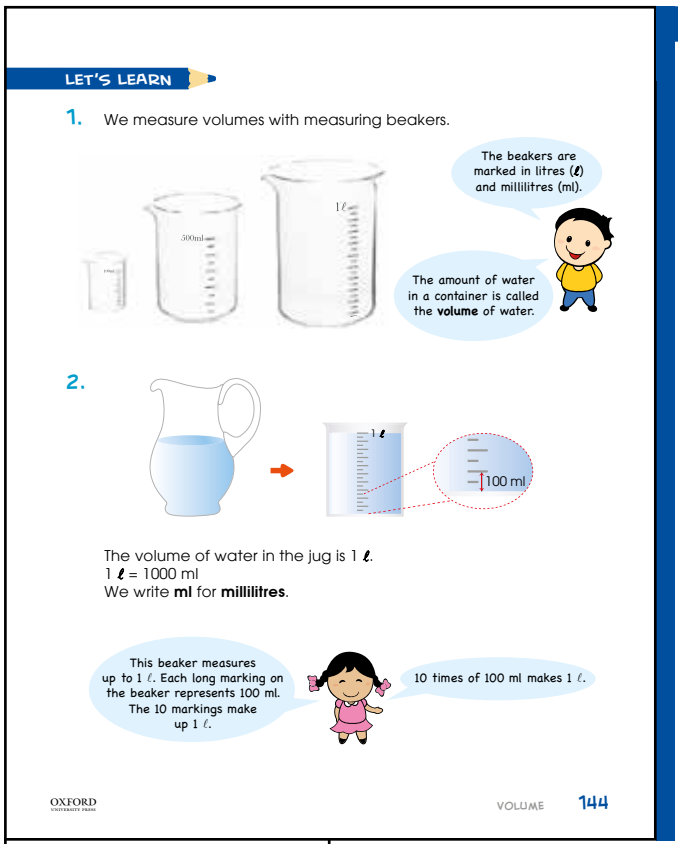
This is a recap of pupils' concept of volume as the amount of liquid in a container, as well as estimation of volumes more than or less than 1 litre.

For a better illustration of this concept, bring four containers (as shown in In Focus) of coloured water into class, one containing 1 ℓ of liquid and others of smaller volumes. Ask pupils to estimate the amount of water in containers containing less than 1 ℓ of liquid, based on the jug holding 1 ℓ of liquid. Most pupils should be able to see that the volumes are less than 1 ℓ.

Ask pupils the following questions to help recap the concepts of volume learnt in Grade 2.

- What is another word for amount of water? (volume)
- What is the standard measure we have learnt for volume of water? (litre)

Next, ask pupils how they can measure volumes less than 1 ℓ and what units are used to measure such small volumes.



Textbook 3 P144

LET'S LEARN

In Let's Learn 1, pupils get to see the relative volumes of 100 ml, 500 ml and 1 ℓ.

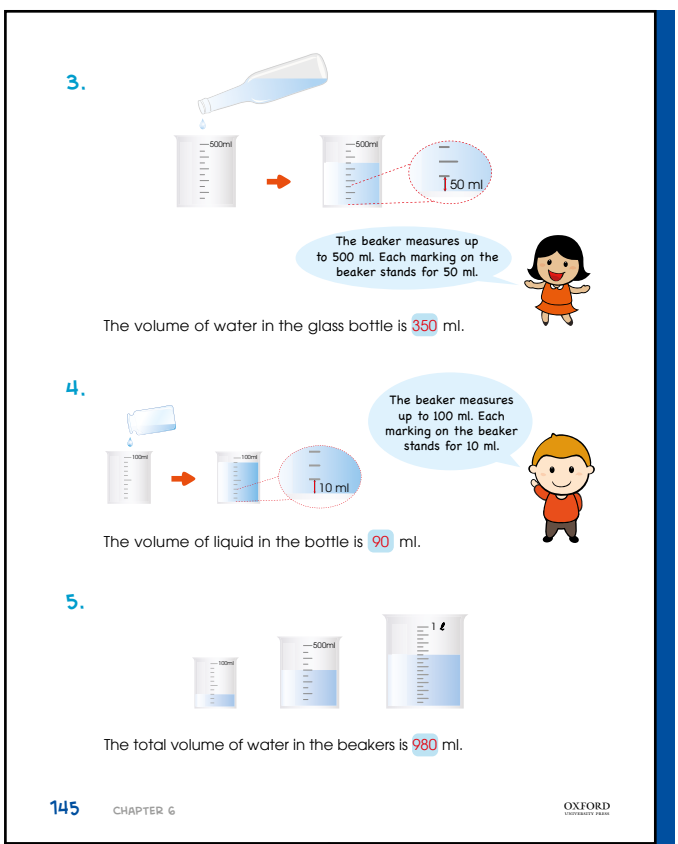
Display the beakers to the class and ask pupils what the beakers can be used for. Show the scale of each empty beaker on the visualiser and explain the markings and units.

Focus on the 100-ml and 500-ml beaker. Write **millilitre (ml)** and introduce this as another standard unit for small volumes of less than 1 ℓ. Ask pupils if they have seen the unit ml on labels of objects around them (such as their water bottles).

For Let's Learn 2, bring out the container (or jug) containing 1 litre of water and pour the water into a 1-ℓ beaker. Once the liquid is poured, draw the pupils' attention to the water level and the markings on the beaker.

Produce an enlarged drawing of the scale on the beaker on the visualiser to enable pupils to see the markings and read the scale. This also helps to explain how 1000 ml is equivalent to 1 ℓ.

To reinforce further that 1 ℓ = 1000 ml, take 1 ℓ of liquid and fill two 500-ml beakers, this shows that 500 ml + 500 ml = 1000 ml, which is also equivalent to 1 ℓ.



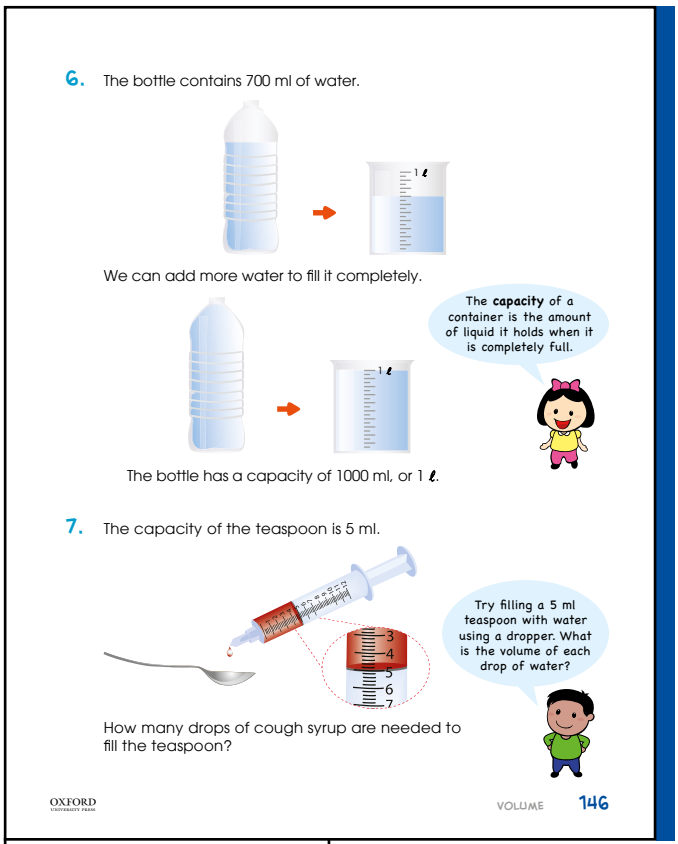
Textbook 3 P145

For Let's Learn 3, show the markings on the empty 500-ml beaker and explain that each marking stands for 50 ml. Bring out a bottle which contains less than 500 ml of water and use the 500-ml beaker to measure the liquid.

Pour the water into the beaker and ask the class to observe the water level and the markings against it. Alternatively, show an enlarged drawing of the scale on the beaker and mark the water level for the class to tell the volume.

Repeat the same process for Let's Learn 4, using the 100-ml beaker to measure the volume instead.

In Let's Learn 5, allow pupils to observe the water levels for a while and invite pupils to read the volume in each beaker. Ask them what is meant by 'total volume'.



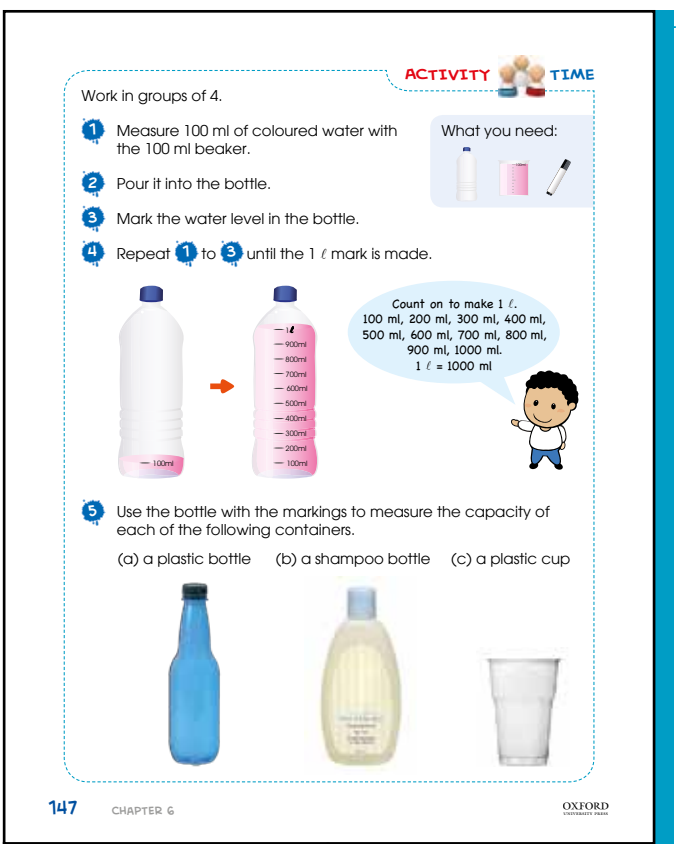
Textbook 3 P146

The concept of capacity is introduced in example 6. Highlight to pupils that the bottle is partially-filled and demonstrate the filling of the bottle. Tell pupils that the amount of liquid that a container holds when it is completely full is **capacity**.

Measure the capacity of the bottle by pouring the water into a 1-ℓ beaker. Show that the beaker contains 1 ℓ of water and hence, the capacity of the bottle is 1 ℓ.

The capacity of a pupil's water bottle can also be measured for further reinforcement of the concept of capacity.

Let's Learn 7 helps pupils to have a sense of small volumes of less than 10 ml. Measure the capacity of a teaspoon with a water syringe.



Textbook 3 P147

ACTIVITY TIME

Assign pupils to work in groups of 4.

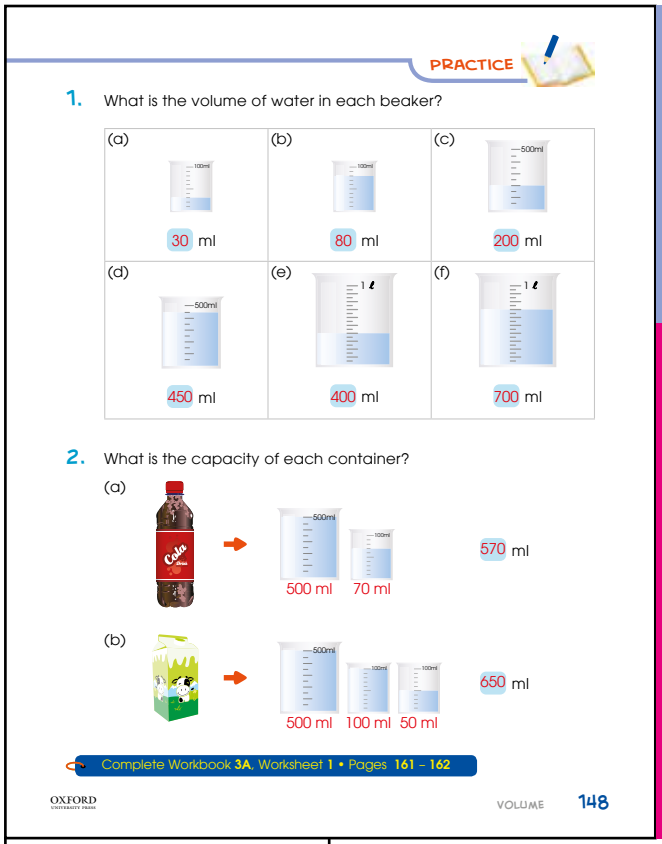
There is a need for careful organisation and selection of the appropriate containers in this group activity. Pupils may be encouraged to bring an empty bottle of any kind from home. Prior to the activity, get pupils to remove all the labels off the containers.

For practical reasons, sand or beans can be used instead of water.

Observe how pupils fill the beaker to measure out 100 ml of water; they should fill it to the 100 ml mark and not to the brim. It is important that pupils estimate the capacities of the empty containers before measuring.

Remind pupils that measurements read off the bottle are approximations and they should use language such as 'the capacity of the plastic bottle is about 400 ml'.

Have a class discussion after the activity, for each group to share their experience.


PRACTICE

1. What is the volume of water in each beaker?

(a) 30 ml (b) 80 ml (c) 200 ml

(d) 450 ml (e) 400 ml (f) 700 ml

2. What is the capacity of each container?

(a) 500 ml + 70 ml → 570 ml

(b) 500 ml + 100 ml + 50 ml → 650 ml

Complete Workbook 3A, Worksheet 1 • Pages 161 – 162

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Textbook 3 P148

PRACTICE

Get some pupils to read the scale. Get another pupil to verify the answer or explain if the answer is incorrect.

For better understanding, select items from **Worksheet 1** and work these out with the pupils.

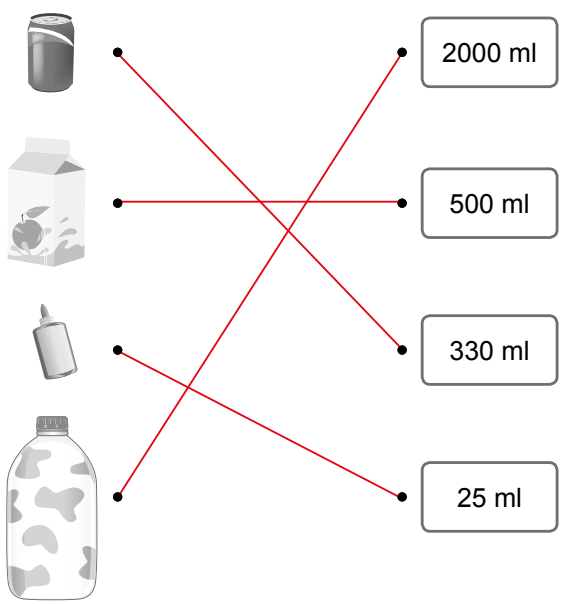
Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 3A P161 – 162).

Answers

Worksheet 1 (Workbook 2A P161 – 162)

1.

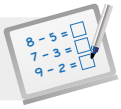


2. (a) 900
   (b) 200
   (c) 100
   (d) 450
   (e) 10
   (f) 70

3. (a) 200 ml + 60 ml → 260 ml

   (b) 700 ml + 20 ml → 720 ml

LESSON PLAN



Specific Learning Focus

- Measure volume of liquid in millilitres (ml).

Suggested Duration

3 periods

Prior Learning

Pupils have learnt that the volume of an object is the amount of space contained in the object. The standard unit of measurement for volume is litres (ℓ). In this lesson, millilitres (ml) is introduced.

Pre-emptive Pitfalls

Since compound units of measurements and conversion of compound units have been introduced in Chapter 5, this chapter should be less challenging for pupils.

Introduction

'In Focus' (Textbook 3 P143) introduces the concept of milli (1000) litres using containers filled with 1 litre of liquid and less than 1 litre of liquid respectively. Ask pupils for water bottles that have markings and show it to the class. The markings between every litre represent volumes in millilitres as 1000 ml = 1 ℓ. Explain the markings on different containers and express the volumes in the compound units. In Let's Learn 6 (Textbook 3 P146), explain that each marking on the beaker represents 50 ml since the beaker has 20 markings up to 1 ℓ (1000 ml ÷ 20 = 50 ml for each marking). In Let's Learn 7 (Textbook 3 P146), the syringe has markings in millilitres only. The concept of capacity is introduced. In lesson 2, expressing capacity in compound units of measurements and conversion from ml to ℓ and vice versa are done progressively.

Problem Solving

Look out for pupils' common errors in conversion (e.g. pupils might mistakenly make the same conversion of 2050 ml and 2500 ml respectively, when in fact, 2050 ml = 2 ℓ 50 ml, while 2500 ml = 2 ℓ 500 ml). Use the conversion of units template (Activity Handbook 3 P25) to do the conversions to compound units (Textbook 3 P151 – 153).

Activities

In 'Activity Time' (Textbook 3 P147), get pupils to mark out every 100 ml on the bottle. Encourage pupils to bring bottles with different capacities and put them on the table for all to see and measure, giving the measurements in compound units.

Resources

- measuring cylinders
- beakers
- containers of various capacities
- conversion of units template (Activity Handbook 3 P25)
- markers

Mathematical Communication Support

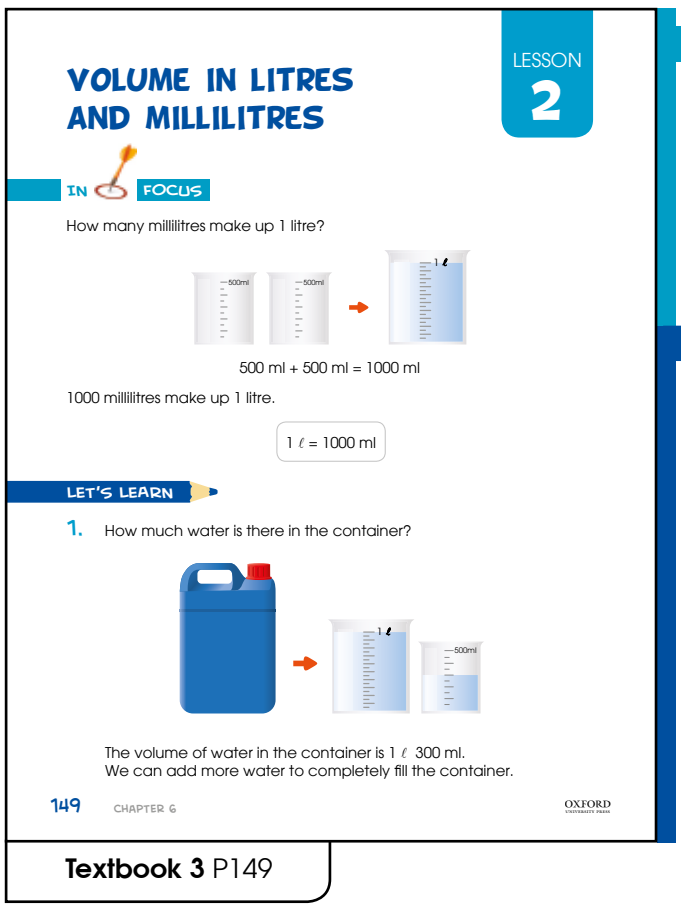
Encourage class discussions. Do a lot of pouring and measurements of volumes of coloured liquids. Bring any orange powdered drink mix to the classroom and get pupils to follow the instructions on the sachet to make the drink. Use of key terms like 'litres', 'millilitres', 'capacity', 'measuring cylinder', 'beaker', 'markings' and 'gradings' are extremely important for pupils to be well-versed in the concept of the volume of liquids.

LESSON 2

VOLUME IN LITRES AND MILLILITRES

LEARNING OBJECTIVES

1. Measure volume of liquid in litres and millilitres.
2. Convert litres and millilitres to millilitres, and vice versa.



VOLUME IN LITRES AND MILLILITRES

LESSON 2

IN FOCUS

How many millilitres make up 1 litre?

500 ml + 500 ml = 1000 ml

1000 millilitres make up 1 litre.

1 ℓ = 1000 ml

LET'S LEARN

1. How much water is there in the container?

The volume of water in the container is 1 ℓ 300 ml.
We can add more water to completely fill the container.

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Textbook 3 P149

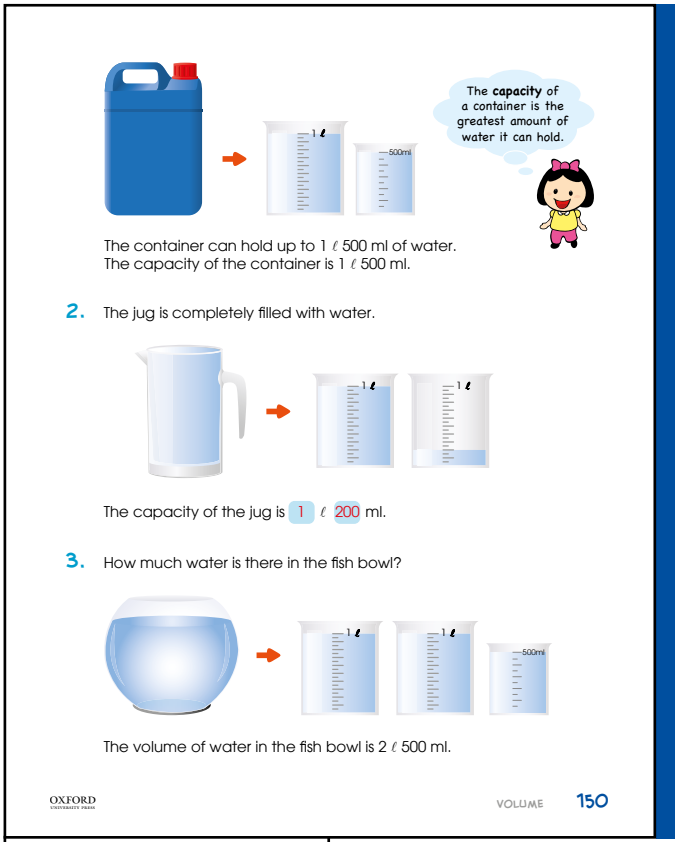
IN FOCUS

This is a recap of 1 ℓ = 1000ml. Recap with pupils the last activity (P147) and ask them how they made a 1-ℓ measuring bottle using a 100-ml beaker. Review with them that they poured 100 ml into the bottle 10 times to make 1 ℓ (i.e. 10 × 100 = 1000 ml, 1 ℓ = 1000 ml). Use two 500-ml beakers to confirm this equivalence.

LET'S LEARN

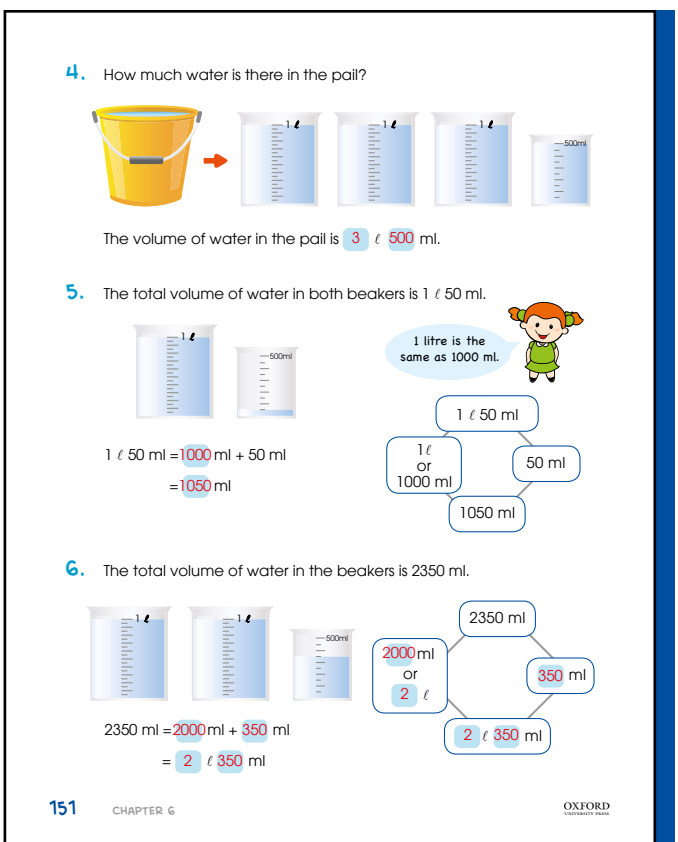
For Let's Learn 1, bring a partially-filled container to class and shake the contents to show that it is not full. Pour the water into measuring beakers to find the volume of the water. Ask pupils to read the volume.

Ask pupils for suggestions to find the capacity of the container. Gauge the pupils' understanding on the concept of capacity based on their suggestions. Pupils are expected to suggest for the container to be completely filled with water first, followed by the measurement of the water in the container using beakers.



Textbook 3 P150

For Let's Learn 2 and 3, introduce compound units for the measuring of volumes more than 1 ℓ.



Textbook 3 P151

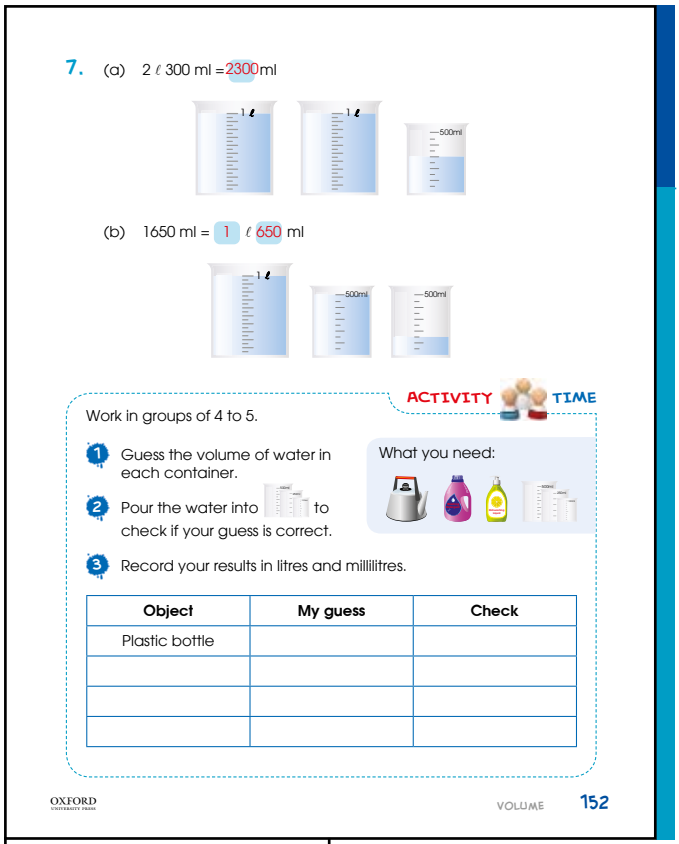
Likewise in Let's Learn 4, pupils are required to measure the volume of liquid in compound units.

Let's Learn 5 and 6 deal with the conversion of compound units to simple units, and vice versa.

In Let's Learn 5, the total volume of water is expressed in compound units. Show pupils that the volume can be converted into simple units. First recap with pupils that 1 ℓ = 1000 ml.

Use the box diagram to show pupils how to separate the units and convert the litres to millilitres, and then add to combine them in millilitres.

In Let's Learn 6, the volume of water is expressed in simple units. Show the conversion process with the box diagram given.



7. (a) 2 ℓ 300 ml = 2300 ml

(b) 1650 ml = 1 ℓ 650 ml

ACTIVITY TIME

Work in groups of 4 to 5.

1. Guess the volume of water in each container.
2. Pour the water into ___ to check if your guess is correct.
3. Record your results in litres and millilitres.

What you need:

Object	My guess	Check
Plastic bottle		

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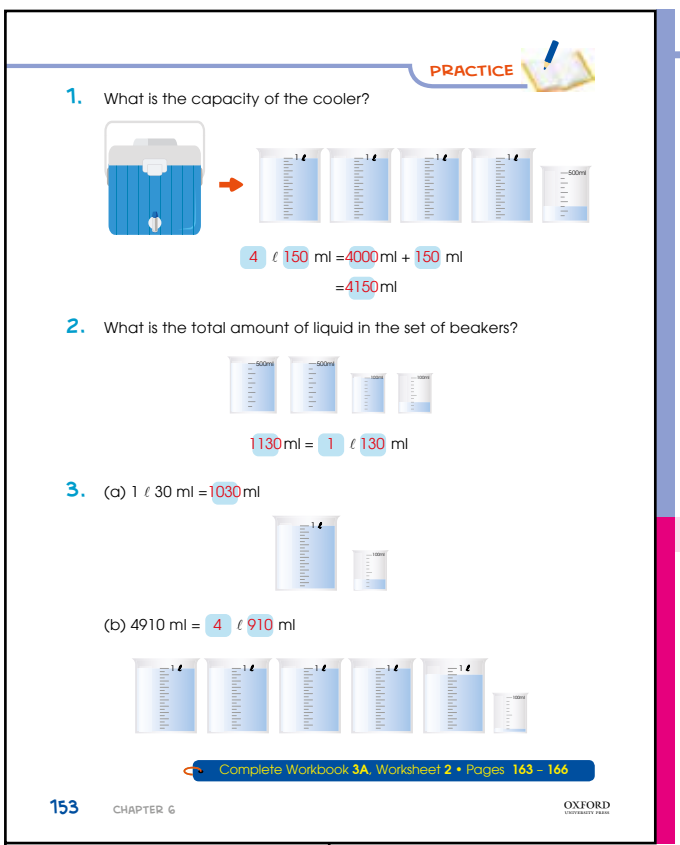
Textbook 3 P152

Get pupils to work on Let's Learn 7 in pairs. Encourage them to use the box diagram to convert the units. Invite pupils to show to the class how they get their answers.

ACTIVITY TIME

Assign pupils to work in groups of 4 or 5.

This activity gives pupils hands-on experience of estimating and measuring volumes of water in compound units. This reinforces pupils' skills in using the appropriate measuring beakers and in reading the scale of the beakers.



PRACTICE

1. What is the capacity of the cooler?

4 ℓ 150 ml = 4000 ml + 150 ml
= 4150 ml

2. What is the total amount of liquid in the set of beakers?

1130 ml = 1 ℓ 130 ml

3. (a) 1 ℓ 30 ml = 1030 ml

(b) 4910 ml = 4 ℓ 910 ml

Complete Workbook 3A, Worksheet 2 • Pages 163 – 166

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Textbook 3 P153

PRACTICE

Get some pupils to read the scale and give the volume. Get another pupil to verify the answer or explain if the answer is incorrect.

Look out for common errors made by pupils, such as show place value error (e.g. 1 ℓ 30 ml = 1300 ml). Encourage pupils to use the box diagram during conversion of units.

For better understanding, select items from **Worksheet 2** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 3A P163 – 166).

Answers Worksheet 3B (Workbook 2A P163 – 166)

1. (a) 1, 350
   (b) 1, 380
   (c) 2, 350
   (d) 1, 700
   (e) 2, 30

2. (a) 20
   (b) 320
   (c) 1, 500
   (d) 2, 600
   (e) 1, 100

3. (a) 550
   (b) 1250
   (c) 1190

4. (a) 6205
   (b) 1000, 200, 1200
   (c) 1030
   (d) 2005

5. (a) 7, 600
   (b) 1000, 190, 1, 190
   (c) 2, 80
   (d) 5, 1

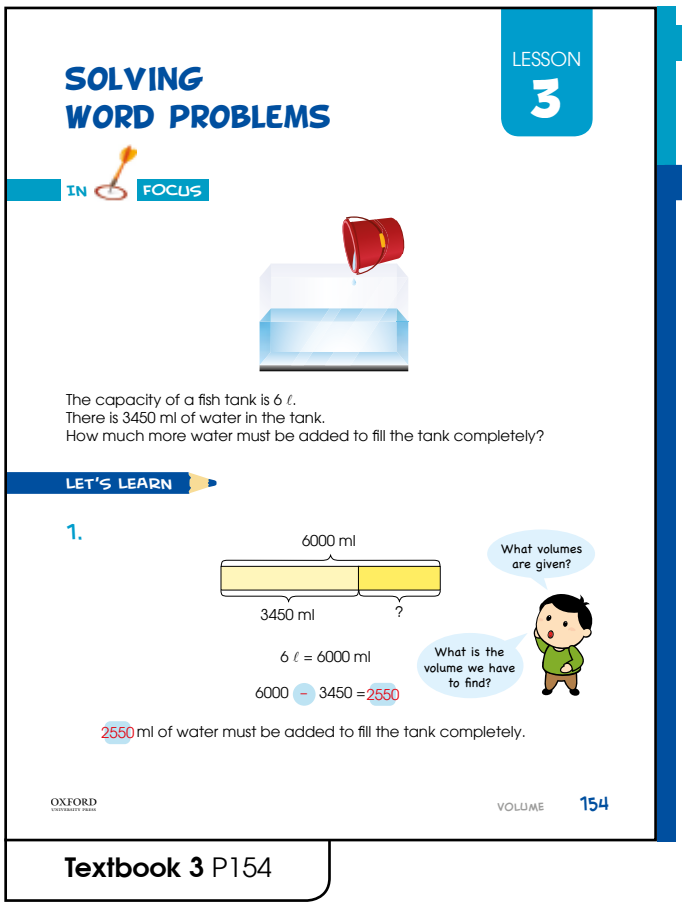
6. (a) 5, 0
   (b) 3, 405
   (c) 6, 5
   (d) 1230
   (e) 2065
   (f) 3005

LESSON 3

SOLVING WORD PROBLEMS

LEARNING OBJECTIVE

1. Solve word problems involving volume and capacity.


SOLVING WORD PROBLEMS

LESSON 3

IN FOCUS

The capacity of a fish tank is 6 ℓ.
There is 3450 ml of water in the tank.
How much more water must be added to fill the tank completely?

LET'S LEARN

1.

6000 ml

3450 ml ?

What volumes are given?

What is the volume we have to find?

6 ℓ = 6000 ml

6000 − 3450 = 2550

2550 ml of water must be added to fill the tank completely.

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Textbook 3 P154

IN FOCUS

Get pupils to discuss the solution to the problem.

LET'S LEARN

Model the four stages of problem solving to guide pupils:

Step 1: Understanding the problem

- Allow silent reading before reading aloud with the class
- Underline the key elements
- Set pupils thinking about the following questions:
  - What do we know?
  - What units are used?
  - How do we convert the units so that all measurements share the same units?
  - What do we have to find?

Step 2: Translate key elements into a model
(Explain to pupils that a model helps them visualise the problem situation.)

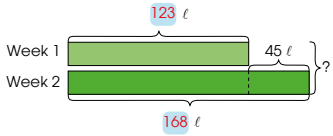
- Draw the model
- Label the known and unknown elements

Step 3: Examine the model and write the number equation

- Lead pupils to see the part-part-whole concept in the problem structure.
- What do we need to find the unknown?
- Do we add or subtract to find it?

Step 4: Answer the question

2. Mr Tan used 123 ℓ of petrol in Week 1.
In Week 2, he needed 45 ℓ more petrol than in Week 1.
(a) What was the volume of petrol that he needed in Week 2?
(b) What was the total volume of petrol he used in both weeks?



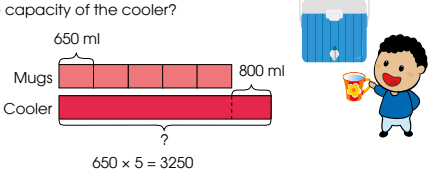
(a) 123 + 45 = 168

Mr Tan needed 168 ℓ of petrol in Week 2.

(b) 123 + 168 = 291

The total volume of petrol he used in both weeks was 291 ℓ.

3. A cooler is completely filled with water.
Farhan drains the water from the cooler into 5 mugs until each is full.
The capacity of each mug is 650 ml.
There is 800 ml of water left in the cooler.
What is the capacity of the cooler?



650 × 5 = 3250

There is 3250 ml of water in the 5 mugs.

3250 + 800 = 4050

The capacity of the cooler is 4050 ml.

Textbook 3 P155

Work on Let's Learn 2 and 3 with the pupils using the four stage process of problem solving.

Note that Let's Learn 3 is a 2-step word problem. Guide pupils by asking what they have to find before working towards the main problem. Guide pupils to choose the correct operation based on the part-whole or comparison concepts.

PRACTICE

Solve.

1. A cup can hold 150 ml of coffee.
A coffee pot can hold 6 times as much coffee as the cup.
What is the capacity of the coffee pot? 150 × 6 = 900

2. Bina drinks 600 ml of milk each day.
Her brother drinks 500 ml of milk each day. 600 + 500 = 1100
(a) How much milk do they drink altogether each day?
(b) How much milk do they drink altogether in 7 days?
Give all your answers in litres and millilitres. 1100 × 7 = 7700
7700 ml = 7 ℓ 700 ml

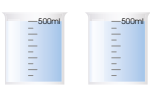
3. Farhan bought 2 ℓ of milk.
He drank 450 ml of it on the first day and 550 ml on the second day. 450 + 550 = 1000
How much milk was left after the two days? 2 ℓ = 2000 ml
2000 – 1000 = 1000

Complete Workbook 3A, Worksheet 3 • Pages 167 – 169

MIND WORKOUT

What are the ways you can measure out 1 ℓ of water with these beakers?

Example



500 ml + 500 ml = 1000 ml
= 1 ℓ

Textbook 3 P156

PRACTICE

Continue to guide pupils by solving these word problems with them and modelling the four stages of problem solving.

For better understanding, select items from **Worksheet 3** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 3A P167 – 169).

Answers Worksheet 3 (Workbook 3B P167 – 169)

1. 2 ℓ = 2000 ml
   2000 – 1635 = 365
   365 ml more milk must be added to completely fill the jug.

2. 400 + 650 = 1050
   1050 + 540 = 1590
   1590 ml = 1 ℓ 590 ml
   The children drink 1 ℓ 590 ml of milk altogether.

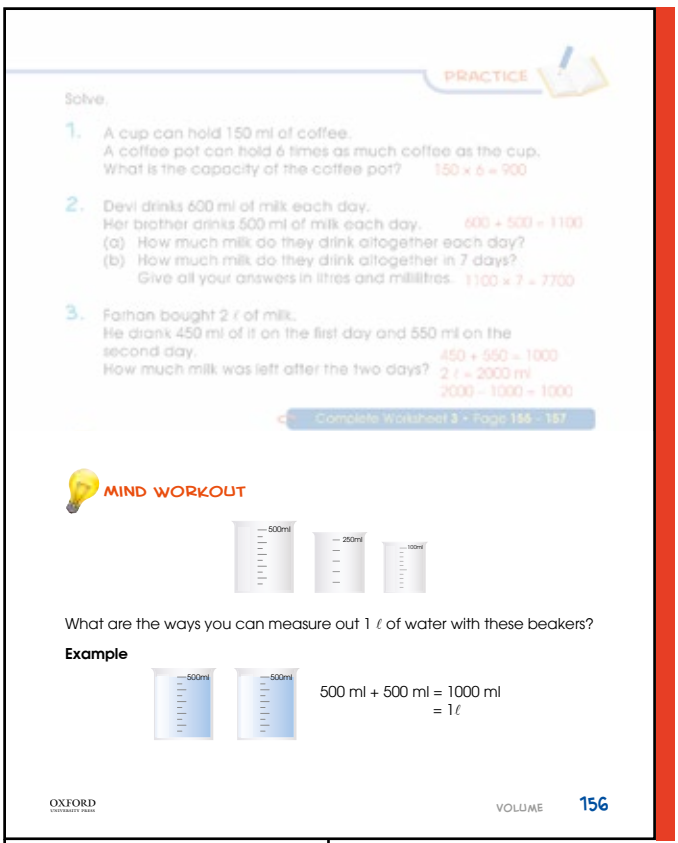
3. (a) 3500 – 950 = 2550
   2550 ml of water was poured out of the container.
   (b) 2550 – 1360 = 1190
   The volume of water in Bottle B was 1190 ml.

4. (a) 650 × 5 = 3250
   3250 ml of water is poured out of the container.
   (b) 4 ℓ = 4000 ml
   4000 – 3250 = 750
   750 ml of water is left in the container.

5. 600 × 8 = 4800
   4800 ml of water was poured into the container.
   3000 + 4800 = 7800
   7800 ml = 7 ℓ 800 ml
   Mrs Lee made a total of 7 ℓ 800 ml of fruit punch.

6. 4035 – 435 = 3600
   3600 ml of oil is used to fill the bottles.
   3600 ÷ 6 = 600
   The capacity of each bottle is 600 ml.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



PRACTICE

Solve.

1. A cup can hold 150 ml of coffee.
A coffee pot can hold 6 times as much coffee as the cup.
What is the capacity of the coffee pot? 150 × 6 = 900

2. Devi drinks 600 ml of milk each day.
Her brother drinks 500 ml of milk each day. 600 + 500 = 1100
(a) How much milk do they drink altogether each day?
(b) How much milk do they drink altogether in 7 days?
Give all your answers in litres and millilitres. 1100 × 7 = 7700

3. Farhan bought 2 ℓ of milk.
He drank 450 ml of it on the first day and 550 ml on the second day.
How much milk was left after the two days? 450 + 550 = 1000
2 ℓ = 2000 ml
2000 − 1000 = 1000

Complete Worksheet 3 • Page 155 – 157

MIND WORKOUT

What are the ways you can measure out 1 ℓ of water with these beakers?

Example

500 ml + 500 ml = 1000 ml
= 1 ℓ

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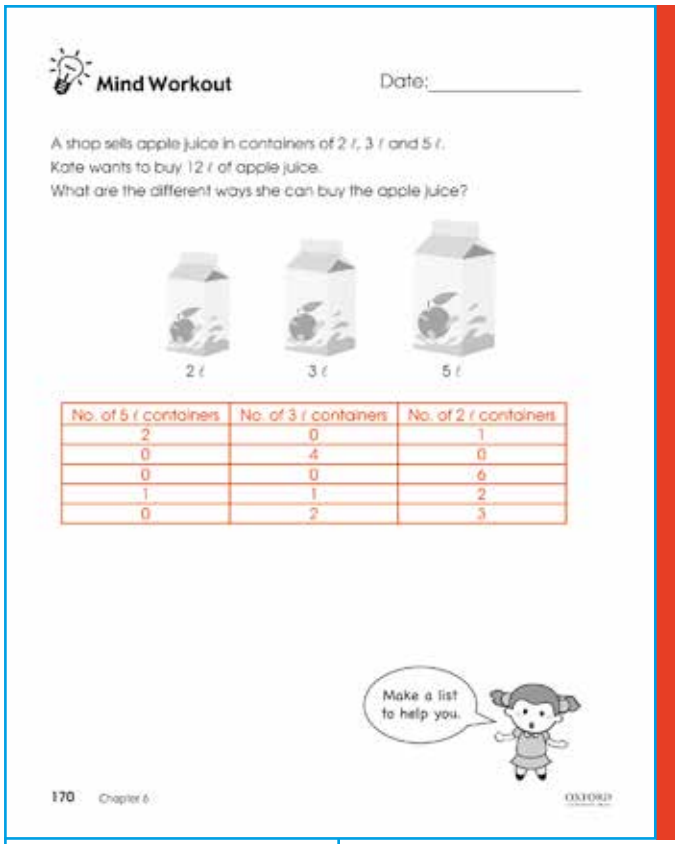
Textbook 3 P156

MIND WORKOUT

Allow pupils to work in pairs or groups for this problem.

Encourage pupils to be systematic when working out the various ways of measuring 1 ℓ of water.

Since there are many possibilities, the group with the greatest number of ways within a given amount of time can be rewarded.



Mind Workout

Date:_____

A shop sells apple juice in containers of 2 ℓ, 3 ℓ and 5 ℓ.
Kate wants to buy 12 ℓ of apple juice.
What are the different ways she can buy the apple juice?

No. of 5 ℓ containers	No. of 3 ℓ containers	No. of 2 ℓ containers
2	0	1
0	4	0
0	0	6
1	1	2
0	2	3

170 Chapter 6 OXFORD

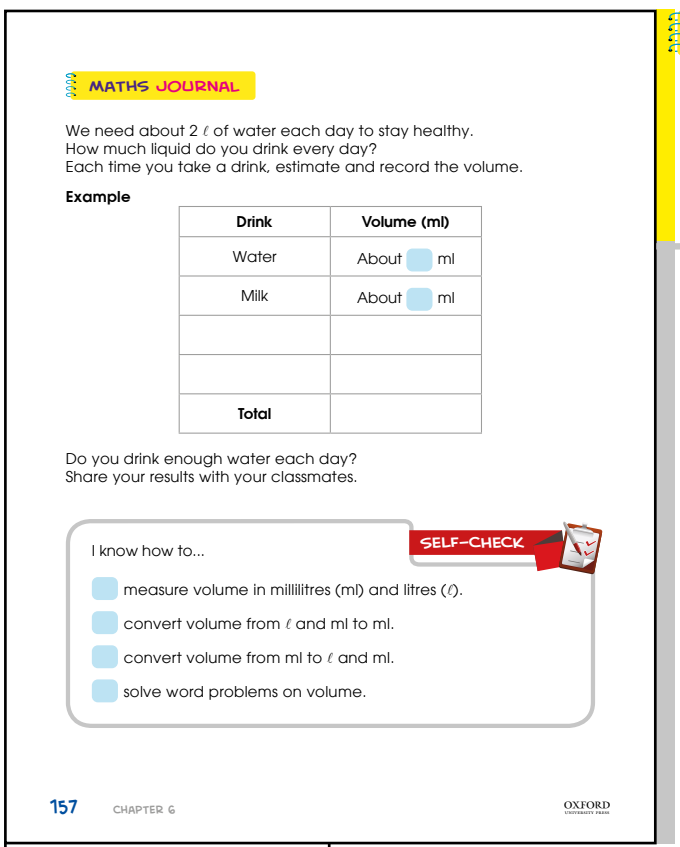
Workbook 3A P170

Mind Workout

Allow pupils to work in pairs or groups to solve the problem.

Encourage pupils to list the various ways in a systematic manner (for instance in a table).

Pupils should be able to give at least three different ways.



MATHS JOURNAL

We need about 2 ℓ of water each day to stay healthy.
How much liquid do you drink every day?
Each time you take a drink, estimate and record the volume.

Example

Drink	Volume (ml)
Water	About ml
Milk	About ml
Total	

Do you drink enough water each day?
Share your results with your classmates.

I know how to...

SELF-CHECK

- measure volume in millilitres (ml) and litres (ℓ).
- convert volume from ℓ and ml to ml.
- convert volume from ml to ℓ and ml.
- solve word problems on volume.

157 CHAPTER 6 OXFORD

Textbook 3 P157

MATHS JOURNAL

This journal can be integrated with health education. Create awareness among pupils of the types of healthy or unhealthy drinks that they may consume daily.

SELF-CHECK

Before the pupils do the self-check, review the important concepts once more by asking for examples learnt for each objective.

This self-check can be done after pupils have completed **Review 6** (Workbook 3A P171 – 174) as consolidation of understanding for the chapter.

1.

Shopping list

1. Three 2 [ℓ] bottles of orange juice 
2. Four 330 [ml] cans of cola 
3. Two 1 [ℓ] bottles of cooking oil 
4. One 1000 [ml] carton of milk 
5. One 750 [ml] bottle of shampoo 

2. 300 ml, 450 ml, 70 ml
   300 + 450 + 70 = 820
   The total volume of water is 820 ml.

3. Set A = 1030 ml
   Set B = 1450 ml
   Set C = 1350 ml
   Set B has the greatest volume of water.

4. (a) 7010
   (b) 6340
   (c) 3950
   (d) 4025
   (e) 9003

5. (a) 3, 705
   (b) 4, 8
   (c) 9, 850
   (d) 6, 354
   (e) 8, 30

6. (a) 5 ℓ = 5000 ml
   5000 – 3125 = 1875
   The volume of water in Container B is 1875 ml.
   (b) 5000 + 1875 = 6875
   8675 ml = 6 ℓ 875 ml
   The total volume of water in both containers is 6 ℓ 875 ml.

7. 150 × 6 = 900
   There is 600 ml of orange juice in the cups.
   900 ÷ 4 = 225
   There is 225 ml of orange juice in each bottle.

Answers Revision 2A (Workbook 2A P175 – 180)

1. (a) 1 m 10 cm
   (b) 2 m 24 cm

2. 168 cm

3. (a) 200
   (b) 600
   (c) 1, 200
   (d) 3, 800

4. (a) 400
   (b) 1600
   (c) 2, 350
   (d) 1, 650

5. (a) 100
   (b) 301
   (c) 6
   (d) 9, 6
   (e) 7, 30
   (f) 8020

6. (a) 1108
   (b) 2060
   (c) 7001
   (d) 3, 575
   (e) 4, 40
   (f) 8, 9

7. (a) 5000
   (b) 1150
   (c) 3025
   (d) 2
   (e) 3, 50
   (f) 6, 5

8. 580 ÷ 4 = 145
   The length of each piece of string is 145 cm.

9. 2500 + 1250 = 3750
   3750 g = 3 kg 750 g
   The total mass of the watermelon and papaya is 3 kg 750 g.

10. 1050 × 5 = 5250
    5250 ml = 5 ℓ 250 ml
    The total mass of juice in the 5 bottles is 5 ℓ 250 ml.

Answers Revision 2B (Workbook 2A P181 – 186)

1. (a) cm
   (b) ℓ
   (c) g
   (d) km
   (e) ml

2. 5

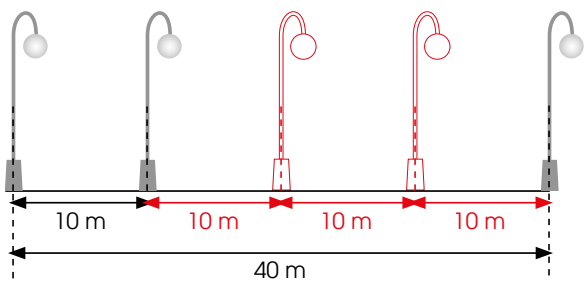
3. (a) Ahmad: 178
   Raju: 199
   Siti: 191
   Meiling: 205
   (b) Meiling

4. (a) 1650
   (b) 3280
   (c) kitten

5. 1500, 330
   (a) 1830
   (b) 1170

6. 19

7. (a) ball
   (b) 122

8. 

   5 lamp posts are placed altogether along the side of the garden.

9. 240 × 6 = 1440
   There was 1440 ml of orange juice in the mugs.
   1500 – 1440 = 60
   60 ml of orange juice was left in the bottle.

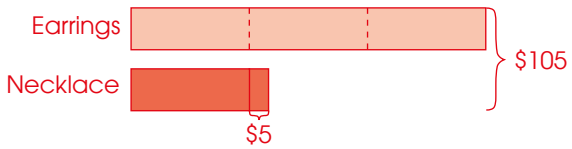
10. 120 × 9 = 1080
    Mrs Lee used 1080 g of flour to make bread.
    2500 – 1080 = 1420
    Mrs Lee had 1420 g of flour left.

Answers Mid-Year Revision (Workbook 3A P187 – 202)

1. 2
2. 1
3. 3
4. 3
5. 2
6. 2
7. 3
8. 3
9. 2
10. 38
11. 50
12. (a) Four thousand and twenty-six
    (b) Two thousand, six hundred and forty-three
13 9099, 9009, 990, 909
14. 5396, 5386
15. 123 R3
16. 2155
17. 72
18. 54
19. 28
20. 5
21. 7
22. 13
23. 4
24. 80
25. 18
26. 140
27. 375
28. 1, 350
29. 1, 500
30. 93
31. 300
32. 70
33. 1050
34. 945
35. 108
36. 6
37. 300
38. 6
*39. 16
40. Butterfly
41. 144 ÷ 9 = 16
    Siti must buy 16 boxes.
42. 36 × 9 = 324
    Raju used 324 cm of wire to make the squares.
    324 + 26 = 350
    Raju had 350 cm of wire at first.

43. 74 – 2 = 72
Mrs Santosh gave 72 sweets to her pupils.
72 ÷ 2 = 36
Mrs Santosh has 36 pupils.

*44.



105 – 5 = 100
4 units = 100
1 unit = 100 ÷ 4
= 25
Each pair of earrings cost $25.

45. 9 grey tiles are found in 2 rows of floor tiles.
18 ÷ 2 = 9
9 × 9 = 81
There are 81 grey tiles altogether.

DOLLARS, CENTS AND RUPEES

CHAPTER 7

Textbook 3 P158

Related Resources
NSPM Textbook 3 (P158 – 177)
NSPM Workbook 3B (P1 – 24)

Materials
Play money, advertisements from newspapers/magazines/flyers, mini whiteboard, markers, real-life objects with price tags

Lesson
Lesson 1 Adding Money
Lesson 2 Subtracting Money
Lesson 3 Solving Word Problems
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

In Grade 2, pupils have learnt the addition, subtraction, multiplication and division of money in dollars or in cents only. In this chapter, they learn to add and subtract money in decimal notation. In addition to the standard algorithms, pupils are taught to use other strategies such as 'make a whole number of dollars first'. Pupils can see that the standard algorithms for addition and subtraction of money, is similar to the algorithms for whole numbers.

Pupils have opportunities to share their everyday experiences in buying things and work in groups to use play money for shopping activities involving addition and subtraction of money in decimal notion and making the correct change. The word problems also provide pupils with a variety of real-world contexts for adding and subtracting money.

LESSON 1

ADDING MONEY

LEARNING OBJECTIVES

1. Count money in sets of notes and coins.
2. Add money in decimal notation.

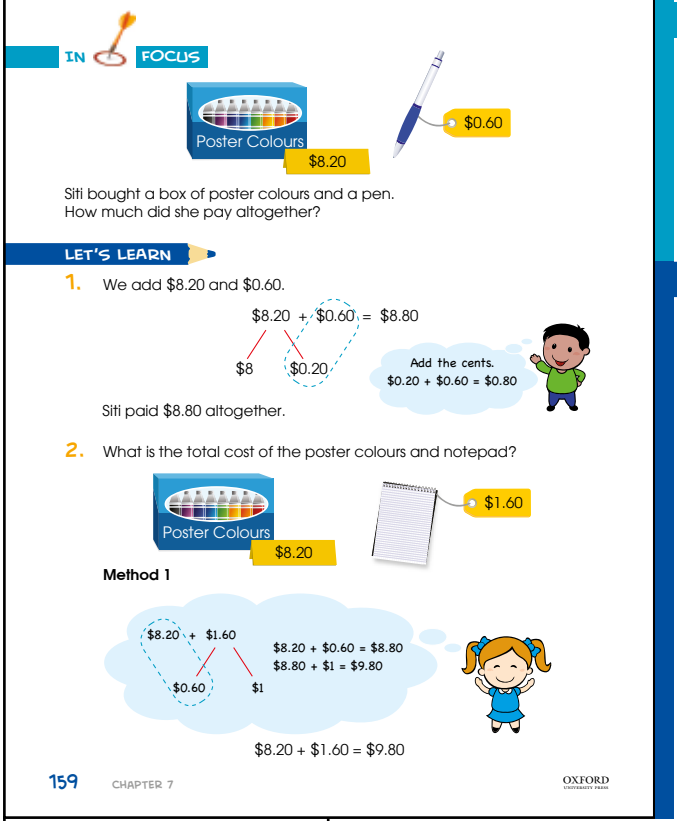
Textbook 3 P158

RECAP

Use the chapter opener to stimulate discussion.

Recap with pupils the decimal notation of writing an amount of money using the cost of the paint brush. Remind pupils that $2 can be written in cents, and $2.30 can be converted into cents as shown:

$$\$2.30 = 200¢ + 30¢$$
$$= 230¢$$



Textbook 3 P159

IN FOCUS

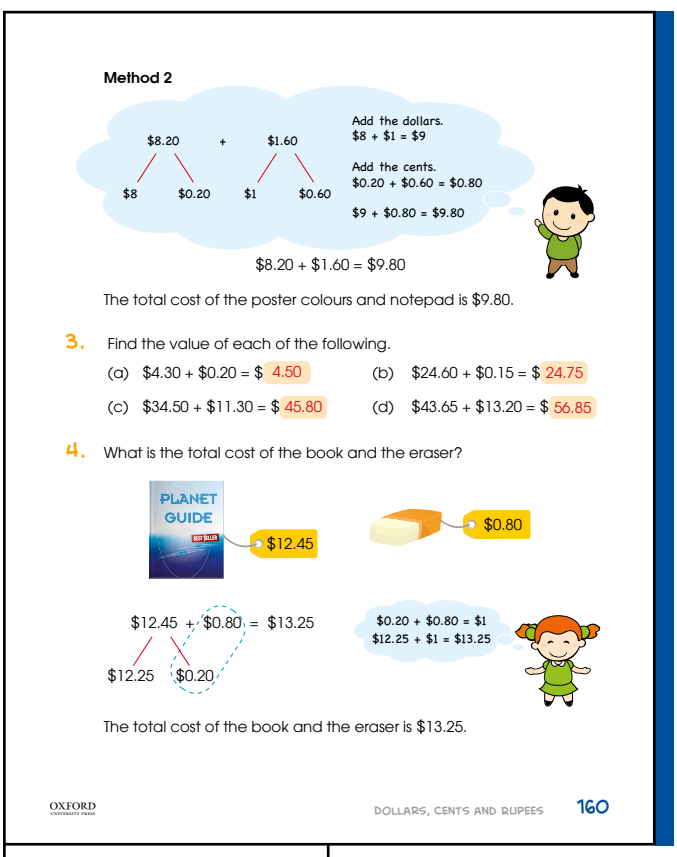
Assign pupils to work in pairs. Provide each pair with a bag of play money. Get pupils to put out the amount of money for the total cost of the box of poster colours and the pen. Ask pupils for the operation to be used to find the total cost of the items.

LET'S LEARN

Get pupils to explain how they would add $8.20 and 60¢. After getting pupils to respond, show them how the two amounts can be added by first adding the cents. Demonstrate this with play money on the visualiser and write the equation on the whiteboard.

For Let's Learn 2, assign pupils to work in pairs. Get pupils to put out the two amounts of money for the cost of the poster colours and the notepad. They are then required to think of at least two ways of finding the total cost. Allow pupils to explore before introducing the strategies.

Two strategies are taught here. In method 1, the cents is added to one amount, followed by adding the dollars to the same amount.



Textbook 3 P160

In method 2, the dollars and cents are added separately, then both values are added together.

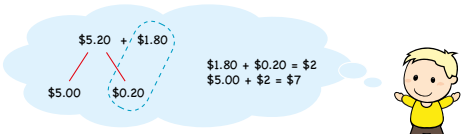
As the addition does not involve regrouping, pupils are shown how to add using these mental strategies. Demonstrate the strategies using the diagrams and get pupils to verbalise the strategy together.

Allow pupils to explore mental calculation with the above strategies with Let's Learn 3. Let pupils practise the two strategies. Get them to check each other's answers and ask them to share their strategies with the class.

Let's Learn 4 illustrates making a whole number of dollars first, followed by adding the dollars to the remaining amount.

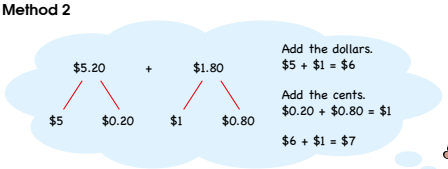
5. How much do the coloured pencils and the palette cost altogether?

Method 1



$5.20 + $1.80 = $7

Method 2



$5.20 + $1.80 = $7

The coloured pencils and the palette cost $7 altogether.

Textbook 3 P161

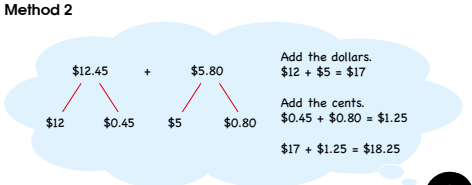
Method 1 in Let's Learn 5 demonstrates the same strategy used in Let's Learn 4. Alternatively, the dollars and cents can be added separately before adding both values together, as shown in method 2.

6. How much do the book and the tape dispenser cost altogether?

Method 1

$12.45 + $5.80 = $18.25

Method 2



$12.45 + $5.80 = $18.25

The book and the tape dispenser cost $18.25 altogether.

Textbook 3 P162

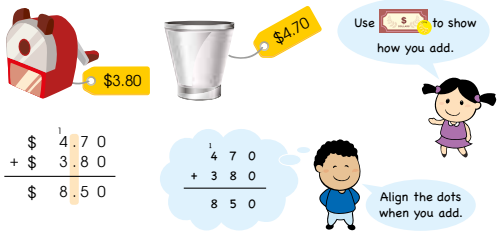
Let's Learn 6 applies the same strategies illustrated in Let's Learn 5. These examples show pupils how to add using mental strategies. To reinforce these strategies, illustrate them with diagrams on the whiteboard and get pupils to verbalise together.

7. Find the value of each of the following.

(a) $8.60 + $0.80 = $ 9.40 (b) $13.50 + $0.75 = $ 14.25

(c) $22.80 + $15.20 = $ 38 (d) $34.60 + $12.60 = $ 47.20

8. Find the total cost of the sharpener and the pencil holder.



$$\begin{array}{r} {}^{1}\$\ 4.7\overset{1}{0} \\ +\ \$\ 3.8\overset{1}{0} \\ \hline \$\ 8.5\overset{1}{0} \end{array}$$

$$\begin{array}{r} {}^{1}4\ 7\overset{1}{0} \\ +\ 3\ 8\overset{1}{0} \\ \hline 8\ 5\ 0 \end{array}$$

$4.70 + $3.80 = $8.50

The total cost of the sharpener and the pencil holder is $8.50.

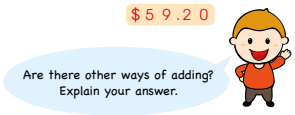
9. Add.

(a) $13.55 + $8.75 = $ 22.30

$$\begin{array}{r} \$\ {}^{1}1\ {}^{1}3.{}^{1}5\ 5 \\ +\ \$\ \ \ 8.7\ 5 \\ \hline \$\ 2\ 2.3\ 0 \end{array}$$

(b) $42.50 + $16.70 = $ 59.20

$$\begin{array}{r} \$\ 4\ {}^{1}2.5\ 0 \\ +\ \$\ 1\ 6.7\ 0 \\ \hline \$\ 5\ 9.2\ 0 \end{array}$$



Textbook 3 P163

Allow pupils to work in pairs to practise the two strategies with Let's Learn 7. Get them to check each other's answers and ask them to share with the class which strategy they use.

In Let's Learn 8, the standard algorithm is taught. Use play money in tandem with the algorithm steps to illustrate the regrouping of cents to dollars.

Guide pupils to see that the skill applied here is the same as adding whole numbers. Demonstrate to pupils by first converting the decimal notation of money to cents, followed by adding using the steps for computation of whole numbers.

Emphasise that when writing the vertical form of addition for money in dollars and cents, the decimal points must be aligned. As a non-example, use a set of misaligned sums to show how the total amount of money can be very different and incorrect.

Give pupils play money to explore the standard algorithm in Let's Learn 9. Ask them to think of the other strategies that they have learnt to do these additions.

10. Part of a café's menu is shown below.

–MENU–

(prices stated are in rupees)

Food		Drinks		Dessert	
Cheesy Fries	280	Mineral Water	90	Ice Cream (cone)	300
Club Sandwich	525	Americano	165	Cheesecake (slice)	420
English Breakfast	700	Fresh Lime Juice	210	Tiramisu	550
Seafood Pasta	870	Ice Lemon Tea	260	Large Ice Cream Sundae (2-3 pax)	1390
BBQ Pizza (16")	1250	Vanilla Latte	380		

(a) How much do the cheesy fries and ice lemon tea cost in total?

280 + 260 = 540

They cost Rs 540 in total.

$$\begin{array}{r} {}^{1}2\ 8\ 0 \\ +\ 2\ 6\ 0 \\ \hline 5\ 4\ 0 \end{array}$$

(b) A group of friends share a BBQ pizza and a large ice cream sundae.
How much did they pay altogether?

1250 + 1390 = 2640

They paid Rs 2640 altogether.

$$\begin{array}{r} 1\ {}^{1}2\ 5\ 0 \\ +\ 1\ 3\ 9\ 0 \\ \hline 2\ 6\ 4\ 0 \end{array}$$

Textbook 3 P164

In Let's Learn 10, pupils are required to read the menu and use standard algorithm to add amounts in rupees to find the total cost of items on the menu.

PRACTICE

1. Add.

(a) $7.15 + $0.40 = $ 7.55
(b) $6.10 + $13.40 = $ 19.50
(c) $23.30 + $41.55 = $ 64.85
(d) $7.40 + $18.20 = $ 25.60
(e) $6.20 + $0.80 = $ 7
(f) $14.85 + $3.45 = $ 18.30
(g) $13.15 + $6.85 = $ 20
(h) $25.40 + $23.80 = $ 49.20

2. Find the value of each of the following.

(a)
$16.80
+ $23.95
$40.75

(b)
$43.70
+ $38.50
$82.20

3. The following items are on sale at a department store.

(a) Sam buys a jacket and a pair of jeans. How much does he pay? Rs 4825
(b) Farhan buys a tie and belt for his father. How much does he pay? Rs 2875
(c) Xinyi buys a wallet and a bag. How much does she pay? Rs 2880

Complete Workbook 3B, Worksheet 1 • Pages 1 – 4

Textbook 3 P165

PRACTICE

Allow pupils to work on the sums independently, then invite some volunteers to show and explain their working on the whiteboard.

Ask the class to identify the errors if there are incorrect methods and answers, before correcting them.

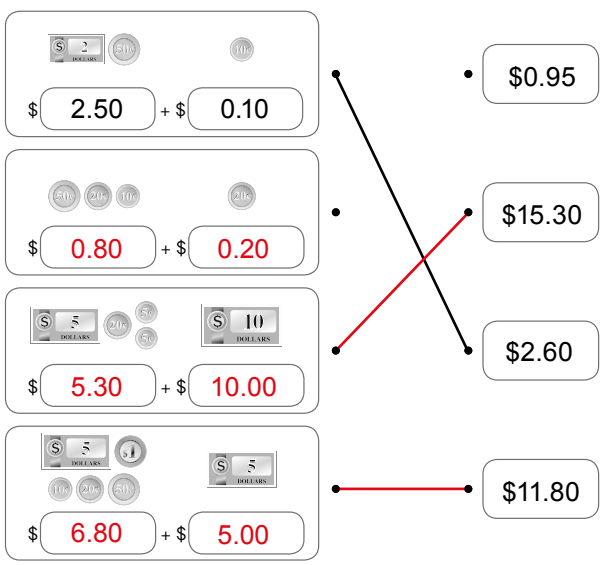
For better understanding, select items from **Worksheet 1** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 3B P1 – 4).

Answers Worksheet 1 (Workbook 3B P1 – 4)

1.



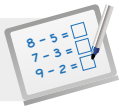
2. (a) 8.95
(b) 17.90
(c) 28.75
(d) 48.60
(e) 43.80

3. (a) $9.10
(b) $59.20
(c) $47.00
(d) $89.10

4. (a) 5.15
(b) 13.75
(c) 55.40
(d) 42.20

5. (a) 1820
(b) 5900
(c) 5901
(d) 4811

LESSON PLAN



Specific Learning Focus

- Count money in sets of notes and coins.
- Add money in decimal notation.

Suggested Duration

4 periods

Prior Learning

Pupils have learnt to recognise money denominations and can add money in dollars and rupees.

Pre-emptive Pitfalls

Since dollars and cents are introduced in Grade 3, the introduction of decimal point in money notation without a formal introduction to decimals might be challenging to teachers and pupils.

Introduction

Since compound units of measurements in length, mass and volume have been introduced in chapters 4 to 6, the introduction of cents in this chapter should not be an uphill task. Explain to pupils that 100 cents = 1 dollar, and that we use the decimal point as a separator between dollars and cents (e.g. $6.30 is equivalent to 6 dollars and 30 cents). In the addition of money, when the total amount of money in cents exceeds 100, we can convert 100¢ to $1. Encourage number bonds of 100 to make combinations of cents that make a dollar (e.g. $0.75 + $0.25¢ = $1.00, $0.55 + $0.45 = $1.00). When adding money, emphasise that cents are added first and that any value less than 100¢ is represented after the decimal point.

Problem Solving

Demonstrate the use of number bond to add money using the template (Activity Handbook 3 P27).
In Let's Learn 4 and 5 (Textbook 3 P160), ask them to add the cents and if the sum exceeds 100, add 1 to the dollars. Introduce the standard algorithm of addition, emphasising the need to align the dollars, decimal points and cents before adding. Since this is similar to addition of whole numbers, pupils should not face difficulty adding money using standard algorithm.

Activities

In Let's Learn 10 (Textbook 3 P164), the teacher may bring actual menus to the classroom and have pupils select food items from the menu and calculate the total cost of the items.

Resources

- number bond (Activity Handbook 3 P26)

Mathematical Communication Support

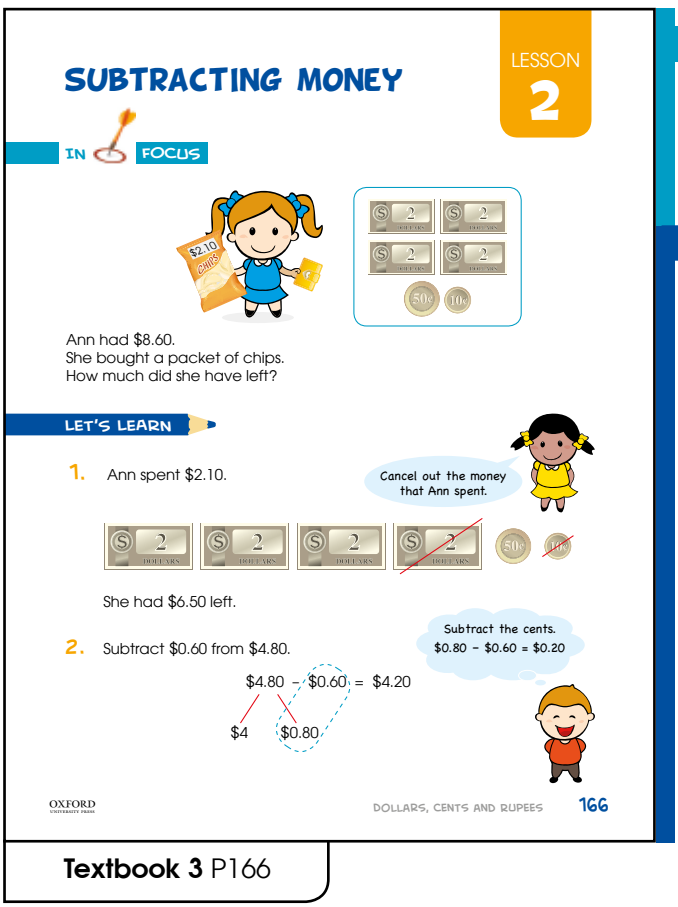
Encourage mental strategies while calculating the sum of money. For the questions (Workbook 3B P1 – 4), ask for individual responses and discuss the number bond strategy in adding money before independent seatwork.

LESSON 2

SUBTRACTING MONEY

LEARNING OBJECTIVE

1. Subtract money in decimal notation.



Textbook 3 P166

IN FOCUS

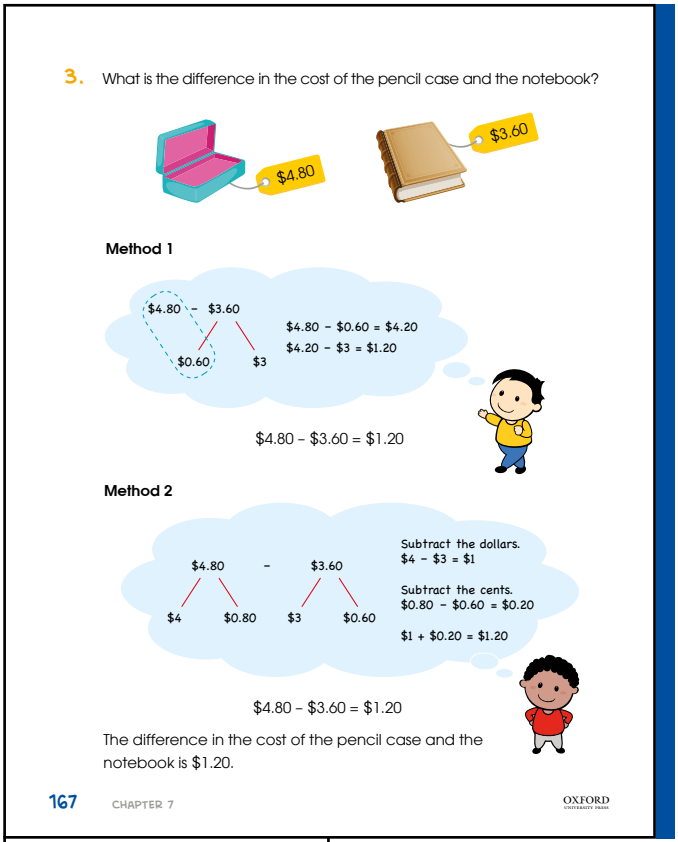
Ask pupils to tell the story in the picture. Give each pair of pupils a bag of play money to find how much money Ann has left.

LET'S LEARN

For Let's Learn 1, ask a pair of pupils to show the class how they subtract $2.10 from $8.60 with the play money on a visualiser.

In Let's Learn 2, ask pupils to make up a story problem, or provide a context to the equation. Without the use of play money, ask pupils to explain how they would do the subtraction.

Consolidate the method of subtracting from the cents by verbalising the strategy.



3. What is the difference in the cost of the pencil case and the notebook?

$4.80 $3.60

Method 1

$4.80 − $3.60
$4.80 − $0.60 = $4.20
$4.20 − $3 = $1.20
$0.60 $3

$4.80 − $3.60 = $1.20

Method 2

$4.80 − $3.60
$4 $0.80 $3 $0.60

Subtract the dollars.
$4 − $3 = $1
Subtract the cents.
$0.80 − $0.60 = $0.20
$1 + $0.20 = $1.20

$4.80 − $3.60 = $1.20

The difference in the cost of the pencil case and the notebook is $1.20.

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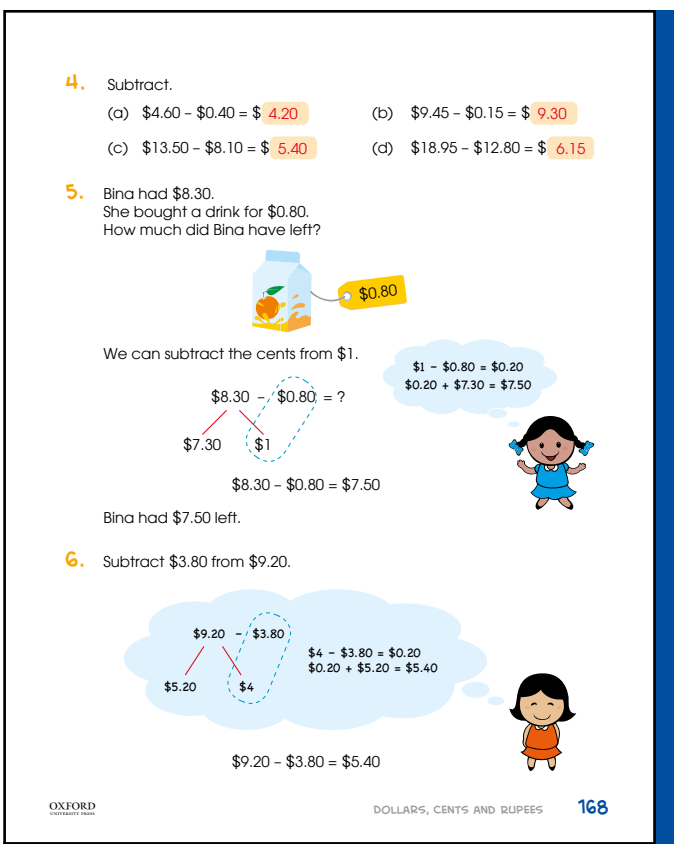
Textbook 3 P167

For Let's Learn 3, explain the meaning of 'difference in cost' and ask pupils what operation they should use to find the answer.

Write the statement $4.80 – $3.60. Two strategies are taught for subtraction without regrouping. Method 1 requires pupils to first subtract the cents from the larger amount, followed by subtracting the dollars from the new amount. Method 2 requires pupils to subtract the dollars and cents separately, followed by adding them together.

Demonstrate the strategy using the diagram and use play money to illustrate the process. At the same time, get pupils to verbalise the strategy together.



4. Subtract.

(a) $4.60 − $0.40 = $ 4.20
(b) $9.45 − $0.15 = $ 9.30
(c) $13.50 − $8.10 = $ 5.40
(d) $18.95 − $12.80 = $ 6.15

5. Bina had $8.30.
She bought a drink for $0.80.
How much did Bina have left?

$0.80

We can subtract the cents from $1.

$1 − $0.80 = $0.20
$0.20 + $7.30 = $7.50

$8.30 − $0.80 = ?
$7.30 $1

$8.30 − $0.80 = $7.50

Bina had $7.50 left.

6. Subtract $3.80 from $9.20.

$9.20 − $3.80
$5.20 $4

$4 − $3.80 = $0.20
$0.20 + $5.20 = $5.40

$9.20 − $3.80 = $5.40

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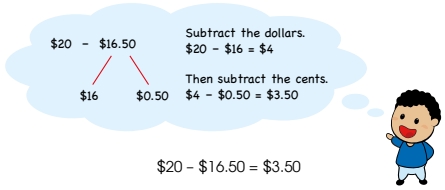
Textbook 3 P168

Allow pupils to practise in pairs the two strategies with Let's Learn 4. Get them to check each other's answers and ask them to share with the class which strategy they use.

In Let's Learn 5, pupils practise the strategy of subtracting from $1. Demonstrate this strategy using the diagram and play money and get pupils to verbalise the strategy together. Give another example for pupils to practise.

In Let's Learn 6, pupils practise the strategy of subtracting from the nearest dollar. Demonstrate this strategy using the diagram and play money while pupils verbalise the strategy together. Give another example for pupils to practise.

7. What is the difference between $16.50 and $20?



$20 − $16.50 = $3.50

8. Subtract.

(a) $5.60 − $0.90 = $ 4.70

(b) $29.10 − $9.70 = $ 19.40

(c) $84 − $12.80 = $ 71.20

(d) $100 − $37.90 = $ 62.10

9. Find the difference between $8.30 and $6.80.

$$\begin{array}{r} \$\ 8\overset{7}{.}\overset{13}{3}\ 0 \\ -\ \$\ 6.8\ 0 \\ \hline \$\ 1.5\ 0 \end{array}$$

$$\begin{array}{r} 8\overset{7}{\ }\overset{13}{3}\ 0 \\ -\ 6\ 8\ 0 \\ \hline 1\ 5\ 0 \end{array}$$

$8.30 − $6.80 = $1.50

Textbook 3 P169

In Let's Learn 7, pupils practise the strategy of subtracting the dollars, followed by subtracting the cents. Demonstrate this strategy using the diagram and play money and get pupils to verbalise the strategy together. Give another example for pupils to practise.

Allow pupils to work in pairs for Let's Learn 8. They are to practise the strategies taught. Get them to check each other's answers and ask them to share with the class the strategies they use.

The standard algorithm is taught in Let's Learn 9. Use play money to illustrate in tandem with the algorithm steps of regrouping dollars to cents for subtraction.

Guide pupils to see that the skill applied here is the same as subtracting whole numbers. For a better illustration of this, convert the decimal notation of money to cents only, then subtract using the steps for computation of whole numbers.

Emphasise that the decimal points must align when subtracting using the standard algorithm. As a non-example, use a set of misaligned subtractions to show how the end results can be very different and incorrect.

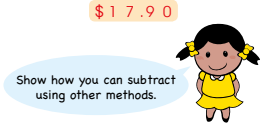
10. Subtract.

(a) $34.20 − $12.70 = $ 21.50

$$\begin{array}{r} \$\ 3\overset{3}{4}.\overset{12}{2}\ 0 \\ -\ \$\ 1\ 2.7\ 0 \\ \hline \$\ 2\ 1.5\ 0 \end{array}$$

(b) $46.55 − $28.65 = $ 17.90

$$\begin{array}{r} \$\ 4\overset{3}{6}.\overset{15}{5}\ 5 \\ -\ \$\ 2\ 8.6\ 5 \\ \hline \$\ 1\ 7.9\ 0 \end{array}$$



11. A shopkeeper is selling a hat and a backpack during a weekend sale.

Which item costs more? How much more?

Rs 2220 − Rs 1050 = Rs 1170

$$\begin{array}{r} 2\ \overset{1}{2}\overset{12}{2}\overset{12}{2}\ 0 \\ -\ 1\ 0\ 5\ 0 \\ \hline 1\ 1\ 7\ 0 \end{array}$$

The backpack costs more.
It costs Rs 1170 more than the hat.

Textbook 3 P170

Give pupils play money to explore the standard algorithm in Let's Learn 10. Ask them to think of other strategies that they have learnt to do these subtractions.

In Let's Learn 11, pupils are required to subtract amounts in rupees using the standard algorithm to find the price difference between two items.

PRACTICE

1. Subtract.

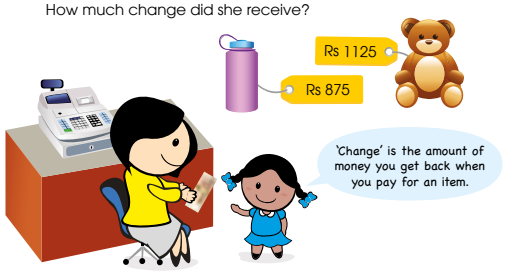
(a) $5.60 – $0.20 = $ 5.40
(b) $9.60 – $2.40 = $ 7.20
(c) $19.40 – $8.20 = $ 11.20
(d) $10.30 – $0.50 = $ 9.80
(e) $26.40 – $14.70 = $ 11.70
(f) $26.85 – $15.90 = $ 10.95
(g) $10 – $7.30 = $ 2.70
(h) $50 – $17.60 = $ 32.40

2. Find the value of each of the following.

(a)
$3 ⁶ ¹⁵ 7.5 0
– $ 1 2 . 8 0
$ 2 4 . 7 0

(b)
$ 9 ⁸ ¹² 3 . ¹ ¹¹ 1 0
– $ 7 6 . 4 0
$ 1 6 . 7 0

3. Bina bought a bottle and a soft toy.
She gave the cashier a Rs 5000 note.
How much change did she receive?



Complete Workbook 3B, Worksheet 2 • Pages 5 – 10

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Textbook 3 P171

PRACTICE

Allow pupils to work on the sums independently, then invite some volunteers to show and explain their working on the whiteboard.

Ask the class to identify the errors if there are incorrect methods and answers, before correcting them.

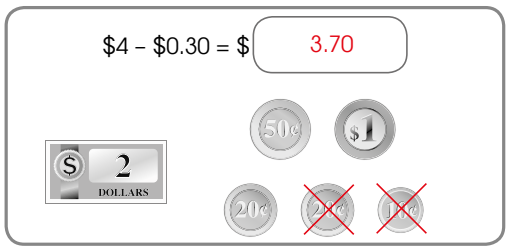
For better understanding, select items from **Worksheet 2** and work these out with the pupils.

Independent seatwork

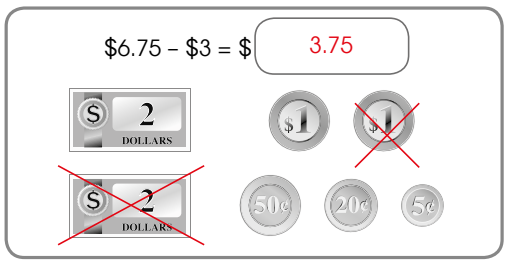
Assign pupils to complete Worksheet 2 (Workbook 3B P5 – 10).

Answers Worksheet 2 (Workbook 3B P5 – 10)

1. (a)



(b)



2. (a) 6.50
   (b) 11.40
   (c) 9.50
   (d) 17.10
   (f) 30.20

3. (a) $15.85
   (b) $30.40
   (c) $33.60
   (d) $40.30
   (e) $1.85

4 (a) 0.50
   (b) 2.40
   (c) 8.45
   (d) 20.50

5. (a) 9.10
   (b) 6.65
   (c) 5.80
   (d) 3.40

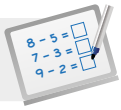
6. (a) $0.55
   (b) $1.25
   (c) $2.55

7. $50.00 – $34.45 = $15.55
   Raju received $15.55 change.

8. (a) 1.35
   (b) 2.60
   (c) 0.50
   (d) 8.80
   (e) 15.95
   (f) 22.35

9. (a) 9050
   (b) 6022
   (c) 1455
   (d) 2686

LESSON PLAN



Specific Learning Focus

- Subtract money in decimal notation.

Suggested Duration

4 periods

Prior Learning

Pupils have learnt the concept of change in money in Grade 2. They have learnt that 'change' refers to the amount of money that the cashier must give back if the exact amount is not given to the cashier.

Pre-emptive Pitfalls

Subtracting dollars from dollars and cents from cents respectively should be relatively easy. However, in this chapter, two steps involving subtraction of dollars and cents are required.

Introduction

Verbalise the strategy of number bond by partitioning the money into dollars and cents. The standard algorithm is introduced in Let's Learn 9 (Textbook 3 P169). Again, emphasise the alignment of the decimal points. Some questions will require subtraction with regrouping. It would be much clearer for pupils to convert the amount of money into cents and then convert the difference into dollars and cents (e.g. if the difference is 756 cents, it can be written as $7.56).

Problem Solving

Emphasise that the dollars can be regrouped to cents and then subtraction can be carried out to find the difference. Encourage alternative strategy of conversion. The difference can then be converted to compound units of dollars and cents.

Activities

Introduce generic play money (Activity Handbook 3 P27) to carry out subtractions. Divide pupils into groups of 3 or 4 to do questions in 'Practice' (Textbook 3 P171). They can be encouraged to use their preferred method (number bond or standard algorithm).

Resources

- play money (Activity Handbook 3 P27)
- real-life objects with price tags

Mathematical Communication Support

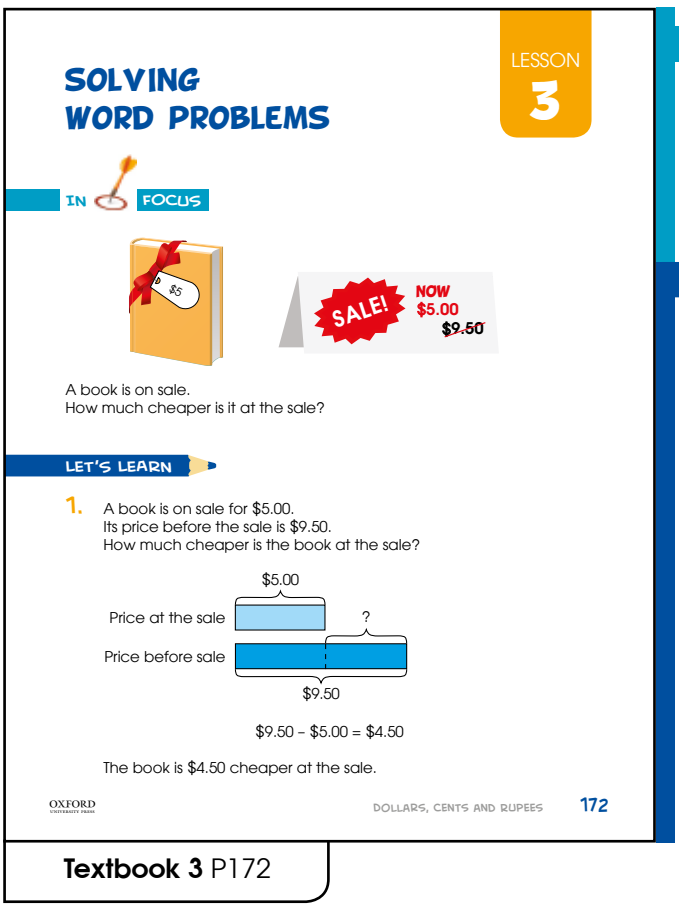
Encourage class discussions and verbalise mathematical reasoning using key terms like 'dollars', 'cents', 'decimal point', 'alignment', 'mental strategy', 'number bonds' and 'change'. Explain to pupils that in situations where the exact amount of money is not given to the cashier for buying an item, the cashier will give a change. The amount of change is found by subtracting the price of the item from the amount of money given to the cashier.

LESSON 3

SOLVING WORD PROBLEMS

LEARNING OBJECTIVE

1. Solve word problems (up to 2-step word problems) involving addition or subtraction of money in decimal notation.



SOLVING WORD PROBLEMS

LESSON 3

IN FOCUS

A book is on sale.
How much cheaper is it at the sale?

LET'S LEARN

1. A book is on sale for $5.00.
Its price before the sale is $9.50.
How much cheaper is the book at the sale?

$9.50 – $5.00 = $4.50

The book is $4.50 cheaper at the sale.

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Textbook 3 P172

IN FOCUS

Allow time for pupils to discuss in pairs what the story problem is in this picture. What do they know and what do they have to find? Invite a few pupils to share what they had discussed.

LET'S LEARN

Model the four stages of problem solving to guide pupils:

Step 1: Understanding the problem
- Underline the key elements
- Set pupils thinking about the following questions:
  - What do we know?
  - What do we have to find?

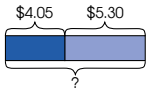
Step 2: Translate key elements into a model
(Explain to pupils that the model helps them visualise the problem situation.)
- Draw the model
- Label the known and unknown elements

Step 3: Examine the model and write the number equation
- Lead pupils to see the comparison concept in the problem structure.
- Do we add or subtract to find the unknown?

Step 4: Answer the question

2. Raju bought a box of chocolates for $4.05 and a box of cookies for $5.30.
He had $15 left.
(a) How much did he spend altogether?
(b) How much did he have at first?

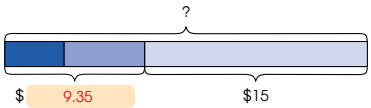
(a)



$4.05 + $5.30 = $ 9.35

He spent $ 9.35 altogether.

(b)



$15 + $ 9.35 = $ 9.35

Raju had $ 24.35 at first.

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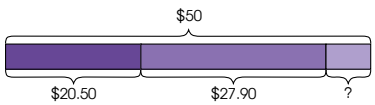
Textbook 3 P173

For Let's Learn 2, follow the same process as in Let's Learn 1 for this 2-part problem.

3. Weiming bought two shirts.
One shirt cost $20.50 and the other cost $27.90.
He gave the cashier a fifty-dollar note.
How much change did he receive?



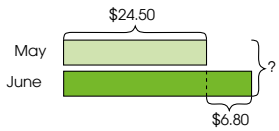
$20.50 + $27.90 = $ 48.40

The cost of the two shirts is $ 48.40 .

$ 50.00 − $ 48.40 = $ 1.60

He received $ 1.60 change.

4. Meiling saved $24.50 in May.
She saved $6.80 more in June than in May.
How much money did she save in the two months altogether?



$ 24.50 + $ 6.80 = $ 31.30

Meiling saved $ 31.30 in June.

$ 24.50 + $ 31.30 = $ 55.80

Meiling saved $ 55.80 in the two months altogether.

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Textbook 3 P174

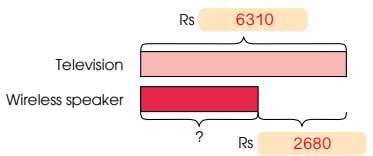
Likewise for Let's Learn 3, model the four stages of problem solving to guide pupils. Since this is a 2-step word problem, there is a hidden problem for pupils to identify and solve first. Guide pupils by asking what they need to find before working on the main problem.

Guide pupils to choose the correct operation based on the part-whole or comparison concepts.

Let's Learn 4 is also a 2-step word problem. Repeat the process as shown in Let's Learn 3.

5. A television costs Rs 6310. It costs Rs 2680 more than a wireless speaker.
(a) How much does the wireless speaker cost?
(b) How much do the two items cost altogether?

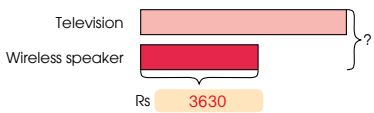
(a)



Rs 6310 – Rs 2680 = Rs 3630

The wireless speaker costs Rs 3630.

(b)



Rs 6310 + Rs 3630 = Rs 9940

They cost Rs 9940 altogether.

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Textbook 3 P175

In Let's Learn 5, pupils are required to solve a 2-part word problem involving amounts in rupees. Repeat the process as shown in Let's Learn 3.

ACTIVITY TIME

Work in groups of 4.

1. Think of some items to buy for a class party with $50.
   Choose these items from a supermarket advertisement.
2. Make a list of these items.
   Write down the name and price of each item on ☐.
3. Find the total cost of the items by adding using $.
4. Compare the list of items with the other groups.
   Who has the best buy?

What you need:

How do you decide who has the best buy?

PRACTICE

Solve.

1. Tom wants to buy a remote-controlled car which costs $35.90.
   He needs to save $8.60 more.
   How much does he have now? $35.90 – $8.60 = $27.30
2. A box of candies costs $12.80.
   A box of biscuits is $4.20 cheaper than the box of candies.
   (a) How much does the box of biscuits cost? $12.80 – $4.20 = $8.60
   (b) What is the total cost of the box of candies and the box of biscuits? $12.80 + $8.60 = $21.40
3. Bina saved a total of $75 in June, July and August.
   She saved $18.25 in June and $28.65 in August.
   How much did she save in July? $18.25 + $28.65 = $46.90
   $75.00 – $46.90 = $28.10
4. Mr Lim bought a pair of shoes and a shirt.
   The pair of shoes cost $46.90 and the shirt cost $15.60.
   After buying the items, he had $29.70 left. $46.90 + $15.60 = $62.50
   How much money did he have at first? $62.50 + $29.70 = $92.20
5. A calculator costs Rs 6875. A music player costs Rs 3766 less than the calculator.
   How much money does Sam need if he wants to buy both the calculator and the music player? Rs 6875 – Rs 3766 = Rs 3109
   Rs 6875 + Rs 3109 = Rs 9984

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Textbook 3 P176

ACTIVITY TIME

Assign pupils to work in groups of 4.

Provide each group with play money and a supermarket advertisement cut-out (from newspapers or magazines).

This activity provides an opportunity for pupils to talk about budgeting and spending within their means in real world context. Pupils are also required to consider which items to get in order to get the most out of $50.

Bring the class together for sharing and comparison.

PRACTICE

Allow pupils to work on the questions in pairs before going through worked examples with them.

For better understanding, select items from **Worksheet 3** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 3B P11 – 17).

Answers Worksheet 3 (Workbook 3B P11 – 17)

1. $2.90 + $5.00 = $7.90
   Mrs Wong spent $7.90 in all.

2. $5.50 + $0.55 = $6.05
   Priya had $6.05 in all.

3. $37.85 + $3.45 = $41.30
   The bag costs $41.30.

4 $2.00 – $0.95 = $1.05
   Siti received $1.05 change.

5. $13.40 – $7.60 = $5.80
   Ahmad has $5.80.

6. $50.20 – $14.95 = $35.25
   Farhan had $35.25 left.

7. (a) $24.50 + $18.80 = $43.30
   Weiming spent $43.30 in total.
   (b) $96.00 – $43.30 = $52.70
   Weiming had $52.70 left after buying the two items.

8. (a) $9.45 + $0.80 = $10.25
   The total cost of the storybook and the ruler is $10.25.
   (b) $10.25 – $8.50 = $1.75
   Sam needs $1.75 more to buy both items.

9. (a) $10.50 + $10.50 = $21
   Bala spent $21 altogether.
   (b) $50 – $21 = $29
   Bala received $29 change.

10. (a) $4.75 + $2.95 = $7.70
   The fish cost $7.70.
   (b) $4.75 + $7.70 = $12.45
   Meiling spent $12.45 altogether.

11. $32.60 + $28.30 = $60.90
   Sam and Meiling have $60.90 altogether.
   $60.90 + $37.00 = $97.90
   The children have $97.90 altogether.

12. $27.65 + $35.20 = $62.85
   Tom saved $62.85 in June and July.
   $99.00 – $62.85 = $36.15
   Tom has to save $36.15 more to buy the toy train.

13. $45.60 + $9.50 = $55.10
   Mr Gopal spent $55.10 in total.
   $60.00 – $55.10 = $4.90
   Mr Gopal received $4.90 change.

14. $33.40 + $36.80 = $70.20
   Kate had $70.20 at first.
   $70.20 – $46.70 = $23.50
   Kate had $23.50 left.

15. Rs 3105 + Rs 875 = Rs 3980
   She had Rs 3980 at first.

16. Rs 1730 - Rs 915 = Rs 815
   She saves Rs 815 on Sunday.
   Rs 1730 + Rs 815 = Rs 2545
   She saves Rs 2545 on the two days.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW

6. Mrs Lee spent Rs 2780 on a dress.
She also bought a pair of earrings for Rs 1915.
She paid the cashier Rs 5000.
How much change did she receive?

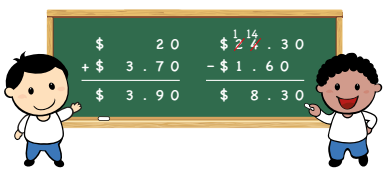
Rs 2780 + Rs 1915 = Rs 4695
Rs 5000 – Rs 4695 = Rs 305

Complete Workbook 3B, Worksheet 3 • Pages 11 – 17

MIND WORKOUT

Nora, Sam and Priya spent less than $30 altogether.
Priya spent the most and Sam spent the least.
Sam said that he spent $10.
Is this possible? Why?

MATHS JOURNAL



Weiming and Raju show their workings on the blackboard.
Can you tell why their workings are wrong?

SELF-CHECK

I know how to...
- add money in dollars, cents and rupees.
- subtract money in dollars, cents and rupees.
- solve word problems on money.

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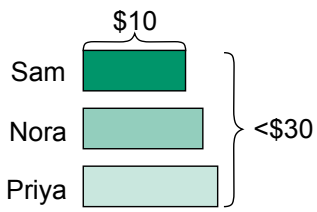
Textbook 3 P177

MIND WORKOUT

Pupils are required to use logical reasoning to figure that the situation presented is not possible.

Based on the information given, the model should be drawn in the following manner:



Since Sam spent the least, Nora and Priya must have spent more than $10 each. Keeping in mind that since the three children spent less than $30 altogether, it is not possible for Sam to have spent $10.

MATHS JOURNAL

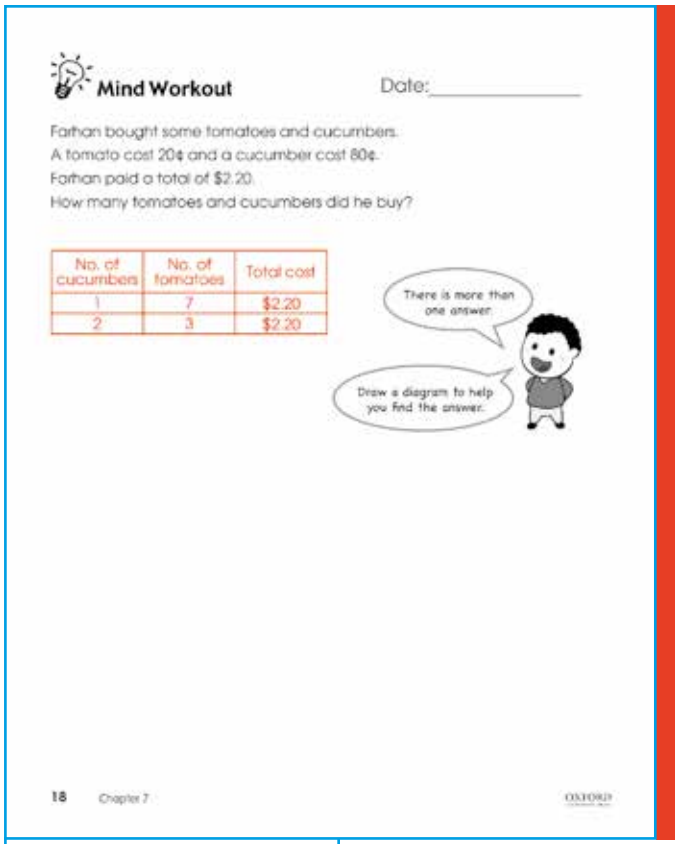
This activity serves to check the pupils' understanding of the standard algorithm for addition or subtraction of money in decimal notation.

Encourage pupils to explain and show how they use the right strategy to do the sums.

SELF-CHECK

Before the pupils do the self-check, review the important concepts once more by asking for examples learnt for each objective.

This self-check can be done after pupils have completed **Review 7** (Workbook 3B P19 – 24) as consolidation of understanding for the chapter.



Mind Workout

Date:_____

Farhan bought some tomatoes and cucumbers.
A tomato cost 20¢ and a cucumber cost 80¢.
Farhan paid a total of $2.20.
How many tomatoes and cucumbers did he buy?

No. of cucumbers	No. of tomatoes	Total cost
1	7	$2.20
2	3	$2.20

18 Chapter 7 OXFORD

Workbook 3B P18

Mind Workout

Encourage pupils to be systematic in their trials. They can start off by paying for the costlier item first, then figure out the quantity of the cheaper item that can be bought with the remaining amount of money.

Answers Review 7 (Workbook 3B P19 – 24)

1. (a) 8.50
   (b) 22.60
   (c) 35.65
   (d) 10.45
   (e) 51.40
   (f) 60.05

2. (a) $15.60
   (b) $26.10
   (c) $29.05
   (d) $34.70

3. (a) 17.35
   (b) 48.10
   (c) 85.15
   (d) 22.80
   (e) 34.50
   (f) 43.75

4. $50.00 – $31.70 = $18.30
   The bag cost $18.30.

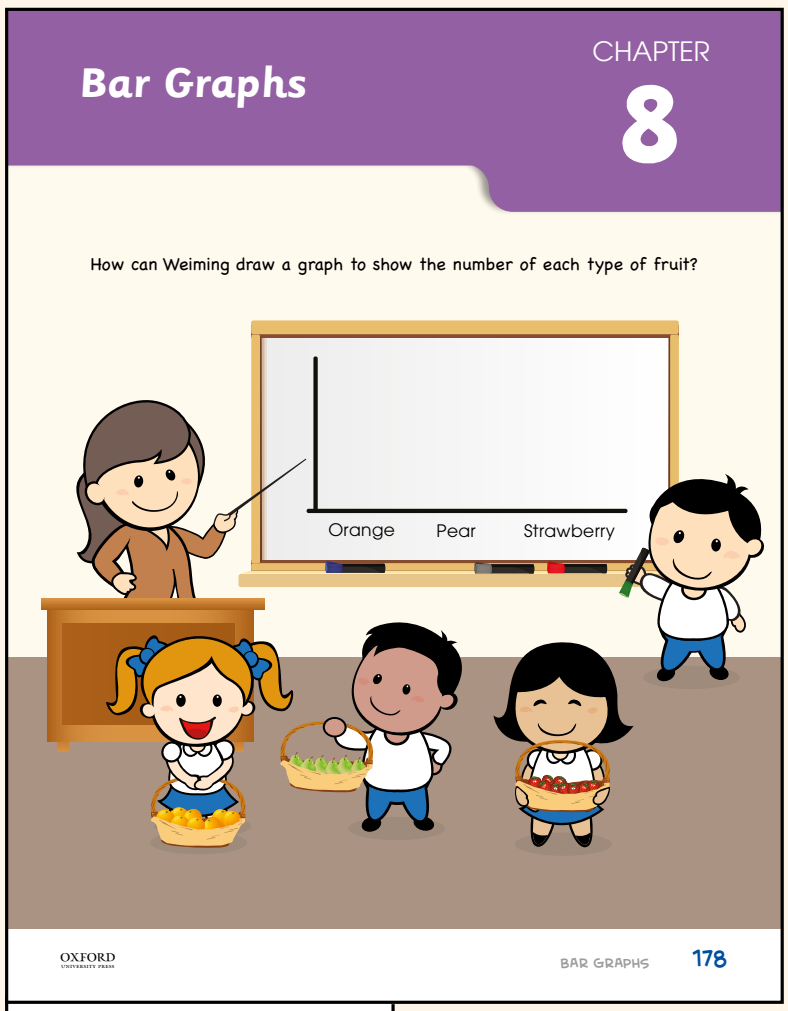
5. (a) 6 × 10 = 60
   Kate gave the cashier $60.
   (b) $60.00 – $3.30 = $56.70
   Kate paid $56.70 for the pair of shoes.

6. $12.50 – $0.90 = $11.60
   The bag of rice from Shop B cost $11.60.
   $12.50 + $11.60 = $24.10
   Siti paid $24.10 in total.

7. Rs 9130 – Rs 3220 = Rs 5910
   Tom had Rs 5910 left after spending on dinner.
   Rs 7600 – Rs 5910 = Rs 1690
   Tom would need Rs 1690 more to buy the watch.

BAR GRAPHS

CHAPTER
8



Textbook 3 P178

Related Resources
NSPM Textbook 3 (P178 – 189)
NSPM Workbook 3B (P25 – 38)

Materials
Magnetic square tiles

Lesson
Lesson 1 Reading Bar Graphs
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

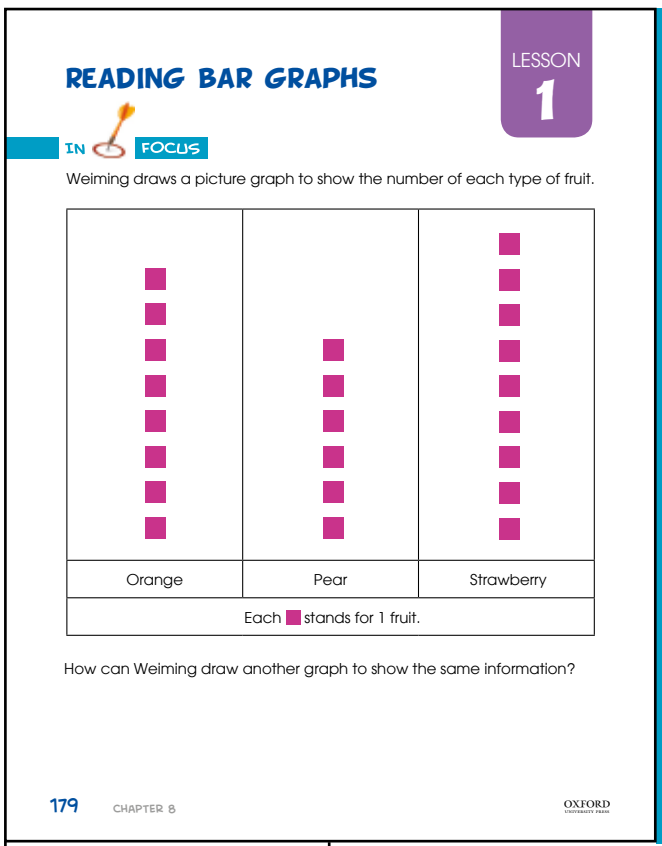
Pupils have learnt to read and interpret picture graphs with scales at Grade 2. In this chapter, they learn to represent data using bar graphs in both horizontal and vertical forms. The emphasis is on reading and interpreting bar graphs. Pupils will discuss and talk about the data given in the graphs and use the information to solve problems. Pupils will have hands-on experiences to collect data by conducting a simple survey and use ICT tools such as a spreadsheet to create bar graphs.

LESSON 1

READING BAR GRAPHS

LEARNING OBJECTIVES

1. Read and interpret bar graphs.
2. Solve problems using information from bar graphs.


READING BAR GRAPHS

LESSON 1

IN FOCUS

Weiming draws a picture graph to show the number of each type of fruit.

Orange	Pear	Strawberry

Each ■ stands for 1 fruit.

How can Weiming draw another graph to show the same information?

179 CHAPTER 8 OXFORD

Textbook 3 P179

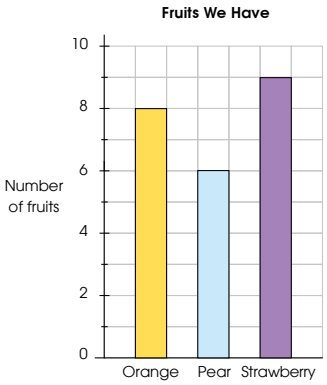
IN FOCUS

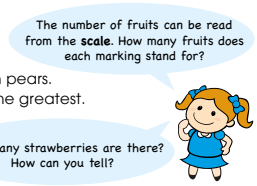
Use the chapter opener to recap the use of picture graphs to represent data. Draw the axis and label the categories of fruits on the whiteboard. Using magnetic square tiles to represent the fruits in three baskets, get three pupils to stick the tiles onto the respective columns to show the quantity of each fruit on the whiteboard.

The result will be the same as the picture graph as shown in the textbook. Ask pupils to identify the different amounts of each fruit. Tell pupils that there is another way of presenting the given information.

LET'S LEARN

1. We can use a **bar graph** to show the number of each type of fruit.





There are 6 pears.
There are 2 more oranges than pears.
The number of strawberries is the greatest.

Textbook 3 P180

LET'S LEARN

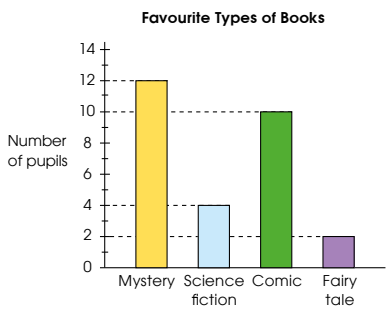
Transform the picture graph on the whiteboard into a bar graph by joining the magnetic square tiles in each column. Using one square as 1 unit, draw the vertical axis and number the scale from 0 to 10. Draw the outline of the columns of tiles as vertical bars and remove the cut-outs. Finally, write the title of the bar graph.

Introduce to pupils the bar graph without changing the quantities shown in the picture graph. Discuss with pupils the vertical scale of the bar graph (e.g. what each marking represents).

Get pupils to read the height of each bar with reference to the vertical scale and get them to answer the following questions:

- Which fruit is present in the greatest amount? How many of the fruit is present?
- Which fruit is present in the least amount? How many of the fruit is present?
- How many more oranges than pears are there?

2. The bar graph shows the number of pupils in a class who like to read different types of books.



Look at the bar graph and answer the questions.

(a) How many pupils like to read fairy tales?

2 pupils like to read fairy tales.

(b) Which type of books is the most popular?

Mystery books are the most popular.

(c) How many more pupils like to read comic books than science fiction books?

6 more pupils like to read comic books than science fiction books.

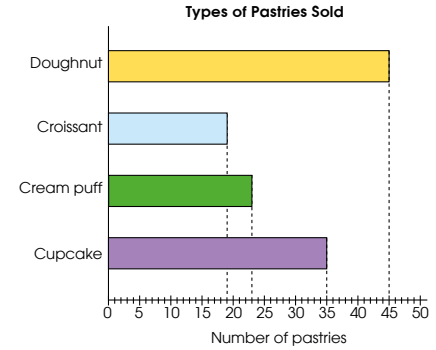
Textbook 3 P181

Get pupils to talk about the bar graph. Ask the following questions to facilitate the discussion:

- What is the bar graph about? (favourite types of books)
- What does each marking on the vertical scale stand for? (1 marking stands for 1 pupil)
- Which type of books is the most popular? How do you know?
- Which type of books is the least popular?

Guide pupils to answer the questions in the textbook.

3. Different pastries are sold at a bakery each day.
The baker draws a bar graph to show the number of each type of pastry he sold in one day.



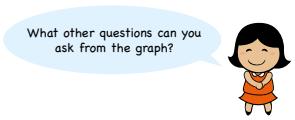
Look at the bar graph and answer the questions.

(a) How many doughnuts did the baker sell? 45

(b) How many cream puffs did the baker sell? 23

(c) Which type of pastry was the least popular? Croissants

(d) Did the baker sell more cream puffs or cupcakes?
How many more? Cupcakes, 12



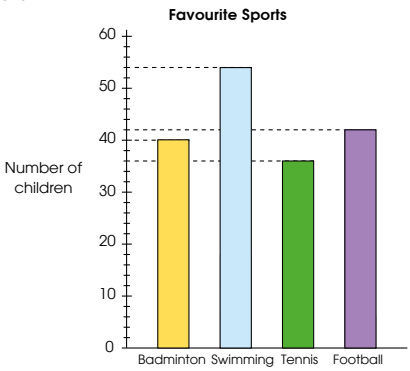
Textbook 3 P182

Ask pupils if they see any difference in this bar graph from the ones in Let's Learn 1 and 2. Lead them to see that the bar graph is drawn horizontally, hence the scale is now horizontal.

Draw pupils' attention to the scale, which has more markings that are close together as the number gets bigger. Ask what information is represented by the bar graph before going into the specific questions.

Guide pupils to read and interpret the graph by answering the questions.

4. The bar graph shows the number of children who like different sports.



Three pupils are talking about the graph.
Whose statements are all correct?


Sam

Most of the pupils like swimming.
The number of pupils who like football is the smallest.


Bina

14 more pupils like swimming than badminton.
Fewer than 40 pupils like tennis.

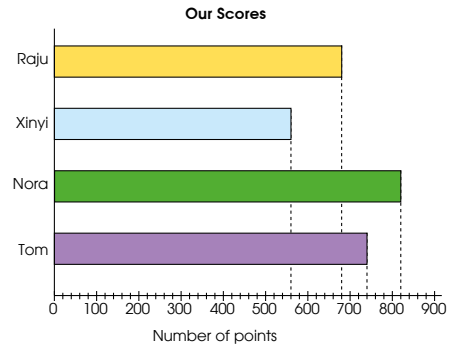

Farhan

38 pupils like tennis.
More pupils like badminton than tennis.

Textbook 3 P183

Allow pupils to discuss in pairs. Invite a pair of pupils to talk about the statements. They are required to justify their responses for each statement. Ask the pair to make up two correct statements of their own from the bar graph. Go through the discussion as a whole class.

*5. Some pupils played a Mathematics game.
Their scores are shown in the bar graph.



Look at the bar graph and answer the questions.

(a) Who has the lowest score? Xinyi

(b) Whose score is higher, Raju or Tom?
How much higher? Tom, 60

(c) Who has the highest score? Nora

(d) How many more points does Xinyi need to have the same score as Nora? 260

Textbook 3 P184

Get pupils to talk about the graph.

Draw pupils' attention to the horizontal form of the bar graph.

Ask them to examine the horizontal scale and find the number of points that each marking stands for.

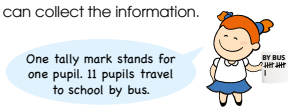
Allow pupils to work in pairs and check each other answers.

ACTIVITY TIME

Work in groups of 4.

1. Some types of transport are shown.

How do your classmates get to school everyday?
Discuss some ways you can collect the information.



2. Go to http://www.shinglee.com.sg/StudentResources/NSPM3.
Open the spreadsheet 'Bar Graphs'.

3. Type in the number of pupils next to each type of transport to create a bar graph.

Example

	A	B	C	D
1				
2		Type of Transport	Number of pupils	
3		Walk	15	
4		By bus	11	
5		By train	5	
6		By car	3	
7		By bicycle	5	
8				

4. Write five sentences to describe the graph.
Share them with your classmates.

Textbook 3 P185

ACTIVITY TIME

Assign pupils to work in groups of 4.

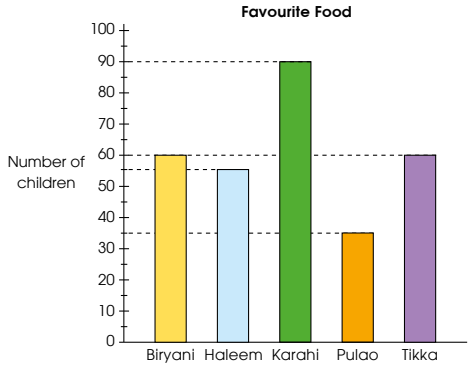
Discuss with pupils the purpose of a survey and the types of surveys they may have come across in real life. Discuss in general some ways that data can be collected for a simple survey.

For this activity, it will be more organised and efficient if the teacher conducts the survey as a class. This ensures that all groups are using the same set of data.

Another objective of this activity is for pupils to use the data to create bar graphs using a spreadsheet. The spreadsheet has been prepared beforehand so pupils are only required to key in data.

PRACTICE

1. The bar graph shows the number of children who like each type of food.



Look at the bar graph and answer the questions.

(a) Which type of food is the least popular? Raita

(b) How many children like haleem? 55

(c) Do more children like biryani or karahi? How many more? Karahi, 30

(d) The same number of children like Biryani and Naan.

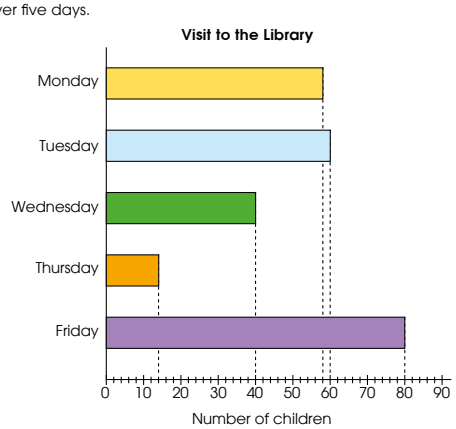
Textbook 3 P186

PRACTICE

Give time for pupils to work on the questions before class discussion. Alternatively, pair a weaker pupil with a higher ability pupil for peer learning.

For better understanding, select items from Worksheet 1 and work these out with the pupils.

2. The bar graph shows the number of children who visited the library over five days.



Look at the bar graph.

(a) 14 children visited the library on Thursday.

(b) The greatest number of children visited the library on Friday.

(c) 18 fewer children visited the library on Wednesday than on Monday.

(d) Twice as many children visited the library on Friday as on Wednesday.

Complete Workbook 3B, Worksheet 1 • Pages 25 – 33

Textbook 3 P187

For better understanding, select items from **Worksheet 1** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 3B P25 – 33).

Answers Worksheet 1 (Workbook 3B P25 – 33)

1. (a) False
   (b) True
   (c) False
   (d) False

2. (a) 9
   (b) monkeys
   (c) deer
   (d) monkeys, bears

3. (a) 35
   (b) 28
   (c) chicken
   (d) egg
   (e) Tuna

4. (a) 50
   (b) Kate
   (c) 18
   (d) 100

5. (a) 68
   (b) roller coaster
   (c) ferris wheels
   (d) bumpers cars

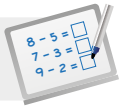
6. (a) 390
   (b) January
   (c) 490
   (d) March, February

7. (a) 450
   (b) 950
   (c) Friday
   (d) 450

8. (a) Wednesday
   (b) Monday
   (c) Thursday
   (d) Wednesday and Friday, because the number of movie tickets sold on these two days is significantly larger than those sold on the other three days.

9. (a) 40
   (b) 50
   (c) No, there are 25 men at the park.
   (d) No, there is a total of 65 chicken at the park.

LESSON PLAN



Specific Learning Focus

- Read and interpret bar graphs.
- Solve problems using information from bar graphs.

Suggested Duration

8 periods

Prior Learning

Pupils should be well-versed with picture graphs and tally charts. They should be able to interpret the scale and read graphs.

Pre-emptive Pitfalls

Since this chapter involves representation of information in a different form, pupils might find it a bit challenging. Since both horizontal and vertical bar graphs are introduced, emphasise that they are similar to each other, apart from the difference in orientation.

Introduction

The chapter opener revisits picture graphs and then the information shown in the picture graph is represented in a bar graph. Explain to pupils that on the bar graph, the markings are labelled on one axis while different categories are labelled on the other axis. Explain that in Let's Learn 3 (Textbook 3 P182), although the markings are labelled on the horizontal axis instead of the vertical axis (as in Let's Learn 2 (Textbook 2 P181)), the interpretation methodology remains the same.

Problem Solving

While reading and interpreting horizontal and vertical bar graphs, encourage pupils to justify their answers by writing complete statements. Emphasise that different bar graphs will have their individual scales and each marking can represent different quantities depending on the data. Skip counting in 2s, 5s, 10s, 50s and 100s are involved in the questions provided in the textbook and workbook.

Activities

Encourage hands-on experience by giving pupils an assignment to conduct a survey and then represent the data in a bar graph (e.g. to find out the number of different types of pets that people in the neighbourhood keep). Get pupils to do the activity in 'Activity Time' (Textbook 3 P185). It is advisable for all groups to collect the data of the class to ensure uniform bar graphs for all. Get pupils to go to http://www.shinglee.com.sg/StudentResources/NSPM3 to create the spreadsheet and then create the bar graph.

Resources

- ICT
- chart papers
- markers

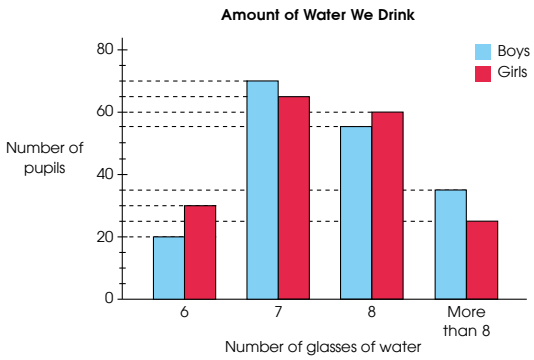
Mathematical Communication Support

Help pupils interpret the graphs by asking pertinent questions like which category has the largest quantity and which category has the least quantity. Discuss the trend of the data and encourage logical and mathematical reasoning.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW

MIND WORKOUT

Ahmad carried out a survey to find out the number of glasses of water some pupils drink in a day.
He drew a bar graph to show the results.



Look at the bar graph and answer the questions.

(a) Do more boys or girls drink 6 glasses of water a day?
How many more? Girls, 10

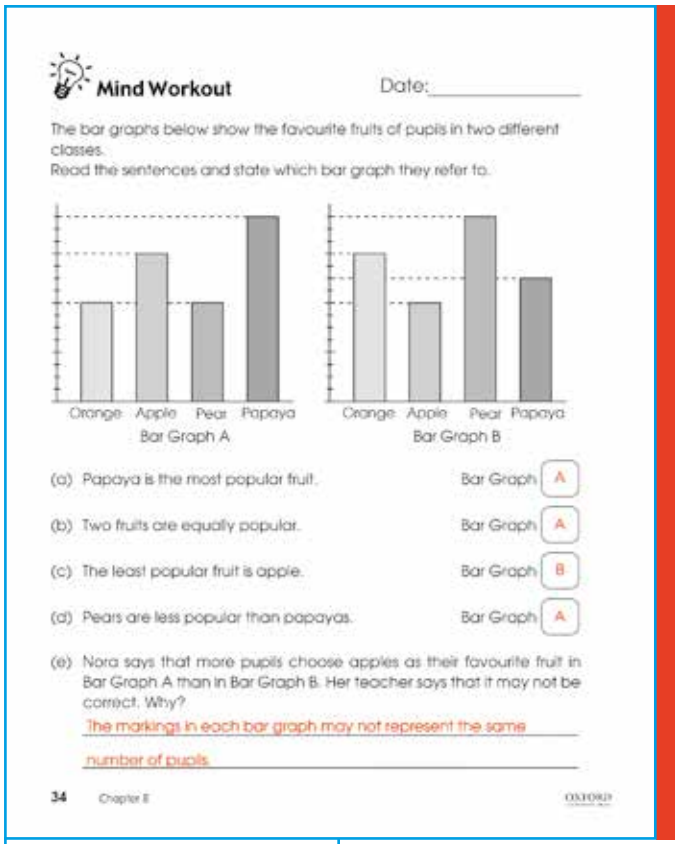
(b) How many pupils drink 7 glasses of water a day? 135

(c) We should drink 8 glasses of water or more every day.
How many boys do not drink enough water? 90

Textbook 3 P188

MIND WORKOUT

In reading the questions, pupils have to be mindful in distinguishing among the sets and set inclusion in (c).



Mind Workout

Date:_____

The bar graphs below show the favourite fruits of pupils in two different classes.
Read the sentences and state which bar graph they refer to.

(a) Papaya is the most popular fruit. Bar Graph A

(b) Two fruits are equally popular. Bar Graph A

(c) The least popular fruit is apple. Bar Graph B

(d) Pears are less popular than papayas. Bar Graph A

(e) Nora says that more pupils choose apples as their favourite fruit in Bar Graph A than in Bar Graph B. Her teacher says that it may not be correct. Why?

The markings in each bar graph may not represent the same number of pupils.

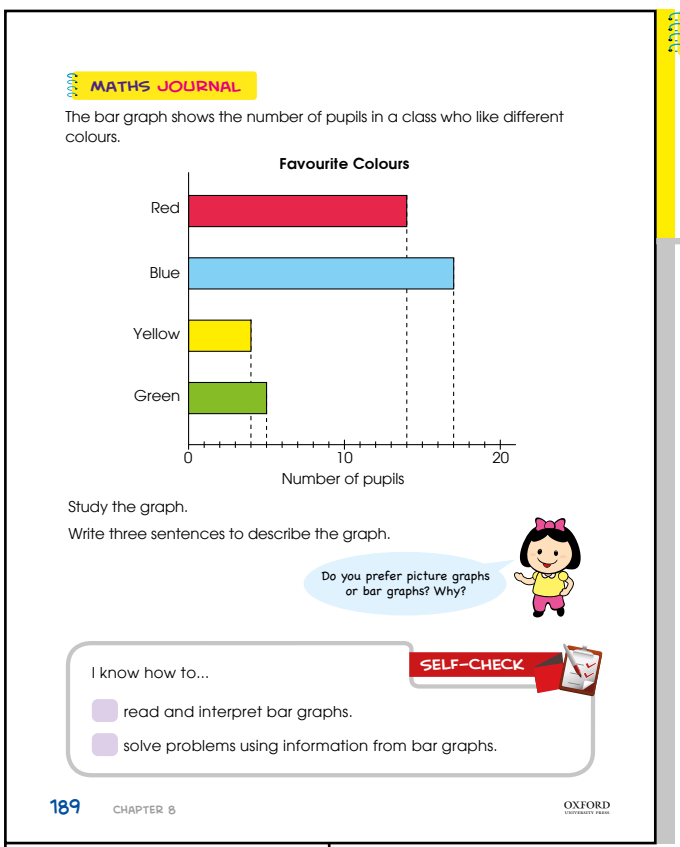
34 Chapter 8 OXFORD

Workbook 3B P34

Mind Workout

Pupils should not have difficulty with parts (a) to (d). For (e), pupils need to have an understanding that the numbers of pupils on the scales of the two graphs are not stated.

Apples may be a favourite in Graph A but the number of pupils who like it may be less than those in Graph B. Pupils may say that apple is not the favourite in graph B and the number of pupils who chose it is smaller.



MATHS JOURNAL

The bar graph shows the number of pupils in a class who like different colours.

Study the graph.
Write three sentences to describe the graph.

Do you prefer picture graphs or bar graphs? Why?

SELF-CHECK

I know how to...

- read and interpret bar graphs.
- solve problems using information from bar graphs.

189 CHAPTER 8 OXFORD

Textbook 3 P189

MATHS JOURNAL

This is an open-ended task that aims to elicit various levels of pupils' understanding on graphs with respect to their characteristics and functions.

SELF-CHECK

Before the pupils do the self-check, review the important concepts once more by asking for examples learnt for each objective.

This self-check can be done after pupils have completed Review 8 (Workbook 3B P35 – 38) as consolidation of understanding for the chapter.

Answers Review 8 (Workbook 3B P35 – 38)

1. (a) Siti
   (b) 30
   (c) 2

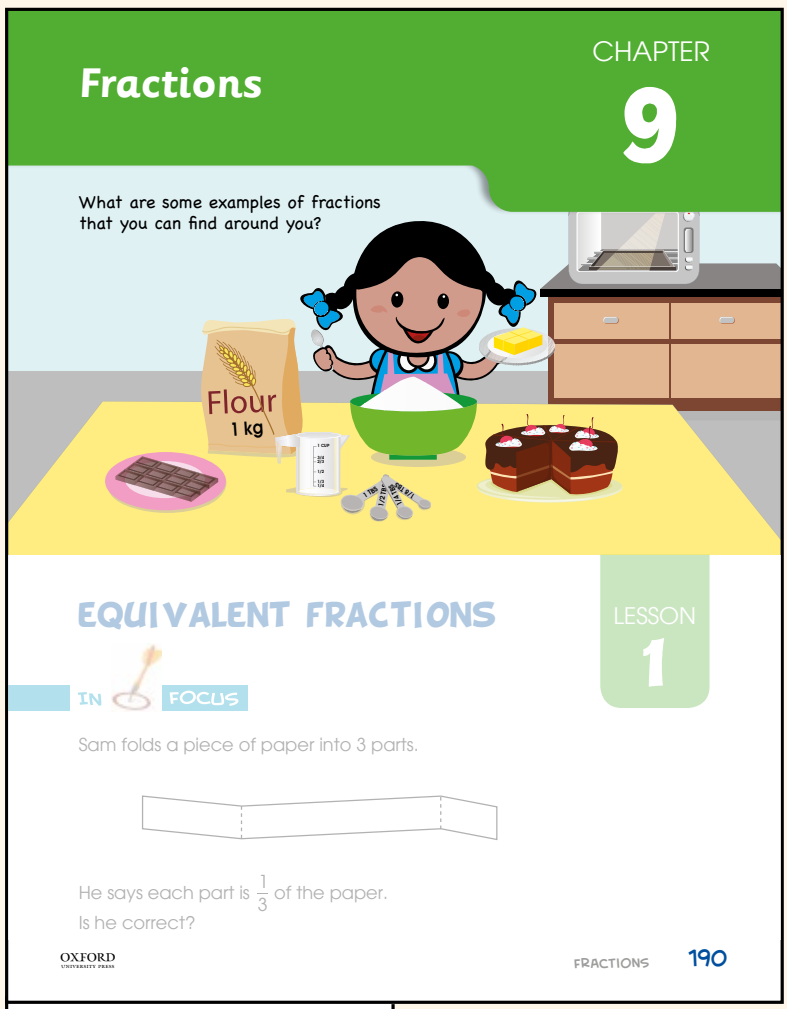
2. (a) D
   (b) 90
   (c) B
   (d) 30
   (e) 210

3. (a) 20
   (b) Monday
   (c) 12
   (d) 4

4. (a) cats
   (b) birds, fish
   (c) 145
   (d) turtles

FRACTIONS

CHAPTER
9



Textbook 3 P190

Related Resources
NSPM Textbook 3 (P190 – 212)
NSPM Workbook 3B (P39 – 62)

Materials
Fraction bars, fraction discs, paper strips, fraction cards

Lesson

Lesson 1	Equivalent Fractions
Lesson 2	Comparing and Ordering Fractions
Lesson 3	Adding Fractions
Lesson 4	Subtracting Fractions

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

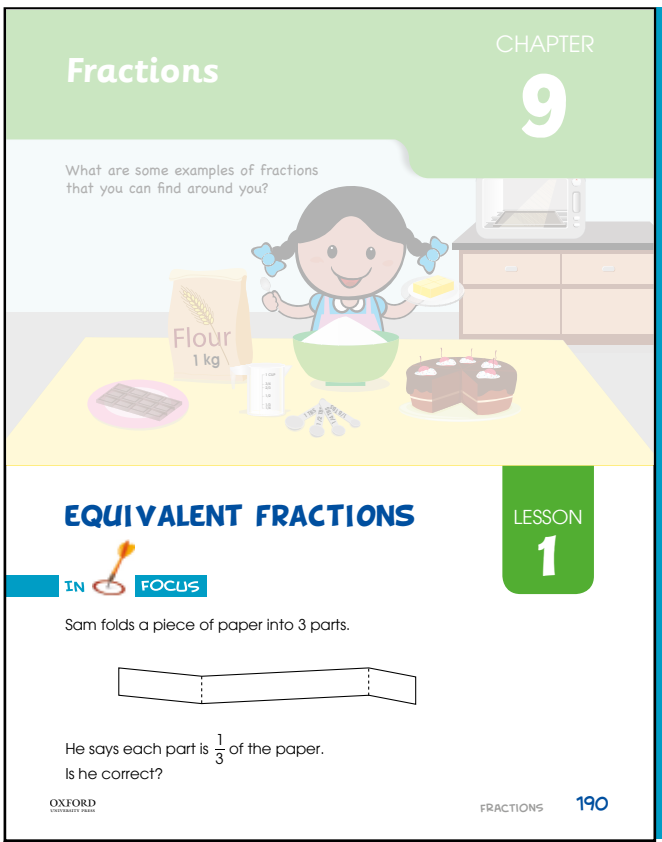
In Grade 2, pupils have learnt to interpret a fraction as part of a whole, compare and order like and related fractions, as well as do simple addition and subtraction of like fractions. In this chapter, paper folding and manipulatives (such as fraction discs and fraction bars) are used to illustrate the concept of equivalent fractions. Pupils are given learning experiences to make a list of the first eight equivalent fractions of a given fraction and later use this method to compare two unlike fractions. Pupils work in groups to compare fractions using different strategies such as listing equivalent fractions, comparing with respect to half, etc. Fraction discs and bars are used to illustrate addition and subtraction of related fractions within one whole. Pupils also work in groups to make addition or subtraction stories involving like fractions and related fractions.

LESSON 1

EQUIVALENT FRACTIONS

LEARNING OBJECTIVES

1. Find and list equivalent fractions.
2. Write a fraction in its simplest form.



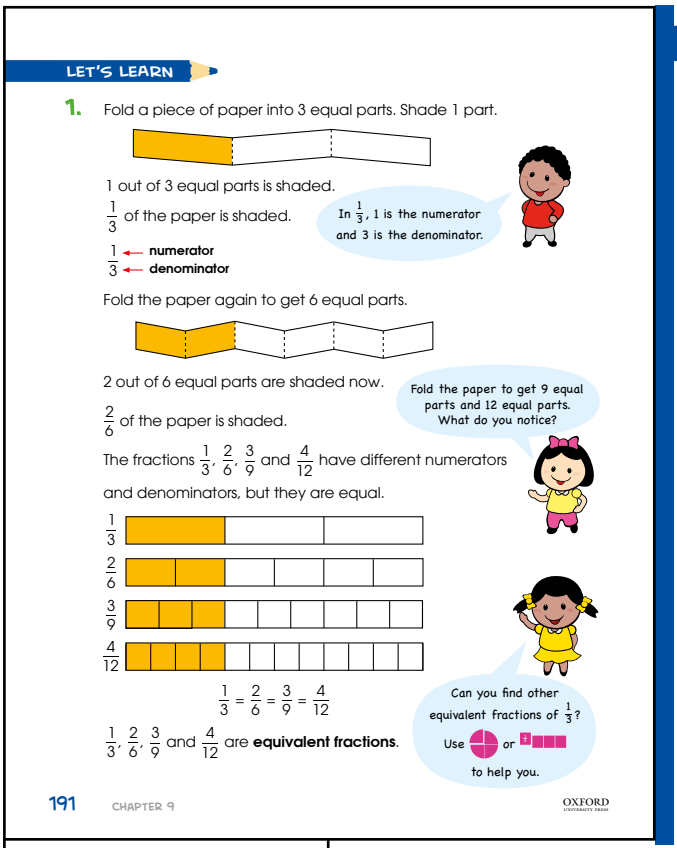
Textbook 3 P190

IN FOCUS

Use the chapter opener to review with pupils the concept of fractions. Get pupils to identify examples of fractions in the chapter opener.

Fraction discs can be used to illustrate the examples more clearly, for example the cake in the chapter opener can be represented by a fraction disc (sixths).

To show the problem presented more clearly, show a strip of paper that is unevenly folded into 3 parts on the visualiser. To show that the 3 parts are not the same, cut the parts and put them on top of each other.



Textbook 3 P191

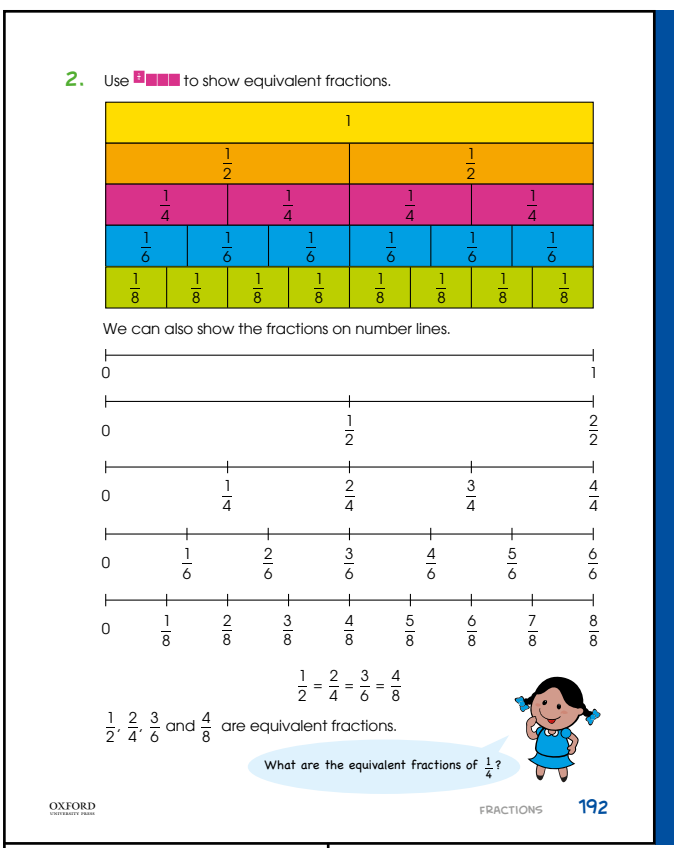
LET'S LEARN

For Let's Learn 1, provide each pupil with 4 strips of paper of the same length. Demonstrate to pupils how to fold 1 paper strip into 3 equal parts. Get them to shade 1 part. With this, review the basic concept of fractions using the appropriate language.

Ask pupils to fold the remaining 3 strips of paper into 3 equal parts each. For each strip, get pupils to shade one part for each strip of paper. Then show pupils how to fold into 6, 9 and 12 equal parts.

Get pupils to align all 4 strips of paper as shown in the textbook, ask pupils to observe the shaded parts. Get them to write the fraction shaded in each strip of paper. Point out to pupils that the fraction shaded in each strip of paper is the same and that these are **equivalent fractions**.

Assign pupils to work in pairs. Give each pair fraction discs to find and confirm equivalent fractions of $\frac{1}{3}$.



Textbook 3 P192

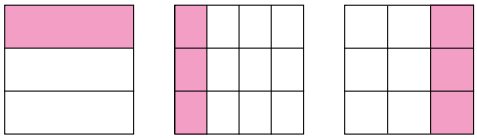
Give each pair of pupils fraction bars to build the equivalent fraction wall as shown on P192.

Make a fraction wall over the visualiser. Show pupils how to find equivalent fractions on the wall using a ruler. For example, demonstrate how to find equivalent fractions of $\frac{1}{2}$. Align the ruler at one $\frac{1}{2}$ and scan down for fractions that match $\frac{1}{2}$ (2 quarters, 3 sixths and 4 eighths). List out the equivalent fractions of $\frac{1}{2}$. On the visualiser, draw the number lines and use the fraction walls to mark out the fractions on the number lines as shown.

Repeat this method for finding the equivalent fractions of $\frac{1}{4}$.

PRACTICE

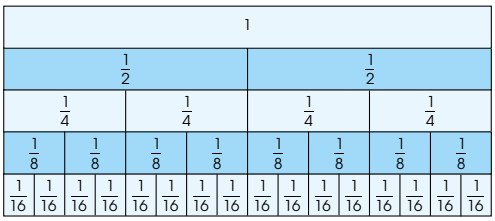
1. The 3 figures are cut into equal parts.
What fraction of each figure is shaded?



$\frac{1}{3}$ $\frac{3}{12}$ $\frac{3}{9}$

Are the fractions equivalent? Why?

2. Look at the diagram.
Find the missing numerator in each set of equivalent fractions.



(a) $1 = \frac{4}{4}$ (b) $\frac{1}{2} = \frac{4}{8}$ (c) $\frac{3}{8} = \frac{6}{16}$

Complete Workbook 3B, Worksheet 1A • Pages 39 – 40

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Textbook 3 P193

PRACTICE

Work with pupils on the practice questions.

For Question 2, ask pupils to explain how they use the fraction wall to find the equivalent fractions.

For better understanding, select items from **Worksheet 1A** and work these out with the pupils.

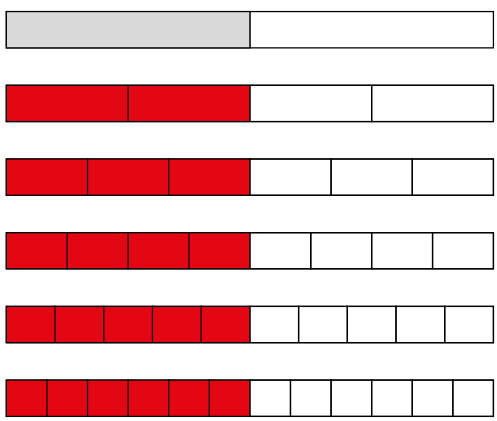
Independent seatwork

Assign pupils to complete Worksheet 1A (Workbook 3B P39 – 40).

Answers

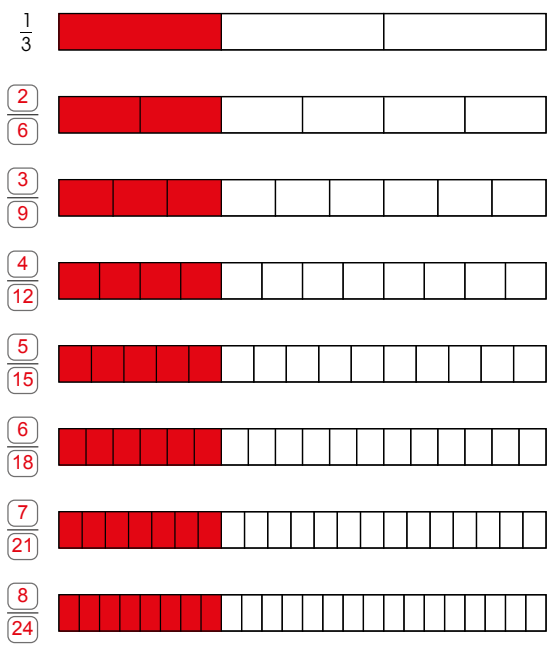
Worksheet 1A (Workbook 3B P39 – 40)

1. (a) $\frac{1}{2}$

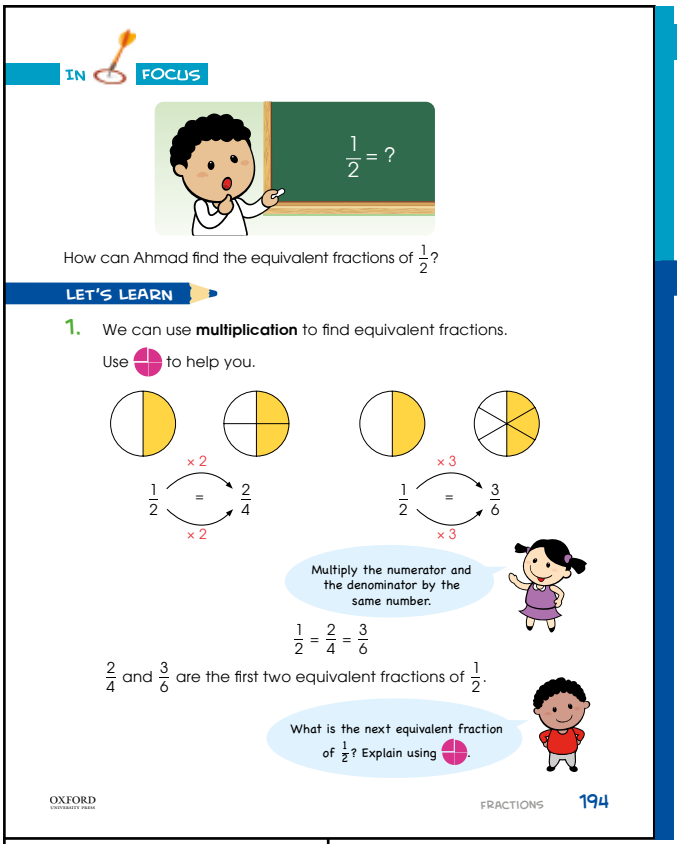


$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$

(b) $\frac{1}{3}$



$\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12} = \frac{5}{15} = \frac{6}{18} = \frac{7}{21} = \frac{8}{24}$



Textbook 3 P194

IN FOCUS

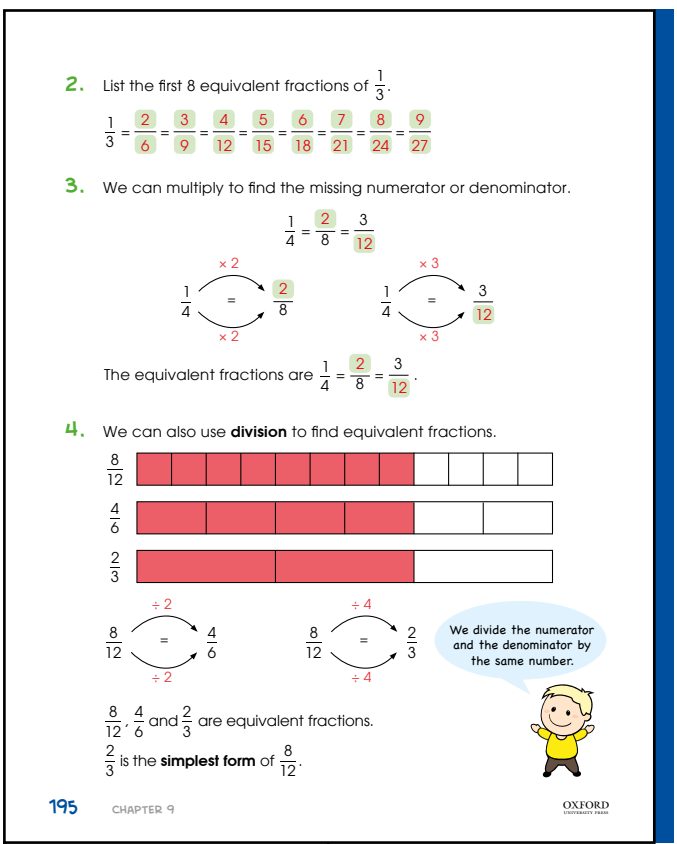
Give each pair of pupils a set of fraction discs and ask them to lay out the pieces that are equivalent fractions of $\frac{1}{2}$ and write down the fractions as shown by the discs.

LET'S LEARN

Introduce pupils to a new method of finding equivalent fractions.

Using Let's Learn 1, lead pupils to see the pattern of multiplying the numerator and the denominator by the same number.

Ask pupils to find the equivalent fractions of $\frac{1}{2}$ by using the multiplication method, and get them to check against the equivalent fractions they have formed with fraction discs.



Textbook 3 P195

Guide pupils to list the first 8 equivalent fractions of a given fraction without the use of manipulatives, using the multiplication method. Point out to pupils that when listing the first 8 equivalent fractions, they must multiply the denominator and numerator of the given fraction by 2, 3, 4, 5, 6, 7 and 8.

After going through Let's Learn 3, give two more examples and assign pupils to work in pairs.

In the reverse process, guide pupils to see that a fraction such as $\frac{8}{12}$ can be simplified by dividing both the numerator and denominator by the same whole number. $\frac{2}{3}$ is a fraction in its simplest form as it cannot be simplified further. Show the process clearly for all the other equivalent fractions of the given fraction.

5. Express $\frac{6}{10}$ in its simplest form.

$\frac{6}{10} \overset{\div 2}{=} \frac{3}{5}$

$\frac{3}{5}$ is the simplest form of $\frac{6}{10}$.

6. Express $\frac{4}{8}$ in its simplest form.

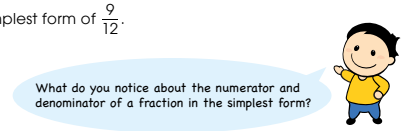
$\frac{4}{8} \overset{\div 4}{=} \frac{1}{2}$

$\frac{1}{2}$ is the simplest form of $\frac{4}{8}$.

7. Express $\frac{9}{12}$ in its simplest form.

$\frac{9}{12} \overset{\div 3}{=} \frac{3}{4}$

$\frac{3}{4}$ is the simplest form of $\frac{9}{12}$.



OXFORD UNIVERSITY PRESS FRACTIONS 196

Textbook 3 P196

Get pupils to work on Let's Learn 5 to 7 using division before demonstrating to the class.

Help pupils to define what a fraction in its simplest form means and give some non-examples for pupils to evaluate and consolidate the concept.

ACTIVITY TIME

Part A:

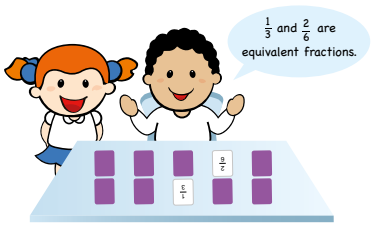
Work in pairs.
Look at the fractions shown on the cards.
Which fractions are not in the simplest form?
Write the fractions in their simplest form.

What you need:

Part B:

Play in pairs.

1. Shuffle the cards.
   Put each card face down on the table.
2. Take turns to turn over 2 cards.
3. If the cards you turn over show equivalent fractions, keep the cards.



If the cards do not show equivalent fractions, turn the cards back.

4. Repeat until no cards are left.
   The player with the most cards wins!

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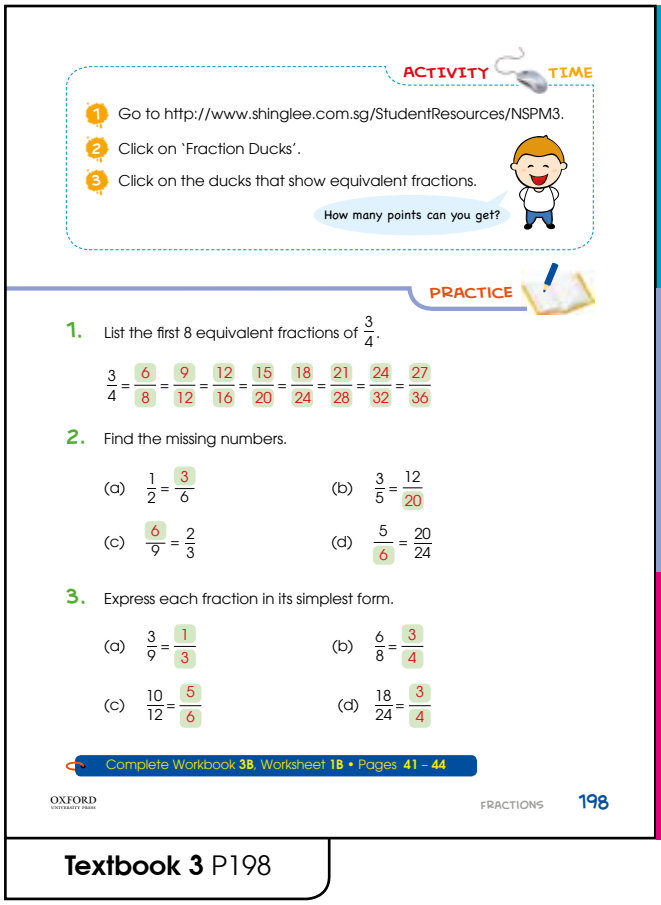
Textbook 3 P197

ACTIVITY TIME

Assign pupils to play in pairs.

The activity aims to develop pupils' mastery of equivalent fractions by playing games.



ACTIVITY TIME

1. Go to http://www.shinglee.com.sg/StudentResources/NSPM3.
2. Click on 'Fraction Ducks'.
3. Click on the ducks that show equivalent fractions.

How many points can you get?

PRACTICE

1. List the first 8 equivalent fractions of $\frac{3}{4}$.

$\frac{3}{4} = \frac{6}{8} = \frac{9}{12} = \frac{12}{16} = \frac{15}{20} = \frac{18}{24} = \frac{21}{28} = \frac{24}{32} = \frac{27}{36}$

2. Find the missing numbers.

(a) $\frac{1}{2} = \frac{3}{6}$ (b) $\frac{3}{5} = \frac{12}{20}$

(c) $\frac{6}{9} = \frac{2}{3}$ (d) $\frac{5}{6} = \frac{20}{24}$

3. Express each fraction in its simplest form.

(a) $\frac{3}{9} = \frac{1}{3}$ (b) $\frac{6}{8} = \frac{3}{4}$

(c) $\frac{10}{12} = \frac{5}{6}$ (d) $\frac{18}{24} = \frac{3}{4}$

Complete Workbook 3B, Worksheet 1B • Pages 41 – 44

OXFORD UNIVERSITY PRESS FRACTIONS 198

Textbook 3 P198

ACTIVITY TIME

This ICT aims to develop pupils' mastery of equivalent fractions in a fun way through interactive computer games.

PRACTICE

Allow pupils to work in pairs first, after which go through the questions with the class.

For better understanding, select items from **Worksheet 1B** and work these out with the pupils.

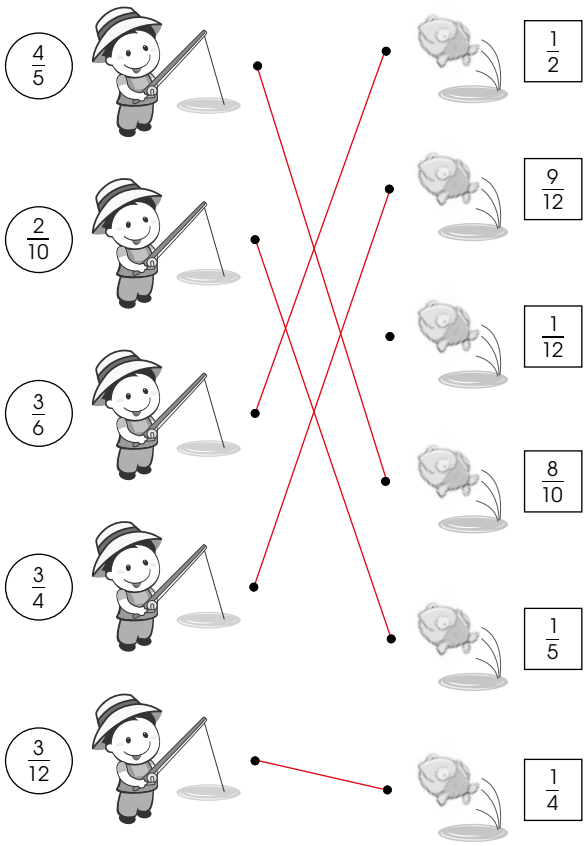
Independent seatwork

Assign pupils to complete Worksheet 1B (Workbook 3B P41 – 44).

Answers Worksheet 1B (Workbook 3B P41 – 44)

1. (a) $\frac{2}{6}, \frac{2}{8}, \frac{1}{4}$
   (b) $\frac{4}{12}, \frac{2}{6}, \frac{3}{7}$
   (c) $\frac{4}{10}, \frac{2}{6}, \frac{2}{5}$

2.



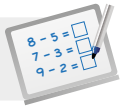
3. (a) $\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15} = \frac{12}{18} = \frac{14}{21} = \frac{16}{24} = \frac{18}{27}$
   (b) $\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \frac{4}{16} = \frac{5}{20} = \frac{6}{24} = \frac{7}{28} = \frac{8}{32} = \frac{9}{36}$
   (c) $\frac{3}{5} = \frac{6}{10} = \frac{9}{15} = \frac{12}{20} = \frac{15}{25} = \frac{18}{30} = \frac{21}{35} = \frac{24}{40} = \frac{27}{45}$
   (d) $\frac{2}{7} = \frac{4}{14} = \frac{6}{21} = \frac{8}{28} = \frac{10}{35} = \frac{12}{42} = \frac{14}{49} = \frac{16}{56} = \frac{18}{63}$
   (e) $\frac{3}{8} = \frac{6}{16} = \frac{9}{24} = \frac{12}{32} = \frac{15}{40} = \frac{18}{48} = \frac{21}{56} = \frac{24}{64} = \frac{27}{72}$

4. (a) 4
   (b) 10
   (c) 12
   (d) 9
   (e) 1
   (f) 2
   (g) 6
   (h) 2

5. (a) $\frac{1}{4}$
   (b) $\frac{4}{6} = \frac{2}{3}$
   (c) $\frac{6}{9} = \frac{2}{3}$
   (d) $\frac{4}{10} = \frac{2}{5}$

6. (a) $\frac{1}{2}$
   (b) $\frac{1}{3}$
   (c) $\frac{3}{5}$
   (d) $\frac{3}{4}$

LESSON PLAN



Specific Learning Focus

- Find and list equivalent fractions.
- Write a fraction in its simplest form.

Suggested Duration

6 periods

Prior Learning

Pupils should be well-versed with the concept of fractions as part of a whole. Numerator and denominator as key terms of fractions have also been introduced in Grade 2. Pupils have also learnt to compare and order like and related fractions, as well as do simple addition and subtraction of like fractions.

Pre-emptive Pitfalls

Equivalence is a challenging concept of fractions. It is the foundation for operations of more complex fractions. Fraction strips and food items like pizzas, cakes or bars of chocolates, can be used for a better understanding of equivalence.

Introduction

Conduct this lesson using fraction strips. Distribute 4 strips of paper of the same length to each pupil and ask them to divide each of the 4 strips into 3 equal parts and shade one part for each strip. Then have them continue to fold the remaining 3 strips into 6, 9 and 12 equal parts respectively. The teacher may get pupils to do the same for 2, 4, 6, 8, 10 and 12 equal parts. Explain that the fraction shaded in each strip of paper is the same and that they are equivalent fractions. Introduce multiplication and then division to find equivalent fractions. Emphasise to pupils that to get larger equivalent fractions, one has to multiply the numerator and denominator by the same number. Conversely, by dividing the numerator and denominator by the same number, one gets a smaller equivalent fraction or a fraction in 'reduced' or simplest form.

Problem Solving

Encourage visual representation of equivalent fraction by using fraction discs. Point out that equivalent fractions have the same quantity but are expressed in various forms.

Activities

In 'Activity Time' (Textbook 3 P97), pictorial representation and then abstract computation through fun and games will enable pupils to grasp the concept of equivalence.

Resources

- fraction bars (Activity Handbook 3 P30)
- fraction discs (Activity Handbook 3 P29)
- paper strips
- fraction cards (Activity Handbook 3 P32 – 37)
- markers

Mathematical Communication Support

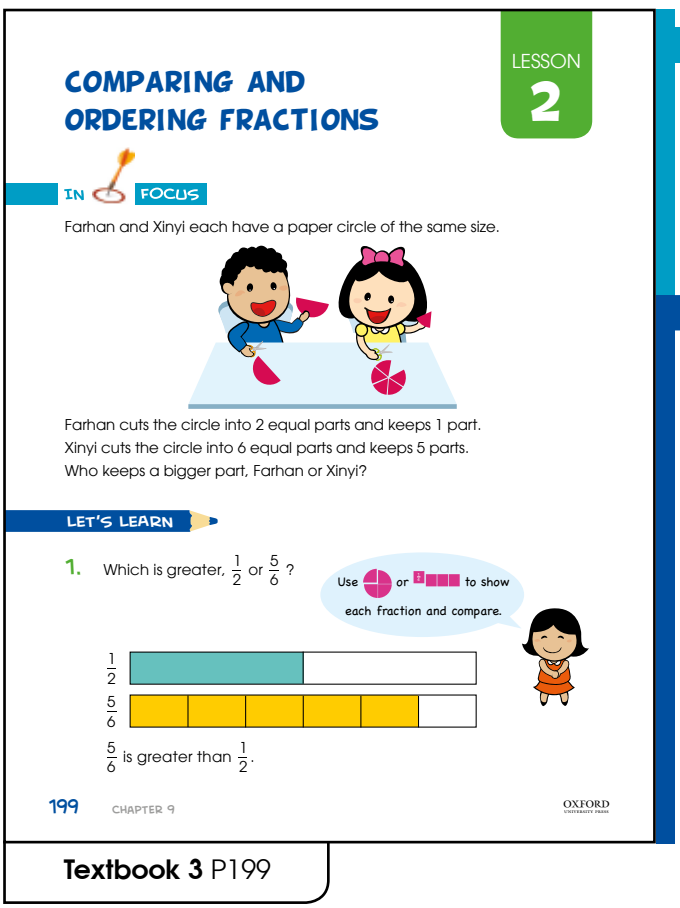
Encourage class discussion while working on the questions on the board. Elicit individual responses. Questions in 'Practice' (Textbook 3 P198) can be done in groups. Give individual attention to each group and discuss if one needs to divide or multiply to find the equivalent fractions.

LESSON 2

COMPARING AND ORDERING FRACTIONS

LEARNING OBJECTIVE

1. Compare and order fractions.



COMPARING AND ORDERING FRACTIONS

LESSON 2

IN FOCUS

Farhan and Xinyi each have a paper circle of the same size.

Farhan cuts the circle into 2 equal parts and keeps 1 part.
Xinyi cuts the circle into 6 equal parts and keeps 5 parts.
Who keeps a bigger part, Farhan or Xinyi?

LET'S LEARN

1. Which is greater, $\frac{1}{2}$ or $\frac{5}{6}$?

Use ● or ■■■■■■ to show each fraction and compare.

$\frac{1}{2}$

$\frac{5}{6}$

$\frac{5}{6}$ is greater than $\frac{1}{2}$.

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Textbook 3 P199

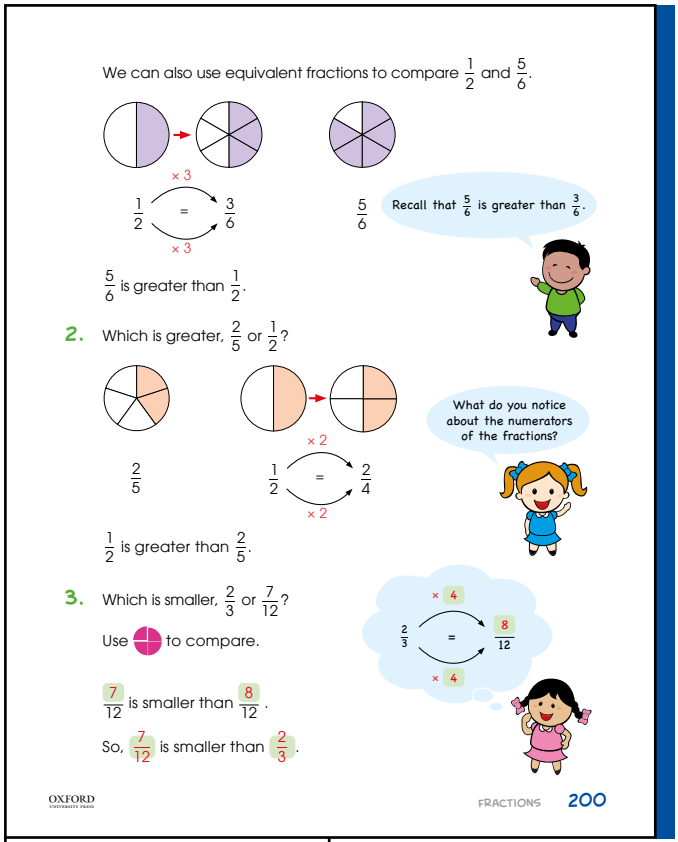
IN FOCUS

Bring two large circle cut-outs to the class. Invite two pupils to act out the scenario as shown. It should be clear which fraction is bigger with the cut-outs. Tell pupils that they will learn how to compare and order fractions without the use of manipulatives.

LET'S LEARN

Write the two fractions on the whiteboard. Illustrate the fractions with fraction bars on the visualiser. Conclude with pupils and use the comparison language (greater than, smaller than, etc.) to compare the given fractions.

Compare the two fractions again without using manipulatives. Recap with pupils how to compare two fractions with the same denominator. So to compare the fractions in this case, they would have to apply the concept of equivalent fractions.

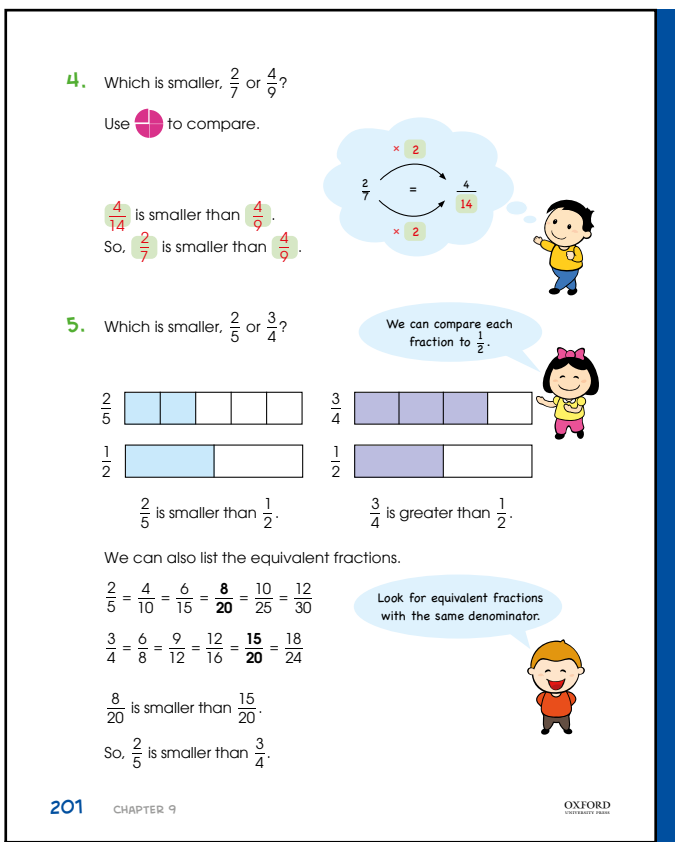


Textbook 3 P200

Illustrate the multiplication process and verify with fraction discs to conclude that $\frac{5}{6}$ is greater than $\frac{1}{2}$.

First review with pupils the comparison of two fractions that have the same numerator. Lead them to see that the fraction with the greater denominator is smaller. This can be illustrated using fraction discs. This serves to help pupils to see why $\frac{1}{2}$ is changed to $\frac{2}{4}$, and then compare with $\frac{2}{5}$.

Let's Learn 3 involves the comparison of two related fractions. Lead pupils to see that the denominator of one fraction is a multiple of the denominator of the other fraction (3 and 12). Show pupils the process of converting $\frac{2}{3}$ to $\frac{8}{12}$.

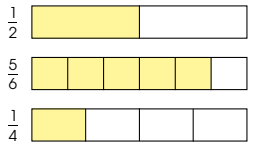


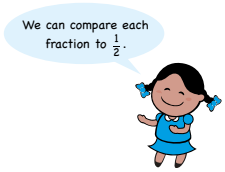
Textbook 3 P201

Let's Learn 4 involves comparing two unrelated fractions. Ask pupils to suggest how the fractions can be compared. Lead pupils to see that they can change one of the fractions to have the same numerator as the other, and then they can compare as in example 2.

In Let's Learn 5, pupils compare fractions using $\frac{1}{2}$ as reference. Without the use of manipulatives, guide pupils to judge whether a fraction is more or less than half, using the denominator as the reference. Alternatively, show pupils the method of listing out the equivalent fractions of the two given fractions and looking for equivalent fractions with the same denominator to compare.

6. Arrange $\frac{1}{2}$, $\frac{5}{6}$ and $\frac{1}{4}$ in order, starting with the greatest.





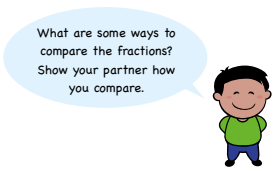
$\frac{5}{6}$ is greater than $\frac{1}{2}$.

$\frac{1}{4}$ is smaller than $\frac{1}{2}$.

Arranging the fractions from the greatest to the smallest, we have

$\frac{5}{6}$, $\frac{1}{2}$, $\frac{1}{4}$

7. Arrange $\frac{5}{8}$, $\frac{1}{2}$ and $\frac{1}{4}$ in order, starting with the smallest.



$\frac{1}{4}$ is the smallest.

$\frac{5}{8}$ is the greatest.

Arranging the fractions from the smallest to the greatest, we have

$\frac{1}{4}$, $\frac{1}{2}$, $\frac{5}{8}$

Textbook 3 P202

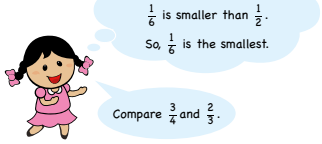
Let's Learn 6 and 7 involve comparing and ordering three fractions. At this juncture, review with pupils the different methods of comparing two fractions practiced in the previous lesson.

Allow pupils to work in pairs for each example. Encourage them to examine the type of fractions that are given and explore using the methods learnt. They can compare two fractions at a time to find the greatest fraction.

After which, demonstrate the process to the class clearly through questioning.

8. Arrange $\frac{3}{4}$, $\frac{2}{3}$ and $\frac{1}{6}$ in order, starting with the smallest.

Use  to help you.



$\frac{3}{4} = \frac{6}{8} = \frac{9}{12} = \frac{12}{16} = \frac{15}{20} = \frac{18}{24} = \frac{21}{28} = \frac{24}{32} = \frac{27}{36}$

$\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15} = \frac{12}{18} = \frac{14}{21} = \frac{16}{24} = \frac{18}{27}$

$\frac{9}{12}$ is greater than $\frac{8}{12}$.

$\frac{3}{4}$ is the greatest.

Arranging the fractions from the smallest to the greatest, we have

$\frac{3}{4}$, $\frac{2}{3}$, $\frac{1}{6}$

ACTIVITY TIME

1. Go to http://www.shinglee.com.sg/StudentResources/NSPM3.
2. Click on 'Robot Race!'
3. Click on the greater fraction to make your robot run faster.

Textbook 3 P203

For Let's Learn 8, allow pupils to spend some time to list the equivalent fractions.

ACTIVITY TIME

The digital game provides fun exercises for pupils to consolidate the comparing of fractions.

PRACTICE

1. Which fraction is greater?

(a) $\frac{1}{3}$ or $\frac{2}{9}$ $\frac{1}{3}$ (b) $\frac{3}{5}$ or $\frac{7}{10}$ $\frac{7}{10}$

(c) $\frac{5}{11}$ or $\frac{1}{2}$ $\frac{1}{2}$ (d) $\frac{6}{7}$ or $\frac{3}{4}$ $\frac{6}{7}$

2. Which fraction is smaller?

(a) $\frac{3}{8}$ or $\frac{1}{4}$ $\frac{1}{4}$ (b) $\frac{2}{3}$ or $\frac{5}{9}$ $\frac{5}{9}$

(c) $\frac{5}{6}$ or $\frac{1}{5}$ $\frac{1}{5}$ (d) $\frac{5}{11}$ or $\frac{4}{5}$ $\frac{5}{11}$

3. Arrange the fractions from the greatest to the smallest.

(a) $\frac{2}{3}, \frac{7}{12}, \frac{5}{6}$ $\frac{5}{6}, \frac{2}{3}, \frac{7}{12}$ *(b) $\frac{3}{4}, \frac{1}{2}, \frac{4}{5}$ $\frac{4}{5}, \frac{3}{4}, \frac{1}{2}$

4. Arrange the fractions from the smallest to the greatest.

(a) $\frac{1}{2}, \frac{3}{5}, \frac{1}{3}$ $\frac{1}{3}, \frac{1}{2}, \frac{3}{5}$ *(b) $\frac{5}{6}, \frac{7}{8}, \frac{2}{3}$ $\frac{2}{3}, \frac{5}{6}, \frac{7}{8}$

Complete Workbook 3B, Worksheet 2 • Pages 45 – 50

OXFORD UNIVERSITY PRESS FRACTIONS 204

Textbook 3 P204

PRACTICE

Work with pupils on the practice questions.

First ask pupils to examine the numerator and denominator of each given fraction. Ask them to think about which method is most appropriate to use for comparing the fractions. Invite a pupil to show his/her working. Get the class to check and identify errors if any are present.

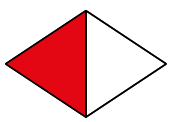
For better understanding, select items from **Worksheet 2** and work these out with the pupils.

Independent seatwork

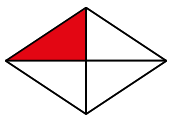
Assign pupils to complete Worksheet 2 (Workbook 3B P45 – 50).

Answers Worksheet 2 (Workbook 3B P45 – 50)

1. (a)



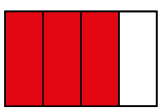
$\frac{1}{2}$



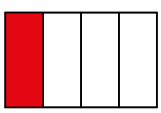
$\frac{1}{4}$

$\frac{1}{2}$ is greater than $\frac{1}{4}$.

(b)



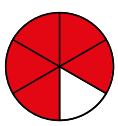
$\frac{3}{4}$



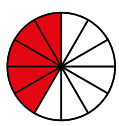
$\frac{1}{4}$

$\frac{3}{4}$ is greater than $\frac{1}{4}$.

(c)



$\frac{5}{6}$



$\frac{5}{12}$

$\frac{5}{12}$ is smaller than $\frac{5}{6}$.

2. $\frac{15}{21}$

$\frac{2}{4}$, is smaller than $\frac{5}{8}$.

(b) $\frac{5}{10}, \frac{2}{5}$

$\frac{2}{5}$, is smaller than $\frac{5}{10}$.

(c) $\frac{4}{12}, \frac{4}{8}$

$\frac{4}{8}$ is greater than $\frac{4}{12}$

3. (a) $\frac{1}{3} = \frac{3}{9}$

$\frac{3}{9}$ is smaller than $\frac{5}{9}$.

So, $\frac{1}{3}$ is smaller than $\frac{5}{9}$.

(b) $\frac{3}{4} = \frac{6}{8}$

$\frac{6}{8}$ is smaller than $\frac{7}{8}$.

So, $\frac{3}{4}$ is smaller than $\frac{7}{8}$.

(c) $\frac{2}{3} = \frac{8}{12}$

$\frac{8}{12}$ is greater than $\frac{5}{12}$.

So, $\frac{2}{3}$ is greater than $\frac{5}{12}$.

(d) $\frac{5}{8} = \frac{15}{24}$ $\frac{3}{7} = \frac{15}{35}$

$\frac{15}{24}$ is greater than $\frac{15}{35}$.

$\frac{5}{8}$ is greater than $\frac{3}{7}$.

(e) $\frac{2}{3} = \frac{14}{21}$ $\frac{5}{7} = \frac{15}{21}$

$\frac{15}{21}$ is greater than $\frac{14}{21}$.

$\frac{5}{7}$ is greater than $\frac{2}{3}$.

*(f) $\frac{6}{9} = \frac{2}{3}$

$\frac{2}{3} = \frac{8}{12}$

$\frac{7}{12}$ is smaller than $\frac{6}{9}$.

4. (a) $\frac{3}{4}$

(b) $\frac{3}{7}$

(c) $\frac{3}{10}$

(d) $\frac{2}{3}$

5. (a) $\frac{4}{9}$

(b) $\frac{7}{12}$

(c) $\frac{5}{8}$

(d) $\frac{3}{4}$

6. (a) ~~$\frac{4}{9}$~~, $\frac{2}{3}$

(b) ~~$\frac{1}{6}$~~, $\frac{6}{7}$

7. (a) $\frac{3}{4}, \frac{1}{2}, \frac{1}{4}$

(b) $\frac{7}{10}, \frac{3}{5}, \frac{1}{2}$

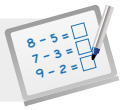
(b) $\frac{5}{6}, \frac{5}{9}, \frac{5}{12}$

8. (a) $\frac{3}{10}, \frac{1}{2}, \frac{7}{12}$

(b) $\frac{1}{4}, \frac{2}{3}, \frac{5}{6}$

(c) $\frac{5}{6}, \frac{7}{8}, \frac{11}{12}$

LESSON PLAN



Specific Learning Focus

- Compare and order fractions.

Suggested Duration

6 periods

Prior Learning

Pupils should be well-versed with comparing and ordering whole numbers. They have also done the same with fractions in Grade 2.

Pre-emptive Pitfalls

Pupils will have to use the concept of equivalence fractions learnt in Lesson 1 to change unlike fractions to like fractions to compare and then order.

Introduction

Recapitulate with pupils that for fractions with the same denominator, the larger the numerator, the larger the fraction is. Use large cut-outs and fraction discs to explain which fraction is larger. Once the pictorial visualisation is done, proceed to the abstract aspect by changing the unlike fractions to fractions with common denominators. Using multiple strategies to compare and order fractions will be beneficial for pupils' understanding of this concept. Make equivalent fractions by either multiplying or dividing, to get the same denominator. The numerators are then compared and the fractions can be arranged in order.

Problem Solving

Use manipulatives and then abstract mathematical computation to arrange the fractions in the correct order. Explain to pupils that fractions with common denominator have the same total number of equal parts that make a whole.

Activities

In 'Activity Time' (Textbook 3 P203), the digital game on the website provides exercises which make the lesson fun and pupils get to understand the concept through fun and visualisation.

Resources

- fraction discs (Activity Handbook 3 P29)
- fraction bars (Activity Handbook 3 P30)

Mathematical Communication Support

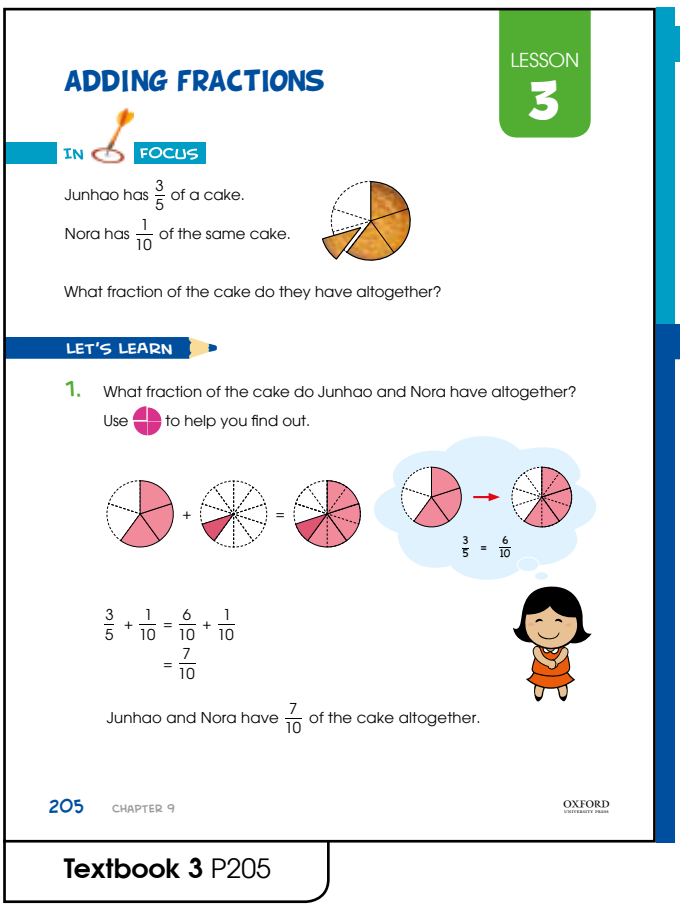
Teach by asking pertinent questions (e.g. Given three fractions $\frac{5}{6}$, $\frac{1}{2}$, $\frac{1}{4}$, can all of them be changed to fractions with the same denominator?). In this case, all three fractions can have a denominator of 12 as the lowest common multiple of 6, 2 and 4 is 12. To change all three fractions to like fractions, $\frac{5}{6}$ is multiplied by 2, $\frac{1}{2}$ is multiplied by 6, $\frac{1}{4}$ is multiplied by 3. The numerators of the like fractions can then be compared and hence the fractions can be arranged in order. Write questions involving the changing of unlike fractions to like fractions, on the board, and elicit individual responses. Encourage multiple strategies while changing them to like fractions.

LESSON 3

ADDING FRACTIONS

LEARNING OBJECTIVE

1. Adding two related fractions within a whole.



ADDING FRACTIONS

LESSON 3

IN FOCUS

Junhao has $\frac{3}{5}$ of a cake.

Nora has $\frac{1}{10}$ of the same cake.

What fraction of the cake do they have altogether?

LET'S LEARN

1. What fraction of the cake do Junhao and Nora have altogether?

Use to help you find out.

$\frac{3}{5} = \frac{6}{10}$

$\frac{3}{5} + \frac{1}{10} = \frac{6}{10} + \frac{1}{10}$

$= \frac{7}{10}$

Junhao and Nora have $\frac{7}{10}$ of the cake altogether.

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Textbook 3 P205

IN FOCUS

Discuss the problem with the class. Facilitate the discussion by asking questions such as:

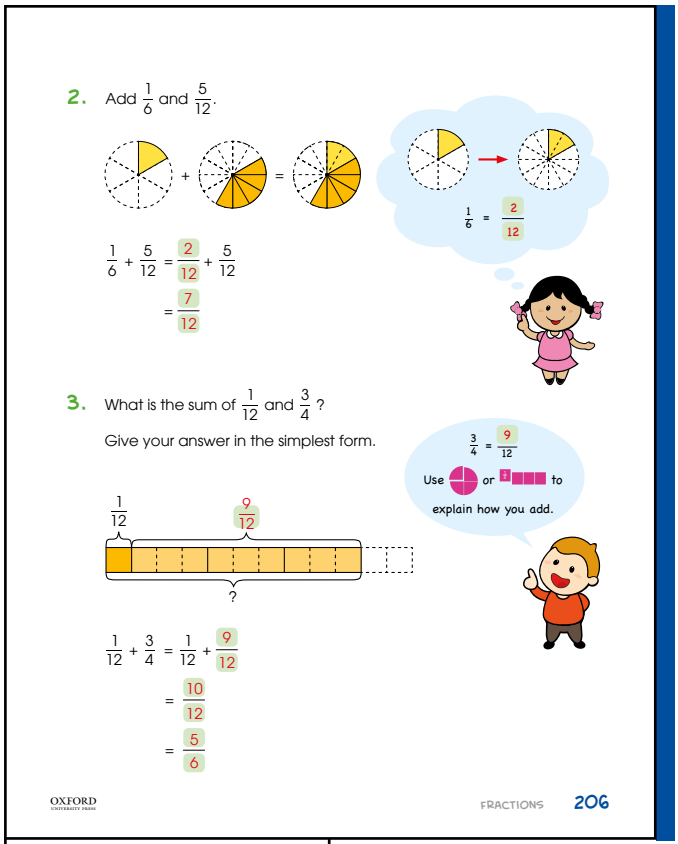
- Which operation should be used to find the fraction of cake both Junhao and Nora had altogether?
- Do the fractions have the same denominator?
- How do we add the two fractions?

LET'S LEARN

Write the fraction statement on the whiteboard and get pupils to use fraction discs to represent the addition of the two fractions. Lead them to see that they can exchange 3 fifths for 6 tenths.

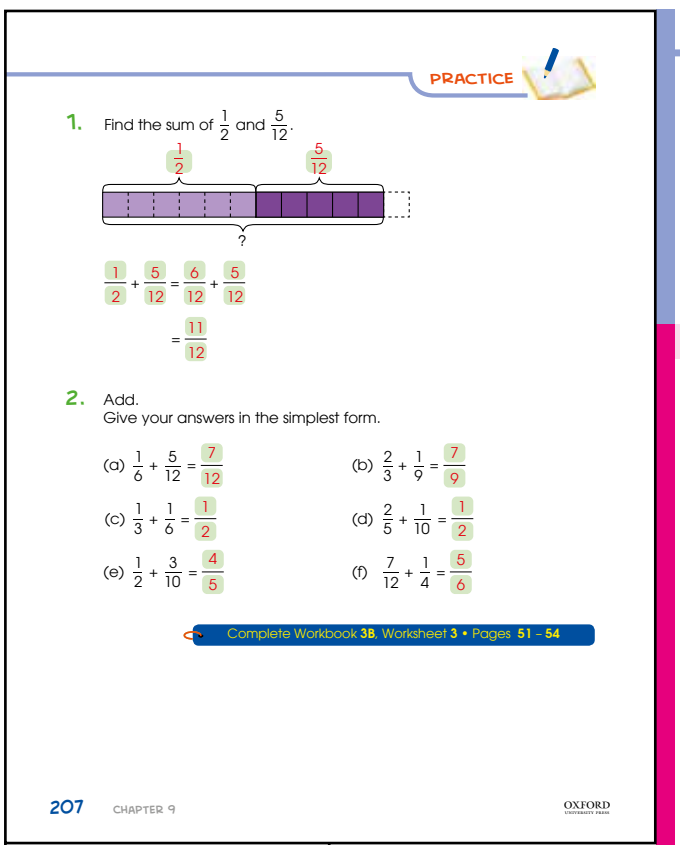
Emphasise that when two fractions have different denominators, they must be changed into like fractions before adding them.

When the denominators are related (such that one denominator is the multiple of the other), we multiply to change the fraction of smaller denominator to an equivalent fraction.



Textbook 3 P206

Reinforce the process with Let's Learn 2 and 3. Show how to give the answer in its simplest form in Let's Learn 3.



Textbook 3 P207

PRACTICE

Allow pupils to work on the questions in pairs before going through worked examples with them.

For better understanding, select items from **Worksheet 3** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 3B P51 – 54).

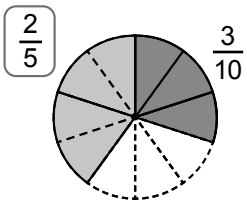
Answers Worksheet 3 (Workbook 3B P51 – 54)

1. (a) $\frac{1}{2} + \frac{1}{12} = \frac{6}{12} + \frac{1}{12}$

$= \frac{7}{12}$

(b) $\frac{2}{5} + \frac{3}{10} = \frac{4}{10} + \frac{3}{10}$

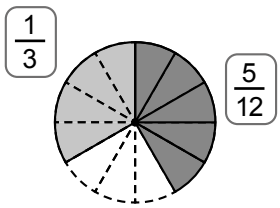
$= \frac{7}{10}$



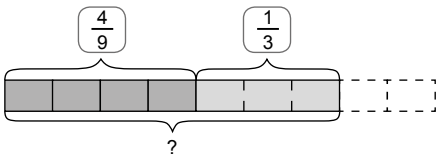
(c) $\frac{1}{3} + \frac{5}{12} = \frac{4}{12} + \frac{5}{12}$

$= \frac{9}{12}$

$= \frac{3}{4}$



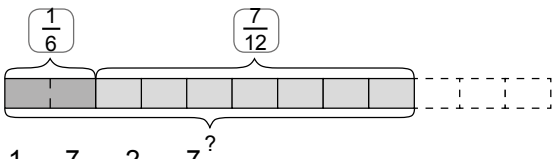
2. (a)



$\frac{4}{9} + \frac{1}{3} = \frac{4}{9} + \frac{3}{9}$

$= \frac{7}{9}$

(b)

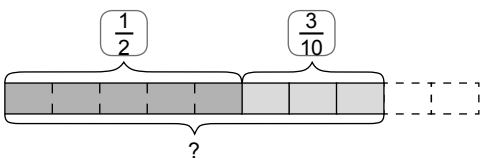


$\frac{1}{6} + \frac{7}{12} = \frac{2}{12} + \frac{7}{12}$

$= \frac{9}{12}$

$= \frac{3}{4}$

(c)

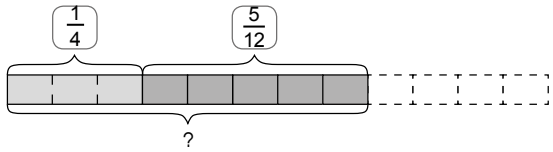


$\frac{1}{2} + \frac{3}{10} = \frac{5}{10} + \frac{3}{10}$

$= \frac{8}{10}$

$= \frac{4}{5}$

(d)



$\frac{1}{4} + \frac{5}{12} = \frac{3}{12} + \frac{5}{12}$

$= \frac{8}{12}$

$= \frac{2}{3}$

3. (a) $\frac{2}{9} + \frac{1}{3} = \frac{2}{9} + \frac{3}{9}$

$= \frac{5}{9}$

(b) $\frac{1}{6} + \frac{5}{12} = \frac{2}{12} + \frac{5}{12}$

$= \frac{7}{12}$

(c) $\frac{5}{8} + \frac{1}{4} = \frac{5}{8} + \frac{2}{8}$

$= \frac{7}{8}$

(d) $\frac{1}{10} + \frac{1}{2} = \frac{1}{10} + \frac{5}{10}$

$= \frac{6}{10}$

$= \frac{3}{5}$

(e) $\frac{1}{5} + \frac{3}{10} = \frac{2}{10} + \frac{3}{10}$

$= \frac{5}{10}$

$= \frac{1}{2}$

(f) $\frac{2}{3} + \frac{1}{12} = \frac{8}{12} + \frac{1}{12}$

$= \frac{9}{12}$

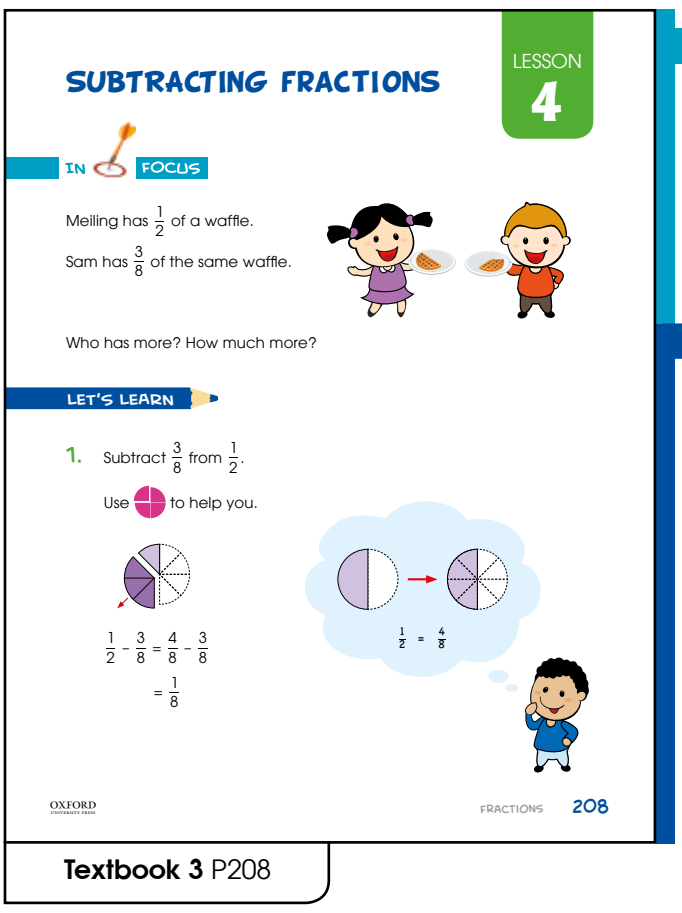
$= \frac{3}{4}$

LESSON
4

SUBTRACTING FRACTIONS

LEARNING OBJECTIVE

1. Subtracting two related fractions within a whole.


SUBTRACTING FRACTIONS

LESSON 4

IN FOCUS

Meiling has $\frac{1}{2}$ of a waffle.

Sam has $\frac{3}{8}$ of the same waffle.

Who has more? How much more?

LET'S LEARN

1. Subtract $\frac{3}{8}$ from $\frac{1}{2}$.

Use ◔ to help you.

$\frac{1}{2} - \frac{3}{8} = \frac{4}{8} - \frac{3}{8}$

$= \frac{1}{8}$

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

OXFORD

FRACTIONS 208

Textbook 3 P208

IN FOCUS

Discuss the problem with the class. Facilitate the discussion by asking questions such as:

- Who has a greater portion of waffle?
- What operation should we use to find the answer?
- Do the fractions have the same denominator?
- How do we subtract the fractions?

LET'S LEARN

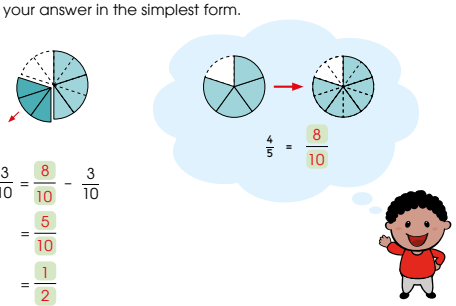
Write the fraction statement on the whiteboard and get pupils to use fraction discs to represent the subtraction of the two fractions. Lead them to see that they can exchange 1 half for 4 eighths.

Emphasise that when two fractions have different denominators, they must be changed into like fractions before subtracting them.

When the denominators are related (such that one denominator is the multiple of the other), we multiply to change the fraction of smaller denominator to an equivalent fraction.

2. Subtract $\frac{3}{10}$ from $\frac{4}{5}$.

Give your answer in the simplest form.

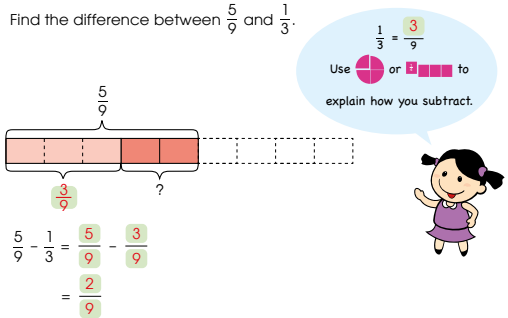


$\frac{4}{5} - \frac{3}{10} = \frac{8}{10} - \frac{3}{10}$

$= \frac{5}{10}$

$= \frac{1}{2}$

3. Find the difference between $\frac{5}{9}$ and $\frac{1}{3}$.



$\frac{5}{9} - \frac{1}{3} = \frac{5}{9} - \frac{3}{9}$

$= \frac{2}{9}$

209 CHAPTER 9 OXFORD UNIVERSITY PRESS

Textbook 3 P209

Reinforce the process with Let's Learn 2 and 3. Ask pupils when they need to give an answer in its simplest form.

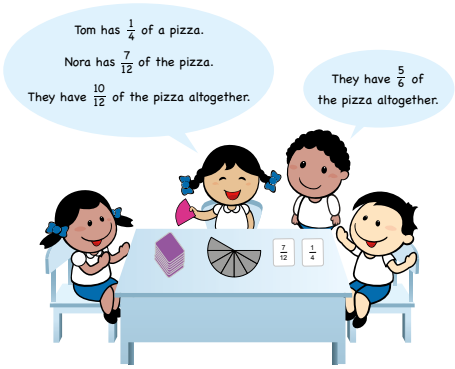
ACTIVITY TIME

Work in groups of 4.

1. Shuffle the cards and put them face down on the table.
2. Take 2 cards.
   Use the fractions to make an addition story or a subtraction story.

What you need:

Example



3. Repeat 1 and 2 to make two more stories.
4. Tell your group's stories to the class.

OXFORD UNIVERSITY PRESS FRACTIONS 210

Textbook 3 P210

ACTIVITY TIME

Assign pupils to work in groups of 4.

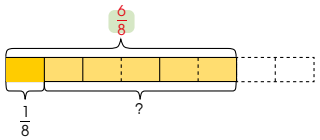
Provide pupils with the necessary materials and paper to write their stories to be shared with the class.

Go through an example with them on how the story should be written. Before they begin their group work, ask pupils what helping words they need. Write them on the whiteboard as pupils say the words.

When the groups present their story to the class, remind them that they must also show the working to the answer in the story.

PRACTICE

1. Subtract $\frac{1}{8}$ from $\frac{3}{4}$.



$\frac{3}{4} - \frac{1}{8} = \frac{6}{8} - \frac{1}{8}$

$= \frac{5}{8}$

2. Subtract.
Give your answers in simplest form.

(a) $\frac{7}{10} - \frac{2}{5} = \frac{3}{10}$

(b) $\frac{5}{6} - \frac{2}{3} = \frac{1}{6}$

(c) $\frac{9}{10} - \frac{1}{2} = \frac{2}{5}$

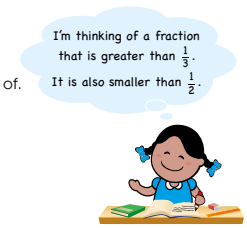
(d) $\frac{3}{4} - \frac{5}{12} = \frac{1}{3}$

Complete Workbook **3B**, Worksheet **4** • Pages **55 – 57**

MIND WORKOUT

Name a fraction Bina could be thinking of.
Explain how you get your answer.

Draw a number line to help you. $\frac{5}{12}$



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Textbook 3 P211

PRACTICE

Allow pupils to work on the questions in pairs before going through worked examples with them.

For better understanding, select items from **Worksheet 4** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 4 (Workbook 3B P55 – 57).

Answers Worksheet 4 (Workbook 3B P55 – 57)

1. (a) $\frac{3}{4} - \frac{1}{2} = \frac{3}{4} - \frac{2}{4}$

$= \frac{1}{4}$

(b) $\frac{1}{3} - \frac{1}{9} = \frac{3}{9} - \frac{1}{9}$

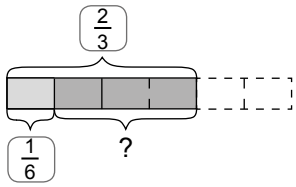
$= \frac{2}{9}$

(c) $\frac{7}{12} - \frac{1}{3} = \frac{7}{12} - \frac{4}{12}$

$= \frac{3}{12}$

$= \frac{1}{4}$

2. (a)

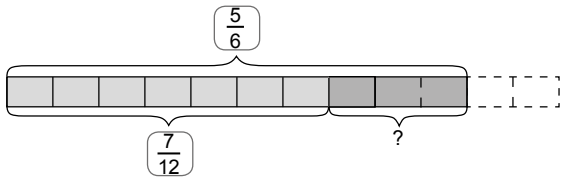


$\frac{2}{3} - \frac{1}{6} = \frac{4}{6} - \frac{1}{6}$

$= \frac{3}{6}$

$= \frac{1}{2}$

(b)



$\frac{5}{6} - \frac{7}{12} = \frac{10}{12} - \frac{7}{12}$

$= \frac{3}{12}$

$= \frac{1}{4}$

3. (a) $\frac{1}{2} - \frac{1}{8} = \frac{4}{8} - \frac{1}{8}$

$= \frac{3}{8}$

(b) $\frac{8}{9} - \frac{2}{3} = \frac{8}{9} - \frac{6}{9}$

$= \frac{2}{9}$

(c) $\frac{1}{4} - \frac{1}{12} = \frac{3}{12} - \frac{1}{12}$

$= \frac{2}{12}$

$= \frac{1}{6}$

(d) $\frac{7}{10} - \frac{1}{2} = \frac{7}{10} - \frac{5}{10}$

$= \frac{2}{10}$

$= \frac{1}{5}$

(e) $\frac{9}{10} - \frac{2}{5} = \frac{9}{10} - \frac{4}{10}$

$= \frac{5}{10}$

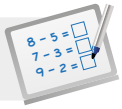
$= \frac{1}{2}$

(f) $\frac{11}{12} - \frac{2}{3} = \frac{11}{12} - \frac{8}{12}$

$= \frac{3}{12}$

$= \frac{1}{4}$

LESSON PLAN



Specific Learning Focus

- Adding two related fractions within a whole.
- Subtracting two related fractions within a whole.

Suggested Duration

Lesson 3: 4 periods
Lesson 4: 4 periods

Prior Learning

Pupils have learnt the addition and subtraction of like fractions.

Pre-emptive Pitfalls

In this lesson, before adding and subtracting fractions, fractions are changed to equivalent fractions first. Pupils have to find a common denominator to both fractions and get the equivalent fractions. Although they have visited this concept in Lesson 2, too many mathematical computation steps are required to add and subtract fractions, so this might be slightly challenging for pupils.

Introduction

Go through all the steps of 'Let's Learn' and questions in 'Practice' of lessons 3 and 4 on the board. Encourage individual responses while making equivalent fractions. Emphasise to pupils that one might need to multiply or divide the denominator to make fractions with the same denominator. After which, the addition and subtraction of fractions is then made easy by simply adding or subtracting the numerators.

Problem Solving

Pupils will have to develop the skill of identifying a common denominator which will have to be the first common multiple of both the denominators of the unlike fractions. To get the common denominator a number will be selected which will then multiply or divide both the numerator and denominator to make both as like fractions.

Activities

Divide the class into groups of 4 and carry out the activities for both lessons.

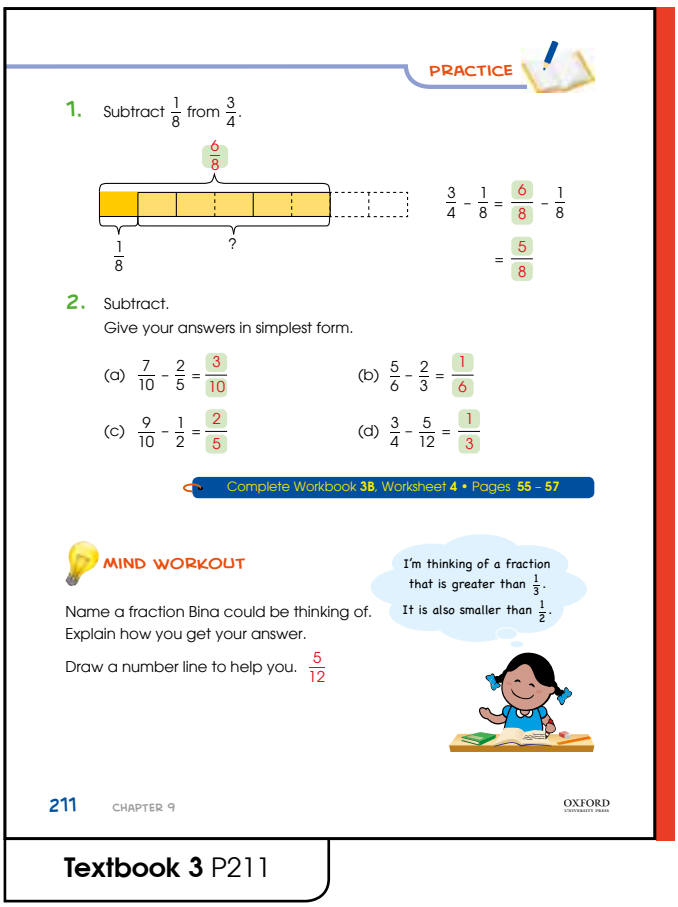
Resources

- fraction discs (Activity Handbook 3 P29)
- fraction bars (Activity Handbook 3 P30)
- fraction cards (Activity Handbook 3 P32 – 37)

Mathematical Communication Support

Ask open-ended questions (e.g. give any 8 equivalent fractions of $\frac{5}{6}$). Write incorrect equivalent fractions on the board and ask pupils if they can identify what is wrong with the fractions. Elicit individual responses to rectify the mistake. Discuss mental strategies verbally and talk them through the steps verbally and then on the board. Consolidate the chapter by using key terms like 'numerator', 'denominator', 'equivalent', 'common multiple', etc.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



PRACTICE

1. Subtract $\frac{1}{8}$ from $\frac{3}{4}$.

$\frac{3}{4} - \frac{1}{8} = \frac{6}{8} - \frac{1}{8}$

$= \frac{5}{8}$

2. Subtract.
Give your answers in simplest form.

(a) $\frac{7}{10} - \frac{2}{5} = \frac{3}{10}$

(b) $\frac{5}{6} - \frac{2}{3} = \frac{1}{6}$

(c) $\frac{9}{10} - \frac{1}{2} = \frac{2}{5}$

(d) $\frac{3}{4} - \frac{5}{12} = \frac{1}{3}$

Complete Workbook 3B, Worksheet 4 • Pages 55 – 57

MIND WORKOUT

Name a fraction Bina could be thinking of.
Explain how you get your answer.

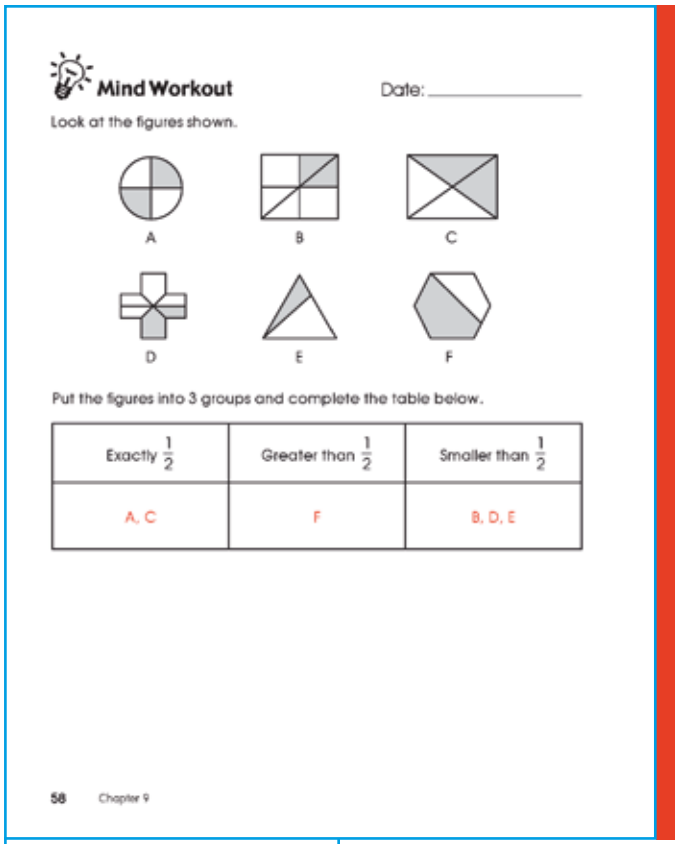
Draw a number line to help you. $\frac{5}{12}$

211 CHAPTER 9 OXFORD

Textbook 3 P211

MIND WORKOUT

This is an open-ended question with many possible answers. To limit the range, ask for a fraction with a denominator up to 12. Suggest for pupils to draw number lines to show equivalent fractions between $\frac{1}{3}$ and $\frac{1}{2}$ up to twelfths. Refer to the number lines on P192 of the textbook.



Mind Workout

Date: _____

Look at the figures shown.

A B C

D E F

Put the figures into 3 groups and complete the table below.

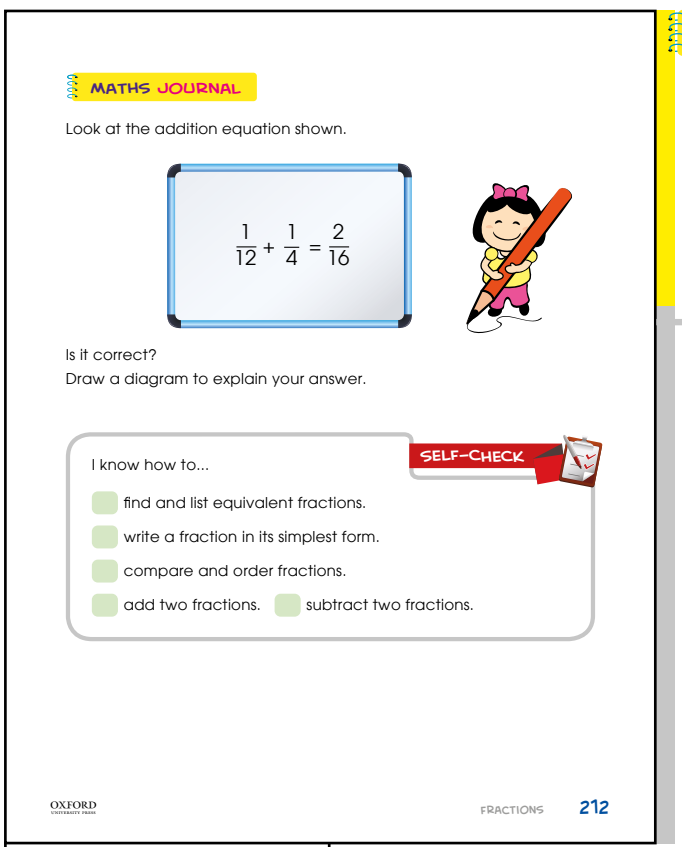
Exactly $\frac{1}{2}$	Greater than $\frac{1}{2}$	Smaller than $\frac{1}{2}$
A, C	F	B, D, E

58 Chapter 9

Workbook 3B P58

Mind Workout

This task requires spatial visualisation and analysis of the figures based on the concept of $\frac{1}{2}$.



MATHS JOURNAL

Look at the addition equation shown.

$\frac{1}{12} + \frac{1}{4} = \frac{2}{16}$

Is it correct?
Draw a diagram to explain your answer.

I know how to...

SELF-CHECK

- find and list equivalent fractions.
- write a fraction in its simplest form.
- compare and order fractions.
- add two fractions.
- subtract two fractions.

OXFORD

FRACTIONS 212

Textbook 3 P212

MATHS JOURNAL

To be more specific, ask pupils to describe what was done wrong in the working.

Draw a diagram and explain what the correct working should be to get the answer.

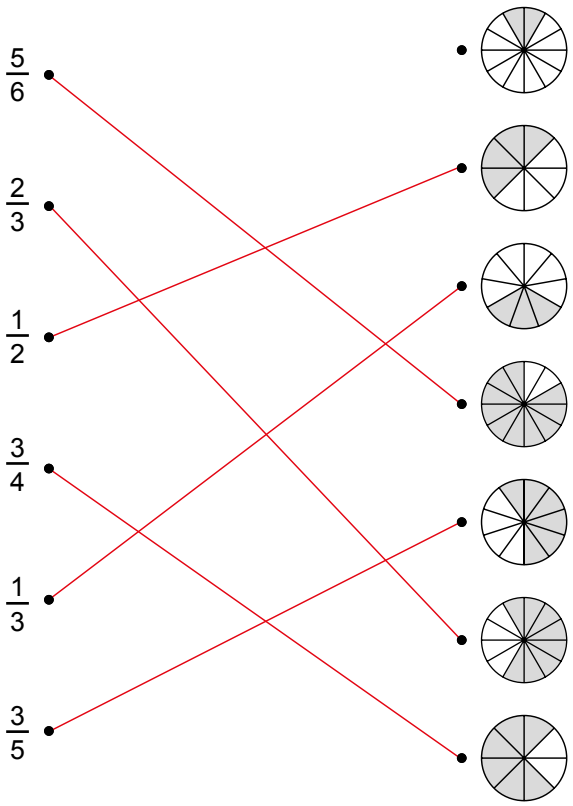
SELF-CHECK

Before the pupils do the self-check, review the important concepts once more by asking for examples learnt for each objective.

This self-check can be done after pupils have completed **Review 9** (Workbook 3B P59 – 62) as consolidation of understanding for the chapter.

Answers Review 9 (Workbook 3B P59 – 62)

1.



2. (a) 3
   (b) 8
   (c) 10
   (d) 12
   (e) 9
   (f) 12

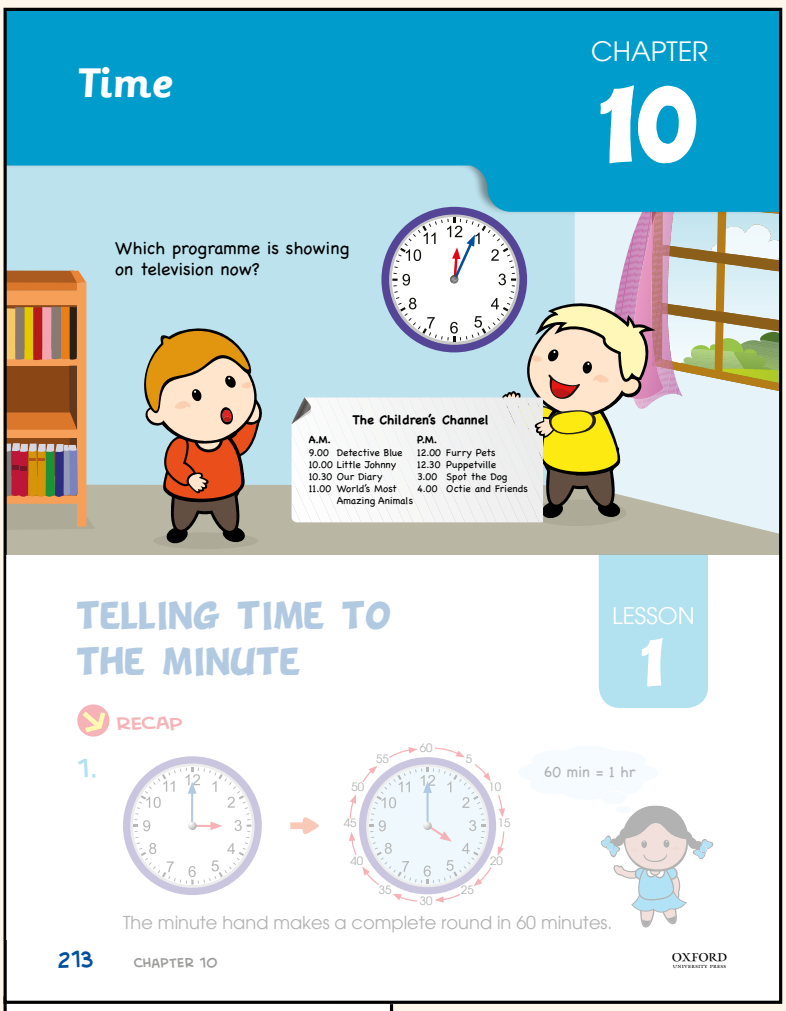
3 (a) $\frac{5}{11}, \frac{3}{11}$
   (b) $\frac{5}{8}$
   (c) $\frac{5}{8}$
   (d) $\frac{3}{11}$
   (e) $\frac{3}{11}, \frac{5}{11}, \frac{5}{8}$

4. (a) $\frac{1}{12}, \frac{1}{8}, \frac{1}{3}$
   (b) $\frac{3}{7}, \frac{1}{2}, \frac{5}{6}$
   (c) $\frac{9}{10}, \frac{4}{5}, \frac{1}{2}$
   *(d) $\frac{5}{6}, \frac{3}{4}, \frac{2}{3}$

5. (a) $\frac{3}{8} + \frac{1}{2} = \frac{3}{8} + \frac{4}{8}$
   $= \frac{7}{8}$
   (b) $\frac{2}{3} + \frac{2}{9} = \frac{6}{9} + \frac{2}{9}$
   $= \frac{8}{9}$
   (c) $\frac{1}{3} + \frac{5}{12} = \frac{4}{12} + \frac{5}{12}$
   $= \frac{9}{12}$
   $= \frac{3}{4}$
   (d) $\frac{3}{4} + \frac{1}{12} = \frac{9}{12} + \frac{1}{12}$
   $= \frac{10}{12}$
   $= \frac{5}{6}$
   (e) $\frac{4}{9} - \frac{1}{3} = \frac{4}{9} - \frac{3}{9}$
   $= \frac{1}{9}$
   (f) $\frac{2}{3} - \frac{4}{9} = \frac{6}{9} - \frac{4}{9}$
   $= \frac{2}{9}$
   (g) $\frac{1}{2} - \frac{1}{10} = \frac{5}{10} - \frac{1}{10}$
   $= \frac{4}{10}$
   $= \frac{2}{5}$
   (h) $\frac{7}{12} - \frac{1}{4} = \frac{7}{12} - \frac{3}{12}$
   $= \frac{4}{12}$
   $= \frac{1}{3}$

TIME

CHAPTER
10



Textbook 3 P213

Related Resources
NSPM Textbook 3 (P213 – 234)
NSPM Workbook 3B (P63 – 98)

Materials
Geared clock, stopwatch, wristwatch, pen, paper

Lesson

Lesson 1	Telling Time to the Minute
Lesson 2	Duration of Time
Lesson 3	Conversion of Hours and Minutes
Lesson 4	Solving Word Problems

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

From telling time to 5 minutes in Grade 2, pupils now learn how to tell time to the minute. Pupils could be given the opportunity to observe the movement of clocks and to experience for themselves how long a minute feels and what can be done in a minute. Pupils also learn to use a timeline to represent information on time and to find duration. Real-life examples of schedules can be provided so that pupils can apply their learning.

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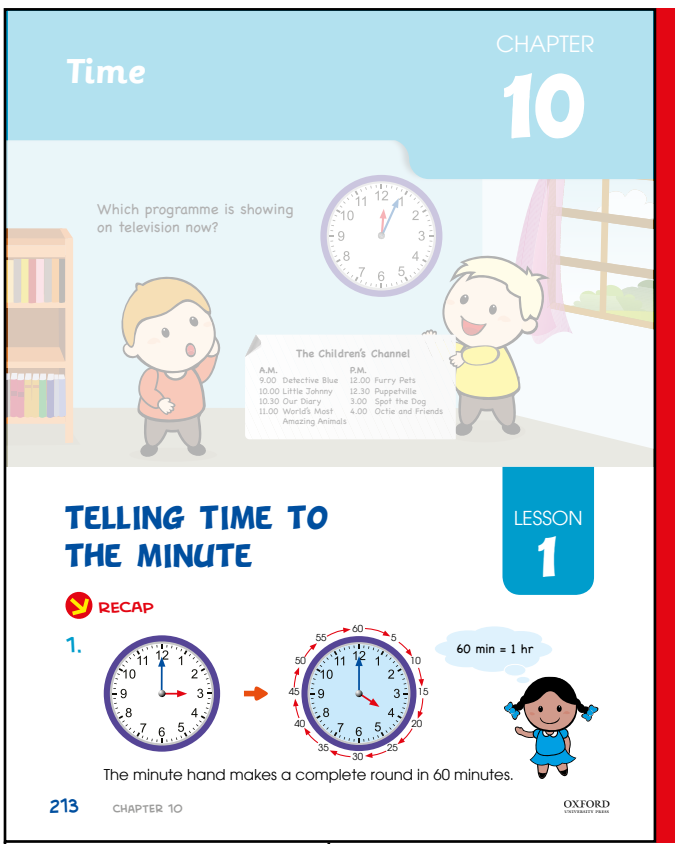
LESSON 1

TELLING TIME TO THE MINUTE

LEARNING OBJECTIVES

1. Tell time to the minute.
2. Use 'past' and 'to' to tell time.



Textbook 3 P213

RECAP

Use a geared clock to recap that the minute hand makes a complete round in 60 minutes.

2.

Bala takes a walk in the park at 9.00 a.m. in the morning.

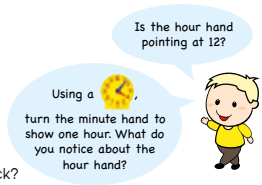
We use a.m. to tell the time from just after 12 midnight to just before 12 noon.

Bala goes to bed at 9.00 p.m. at night.

We use p.m. to tell the time from just after 12 noon to just before 12 midnight.

IN FOCUS

What is the time shown on the clock?



Textbook 3 P214

IN FOCUS

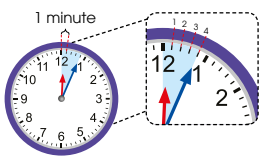
Review the concepts of a.m. and p.m. Use the chapter opener (P213) to discuss what time it is. Use a geared clock to demonstrate and ask questions such as:

- When the minute hand points at 1, the time is 12.05. What is one marking before 12.05?
- What does each marking represent?

Ask pupils to refer to the TV guide to determine what programme is showing at 12.05.

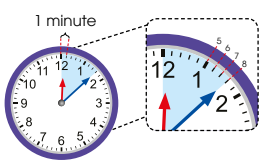
LET'S LEARN

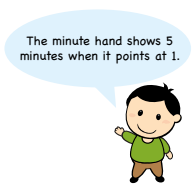
1.



Each small marking on the clock face stands for 1 minute.
The minute hand shows 4 minutes, so the time is 12.04.

2.





We can count on from 5 to find the minutes shown on the clock.
The time is 12.08.

3. Write the time.

11.19

4.39

Textbook 3 P215

LET'S LEARN

Use a geared clock to show the minute hand moving from one small marking to another and tell pupils that each small marking stands for 1 minute. Continue to count from the 6th to 10th minute.

For the first clock in Let's Learn 3, guide pupils to tell the time by counting back from 20 or counting forward from 15 to get the time 11.19.

Allow pupils to try telling the time on the second clock and get them to explain how they arrived at their answer.

4.

Ann leaves school at 1.24 p.m.
We say the time is **24 minutes past 1** in the afternoon.

5.

Tom is at the library at 4.13 p.m.
We say the time is 13 minutes past 4 in the afternoon.

6.

Junhao has dinner at 7.26 p.m.
We say the time is 26 minutes past 7 in the evening.

Textbook 3 P216

For Let's Learn 4 to 6, use a geared clock to show the number of minutes past the hour.

7.

Farhan meets his neighbour at 8.45 a.m.
We say it is **15 minutes to 9** in the morning.

8.

Priya meets the postman at 5.48 p.m.
The time is 12 minutes to 6 in the afternoon.

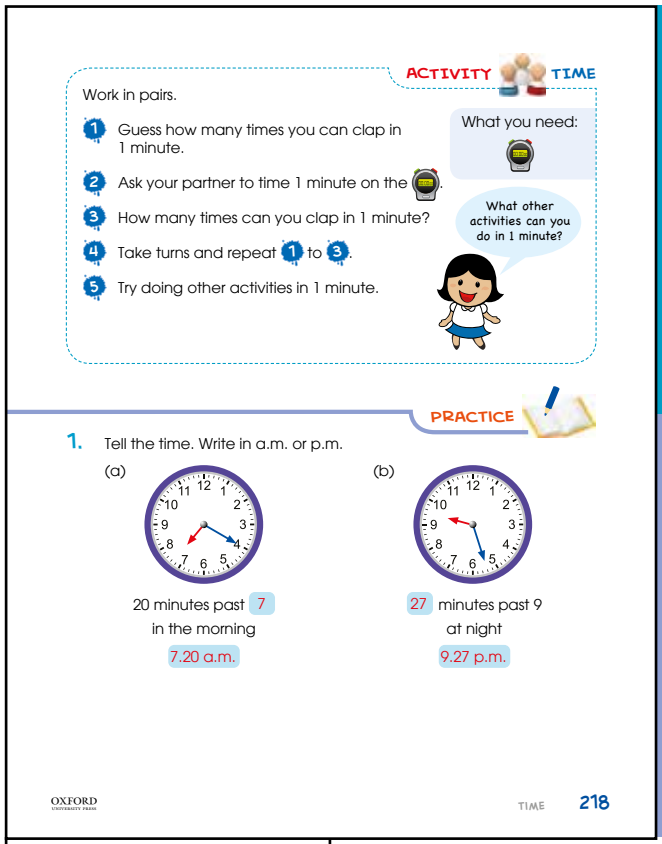
9.

Raju plays the piano at 7.53 a.m.
The time is 7 minutes to 8 in the morning.

Textbook 3 P217

For Let's Learn 7 to 9, use a geared clock to show the number of minutes to the next hour.

Ask pupils when they think **past** and **to** should be used to tell time.



Textbook 3 P218

ACTIVITY TIME

Assign pupils to work in pairs.

Distribute a stopwatch to each pair and demonstrate how the activity should be carried out.

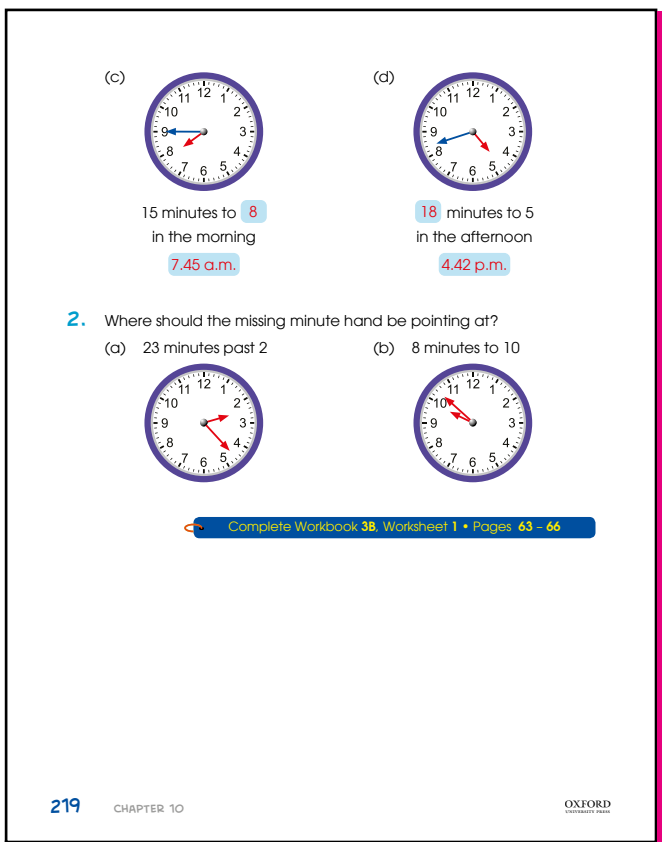
Elicit ideas on other activities that could be carried out in 1 minute. Other activities that can be carried out are as follows.

- Find as many words on a Boggle game board
- Write 'Maths is fun' as many times as possible

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 1** and work these out with the pupils.



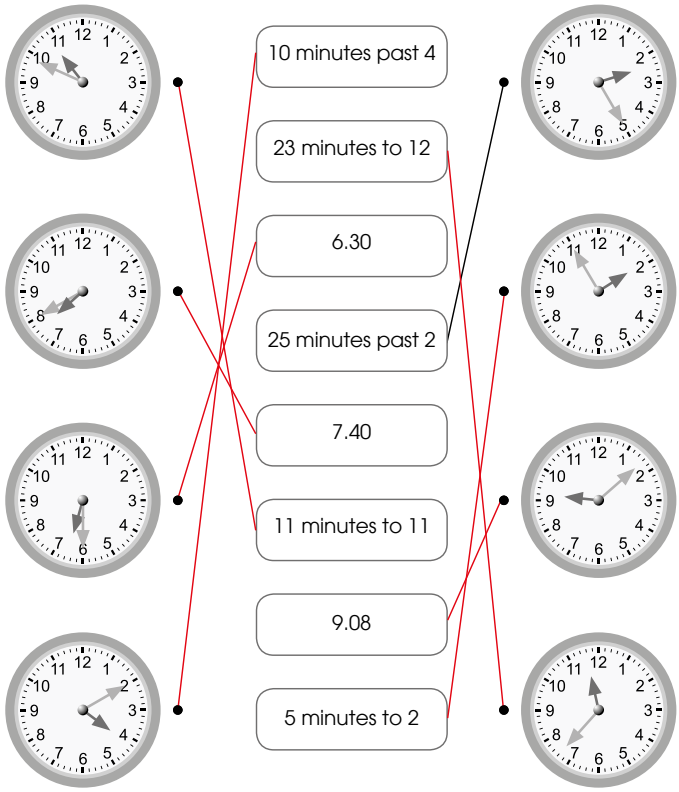
Textbook 3 P219

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 3B P63 – 66).

Answers Worksheet 1 (Workbook 3B P63 – 66)

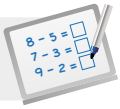
1. (a) 10.02
   (b) 2.58
   (c) 9.46
   (d) 6.17

2. 

3. (a) 15 minutes past 10
   15 minutes after 10
   (b) 5 minutes to 8
   5 minutes before 8
   (c) 15 minutes to 7
   15 minutes before 7
   (d) 5 minutes past 11
   5 minutes after 11
   (e) 20 minutes to 3
   20 minutes before 3
   (f) 10 minutes to 5
   10 minutes before 5

4. (a) 2.15 p.m.
   (b) 8.50 p.m.
   (c) 5.55 a.m.
   (d) 5.30 p.m.
   (e) 12.21 p.m.
   (f) 9.53 p.m.

LESSON PLAN



Specific Learning Focus

- Tell time to the minute.
- Use 'past' and 'to' to tell time.

Suggested Duration

2 periods

Prior Learning

Pupils should be well-versed with telling time to the hour, half hour and 5 minutes. The use of a.m. and p.m. can be revisited.

Pre-emptive Pitfalls

In this lesson, pupils learn to tell time to the minute and find the duration of an event.

Introduction

Use real-life events when revisiting a.m. and p.m. concepts. A geared clock comes in handy when explaining that the minute hand makes a complete round in 60 minutes, which is an hour. Use a wristwatch to show that the second hand makes a complete round in a minute. Explain that each of the 12 markings on the clock stands for 5 minutes, so when the minute hand points at 1 it is 5 minutes past the hour, hence 2 → 10 minutes, 3 → 5 minutes, 6 → 30 minutes, 9 → 45 minutes, 10 → 50 minutes, 11 → 55 minutes. When the minute hand points at 12 it is 60 minutes (= 1 hour) past the hour. Explain that between every 2 successive such markings, there are 4 small markings, and each of these small markings stands for 1 minute.

Problem Solving

The concepts that 60 minutes equals an hour and each small marking on a clock stands for 1 minute need to be reinforced by working on questions.

Activities

Let the pupils experience the duration of a minute by bringing in a stopwatch to class and play a game. Throw coloured balls on the floor and ask them to put as many balls in the colour coded buckets as possible. Start the game using a stopwatch and stop after a minute.

Resources

- geared clock
- stopwatch
- wristwatch
- real-life objects (e.g. balloons, balls, buckets, etc.)

Mathematical Communication Support

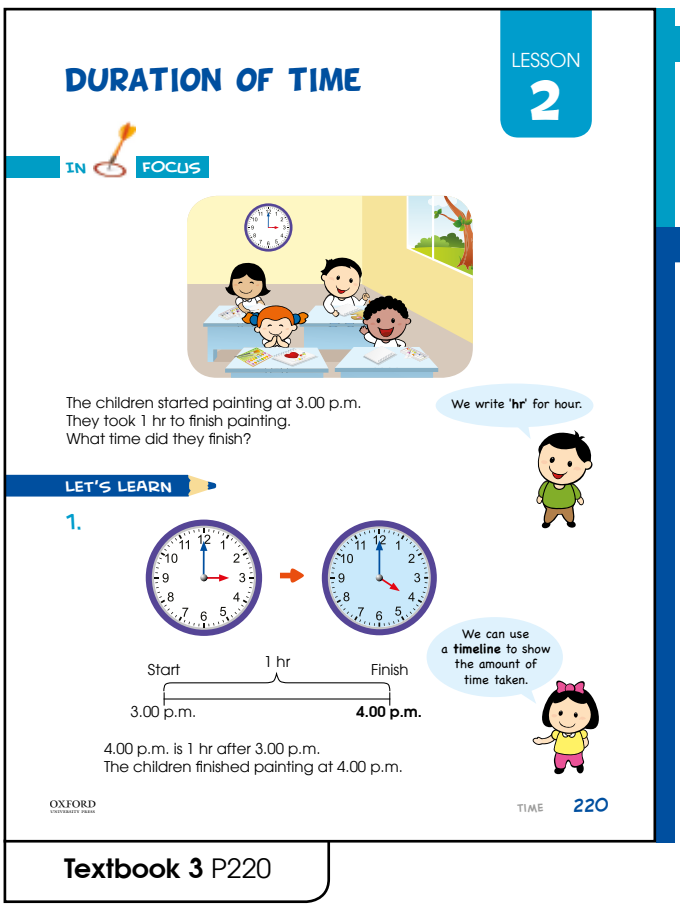
The use of 'past' and 'to' the hour are important when telling time (e.g. 10 minutes past 1 o'clock, 20 minutes to 12 o'clock).

LESSON 2

DURATION OF TIME

LEARNING OBJECTIVES

1. Measure time in hours and minutes.
2. Find the starting time, finishing time or duration given two other quantities.



Textbook 3 P220

IN FOCUS

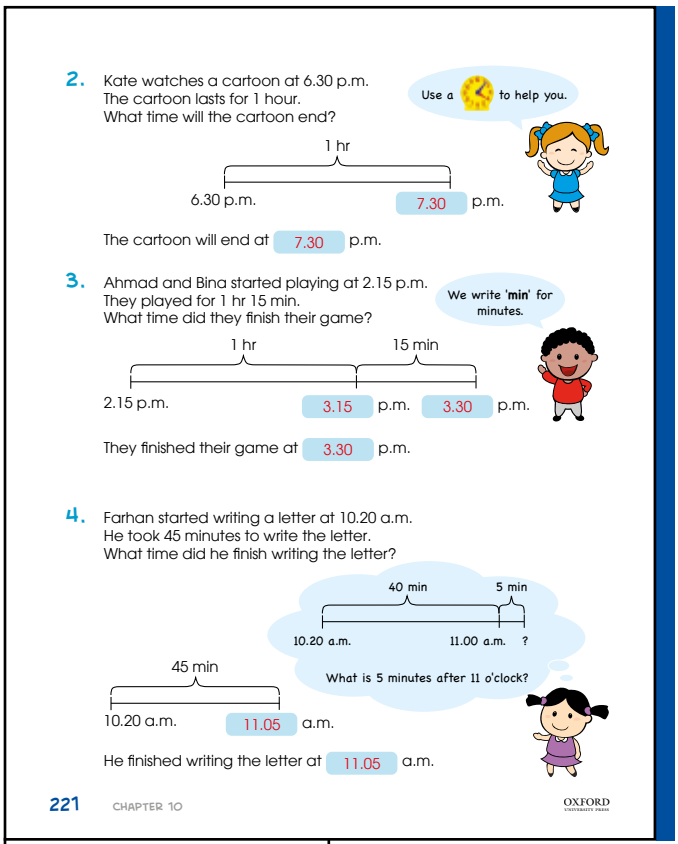
Elicit the answer from pupils and ask them how they arrived at their answers. Emphasise that the standard unit for hour is hr.

LET'S LEARN

For Let's Learn 1, use a geared clock to show the minute hand moving one round from 3 p.m. to 4 p.m.

Ask pupils how many minutes have passed. Tell pupils that 60 minutes is also 1 hour.

Demonstrate how a timeline is drawn.



2. Kate watches a cartoon at 6.30 p.m.
The cartoon lasts for 1 hour.
What time will the cartoon end?

Use a to help you.

1 hr

6.30 p.m. — 7.30 p.m.

The cartoon will end at 7.30 p.m.

3. Ahmad and Bina started playing at 2.15 p.m.
They played for 1 hr 15 min.
What time did they finish their game?

We write 'min' for minutes.

1 hr | 15 min

2.15 p.m. — 3.15 p.m. — 3.30 p.m.

They finished their game at 3.30 p.m.

4. Farhan started writing a letter at 10.20 a.m.
He took 45 minutes to write the letter.
What time did he finish writing the letter?

40 min | 5 min

10.20 a.m. — 11.00 a.m. — ?

What is 5 minutes after 11 o'clock?

45 min

10.20 a.m. — 11.05 a.m.

He finished writing the letter at 11.05 a.m.

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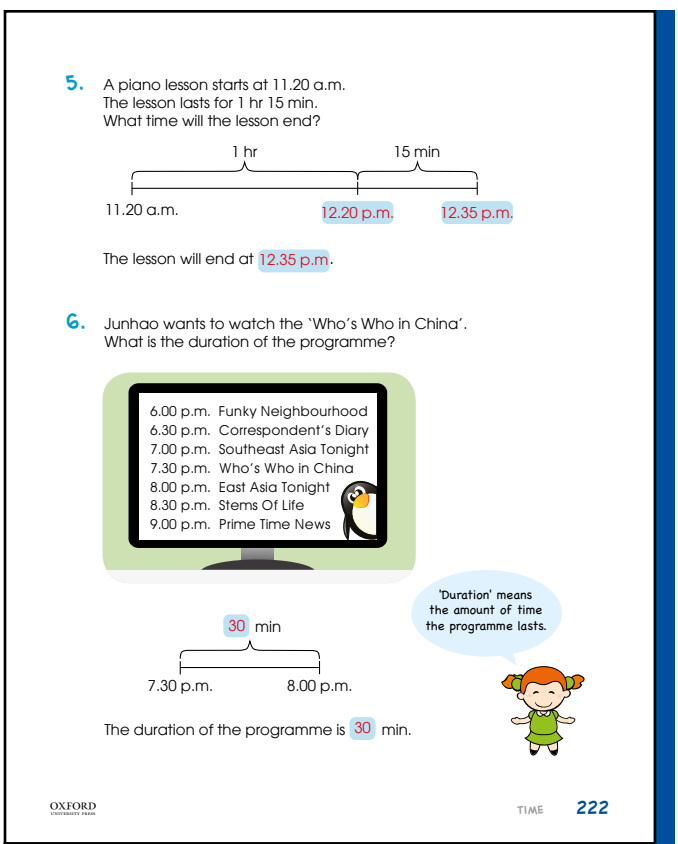
Textbook 3 P221

Let pupils try Let's Learn 2 on their own, possibly using a geared clock.

For Let's Learn 2, use a geared clock to show the minute hand moving from 2.15 p.m. to 3.15 p.m. and translate this to a timeline. Then use the geared clock to show the minute hand moving from 3.15 to 3.30 and translate this to the timeline. Conclude that 1 h 15 min after 2.15 p.m. is 3.30 p.m.

Also introduce to pupils that min is the standard unit for minutes.

Allow pupils to work on Let's Learn 4 on their own. Provide some guidance by telling pupils to break up 45 min in different ways (e.g. 30 min + 15 min) and discuss which way is better.



5. A piano lesson starts at 11.20 a.m.
The lesson lasts for 1 hr 15 min.
What time will the lesson end?

1 hr | 15 min

11.20 a.m. — 12.20 p.m. — 12.35 p.m.

The lesson will end at 12.35 p.m.

6. Junhao wants to watch the 'Who's Who in China'.
What is the duration of the programme?

6.00 p.m. Funky Neighbourhood
6.30 p.m. Correspondent's Diary
7.00 p.m. Southeast Asia Tonight
7.30 p.m. Who's Who in China
8.00 p.m. East Asia Tonight
8.30 p.m. Stems Of Life
9.00 p.m. Prime Time News

'Duration' means the amount of time the programme lasts.

30 min

7.30 p.m. — 8.00 p.m.

The duration of the programme is 30 min.

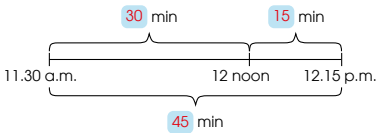
OXFORD UNIVERSITY PRESS TIME 222

Textbook 3 P222

Let pupils try Let's Learn 5 on their own with the help of the timeline.

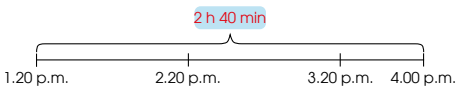
For Let's Learn 6, use a geared clock to show the minute hand moving from the start time to the end time and translate the information onto a timeline. Introduce the word duration as the amount of time taken.

7. Nora and her family started making kites at 11.30 a.m.
They finished making their kites at 12.15 p.m.
How long did they take to make their kites?



They took 45 min to make their kites.

8. A movie starts at 1.20 p.m. and ends at 4.00 p.m.
What is the duration of the movie?

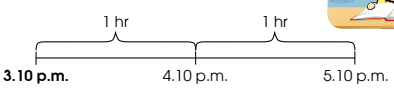


The duration of the movie is 2 hr 40 min.

Textbook 3 P223

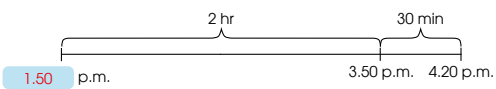
For Let's Learn 7 and 8, continue to show the duration with a geared clock and translate the information onto a timeline.

9. Xinyi took 2 hours to read a book.
She finished reading the book at 5.10 p.m.
What time did she start reading the book?



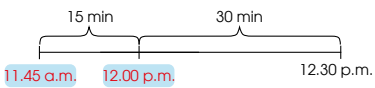
She started reading the book at 3.10 p.m.

10. Bala spent 2 hr 30 min at his relatives' house.
He left his relatives' house at 4.20 p.m.
What time did he reach his relatives' house?



Bala reached his relatives' house at 1.50 p.m.

11. Ann watched television for 45 minutes.
She switched off the television at 12.30 p.m.
What time did she start watching television?

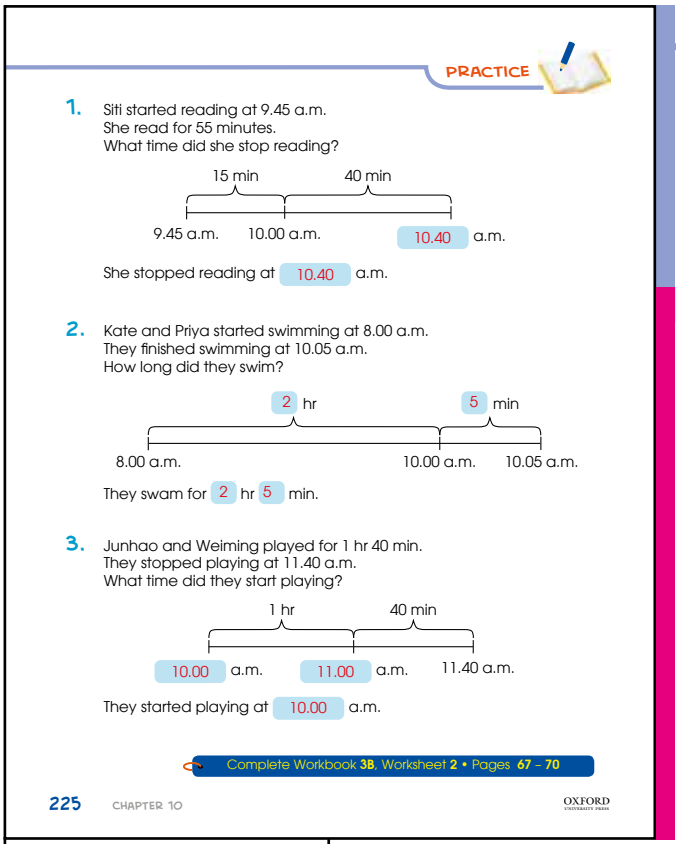


Ann started watching television at 11.45 a.m.

Textbook 3 P224

For Let's Learn 9 to 11, use the timeline to show how the duration can be broken up.

For Let's Learn 10, the duration can be broken up into 2 hr, then 30 min (i.e. 2 hr before 4.20 p.m. is 2.20 p.m. and 30 min before 2.20 p.m. is 1.50 p.m.).



PRACTICE

1. Siti started reading at 9.45 a.m.
She read for 55 minutes.
What time did she stop reading?

15 min, 40 min
9.45 a.m. 10.00 a.m. 10.40 a.m.

She stopped reading at 10.40 a.m.

2. Kate and Priya started swimming at 8.00 a.m.
They finished swimming at 10.05 a.m.
How long did they swim?

2 hr, 5 min
8.00 a.m. 10.00 a.m. 10.05 a.m.

They swam for 2 hr 5 min.

3. Junhao and Weiming played for 1 hr 40 min.
They stopped playing at 11.40 a.m.
What time did they start playing?

1 hr, 40 min
10.00 a.m. 11.00 a.m. 11.40 a.m.

They started playing at 10.00 a.m.

Complete Workbook 3B, Worksheet 2 • Pages 67 – 70

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Textbook 3 P225

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 2** and work these out with the pupils.

Independent seatwork

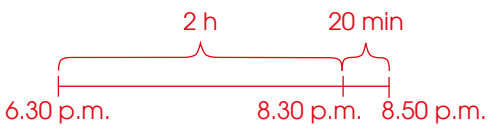
Assign pupils to complete Worksheet 2 (Workbook 3B P67 – 70).

Answers Worksheet 2 (Workbook 3B P67 – 68)

1. (a) 3.40 p.m.
Tom finished watching television at 3.40 p.m.

(b) 12.35 p.m., 12.40 p.m.
Nora finished doing her homework at 12.40 p.m.

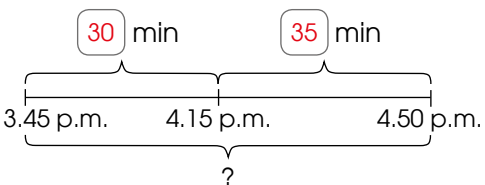
(c)



Bala finished making the card at 8.50 p.m.

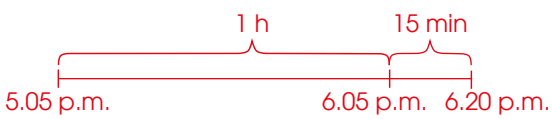
2. (a) 40

(b)



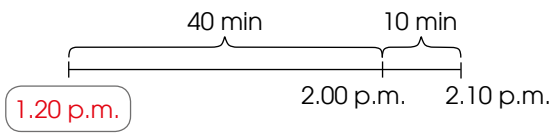
I took 1 hr 5 min to finish my homework.

(c)



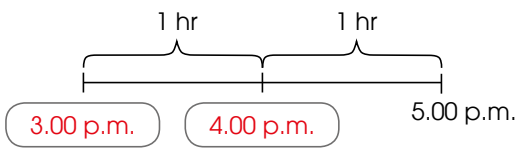
I took 1 hr 15 min to finish reading the book.

3. (a)



Sam started travelling at 1.20 p.m.

(b)

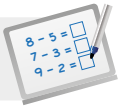


Weiming started cycling at 1.20 p.m.

(c)

She started painting at 5.55 p.m.

LESSON PLAN



Specific Learning Focus

- Measure time in hours and minutes.
- Find the starting time, finishing time or duration given two other quantities.

Suggested Duration

4 periods

Prior Learning

Pupils have learnt that an hour has passed when the minute hand has made a complete round in 60 minutes.

Pre-emptive Pitfalls

The duration (time taken from starting time to finishing time) of an event is found in this lesson. This could be challenging for pupils when dealing with compound units of time in hours and minutes.

Introduction

Use a geared clock and timeline to calculate the duration of an event. The timeline can be divided into parts for ease of calculation in finding the finishing time. In Let's Learn 4 (Textbook 3 P221), 45 minutes is split into 40 and 5 minutes for ease of calculation. To find the finishing time, 40 minutes after 10:20 a.m. gives 11:00 a.m., then 5 minutes after 11:00 a.m. gives 11:05 a.m.

Problem Solving

Using a timeline, the duration of time is added to the starting time to find the finishing time. Every 60 minutes is regrouped to 1 hour and the remaining minutes are added, and the finishing time could be expressed in compound units (□ hr □ min).

Activities

Bring to class the programme schedule of a cartoon channel and ask pupils to find the duration of their favourite programme.

Resources

- geared clock

Mathematical Communication Support

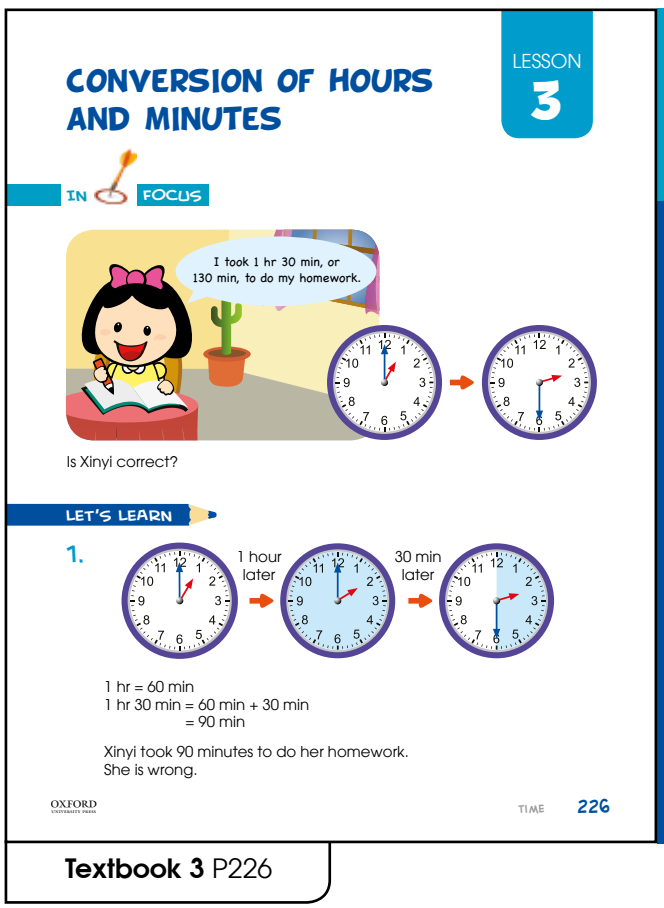
Use key terms during class discussions. Recapitulate with pupils that the time can be told as '□ minutes past the hour' or '□ minutes to the hour'. Duration is the time elapsed from the beginning to the end of the event. Encourage individual responses while discussing the questions. Have pupils use a timeline to work on the questions.

LESSON 3

CONVERSION OF HOURS AND MINUTES

LEARNING OBJECTIVE

1. Convert time in hours and minutes to minutes, and vice versa.



CONVERSION OF HOURS AND MINUTES

LESSON 3

IN FOCUS

I took 1 hr 30 min, or 130 min, to do my homework.

Is Xinyi correct?

LET'S LEARN

1. 1 hour later, 30 min later

1 hr = 60 min
1 hr 30 min = 60 min + 30 min
= 90 min

Xinyi took 90 minutes to do her homework.
She is wrong.

OXFORD UNIVERSITY PRESS TIME 226

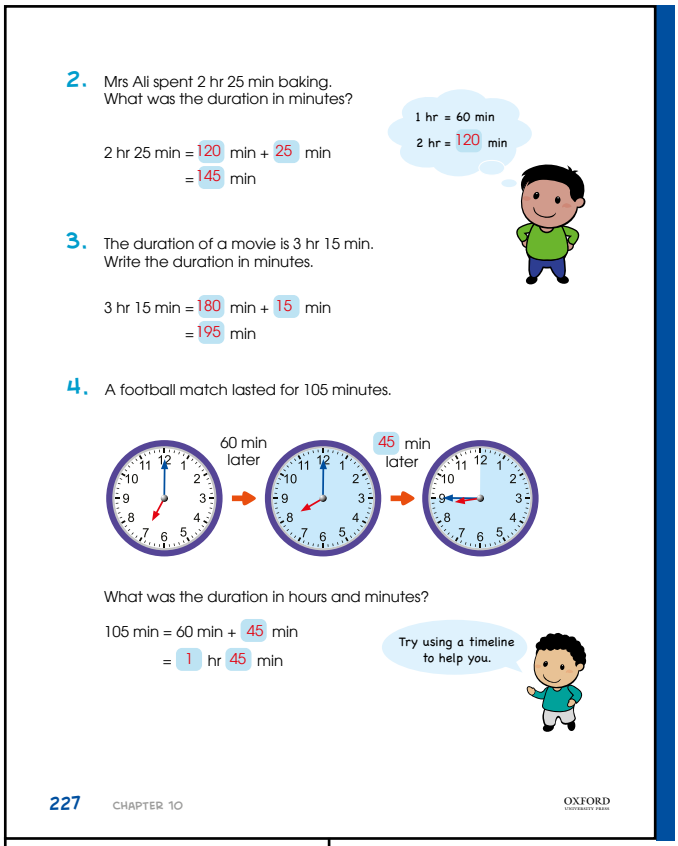
Textbook 3 P226

IN FOCUS

Discuss with pupils if Xinyi is correct. Let pupils explain their ideas.

LET'S LEARN

For Let's Learn 1, use a geared clock to show pupils the movement of the minute hand from 1 o'clock to 2 o'clock. Show pupils that 60 minutes have passed. 1 hour has also passed between 1 and 2 o'clock, so 60 minutes is equal to 1 hour.



2. Mrs Ali spent 2 hr 25 min baking.
What was the duration in minutes?

1 hr = 60 min
2 hr = 120 min

2 hr 25 min = 120 min + 25 min
= 145 min

3. The duration of a movie is 3 hr 15 min.
Write the duration in minutes.

3 hr 15 min = 180 min + 15 min
= 195 min

4. A football match lasted for 105 minutes.

60 min later

45 min later

What was the duration in hours and minutes?

105 min = 60 min + 45 min
= 1 hr 45 min

Try using a timeline to help you.

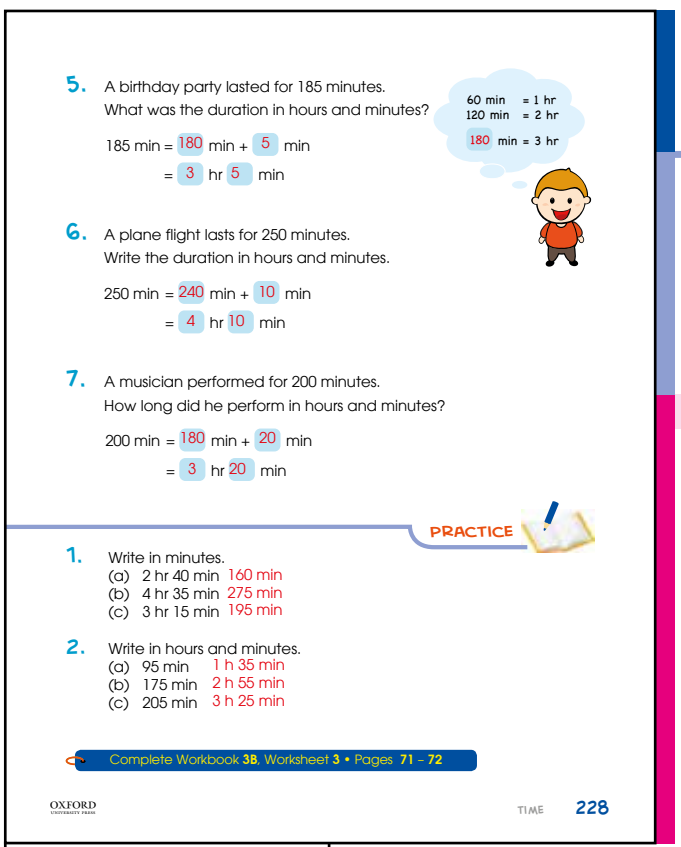
227 CHAPTER 10 OXFORD

Textbook 3 P227

For Let's Learn 2 and 3, use the fact that 1 hour = 60 min to convert from hr and min to min.

For Let's Learn 4, ask pupils how many 60 min there are in the given duration. When separating the duration into hours and minutes, the 'hours' segment should be a multiple of 60 (relate this to 1 hr = 60 min) and the 'minutes' segment is the remaining time.

Example
160 min = 120 min + 40 min (120 is a multiple of 60)
= 2 hr 40 min



5. A birthday party lasted for 185 minutes.
What was the duration in hours and minutes?

60 min = 1 hr
120 min = 2 hr
180 min = 3 hr

185 min = 180 min + 5 min
= 3 hr 5 min

6. A plane flight lasts for 250 minutes.
Write the duration in hours and minutes.

250 min = 240 min + 10 min
= 4 hr 10 min

7. A musician performed for 200 minutes.
How long did he perform in hours and minutes?

200 min = 180 min + 20 min
= 3 hr 20 min

PRACTICE

1. Write in minutes.
(a) 2 hr 40 min 160 min
(b) 4 hr 35 min 275 min
(c) 3 hr 15 min 195 min

2. Write in hours and minutes.
(a) 95 min 1 h 35 min
(b) 175 min 2 h 55 min
(c) 205 min 3 h 25 min

Complete Workbook 3B, Worksheet 3 • Pages 71 – 72

OXFORD TIME 228

Textbook 3 P228

Allow pupils to work on Let's Learn 5 to 7.

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 3** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 3B P71 – 72).

Answers Worksheet 3 (Workbook 3B P71 – 72)

1. (a) 1 hr 20 min = 60 min + 20 min
= 80 min

(b) 2 hr = 120 min

2 hr 48 min = 120 min + 48 min
= 168 min

(c) 3 hr = 180 min

3 hr 15 min = 180 min + 15 min
= 195 min

(d) 4 hr 36 min = 240 min + 36 min
= 276 min

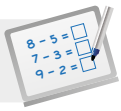
2. (a) 95 min = 60 min + 35 min
= 1 hr 35 min

(b) 170 min = 120 min + 50 min
= 2 hr 50 min

(c) 149 min = 120 min + 29 min
= 2 hr 29 min

(d) 253 min = 240 min + 13 min
= 3 hr 13 min

LESSON PLAN



Specific Learning Focus

- Convert time in hours and minutes to minutes, and vice versa.

Suggested Duration

2 periods

Prior Learning

Pupils should be well-versed in conversion between kg and g, and ℓ and ml. Standard units of time in hours and minutes have been covered in lessons 1 and 2, and pupils have learnt to use timeline to find starting time, finishing time or duration given two other quantities, as well as express the duration in compound units of time.

Pre-emptive Pitfalls

Reinforce that each small marking on the clock stands for 1 minute. Remind pupils to use the fact that 1 hr = 60 min to convert time in hours and minutes to minutes.

Introduction

Emphasise that 60 min make 1 hr so to convert time in hr and min to min, convert every hour to 60 minutes and express the remaining minutes in min (e.g. 106 min can be written as 1 hr 46 min). Similarly, 3 hr and 15 min equal to (3 × 60 + 15) minutes, which is 195 minutes.

Problem Solving

Encourage pupils to learn to find the number of minutes that a specified number of hours is equivalent to (e.g. 2 hr = (2 × 60) min = 120 min, 3 hr = (3 × 60) min = 180 min, etc.).

Activities

Encourage pupils to work in pairs to solve the questions in Textbook 3 P226 – 228 and Workbook 3B P71 – 72. Encourage pupils to check each other's answers.

Resources

- geared clock

Mathematical Communication Support

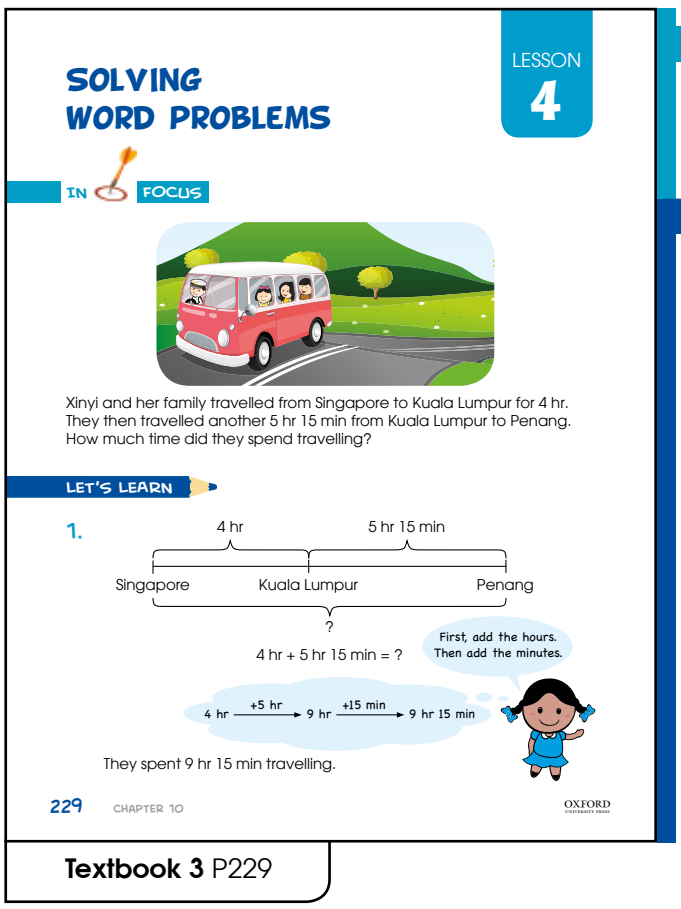
Conduct class discussions and create word problems of real-life events involving time in compound units of hours and minutes. Bring in the daily class time table, concert or programme schedule, or exam timetable, to discuss the duration or time elapsed (e.g. give the starting time and duration of a television programme and ask for the finishing time). Ask pupils to bring flight schedules and calculate the duration.

LESSON 4

SOLVING WORD PROBLEMS

LEARNING OBJECTIVE

1. Solve problems involving time in hours and minutes.



SOLVING WORD PROBLEMS

LESSON 4

IN FOCUS

Xinyi and her family travelled from Singapore to Kuala Lumpur for 4 hr. They then travelled another 5 hr 15 min from Kuala Lumpur to Penang. How much time did they spend travelling?

LET'S LEARN

1. 4 hr, 5 hr 15 min; Singapore, Kuala Lumpur, Penang; ?

4 hr + 5 hr 15 min = ?

First, add the hours. Then add the minutes.

4 hr +5 hr 9 hr +15 min 9 hr 15 min

They spent 9 hr 15 min travelling.

229 CHAPTER 10 OXFORD

Textbook 3 P229

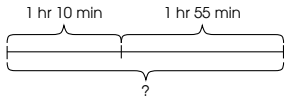
IN FOCUS

Discuss with pupils how the problem can be solved. Get pupils to explain their answers.

LET'S LEARN

Use the timeline to show how the problem can be solved.

2. Mrs Lee took 1 hr 10 min to shop for groceries.
She spent another 1 hr 55 min to shop for presents.
What was the total time she spent shopping?



1 hr 10 min + 1 hr 55 min = ?

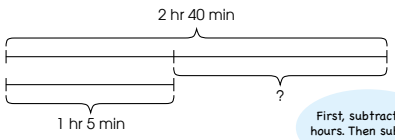
1 hr 10 min $\xrightarrow{+1\text{ hr}}$ 2 hr 10 min $\xrightarrow{+55\text{ min}}$ 2 hr 65 min

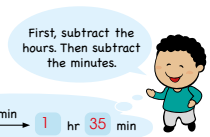
65 min = 60 min + 5 min = 1 hr 5 min

2 hr 65 min = 3 hr 5 min

Mrs Lee spent 3 hr 5 min shopping.

3. Nora spent 2 hr 40 min reading.
She then spent 1 hr 5 min watching television.
How much longer did she spend reading than watching television?





2 hr 40 min − 1 hr 5 min = ?

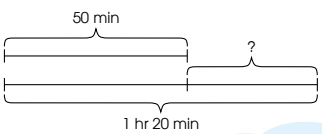
2 hr 40 min $\xrightarrow{-1\text{ hr}}$ 1 hr 40 min $\xrightarrow{-5\text{ min}}$ 1 hr 35 min

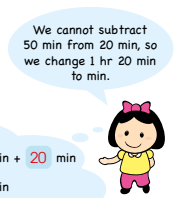
Nora spent 1 hr 35 min longer reading than watching television.

Textbook 3 P230

Continue to show pupils how the timeline is used to solve problems involving duration. Explain to pupils that it is easier to add or subtract the hours first, followed by the minutes.

4. Farhan takes 50 minutes to travel to the library.
He takes 1 hr 20 min to travel to school.
How much longer does he take to travel to school than to the library?





1 hr 20 min − 50 min = ?

1 hr 20 min = 60 min + 20 min

= 80 min

80 min $\xrightarrow{-50\text{ min}}$ 30 min

Farhan takes 30 min longer to travel to school than to the library.

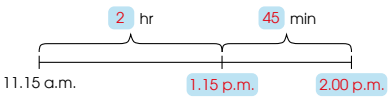
5. Ann spent 80 minutes jogging.
She then spent another 85 minutes walking.
(a) What was the total time she spent on exercising?
Give your answer in hours and minutes.
(b) Ann started jogging at 11.15 a.m.
What time did she finish exercising?

(a) 80 min + 85 min = 165 min

165 min = 2 hr 45 min

She spent a total of 2 hr 45 min exercising.

(b)

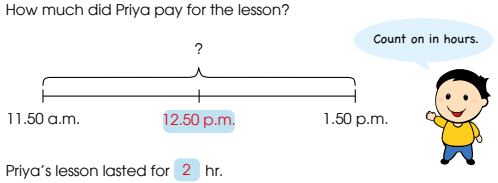


She finished exercising at 2.00 p.m.

Textbook 3 P231

For Let's Learn 4 and 5, point out to pupils when duration should be converted (from hr and min to min, or from min to hr and min).

6. Priya had a piano lesson from 11.50 a.m. to 1.50 p.m.
The lesson cost Rs 2600 each hour.
How much did Priya pay for the lesson?



Priya's lesson lasted for 2 hr.

Rs 2600 × 2 = Rs 150

Priya paid Rs 150 for the lesson.

ACTIVITY TIME

Work in groups of 3 to 4.

1. Write a word problem about what you did yesterday.

What you need:

I watched a movie at 7.15 p.m.
The movie lasted for 100 minutes.
What time did I finish watching the movie?

2. Make three more word problems.

3. Exchange your word problems with another group.
Solve the word problems.

OXFORD UNIVERSITY PRESS TIME 232

Textbook 3 P232

For Let's Learn 6, a common error is that pupils write '1.50 p.m. – 11.50 a.m.' to find the duration. Remind pupils that specific times cannot be added or subtracted and only durations can be added or subtracted.

ACTIVITY TIME

Assign pupils to work in groups 3 or 4.

Pupils are to write word problems about what they did the day before, after which the groups are to exchange word problems with one another to solve.

PRACTICE

Solve.

1. Meiling spent 1 hr 35 min doing homework.
She spent another 1 hr 55 min reading a book.
How much time did she spend doing homework and reading altogether?
1 h 35 min + 1 h 55 min = 2 h 90 min
= 3 h 30 min

2. Tom took 2 hr 15 min to complete a walkathon.
Ahmad took 70 minutes to complete the same walkathon.
How much longer did Tom take to complete the walkathon than Ahmad?
2 h 15 min = 1 h 75 min
1 h 75 min – 70 min = 1 h 5 min

3. Nora cycled for 1 hr 55 min.
The total time that Nora and Priya cycled was 5 hr 45 min.
(a) How long did Priya cycle?
(b) Priya started cycling at 8.10 a.m.
What time did she finish cycling?
(a) 5 h 45 min – 1 h 55 min
= 4 h 105 min – 1 h 55 min
= 3 h 50 min
(b) 12.00 p.m.

4. Mr Wong works from 11.30 a.m. to 4.30 p.m. every day.
He is paid Rs 1750 each hour.
How much is he paid in one day?
11.30 a.m. —5 h→ 4.30 p.m.
$64 × 5 = $320

Complete Workbook 3B, Worksheet 4 • Pages 73 – 77

MIND WORKOUT

Islamabad is 5 hours ahead of London.
Melbourne is 6 hours ahead of Islamabad.
It is Tuesday, 2 August, 6.00 p.m. in Islamabad.
What day and time is it in London and Melbourne?
Explain your answer.

London : 2 August, 1.00 p.m.
Melbourne : 3 August, 12.00 a.m.

233 CHAPTER 10 OXFORD UNIVERSITY PRESS

Textbook 3 P233

PRACTICE

Work with pupils on the practice questions.

For better understanding, select items from **Worksheet 4** and work these out with the pupils.

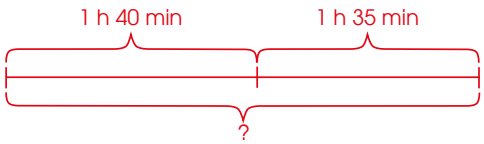
Independent seatwork

Assign pupils to complete Worksheet 4 (Workbook 3B P73 – 77).

Answers Worksheet 4 (Workbook 3B P73 – 77)

1. 1 hr 27 min + 1 hr 15 min = 2 hr 42 min

   She spent a total of 2 hr 42 min doing housework.

2. 

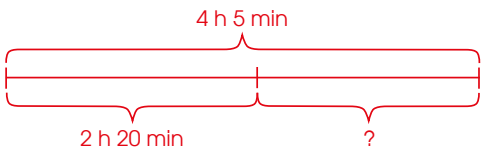
   1 h 40 min + 1 h 35 min = 2 h 75 min

   2 h 75 min = 3 h 15 min

   Devi spent 3 h 15 min exercising on Saturday.

3. 3 hr 45 min – 1 hr 28 min = 2 hr 17 min

   He took 2 hr 17 min to bake the cake.

4. 

   4 h 5 min = 3 h 65 min

   3 h 65 min – 2 h 20 min = 1 h 45 min

   Kate spent 1h 45 min flying a kite.

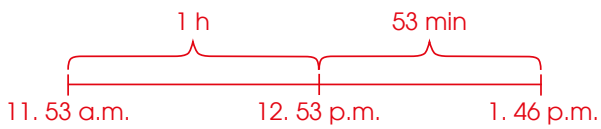
5. (a) 8 hr 20 min = 7 hr 80 min

   7 hr 80 min – 3 hr 34 min = 4 hr 46 min

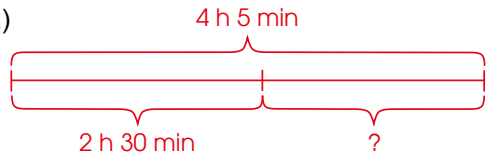
   She took 4 hr 46 min to sew the dress.

   (b) 4 hr 46 min – 3 hr 34 min = 1 hr 12 min

   She took 1 hr 12 min longer to sew the dress than the skirt.

6. 

   Mr Tan will reach the town at 1.46 p.m.

7. (a) 

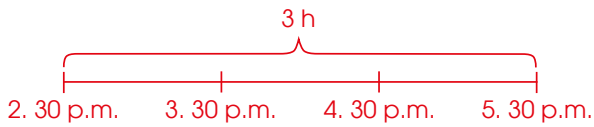
   4 h 5 min = 3 h 65 min

   3 h 65 min – 2 h 30 min = 1 h 35 min

   Raju spent 1 h 35 min reading the newspaper.

   (b) 

   Raju finishes reading the newspaper at 3.50 p.m.

8. 

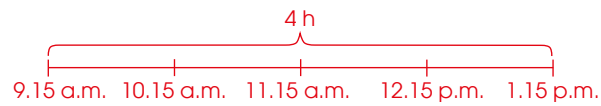
   Mr Wong teaches for 3 h on Saturday.

   3 × $48 = $144

   Mr Wong earns $144 that day.

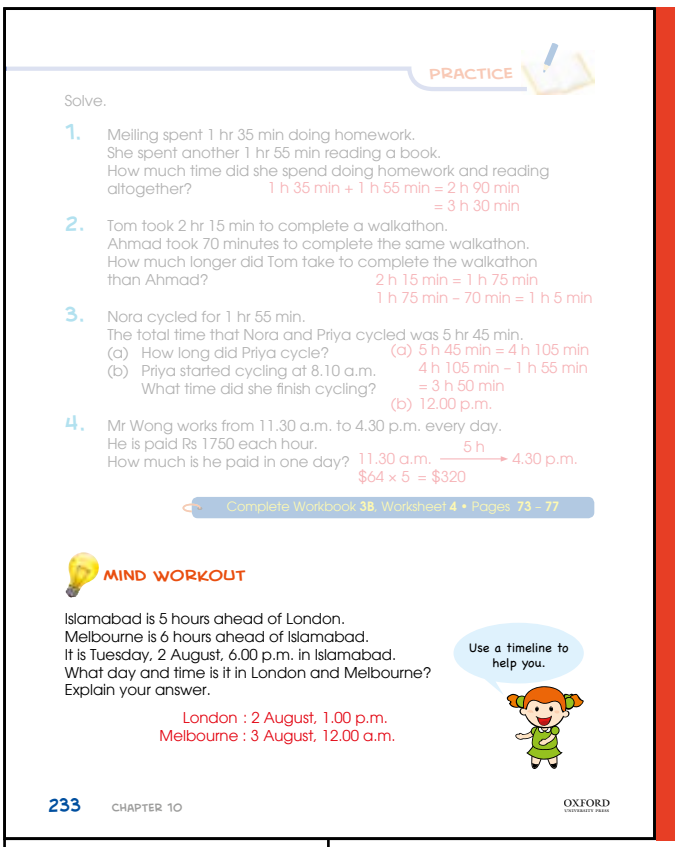
9. 28 ÷ 7 = 4

   Mr Lim worked for 4 h.



   Mr Lim finished work at 1.15 p.m.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



PRACTICE

Solve.

1. Meiling spent 1 hr 35 min doing homework.
She spent another 1 hr 55 min reading a book.
How much time did she spend doing homework and reading altogether?
1 h 35 min + 1 h 55 min = 2 h 90 min
= 3 h 30 min

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Ahmad took 70 minutes to complete the same walkathon.
How much longer did Tom take to complete the walkathon than Ahmad?
2 h 15 min = 1 h 75 min
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3. Nora cycled for 1 hr 55 min.
The total time that Nora and Priya cycled was 5 hr 45 min.
(a) How long did Priya cycle?
(a) 5 h 45 min = 4 h 105 min
4 h 105 min – 1 h 55 min
= 3 h 50 min
(b) Priya started cycling at 8.10 a.m.
What time did she finish cycling?
(b) 12.00 p.m.

4. Mr Wong works from 11.30 a.m. to 4.30 p.m. every day.
He is paid Rs 1750 each hour.
How much is he paid in one day?
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$64 × 5 = $320

Complete Workbook 3B, Worksheet 4 • Pages 73 – 77

MIND WORKOUT

Islamabad is 5 hours ahead of London.
Melbourne is 6 hours ahead of Islamabad.
It is Tuesday, 2 August, 6.00 p.m. in Islamabad.
What day and time is it in London and Melbourne?
Explain your answer.

London : 2 August, 1.00 p.m.
Melbourne : 3 August, 12.00 a.m.

233 CHAPTER 10 OXFORD

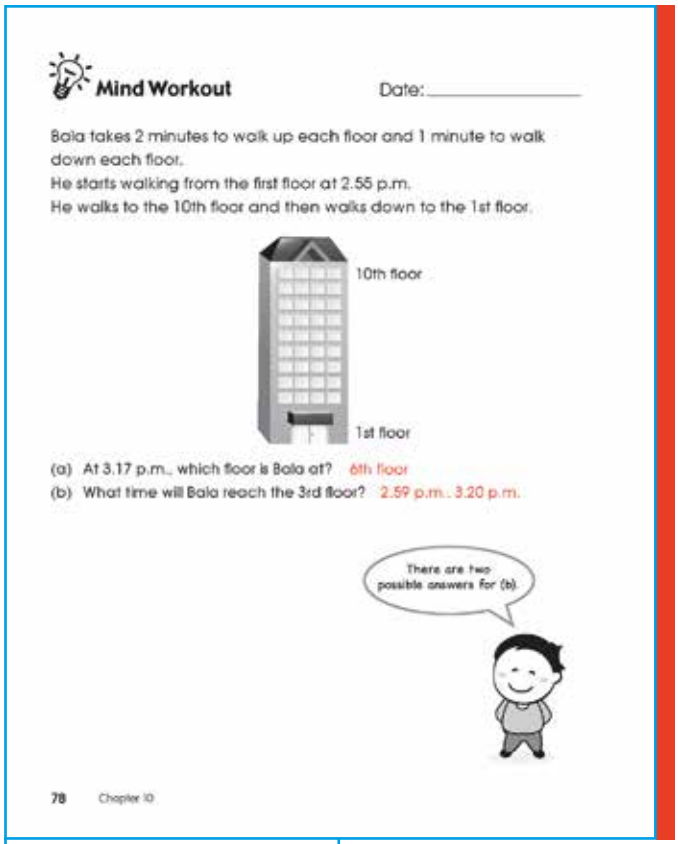
Textbook 3 P233

MIND WORKOUT

If pupils have difficulty approaching the question, facilitate by showing how a timeline can be used to solve the problem.

Pupils could also be asked to find the day and time in London and Melbourne at the point of the lesson.

Show a world clock, which can be found online, and discuss time differences around the world.



Mind Workout Date:

Bala takes 2 minutes to walk up each floor and 1 minute to walk down each floor.
He starts walking from the first floor at 2.55 p.m.
He walks to the 10th floor and then walks down to the 1st floor.

10th floor

1st floor

(a) At 3.17 p.m., which floor is Bala at? 6th floor
(b) What time will Bala reach the 3rd floor? 2.59 p.m., 3.20 p.m.

There are two possible answers for (b).

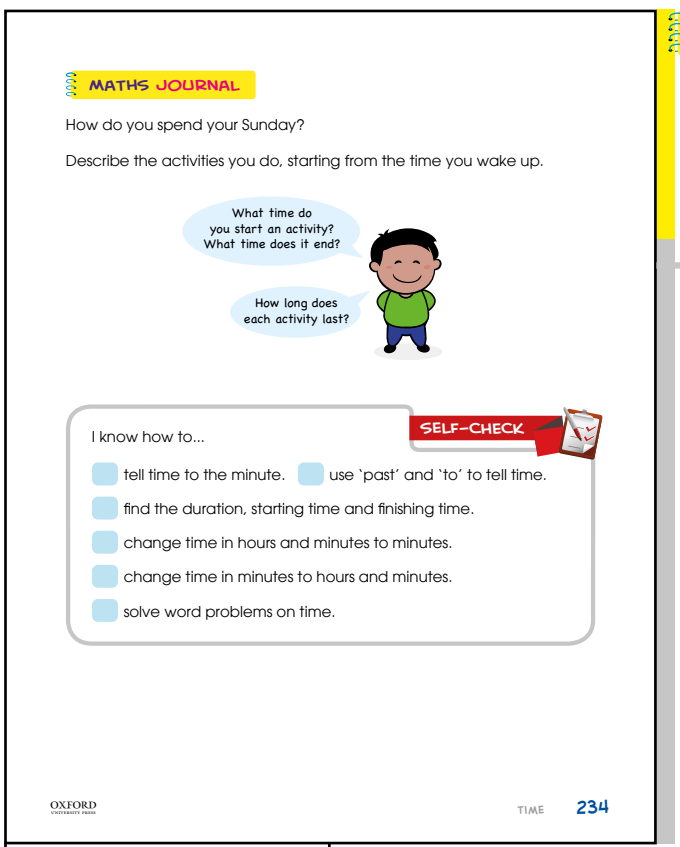
78 Chapter 10

Workbook 3B P78

Mind Workout

There are a few ways to solve this problem. Ask pupils questions such as:

- What is the duration between 12.55 p.m. and 3.17 p.m.?
- How long does Bala take to walk up 10 storeys?
- Will Bala be walking up or down the building at 3.17 p.m.?



MATHS JOURNAL

How do you spend your Sunday?

Describe the activities you do, starting from the time you wake up.

What time do you start an activity? What time does it end?

How long does each activity last?

I know how to... SELF-CHECK

- tell time to the minute.
- use 'past' and 'to' to tell time.
- find the duration, starting time and finishing time.
- change time in hours and minutes to minutes.
- change time in minutes to hours and minutes.
- solve word problems on time.

OXFORD TIME 234

Textbook 3 P234

MATHS JOURNAL

Show an example of how the activities can be described or recorded. Pupils are required to work on the task individually, then share their schedules in pairs.

SELF-CHECK

Before the pupils do the self-check, review the important concepts once more by asking for examples learnt for each objective.

This self-check can be done after pupils have completed **Review 10** (Workbook 3B P79 – 84) as consolidation of understanding for the chapter.

Answers Review 10 (Workbook 3B P79 – 84)

1. (a) 9.18, 18
   (b) 3.28, 28
   (c) 11.38, 22
   (d) 9.58, 2

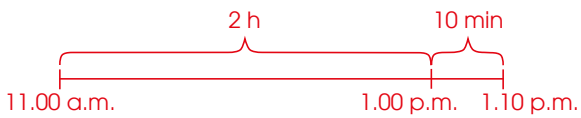
2. (a) 15, 9.15 a.m.
   (b) 7, 6.40 p.m.
   (c) 8, 7.53 am
   (d) 13, 4.47 p.m.

3. (a) 1, 45
   (b) 8.15 a.m.

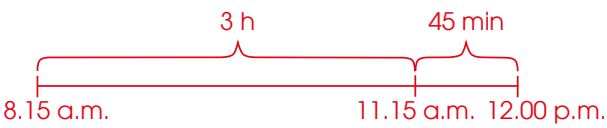
4. (a) 4 h 8 min
   (b) 10.07 am

5. (a) 15 min
   (b) 120 min
   (c) 1 h 0 min
   (d) 75

6. 130 minutes = 2 hour 10 min

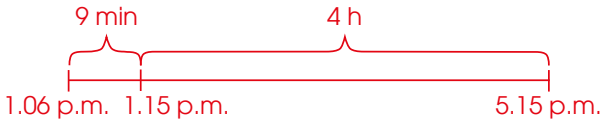


   Farhan's lesson will end at 1.10 p.m.

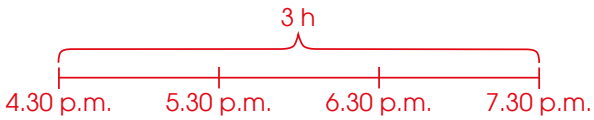
7. 

   3 h 45 min = 2 h 105 min
   2 h 105 min – 95 min = 2 h 10 min
   Ann spent 2 h 10 min painting.

8. 2 h 54 min $\xrightarrow{+ 1 \text{ h}}$ 3 h 54 min $\xrightarrow{+ 15 \text{ min}}$ 3 h 69 min
   3 h 69 min = 4 h 9 min
   Ahmad spent 4 h 9 min travelling to the library and spending time there.



   Ahmad started travelling to the library at 1.06 p.m.

9. 

   The pianist spent 3 h performing.
   3 × $96 = $288
   The pianist was paid $288.

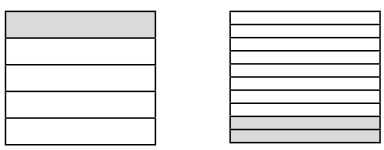
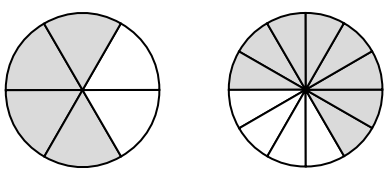
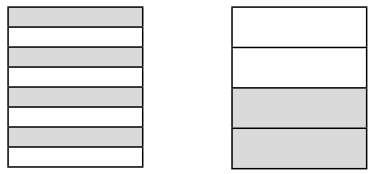
Answers Revision 3A (Workbook 3B P85 – 92)

1. (a) 7.60
   (b) 51.80
   (c) 20.90
   (d) 7.10
   (e) 5.95
   (f) 11.05
   (g) 32.55
   (h) 41.60
   (i) 43.05
   (j) 25.60

2. (a) $5.95 + $2.30 = $8.25
   $8.25 + $5.40 = $13.65
   The total cost of the items is $13.65
   (b) $4.75 + $15.30 = $20.05
   $20.05 + $20.35 = $40.40
   The total cost of the items is $40.40

3. (a) True
   (b) True
   (c) False
   (d) True

4. (a) Friday
   (b) Monday, Wednesday
   (c) 80

5. (a) 
   
   (b) 
   
   (c) 
   

6. (a) 5.12
   (b) 1.38
   (c) 6.02
   (d) 9.52

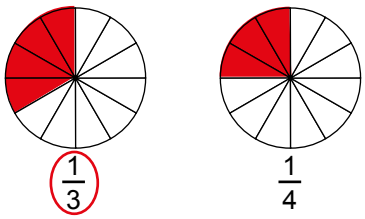
7. 1 h 5 min = 65 min
   65 min – 15 min = 50 min
   Ahmad took 50 min to finish his homework.

8. 4 × $10 = $40
   Ann had $40 at first.
   $40.00 – $5.85 = $34.15
   The pair of shoes cost $34.15.

9. $59.80 + $6.30 = $66.10
   Bala saved $66.10.
   $59.80 + $66.10 = $125.90
   Siti and Bala saved $125.90 altogether.

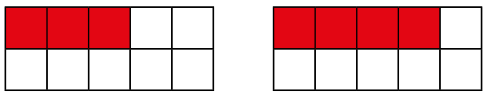
10. Rs 3000 − Rs 895 = Rs 2105
    The book and pen cost Rs 2105 altogether.
    Rs 2105 − Rs 1650 = Rs 455
    The pen cost Rs 455.

1. (a)



$\frac{1}{3}$ $\frac{1}{4}$

(b)



$\frac{3}{10}$ $\frac{2}{5}$

2. (a) $\frac{1}{2}, \frac{6}{10}, \frac{4}{5}$

(b) $\frac{5}{6}, \frac{7}{12}, \frac{1}{3}$

3. (a) $\frac{5}{12} + \frac{1}{4} = \frac{5}{12} + \frac{3}{12}$

$= \frac{8}{12}$

$= \frac{2}{3}$

(b) $\frac{1}{5} + \frac{7}{10} = \frac{2}{10} + \frac{7}{10}$

$= \frac{9}{10}$

(c) $\frac{5}{9} - \frac{1}{3} = \frac{5}{9} - \frac{3}{9}$

$= \frac{2}{9}$

(d) $\frac{7}{8} - \frac{1}{4} = \frac{7}{8} - \frac{2}{8}$

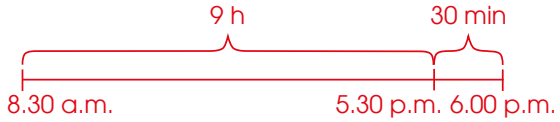
$= \frac{5}{8}$

4. (a) 19 minutes past 8
(b) 18 minutes past 11
(c) 12 minutes to 11
(d) 24 minutes to 10

5. (a)

Farhan will reach school at 7.10 a.m.

(b)



Mr Lim works 9 h 30 min a day.

(c)

The documentary started at 5.40 p.m.

6. (a) 159
(b) 234
(c) 3, 6
(d) 5, 15

7. (a) 17.35
(b) 16.60
(c) 52.75
(d) 43.75

8. (a) Sam
(b) Ann
(c) 45
(d) 230

9. 1 h 15 min $\xrightarrow{+ 2 \text{ h}}$ 3 h 15 min $\xrightarrow{+ 50 \text{ min}}$ 3 h 65 min

3 h 65 min = 4 h 5 min

Priya spent 4 h 5 min in total to make the bracelet and the necklace.

10. 1 h 48 min $\xrightarrow{+ 1 \text{ h}}$ 2 h 48 min $\xrightarrow{+ 55 \text{ min}}$ 2 h 103 min

2 h 103 min = 3 h 43 min

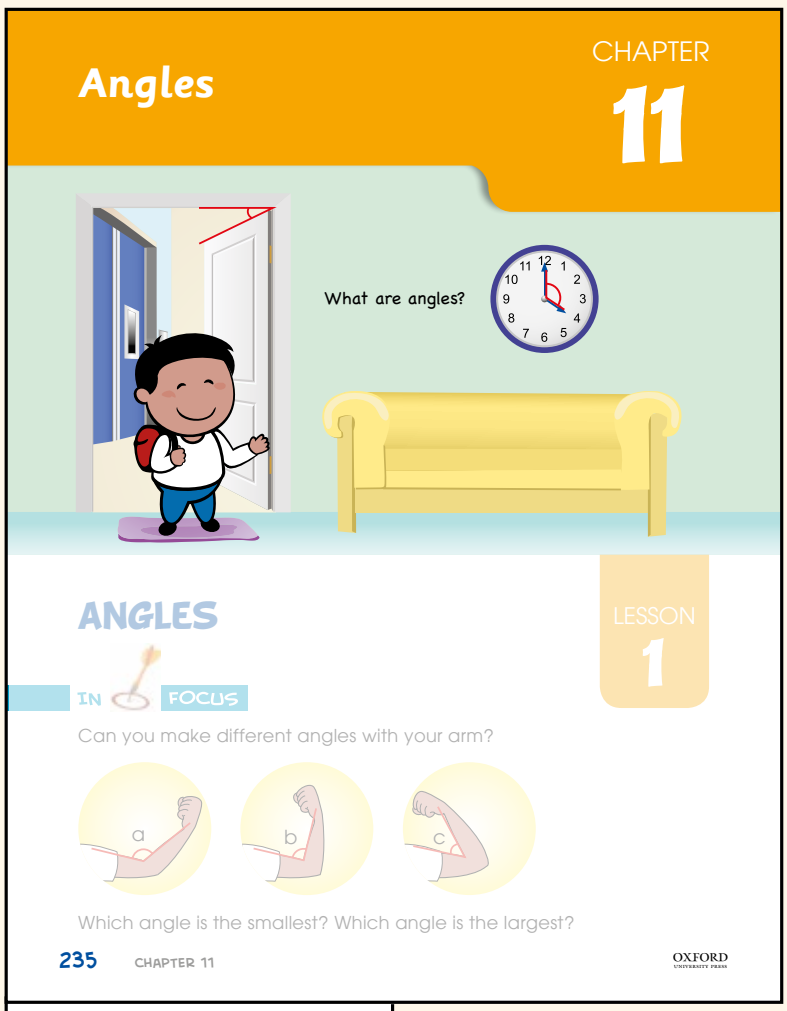
Mrs Tan took 3 h 43 min to bake.

3 h 43 min $\xrightarrow{- 3 \text{ h}}$ 43 min $\xrightarrow{- 12 \text{ min}}$ 31 min

Mrs Gopal is 31 min faster than Mrs Tan.

ANGLES

CHAPTER
11



Textbook 3 P235

Related Resources
NSPM Textbook 3 (P235 – 245)
NSPM Workbook 3B (P99 – 106)

Materials
Strips of cardboard, pencils, geoboards, rubber bands, everyday objects that show angles (e.g. scissors, ruler), fastener, A4 size paper

Lesson
Lesson 1 Angles
Lesson 2 Right Angles
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

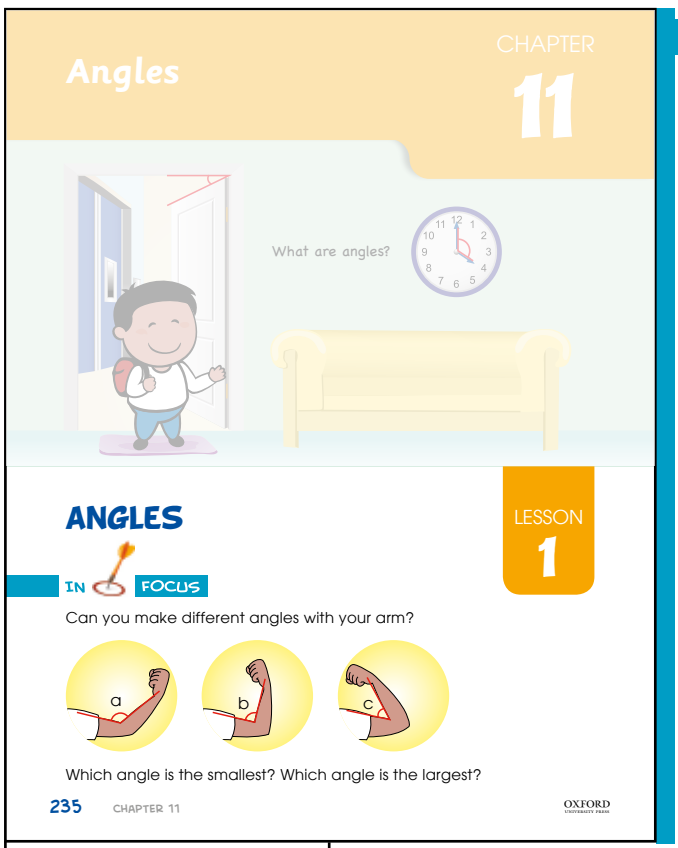
At Grade 3, the concept of angles is first developed as a 'turning', where pupils explore turning their arms or things in the environment (e.g. hands of a clock, a door or a pair of scissors). The concept of angles that pupils have to grasp at this stage is that an angle is formed when two straight line segments meet at a point. Through other practical experiences of forming an angle (e.g. by using two pencils or two angle strips) and varying the size of the amount of turning, pupils learn the concept of angles intuitively. They will then be able to identify angles in two-dimensional and three-dimensional objects in the environment. Before the measurement of angles in degrees is introduced at Grade 4, the right angle is used as a unit of comparison. A right angle can be identified in the corners of a square or rectangle and a right-angle tester can be easily made by folding a piece of paper. Pupils use the right-angle tester to discover more examples of right angles, as well as angles that are greater or smaller than a right angle. Pupils can use terms such as 'acute angle' and 'obtuse angle' to describe such angles.

LESSON 1

ANGLES

LEARNING OBJECTIVES

1. Associate angles as an amount of turning.
2. Identify angles in the environment.
3. Identify angles in two-dimensional shapes.


Angles

CHAPTER 11

What are angles?

ANGLES

LESSON 1

IN FOCUS

Can you make different angles with your arm?

a b c

Which angle is the smallest? Which angle is the largest?

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Textbook 3 P235

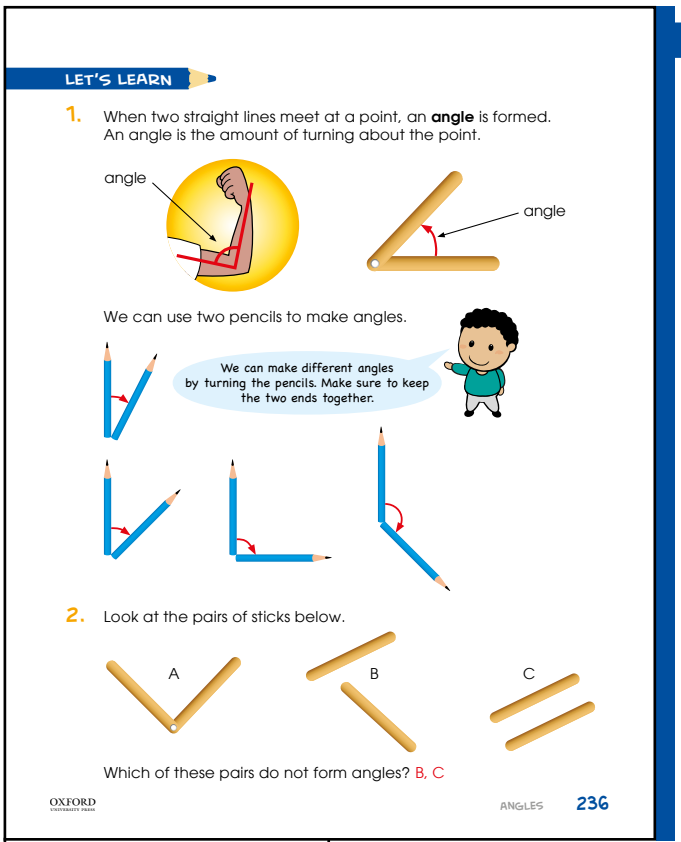
IN FOCUS

Use the chapter opener to stimulate discussion. Ask pupils to suggest reasons as to why the angles are marked as shown in the chapter opener.

For a clearer demonstration of the examples shown, use the classroom door to show the 'turning' of the door as it opens and closes, and use a geared clock to show where the minute hand 'turns' from the hour hand.

Ask pupils to spot more examples of angles in the chapter opener. They are expected to identify Bala's bent arm as an example.

Get pupils to hold up their right arms and make angles as shown in In Focus. Invite a volunteer to show a big angle and a small angle with his/her arms in front of the class. Each time the pupil does this, help the class see where the angle is formed.



Textbook 3 P236

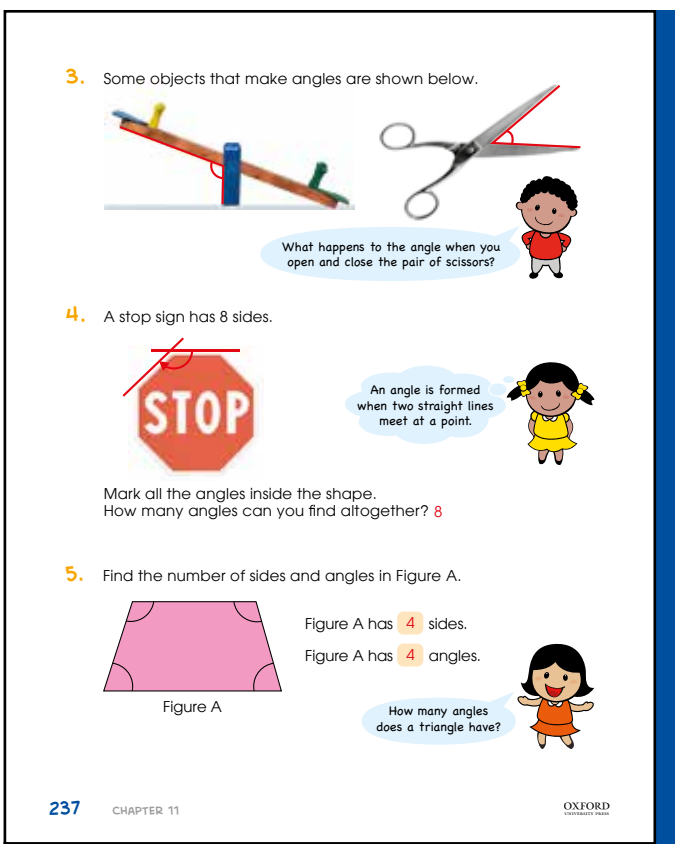
LET'S LEARN

Using the illustration, formally introduce the concept of an angle as the amount of turning about a point and how it is formed.

For more hands-on experience on making angles, assemble two strips of paper and a fastener as shown in Let's Learn 1. These can be shown on a visualiser or distributed to pupils to manipulate.

Alternatively, get pupils to work in pairs to make angles of varying sizes using pencils as shown. Emphasise to pupils that the ends of the pencils must meet in order for an angle to be formed.

Let's Learn 2 shows some non-examples of angles. This serves to verify the pupils' idea on what an angle is. Pupils are expected to see that B and C are not angles since the sticks do not meet at a point.

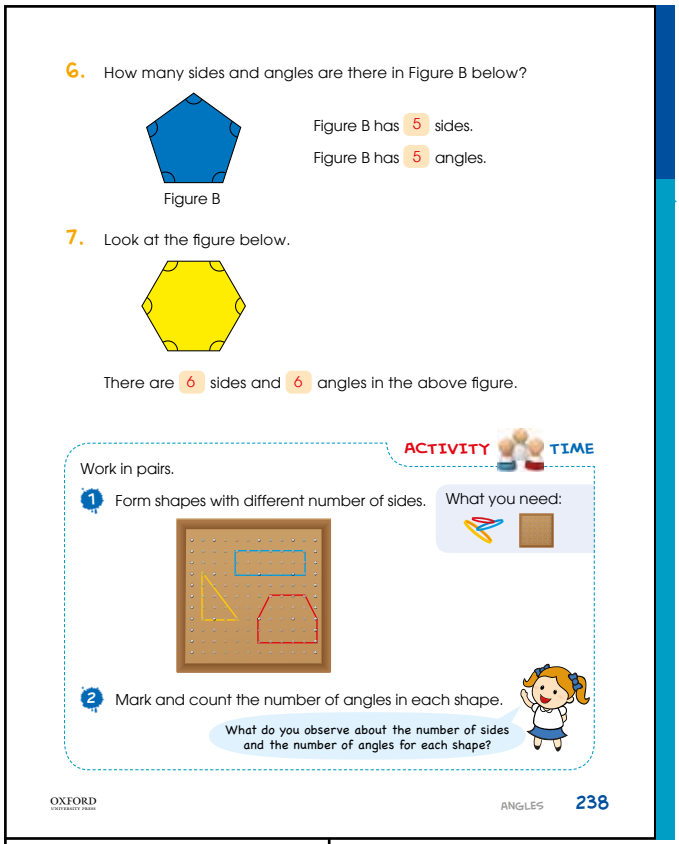


Textbook 3 P237

Let's Learn 3 and 4 help pupils to identify angles in 2D and 3D objects in their surroundings.

Apart from these examples, ask pupils to identify angles in objects around them.

Let's Learn 5 enables pupils to identify angles in rectilinear figures. Get pupils to count the angles and sides.



6. How many sides and angles are there in Figure B below?

Figure B

Figure B has 5 sides.

Figure B has 5 angles.

7. Look at the figure below.

There are 6 sides and 6 angles in the above figure.

ACTIVITY TIME

Work in pairs.

1. Form shapes with different number of sides.

What you need:

2. Mark and count the number of angles in each shape.

What do you observe about the number of sides and the number of angles for each shape?

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ANGLES 238

Textbook 3 P238

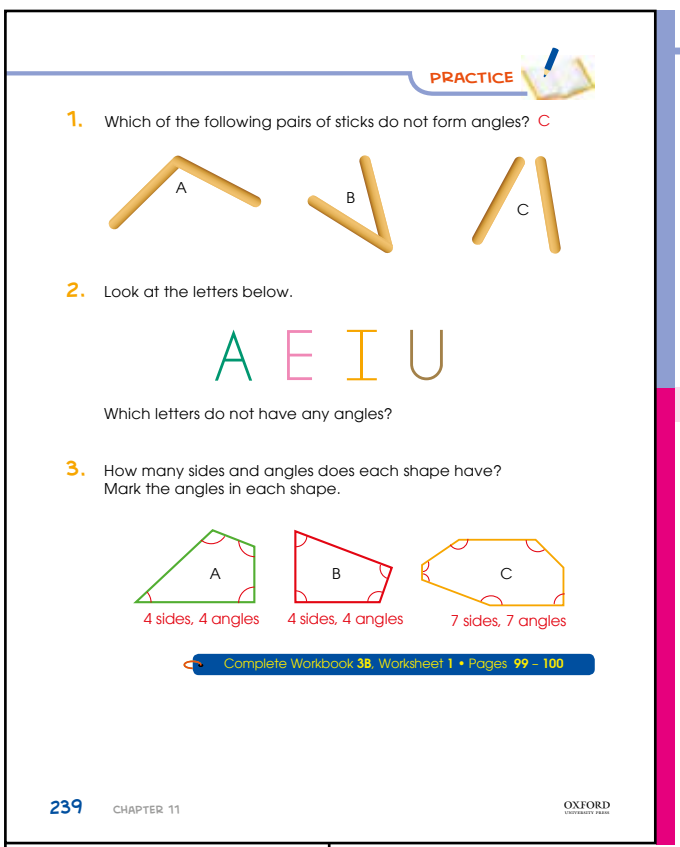
Let's Learn 6 and 7 provide pupils with other rectilinear figures (pentagon and hexagon) to work on.

ACTIVITY TIME

Assign pupils to work in pairs.

Give each pair of pupils a geoboard and rubber bands to form different rectilinear figures. Pupils are to count and record the number of angles and sides for each figure.

The objective is for pupils to investigate the relationship between the number of sides and the number of angles in a 2D figure.



PRACTICE

1. Which of the following pairs of sticks do not form angles? C

A B C

2. Look at the letters below.

A E I U

Which letters do not have any angles?

3. How many sides and angles does each shape have?
Mark the angles in each shape.

A B C

4 sides, 4 angles 4 sides, 4 angles 7 sides, 7 angles

Complete Workbook 3B, Worksheet 1 • Pages 99 – 100

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Textbook 3 P239

PRACTICE

Work with pupils on the practice questions.

Get pupils to answer and explain how they got their answers.

For better understanding, select items from **Worksheet 1** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 3B P99 – 100).

Answers Worksheet 1 (Workbook 3B P99 – 100)

1. (b)

✓

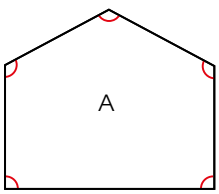
(c)

✓

(f)

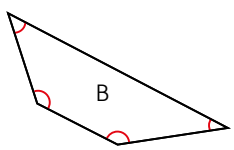
✓

2.



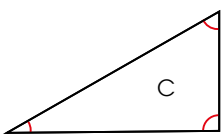
5 sides

5 angles



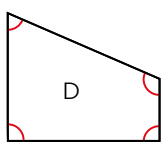
4 sides

4 angles



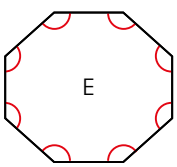
3 sides

3 angles



4 sides

4 angles



8 sides

8 angles

4 sides

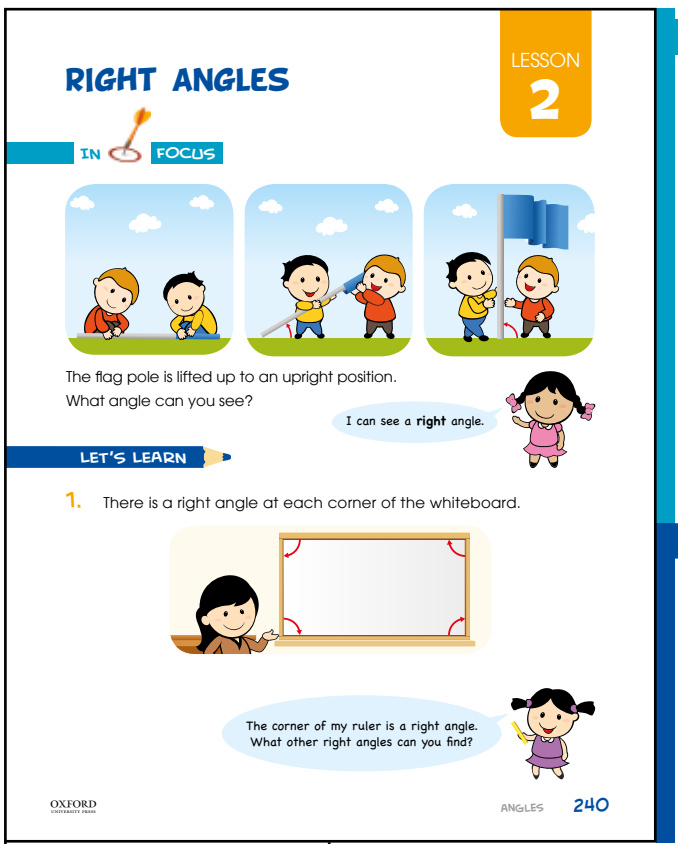
4 angles

LESSON 2

RIGHT ANGLES

LEARNING OBJECTIVES

1. Identify right angles.
2. Compare the size of an angle as equal to, greater than or smaller than a right angle.



Textbook 3 P240

IN FOCUS

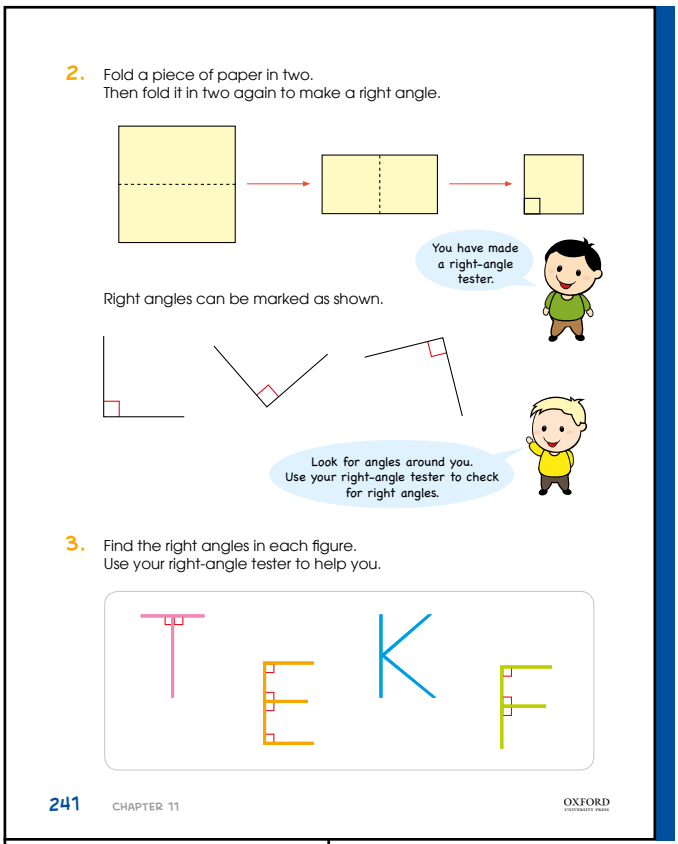
Ask pupils to describe what the two boys are doing and observe the angle that the flag pole makes with the ground. It will be visually impactful if the raising of the flag pole can be shown manually with a model or using ICT.

Ask pupils what angle they observe when the flag pole is in an upright position. Emphasise 'upright position' and show non-examples when the flag pole is not upright.

Mark the right angle on the picture and tell pupils that this is a **right angle**.

LET'S LEARN

Use the white board, ruler, windows and other objects in the environment for pupils to identify right angles.
It is important that visuals of these objects are prepared beforehand (either in pictures or the actual objects).
Get pupils to mark or identify the right angles in each object. Show pupils the correct way to mark an angle in a shape.



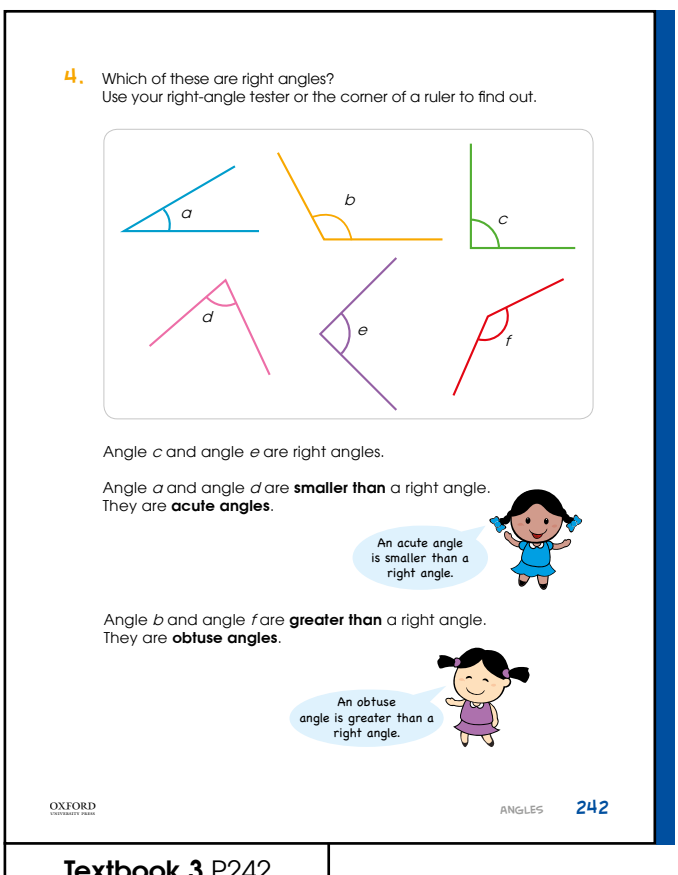
Textbook 3 P241

Taking a piece of paper, show pupils how it can be folded to make a right-angle tester. The paper used need not be rectangular.

Draw some right angles in different orientations and show them on the visualiser. Use the right-angle tester to show that the angle shown in each orientation is still a right angle.

Get pupils to make their own right-angle tester and allow them to check for right angles around them.

In Let's Learn 3, allow pupils to work in pairs and ask them to identify the right angles before testing them with a right-angle tester.

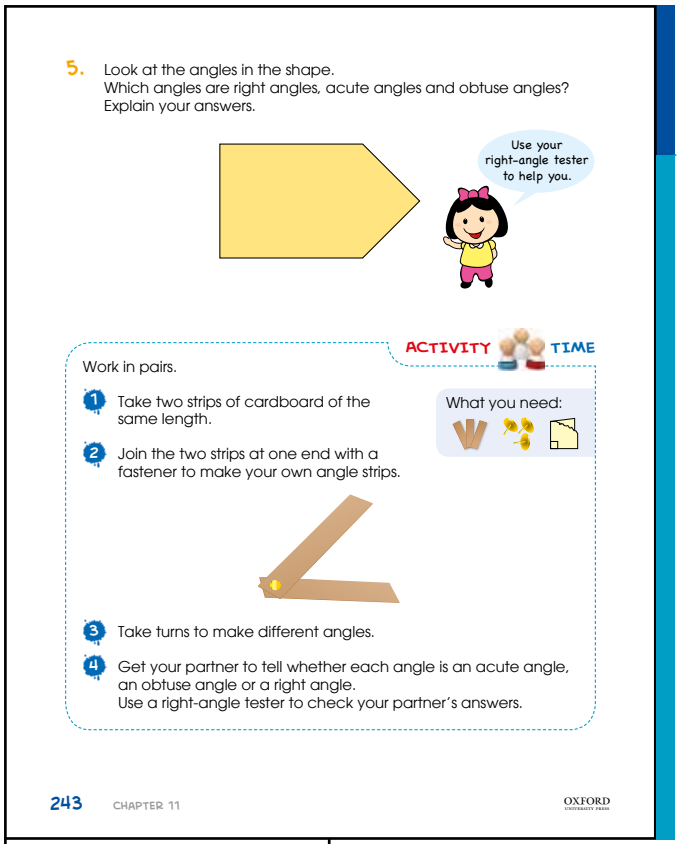


Textbook 3 P242

In Let's Learn 4, the right angle is used as a unit of comparison to identify angles. Pupils also learn to use letters to name marked angles.

Before testing the angles with the right-angle tester, get pupils to visually group the six given angles according to size: right angle, smaller than a right angle and greater than a right angle.

The language pattern of **smaller than a right angle** and **greater than a right angle** is reinforced, and new terms **acute angles** and **obtuse angles** are introduced to name the groups of angles.



5. Look at the angles in the shape.
Which angles are right angles, acute angles and obtuse angles?
Explain your answers.

Use your right-angle tester to help you.

ACTIVITY TIME

Work in pairs.

What you need:

1. Take two strips of cardboard of the same length.
2. Join the two strips at one end with a fastener to make your own angle strips.
3. Take turns to make different angles.
4. Get your partner to tell whether each angle is an acute angle, an obtuse angle or a right angle.
Use a right-angle tester to check your partner's answers.

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Textbook 3 P243

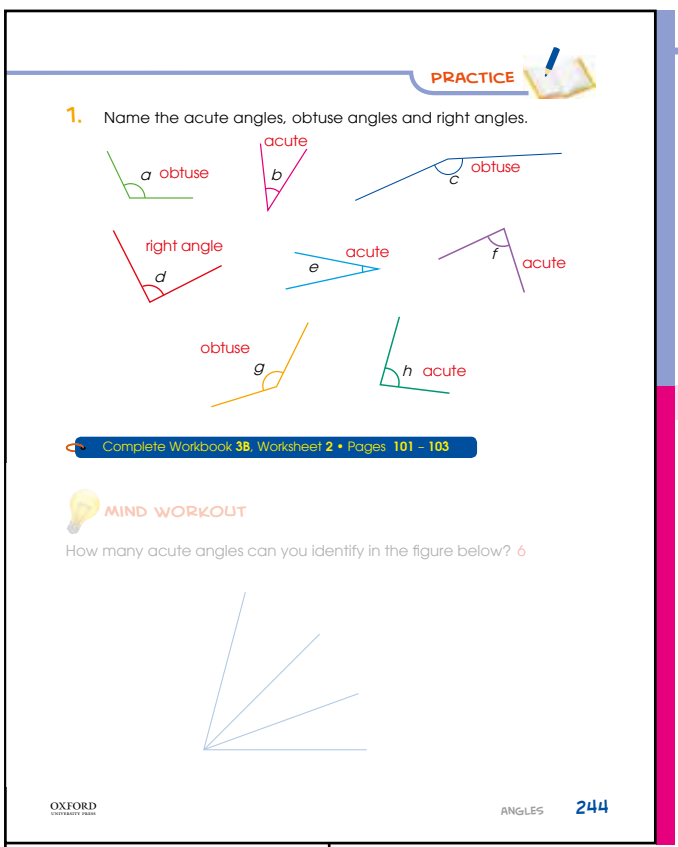
Let's Learn 5 reinforces pupils' concepts of the three types of angles.

ACTIVITY TIME

Assign pupils to work in pairs.

This activity gives pupils practical experience in making a dynamic angle and manipulating its size.

Pupils are to verbalise the names 'right angle', 'acute angle' or 'obtuse angle' when identifying them with their partners.



PRACTICE

1. Name the acute angles, obtuse angles and right angles.

a obtuse
b acute
c obtuse
d right angle
e acute
f acute
g obtuse
h acute

Complete Workbook 3B, Worksheet 2 • Pages 101 – 103

MIND WORKOUT

How many acute angles can you identify in the figure below? 6

OXFORD UNIVERSITY PRESS ANGLES 244

Textbook 3 P244

PRACTICE

Work with pupils on the practice questions.

Get pupils to answer and explain how they got their answers.

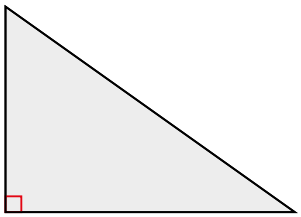
For better understanding, select items from **Worksheet 2** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 3B P101 – 103).

Answers Worksheet 2 (Workbook 3B P101 – 103)

1. (a)

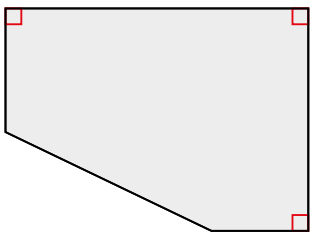


1 right angle

(b)

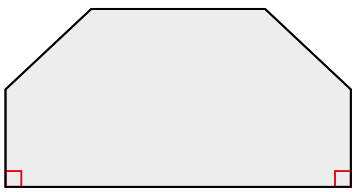
4 right angles

(c)



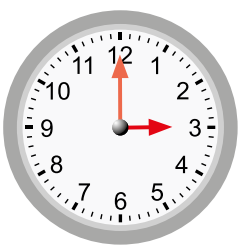
3 right angles

(d)



2 right angles

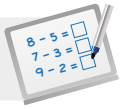
2.



3. 2

4 (a) obtuse angle
(b) acute angle
(c) acute angle
(d) obtuse angle

LESSON PLAN



Specific Learning Focus

- Associate angles as an amount of turning.
- Identify angles in the environment.
- Identify angles in two-dimensional shapes.

Suggested Duration

4 periods

Prior Learning

Angles had been introduced informally as a 'turning', where pupils explore turning their arms or things in the environment (e.g. hands of a clock, a door, a window, pair of scissors, javelin throw, etc.)

Pre-emptive Pitfalls

Angles are first introduced by having pupils look for right angles in real-life objects. The right angle is first used as the basis of comparison with other types of angles. Though practical experiences using their arms and angle strips, pupils get to learn the concept of angles visually. If pupils clearly understand right angles they should not have difficulties understanding and identifying other types of angles.

Introduction

A right angle can be introduced by pointing out to pupils that right angles can be found at the corners of tables, rulers and books. A right-angle tester can be made by folding an A4 size paper and used to find right angles in their environment (Textbook 3 P241). Let's Learn 3 (Textbook P241) shows interesting examples of finding angles in letters. In Let's Learn 5 (Textbook 3 P243), the angles in a polygon are to be identified. For example, an octagon (an 8-sided polygon) has 8 angles. Once the concept of right angles has been clearly explained using real-life examples such as the walls of the classroom meet at right angles and the school flag standing upright at right angle to the ground (Textbook 3 P240), acute and obtuse angles are then introduced.

Problem Solving

'Mind Workout' (Textbook 3 P244) and 'Maths Journal' (Textbook 3 P245) can be used to further explore the concepts of angles in real life. To relate angles to real life, use sports like cricket, tennis, and holding a bat or a tennis racquet at a certain angle for maximum strike, as examples.

Activities

Distribute strips of cardboard to pupils for them to fasten and make their own angle strips. Call out acute, obtuse and right angles, and have pupils make the angles using the angle strips and then raise the strips in the air.

Resources

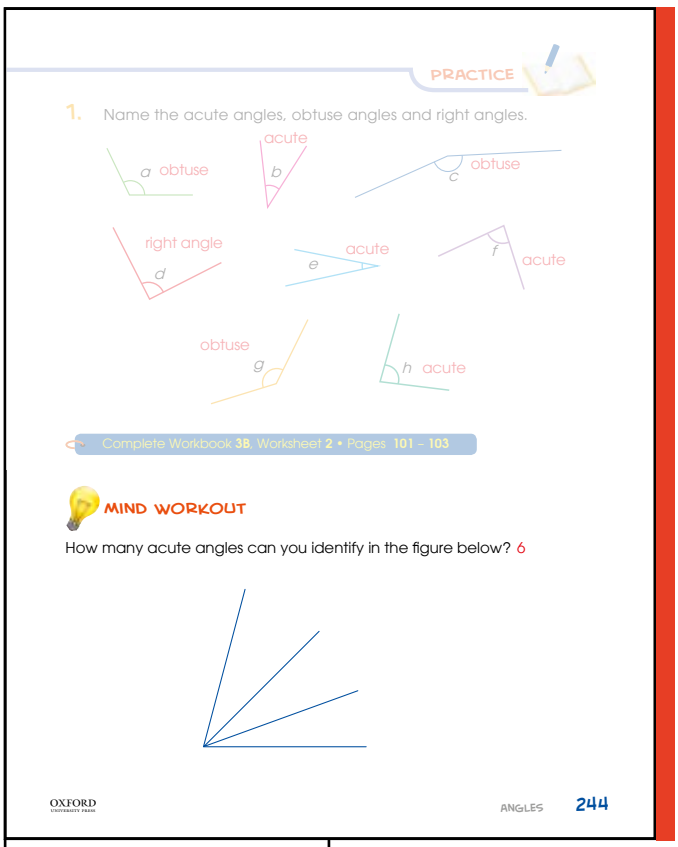
- strips of cardboard
- fastener
- A4 size paper
- everyday objects that show angles (e.g. scissors, ruler)
- worksheet (Activity Handbook 3 P40)
- polygons (Activity Handbook 3 P38)

Mathematical Communication Support

Discuss various angular motions in real life, like the gradient of an airplane taking off from the ground or the opening of a window. Two-dimensional figure cut-outs can be distributed to pupils and they can visually predict acute, obtuse and right angles in the shapes (Activity Handbook 3 P40). Explain the concepts of angles as:

- An angle is formed when two lines meet at a point.
- When two perpendicular lines meet at a point, a right angle is formed.
- An angle smaller than a right angle is an acute angle.
- An angle greater than a right angle but smaller than 180° is an obtuse angle.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



PRACTICE

1. Name the acute angles, obtuse angles and right angles.

a obtuse
b acute
c obtuse
d right angle
e acute
f acute
g obtuse
h acute

Complete Workbook 3B, Worksheet 2 • Pages 101 – 103

MIND WORKOUT

How many acute angles can you identify in the figure below? 6

OXFORD

ANGLES 244

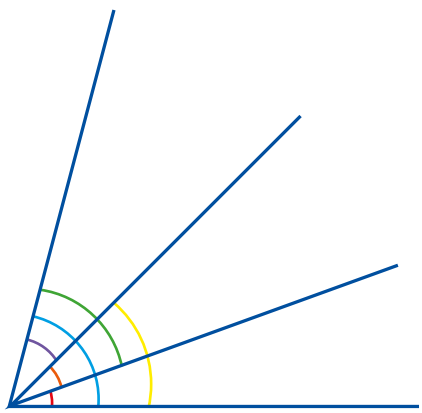
Textbook 3 P244

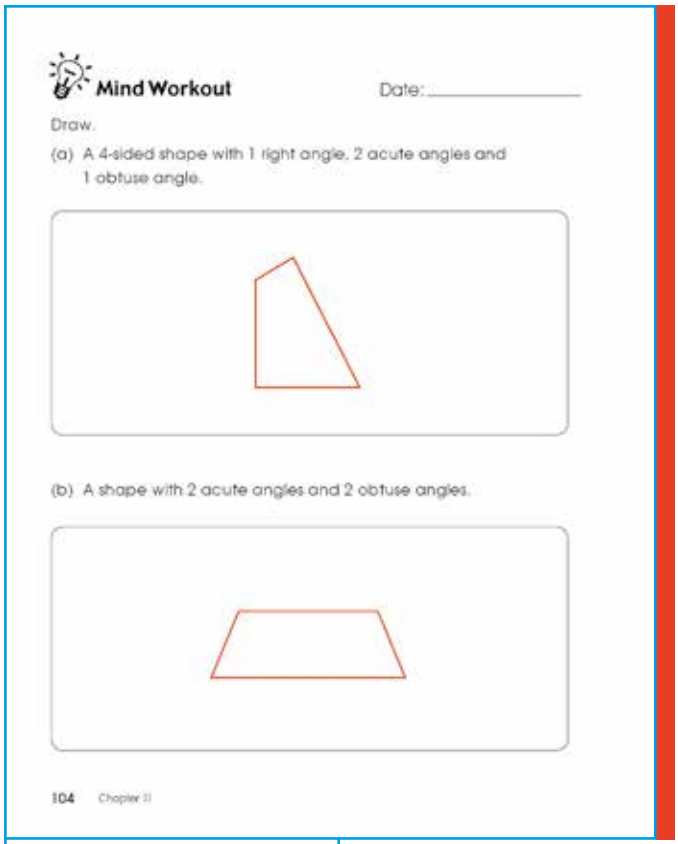
MIND WORKOUT

Pupils would commonly see 3 angles in the figure at first glance.

Besides spatial visualisation, pupils need to dissect the figure based on the concept that an angle is formed by two lines meeting at a point.

Guide pupils to see that there are other angles as well.





Mind Workout

Date: _____

Draw.

(a) A 4-sided shape with 1 right angle, 2 acute angles and 1 obtuse angle.

(b) A shape with 2 acute angles and 2 obtuse angles.

104 Chapter 11

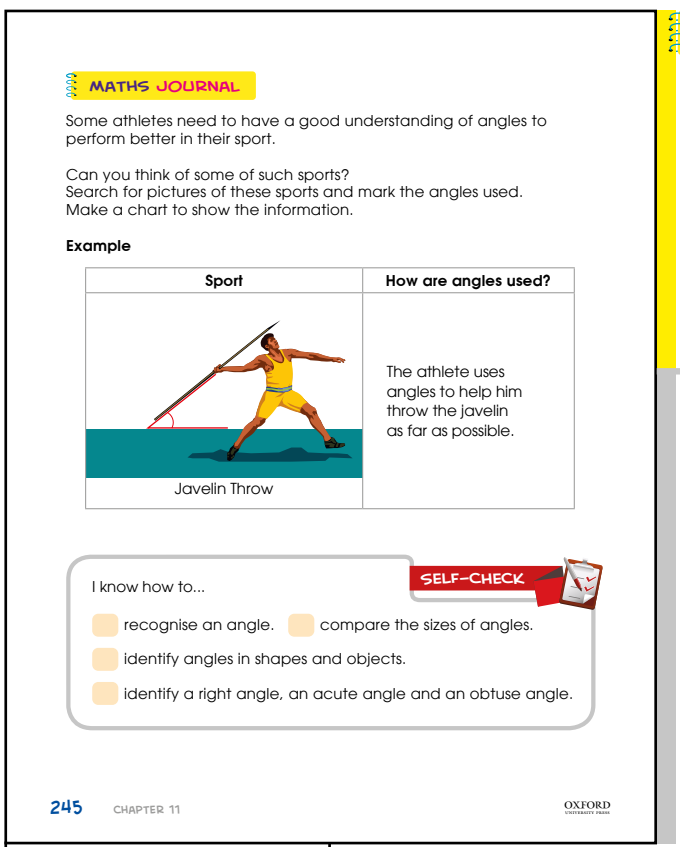
Workbook 3B P104

Mind Workout

Guide pupils in understanding the requirements of the question. Ask pupils to sketch the figure before drawing with pencil and ruler.

Suggest to them to sketch a square first, and then change the angles to get the required shape.

For further guidance, demonstrate (a) to help pupils.



MATHS JOURNAL

Some athletes need to have a good understanding of angles to perform better in their sport.

Can you think of some of such sports?
Search for pictures of these sports and mark the angles used.
Make a chart to show the information.

Example

Sport	How are angles used?
Javelin Throw	The athlete uses angles to help him throw the javelin as far as possible.

I know how to... SELF-CHECK

- recognise an angle.
- compare the sizes of angles.
- identify angles in shapes and objects.
- identify a right angle, an acute angle and an obtuse angle.

245 CHAPTER 11 OXFORD

Textbook 3 P245

MATHS JOURNAL

Have a class discussion before setting this journal as individual work. Ask pupils which sports they like to play or watch. Use one of their sports to elaborate about use of angles.

Encourage them to search the internet to learn more about their favourite sport for this journal.

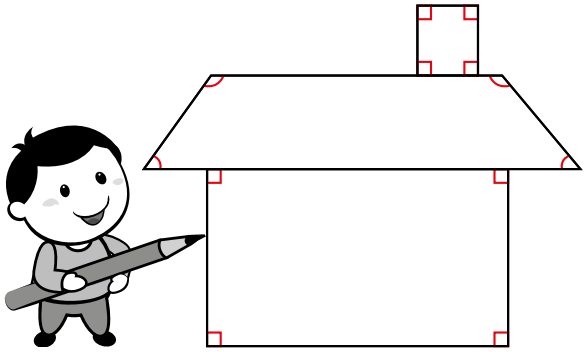
SELF-CHECK

Before the pupils do the self-check, review the important concepts once more by asking for examples learnt for each objective.

This self-check can be done after pupils have completed **Review 11** (Workbook 3B P105 – 106) as consolidation of understanding for the chapter.

Answers Review 11 (Workbook 3B P105 – 106)

1.



(a) 8
(b) 2
(c) 2

2.

3. (a) 6, 6
(b) 3, 3
(c) 5, 5

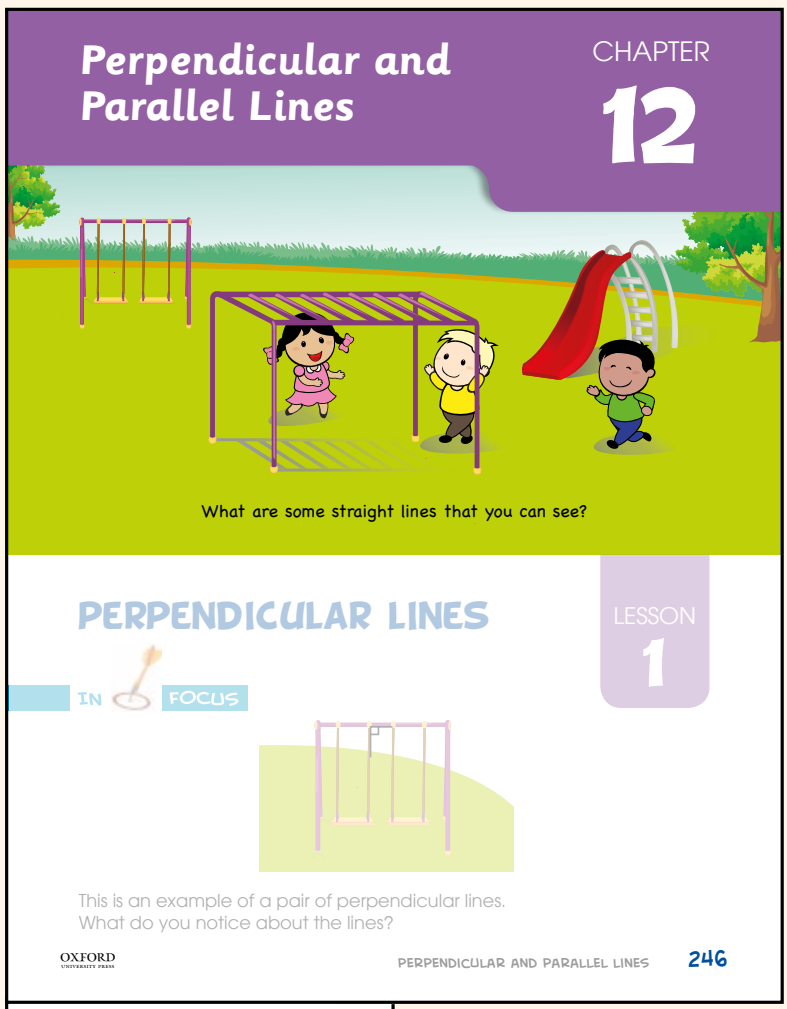
The number of sides of a figure is always equal to the number of angles inside the figure.

4.

Acute angles	Right angles	Obtuse angles
c *i*	a *d* *g*	*b* *e* *f* *h*

PERPENDICULAR AND PARALLEL LINES

CHAPTER
12



Textbook 3 P246

Related Resources
NSPM Textbook 3 (P246 – 267)
NSPM Workbook 3B (P107 – 124)

Materials
Square grid paper, set square, ruler, plumb line

Lesson

Lesson 1	Perpendicular Lines
Lesson 2	Drawing Perpendicular Lines
Lesson 3	Parallel Lines
Lesson 4	Drawing Parallel Lines
Lesson 5	Vertical and Horizontal Lines

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

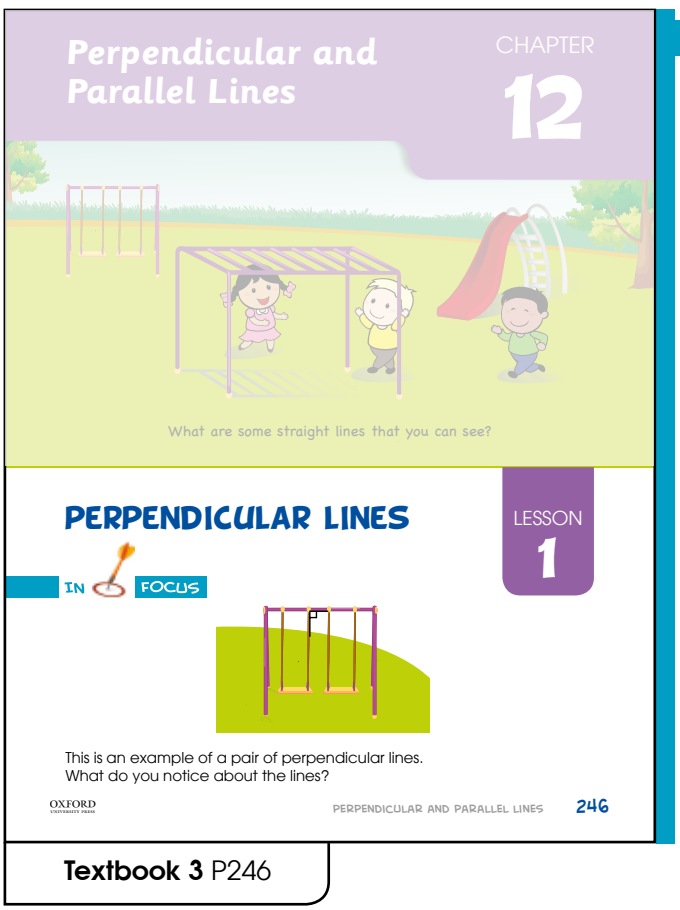
The learning of perpendicular and parallel lines follows from the concepts of angles in the previous chapter. Two lines that intersect at right angles are called perpendicular lines while two lines that never meet at a point no matter how long they are drawn are called parallel lines. Real-world examples and activities enable pupils to explore and visualise these concepts intuitively. Pupils are taught the skills of drawing perpendicular and parallel lines using a ruler and a set square, as well as on square grid. The terms vertical and horizontal are taught in association with perpendicular and parallel lines through real-world illustrations (e.g. a picture frame hanging upright on a wall or a table standing upright with respect to the floor).

LESSON 1

PERPENDICULAR LINES

LEARNING OBJECTIVE

1. Identify and name perpendicular lines.


Perpendicular and Parallel Lines

CHAPTER 12

What are some straight lines that you can see?

PERPENDICULAR LINES

LESSON 1

IN FOCUS

This is an example of a pair of perpendicular lines.
What do you notice about the lines?

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PERPENDICULAR AND PARALLEL LINES 246

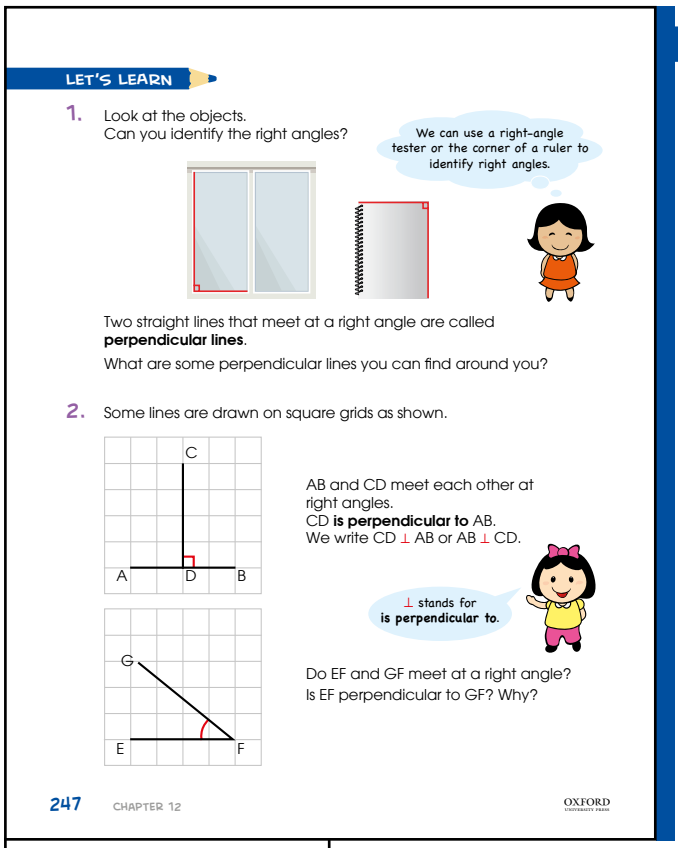
Textbook 3 P246

IN FOCUS

Use the chapter opener to stimulate discussion on the equipment at the playground.

Get pupils to identify straight lines and right angles in the playground equipment. Invite some volunteers to show and mark right angles on the visualiser.

To help the pupils with this lesson, get them to make a right-angle tester as they had done in Chapter 11.



Textbook 3 P247

LET'S LEARN

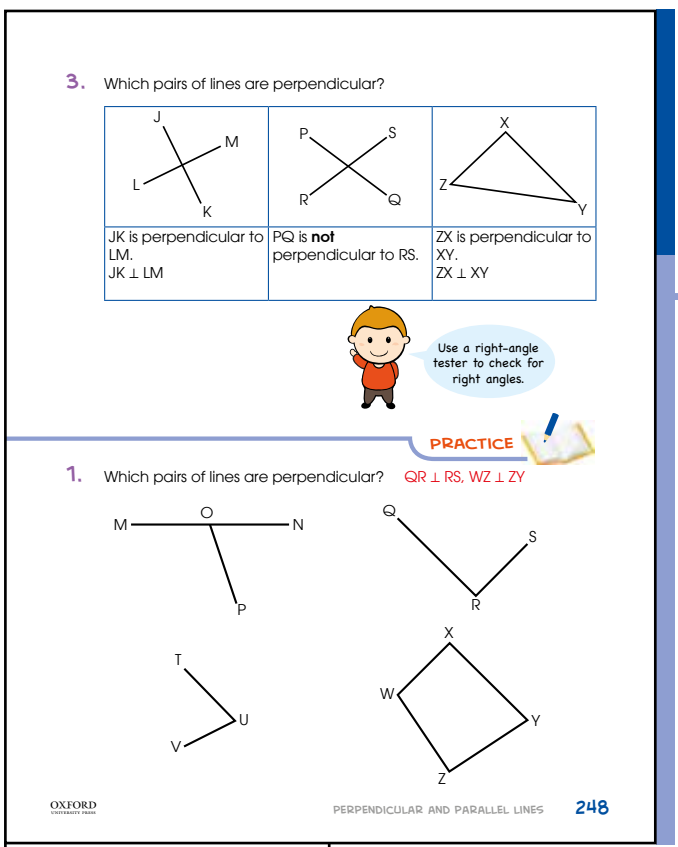
Instruct pupils to use the right-angle tester to identify right angles in Let's Learn 1. Draw a pair of perpendicular lines on the whiteboard, mark the right angle and introduce the term **perpendicular lines**.

Refer pupils to the diagram in In Focus and ask pupils to indicate the perpendicular lines.

For further practice, get pupils to pair up and look for two objects around them that have perpendicular lines. Each pair is required to make a simple drawing of the objects and mark out the pair of perpendicular lines. After which, the pupils are to present their drawings on the visualiser.

Show the class blank square grids and draw their attention to the lines on the grid and how they intersect each other. Lead pupils to see the squares formed by the intersection and the right angles, which are corners of squares.

Introduce pupils to the symbol ⊥ and how it is used.



Textbook 3 P248

Reinforce the concept of perpendicular lines with Let's Learn 3. Extend beyond the example by asking if the following is true or false:

- XZ ⊥ ZY
- ZY ⊥ YX

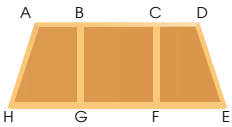
PRACTICE

Work with pupils on the practice questions.

2. Which letters have perpendicular lines? E, F, H

A E F H O S

3. List the pairs of perpendicular lines you can find in each object.



BG ⊥ GH, BG ⊥ GF,
CF ⊥ FG, CF ⊥ FE

JM ⊥ ML, ML ⊥ KL,
JK ⊥ KL, JK ⊥ JM

Complete Workbook 3B, Worksheet 1 • Pages 107 – 108

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Textbook 3 P249

For Question 3, invite as many possible answers from pupils.

For better understanding, select items from **Worksheet 1** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 3B P107 – 108).

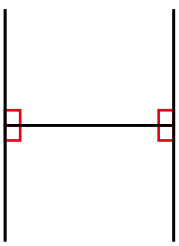
Answers

Worksheet 1 (Workbook 3B P107 – 108)

1. (a) Yes
   (b) No
   (c) Yes
   (d) No

2. (a) QS
   (b) EF

3. (a) AB, BC
   (b) AB, AD or AD, DC

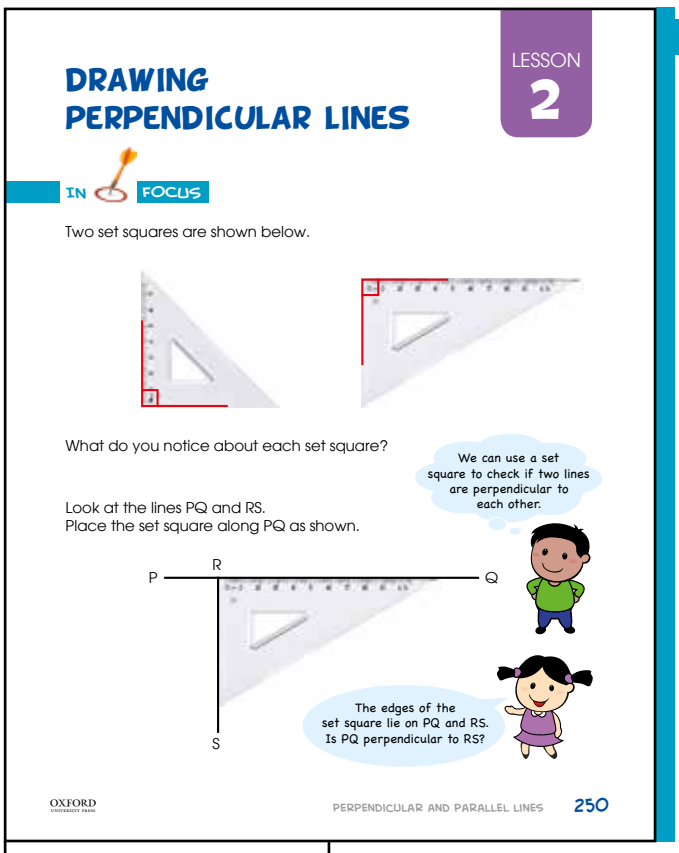
4. 

LESSON
2

DRAWING PERPENDICULAR LINES

LEARNING OBJECTIVES

1. Draw perpendicular lines using a ruler and a set square.
2. Draw perpendicular lines on square grids.



DRAWING PERPENDICULAR LINES

LESSON 2

IN FOCUS

Two set squares are shown below.

What do you notice about each set square?

We can use a set square to check if two lines are perpendicular to each other.

Look at the lines PQ and RS.
Place the set square along PQ as shown.

P R Q S

The edges of the set square lie on PQ and RS. Is PQ perpendicular to RS?

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PERPENDICULAR AND PARALLEL LINES 250

Textbook 3 P250

IN FOCUS

Pupils should have each a set square of their own.

Show the two kinds of set squares on the visualiser and ask pupils to compare the two. Focus on the similarity of the right-angled corners and how this instrument got its name ‘set square’.

Draw a pair of perpendicular lines, PQ and RS. Ask a pupil to use a set square to show the class how to check for right angles and prove that PQ and RS are perpendicular. Guide the pupil along in the demonstration.

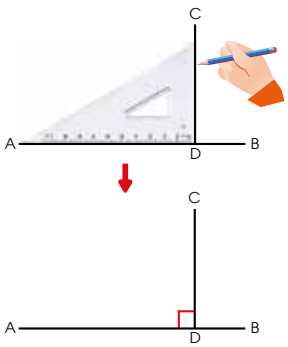
Allow a few minutes for pupils to discuss in pairs how they can use a set square and a ruler to draw perpendicular lines.

LET'S LEARN

1. Draw a pair of perpendicular lines with a set square.

Step 1 Draw a straight line with a ruler and label the line AB. Place a set square on AB as shown.

Step 2 Draw a line along the other edge of the set square and label the line CD.



Line CD is perpendicular to line AB.

Textbook 3 P251

LET'S LEARN

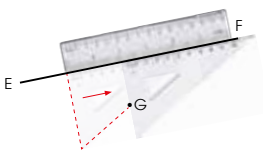
Using the visualiser, demonstrate the steps in drawing a pair of perpendicular lines using a ruler and a set square. After which, allow pupils to work in pairs to do the construction.

Starting with a horizontal line, demonstrate the steps to the class before letting pupils work in pairs to do the construction. Pupils may have difficulty manipulating the ruler and the set square. In this case, suggest for one pupil to hold the ruler in position while the other places the set square and draws the line.

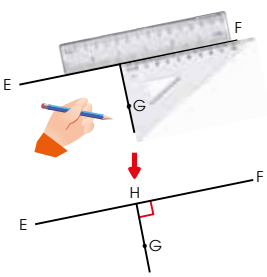
Ensure that pupils take turns to practice.

2. Draw a line perpendicular to line EF that passes through point G.

Step 1 Place a set square and a ruler on EF as shown. Move the set square along EF until its other edge passes through G.



Step 2 Draw a line along the edge of the set square through G.



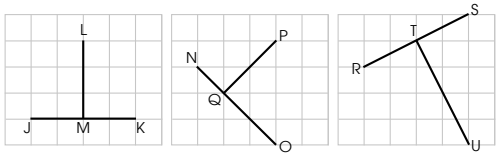
Line HG is perpendicular to line EF.

Textbook 3 P252

Draw pupils' attention to the difference between this task and Let's Learn 1. The task here is to draw a line that is perpendicular to the given line and passes through the given point.

Demonstrate these steps first, then get pupils to work in pairs. Likewise, ensure that pupils take turns to practice.

3. Look at the perpendicular lines drawn on square grids shown. Describe how these perpendicular lines are drawn.

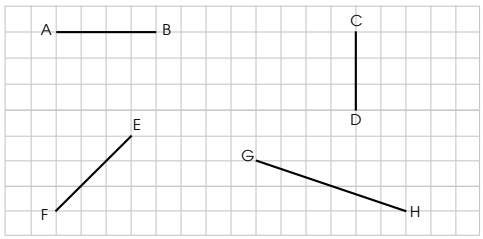


ACTIVITY TIME

Work in pairs.

1. Draw a line perpendicular to each of the following lines.

What you need:



2. Show and explain to your partner how you draw each line.
3. Get your partner to check that your lines are perpendicular.
4. Switch roles and repeat 1 to 3.

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Textbook 3 P253

In Let's Learn 3, pupils examine how a perpendicular line can be drawn on a square grid without the aid of a set square.

For each diagram, draw pupils' attention to:

(a) JK ⊥ LM: A line perpendicular to JK can be drawn along any of the grid lines that form right angles with JK. Why?

(b) NO ⊥ PQ: NO cuts diagonally through each square in the grid from one corner to the opposite corner. The perpendicular line can start from point Q, which is a corner of a square, and joined to the opposite corner of the square. The line can be further extended to point P.

(c) RS ⊥ TU: RS cuts diagonally a '2 by 4' rectangle from point R to point S. The perpendicular line can start from point T and cut diagonally the '2 by 4' rectangle to point U.

Note that there is no need to use the term 'diagonally' at this stage.

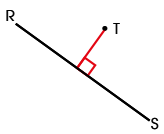
ACTIVITY TIME

Based on the exploration in Let's Learn 3, let pupils work in pairs to have hands-on experience in the visualisations and drawing the images on the square grids.

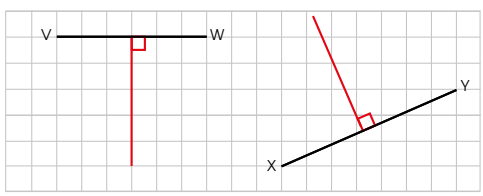
PRACTICE

1. Use a set square to draw a line perpendicular to line PQ.

2. Use a set square to draw a line perpendicular to line RS that passes through point T.



3. Draw a line perpendicular to each of the following lines.



Complete Workbook 3B, Worksheet 2 • Pages 109 – 112

OXFORD UNIVERSITY PRESS PERPENDICULAR AND PARALLEL LINES 254

Textbook 3 P254

PRACTICE

Allow pupils to work on the questions individually. Move around to monitor individual pupils' understanding.

Pupils may need help with Let's Learn 3 (for line XY).

For better understanding, select items from **Worksheet 2** and work these out with the pupils.

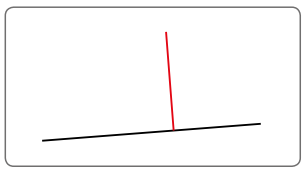
Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 3B P109 – 112).

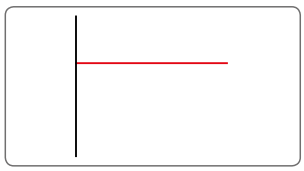
Answers Worksheet 1 (Workbook 3B P109 – 112)

1. (a) AB ⊥ EF ✓
   CD ⊥ EF ✓
   (b) CD ⊥ AB ✓
   EF ⊥ AB ✗
   (c) CD ⊥ AB ✗
   EF ⊥ AB ✓

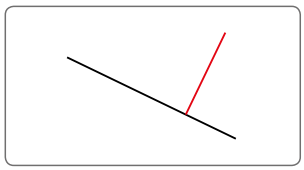
2. (a)



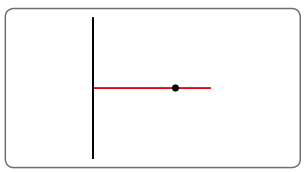
(b)



(c)



3. (a)



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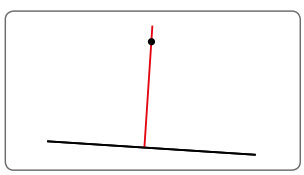
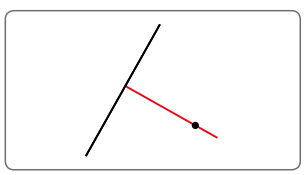


(c)



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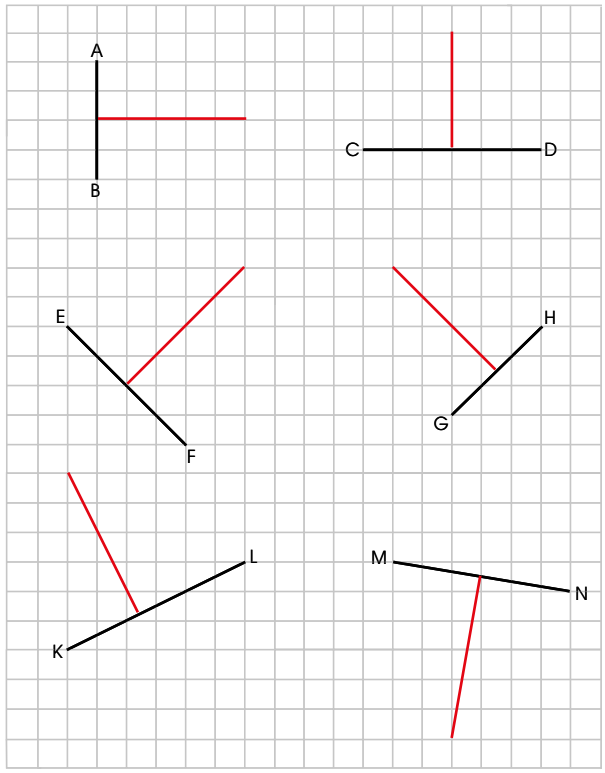
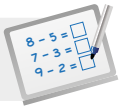


LESSON PLAN



Specific Learning Focus

- Identify and name perpendicular lines.
- Draw perpendicular lines using a ruler and a set square.
- Draw perpendicular lines on square grids.

Suggested Duration

Lesson 1: 2 periods
Lesson 2: 3 periods

Prior Learning

Pupils have been introduced to straight and curved lines in Grade 2. This chapter is a continuation of Chapter 11, where pupils are introduced to angles as being formed when two lines meet at a point.

Pre-emptive Pitfalls

Construction of parallel and perpendicular lines is introduced in this chapter. The use of mathematical geometric tools (set square and ruler) is introduced. The pupils will have to be skilful in constructing and individual attention is advised.

Introduction

Introduce the concept of perpendicular lines by bringing pupils to the playground and have them identify lines perpendicular to each other. Explain that right angles are formed when two perpendicular lines meet at a point. Revisit the identification of right angles in the environment and point out the lines that are perpendicular to each other. Get pupils to use a square grid to make angles that are acute, obtuse and right angles. Encourage pupils to differentiate between perpendicular and non-perpendicular lines. In Lesson 2, demonstrate the steps in drawing a pair of perpendicular lines using a set square and a ruler. Divide the class into groups of 2 and encourage them to work together, where one partner holds the ruler and the other slides the set square and draws the perpendicular line. They can practise this on square grid paper initially until they become skilful at handling the geometric tools.

Problem Solving

In Let's Learn 3 (Textbook 3 P253), explain to pupils how they can draw perpendicular lines on the square grid using a ruler only (without the use of a set square).

Activities

Let pupils have hands-on experience in pairs in making perpendicular lines on square grid paper (Activity Handbook 3 P43).

Resources

- set square
- ruler
- square grid paper (Activity Handbook 3 P43)

Mathematical Communication Support

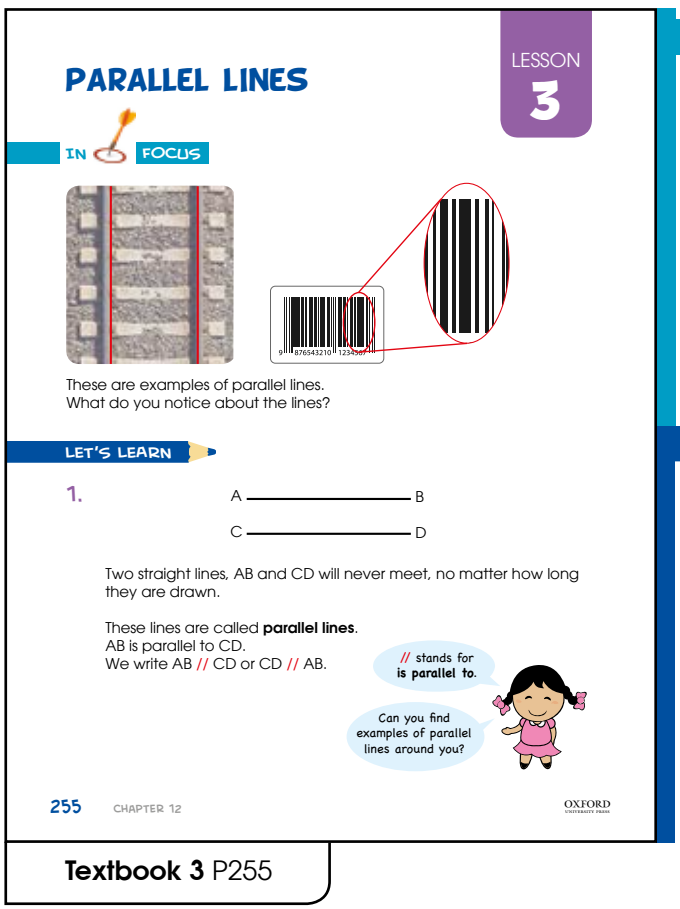
Verbalise the steps while pupils draw the perpendicular lines. Articulate each step using set square and ruler and give individual attention to each group.

LESSON 3

PARALLEL LINES

LEARNING OBJECTIVE

1. Identify and name perpendicular lines.


PARALLEL LINES

LESSON 3

IN FOCUS

These are examples of parallel lines.
What do you notice about the lines?

LET'S LEARN

1.

A ——— B

C ——— D

Two straight lines, AB and CD will never meet, no matter how long they are drawn.

These lines are called **parallel lines**.
AB is parallel to CD.
We write AB // CD or CD // AB.

// stands for **is parallel to.**

Can you find examples of parallel lines around you?

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Textbook 3 P255

IN FOCUS

Ask pupils to make a guess of what the pictures show and where they can find these in the real world. The picture on the left shows railway tracks, and a barcode (which is found on the packaging of items sold in shops) is shown on the right.

Ask pupils to look at the lines in the two pictures and describe them. Pupils can describe the lines based on how they differ from perpendicular lines.

LET'S LEARN

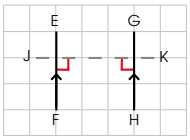
Draw a pair of parallel lines on the whiteboard and ask pupils if the lines will ever meet if the lines are extended further. Demonstrate this by lengthening the lines as much as possible.

Introduce the term **parallel lines** and lead pupils to understand the definition of parallel lines (two straight lines that never meet, regardless of how long they are). Introduce to pupils the symbol // and how it is used.

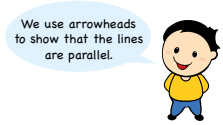
Refer pupils back to the pictures in In Focus and ask them to indicate the parallel lines.

For further practice, get pupils to pair up and look for objects around them that have parallel lines. Each pair is required to make a simple drawing of the objects and mark out the pair of parallel lines. After which, the pupils are to present their drawing on the visualiser. Alternatively, this activity can be done at the end of the lesson.

2. Some pairs of lines are drawn on square grids as shown.
Are the lines parallel to each other?

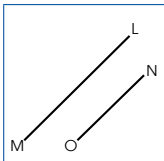
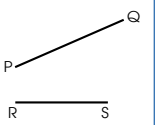
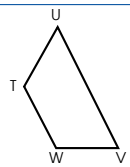


Two lines perpendicular to the same line, JK, are parallel to each other.
EF // GH



ST and UV are not parallel to each other.

3. Which pairs of lines are parallel?

		
LM is parallel to NO. LM // NO	PQ and RS are **not** parallel to each other.	TW is parallel to UV. TW // UV

Textbook 3 P256

In Let's Learn 2, initiate discussion with the pupils by asking the following questions:

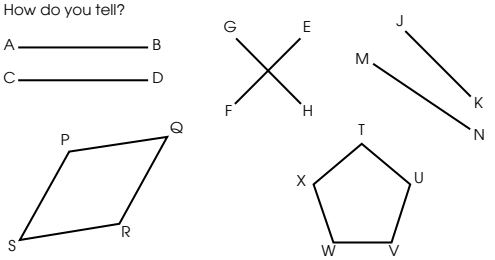
- Are EF and GH parallel? Why?
- How do you know if they are parallel?
- What do you notice about the line JK?
- Are ST and UV parallel? Why?
- How do you know if two lines are not parallel to each other?

For Let's Learn 3, pupils use visualisation to tell if the lines are parallel or not.

Extend to ask if the following is true or false:

- UT // VW
- UV // VW

4. Which pairs of lines are parallel?
How do you tell?

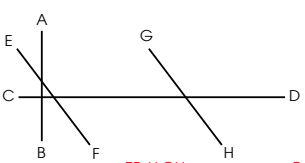


PRACTICE

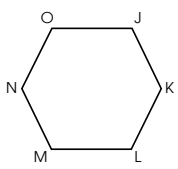
1. Which letters have parallel lines? H, Z, F, N

V H X Y Z
K L F N O

2. Which pairs of lines are parallel?



EF // GH



OJ // ML, JK // NM, KL // ON

Complete Workbook 3B, Worksheet 3 • Pages 113 – 114

Textbook 3 P257

Like in Let's Learn 3, Let's Learn 4 requires pupils to use visualisation to tell if the lines are parallel or not.

PRACTICE

Work on the practice questions with pupils.

Check that pupils do not confuse perpendicular lines with parallel lines. When pupils share their answer, get them to elaborate rather than respond with 'yes' or 'no'.

For better understanding, select items from **Worksheet 3** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 3B P113 – 114).

Answers Worksheet 3 (Workbook 3B P113 – 114)

1. (a) Yes
   (b) No
   (c) Yes
   (d) No
   (e) No
   (f) Yes

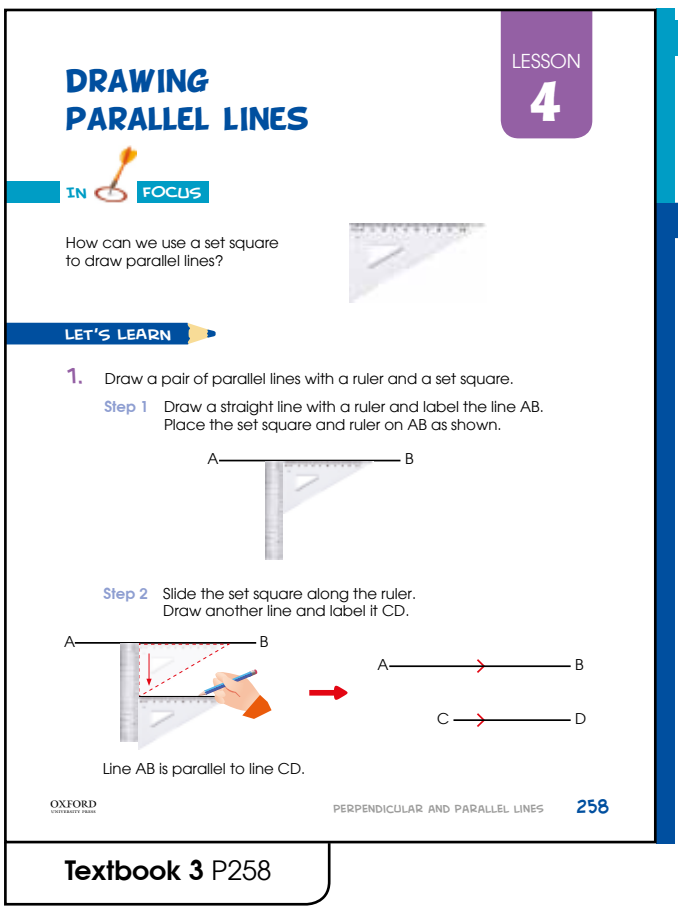
2. (a) AB // CD, EF // GH
   (b) OP // QR, UV // YZ
   (c) UV // YX, UZ // WX
   (d) OP // SR, OT // QR, PQ // TS

LESSON
4

DRAWING PARALLEL LINES

LEARNING OBJECTIVES

1. Draw parallel lines using a ruler and a set square.
2. Draw parallel lines on square grids.



DRAWING PARALLEL LINES

LESSON 4

IN FOCUS

How can we use a set square to draw parallel lines?

LET'S LEARN

1. Draw a pair of parallel lines with a ruler and a set square.

Step 1 Draw a straight line with a ruler and label the line AB. Place the set square and ruler on AB as shown.

Step 2 Slide the set square along the ruler. Draw another line and label it CD.

Line AB is parallel to line CD.

Textbook 3 P258

IN FOCUS

Allow pupils to work in pairs to explore how they can use the set square and ruler to draw parallel lines.

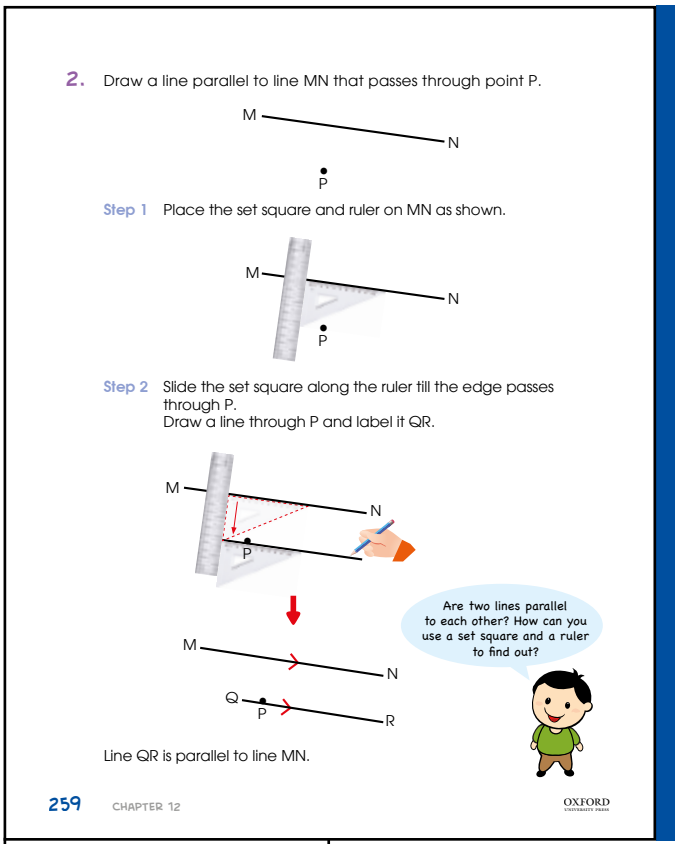
LET'S LEARN

Using the visualiser, demonstrate the steps in drawing a pair of parallel lines using a ruler and a set square. After which, allow pupils to work in pairs to do the construction.

Pupils may have difficulty manipulating the ruler and the set square. In this case, suggest for one pupil to hold the ruler in position while the other slides the set square and draws the line.

Remind pupils to draw arrow heads to indicate parallel lines.

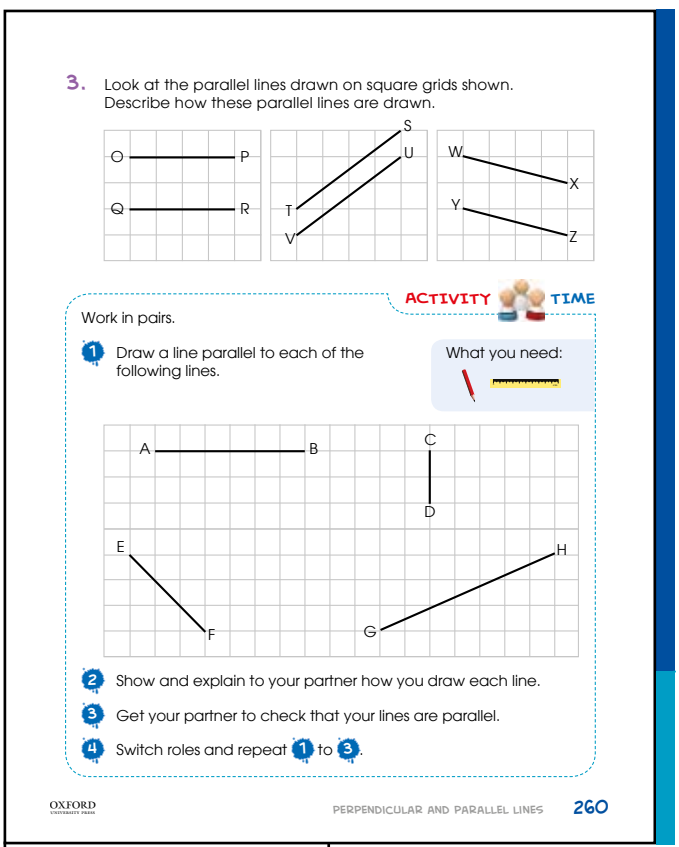
Ensure that pupils take turns to practice.



Textbook 3 P259

Draw pupils' attention to the difference between this task and Let's Learn 1. The task here is to draw a line that is parallel to the given line and passes through the given point.

Demonstrate these steps first, then get pupils to work in pairs. Likewise, ensure that pupils take turns to practice.



Textbook 3 P260

In Let's Learn 3, let pupils examine how a parallel line can be drawn on a square grid without the aid of a set square.

For each diagram, draw pupils' attention to:

(a) OP // QR: Note the end points of OP. Point P is 2 units from point R. Point O is also 2 units from point Q.

(b) VU // TS: Point S is 1 unit from point U along the same grid line. Likewise, point T is 1 unit from point V along the same grid line.

(c) YZ // WX: Count the number of units point W is from point Y along the same gridline. Do the same with points X and Z.

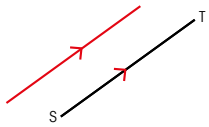
Demonstrate the drawing of the above parallel lines on square grids. Emphasise the drawing of arrow heads to indicate parallel lines.

ACTIVITY TIME

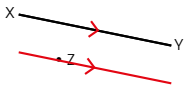
Based on the exploration in Let's Learn 3, let pupils work in pairs to have hands-on experience in the visualisations and drawing the images on the square grids.

PRACTICE

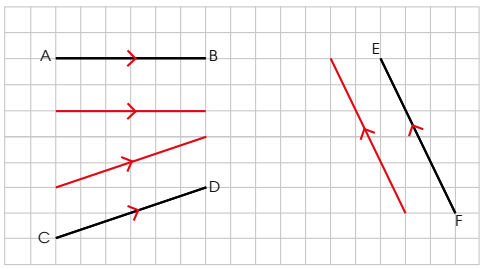
1. Use a set square and a ruler to draw a line parallel to line ST.



2. Use a set square and a ruler to draw a line parallel to line XY that passes through point Z.



3. Draw a line parallel to each of the following lines.



Complete Workbook 3B, Worksheet 4 • Pages 115 – 118

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Textbook 3 P261

PRACTICE

Allow pupils to work on the questions individually. Move around the class to monitor individual pupils' understanding.

For better understanding, select items from **Worksheet 4** and work these out with the pupils.

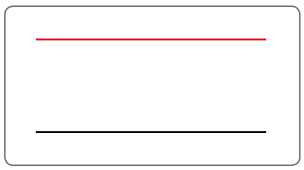
Independent seatwork

Assign pupils to complete Worksheet 4 (Workbook 3B P115 – 118).

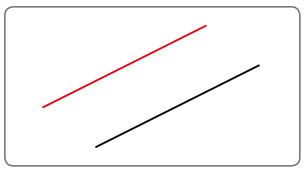
Answers Worksheet 4 (Workbook 3B P115 – 118)

1. (a) ✗
   (b) ✓
   (c) ✗
   (d) ✓
   (e) ✓
   (f) ✗

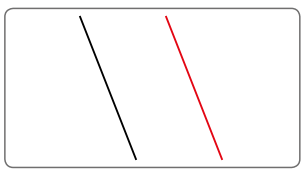
2. (a)



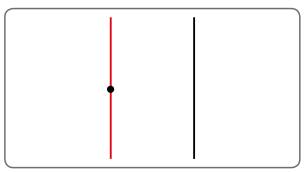
   (b)



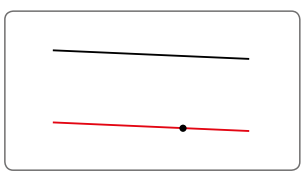
   (c)



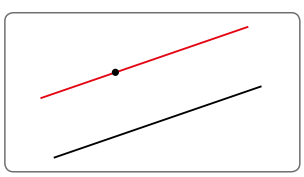
3. (a)



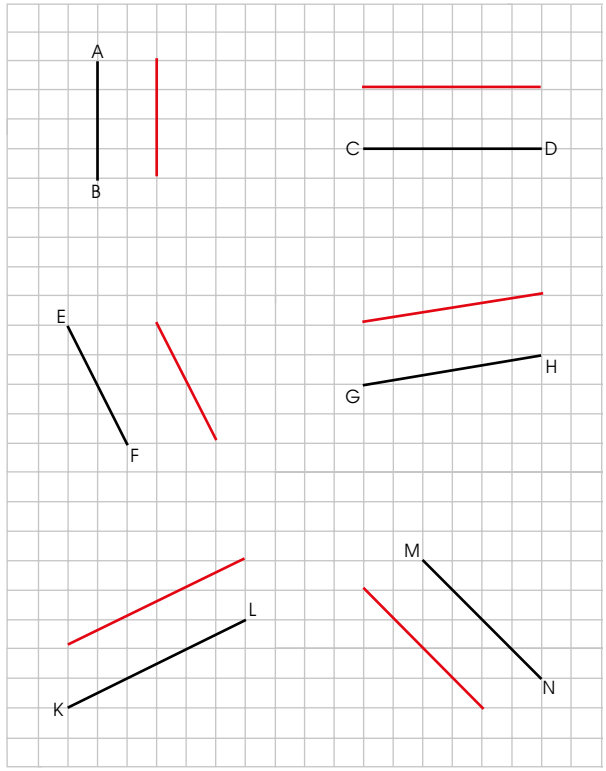
   (b)



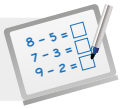
   (c)



4.



LESSON PLAN



Specific Learning Focus

- Identify and name perpendicular lines.
- Draw parallel lines using a ruler and a set square.
- Draw parallel lines on square grids.

Suggested Duration

Lesson 3: 2 periods
Lesson 4: 3 periods

Prior Learning

Pupils might not be familiar with parallel lines. Lead them to see that parallel lines can be found in their daily lives, such as parallel lines on the road, buildings parallel to each other, parallel lines on bar code, etc.

Pre-emptive Pitfalls

A clear distinction should be made between perpendicular and parallel lines. Emphasise that parallel lines are two straight lines that never meet, regardless of how long they are. Get pupils to practise using set squares on newspaper to overcome the difficulties they may face in handling the ruler and set square.

Introduction

Introduce parallel lines by pointing out real-life examples such as the legs of the table and the edges of the room being parallel to each other. Go through the pictures on ‘In Focus’ and ask the pupils to describe the lines.

Problem Solving

Introduce to pupils the symbol // that represents parallel lines. While constructing parallel lines explain the reasons for each step. The ruler keeps the two set squares aligned and since they both form 90° at the edges, the lines drawn are definitely parallel. In Let’s Learn 3 (Textbook 3 P260), draw pupils’ attention to the fact that the gap between the two parallel lines always remains the same.

Activities

Get pupils to pair up and make simple drawings of objects around the room and mark out the parallel lines with a coloured pen.

Resources

- set square
- square grid paper (Activity Handbook 3 P43)
- ruler
- pencil
- markers

Mathematical Communication Support

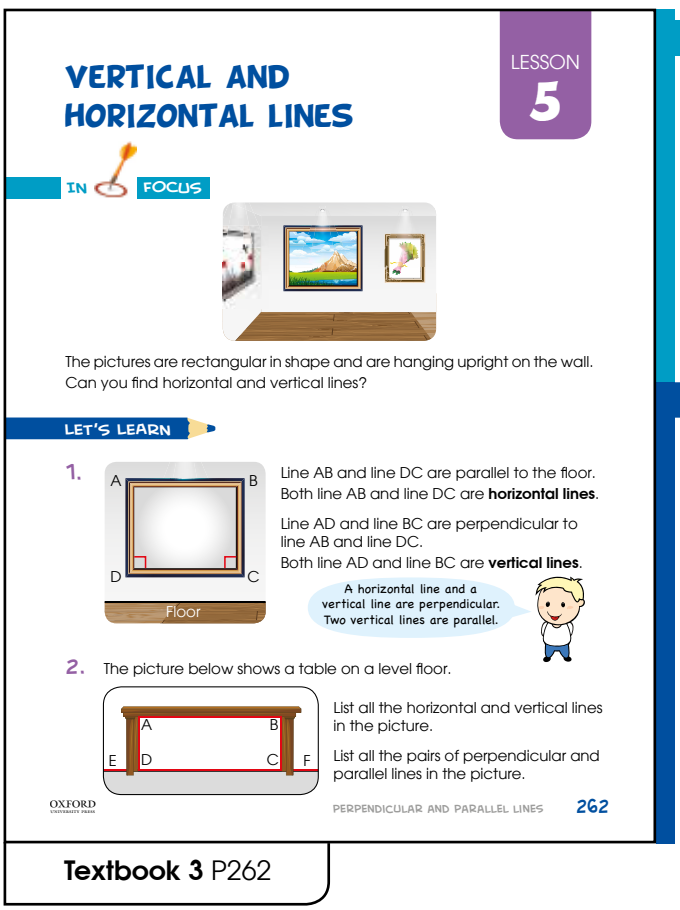
Encourage class discussions. Ask pupils the following questions: ‘Why do you think the given lines are parallel? If we extend the lines will they ever meet? In Let’s Learn 2 (Textbook 3 P256), why will ST and UV meet if we extend the lines?’ Give individual attention to each pair while doing the construction. Explain the reason for the placement of the set squares and ruler.

LESSON 5

VERTICAL AND HORIZONTAL LINES

LEARNING OBJECTIVE

1. Identify vertical and horizontal lines.



VERTICAL AND HORIZONTAL LINES

LESSON 5

IN FOCUS

The pictures are rectangular in shape and are hanging upright on the wall.
Can you find horizontal and vertical lines?

LET'S LEARN

1. Line AB and line DC are parallel to the floor.
Both line AB and line DC are **horizontal lines**.

Line AD and line BC are perpendicular to line AB and line DC.
Both line AD and line BC are **vertical lines**.

A horizontal line and a vertical line are perpendicular. Two vertical lines are parallel.

2. The picture below shows a table on a level floor.

List all the horizontal and vertical lines in the picture.

List all the pairs of perpendicular and parallel lines in the picture.

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Textbook 3 P262

IN FOCUS

Ask pupils if the picture frames in the picture are hung properly. Get them to explain their answers. Some pupils may respond with answers such as 'Yes, because they are straight on the wall' or 'Yes, the frames are not slanted'. Such answers are acceptable as they convey a sense of the wall or pictures being vertical.

Clarify with pupils that the frames are indeed hanging upright because the wall is vertical and the floor is horizontal. Write the two new terms **vertical** and **horizontal** and introduce these terms to pupils.

LET'S LEARN

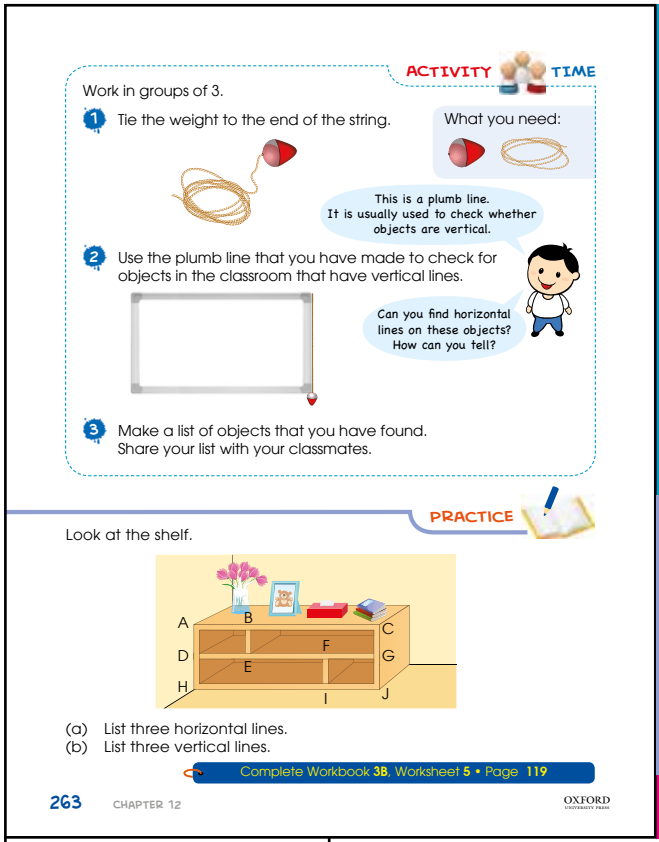
Show the picture of the photo frame on the visualiser and label the corners, A, B, C and D. Draw over the parallel lines AB and DC, then introduce them as **horizontal lines**. Do the same for the **vertical lines**, AD and BC.

Ask pupils to talk about the vertical line BC and the horizontal line CD. Likewise, get them to talk about the vertical line AD and horizontal line DC. Lead them to see that a horizontal and a vertical line are perpendicular.

Similarly lead pupils to see that the vertical lines are parallel. Extend to ask them for the reason (because both lines are perpendicular to DC).

Emphasise that the table is upright and stands on a level floor, so the legs of the table are vertical.

Call for individual answers and write the pupils' answers under four headings: horizontal lines, vertical lines, perpendicular lines and parallel lines. After that, ask pupils to compare the sets and make an association between horizontal/vertical lines with perpendicular/ parallel lines.



ACTIVITY TIME

Work in groups of 3.

1. Tie the weight to the end of the string.

What you need:

This is a plumb line. It is usually used to check whether objects are vertical.

2. Use the plumb line that you have made to check for objects in the classroom that have vertical lines.

Can you find horizontal lines on these objects? How can you tell?

3. Make a list of objects that you have found. Share your list with your classmates.

PRACTICE

Look at the shelf.

A B C D E F G H I J

(a) List three horizontal lines.
(b) List three vertical lines.

Complete Workbook 3B, Worksheet 5 • Page 119

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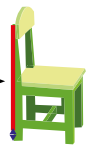
Textbook 3 P263

ACTIVITY TIME

Assign pupils to work in groups of 3.

Before pupils begin the activity, show them how to make a plumb line. Demonstrate the use of a plumb line to check whether objects are vertical e.g. upright chair versus a chair that is tilted.

Plumb line → 	Plumb line → 
The chair is vertical	The chair is not vertical

PRACTICE

Work on the questions with pupils.

For better understanding, select items from **Worksheet 5** and work these out with the pupils.

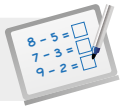
Independent seatwork

Assign pupils to complete Worksheet 5 (Workbook 3B P119).

Answers Worksheet 5 (Workbook 3B P119)

1. (a) AD, BC
   (b) AB, DC
   (c) AD // BC, AB // DC
   (d) AD ⊥ AB, AB ⊥ BC, BC ⊥ CD, CD ⊥ AD

LESSON PLAN



Specific Learning Focus

- Identify vertical and horizontal lines.

Suggested Duration

2 periods

Prior Learning

Pupils should be well-versed with straight lines, curves, parallel and perpendicular lines. This lesson is an extension of Lesson 4.

Pre-emptive Pitfalls

The concept of vertical and horizontal lines should not be difficult for pupils. Key terms are primarily introduced in this chapter.

Introduction

Have pupils identify vertical and horizontal lines around the classroom. Explain that a vertical and a horizontal line will meet at 90° (perpendicular) to each other. Similarly, two vertical lines will be parallel, and two horizontal lines will be parallel. Let's Learn 2 (Textbook 3 P262) should be done as a class activity where class discussion is involved. Encourage individual responses. Ask them to correlate vertical and horizontal lines to parallel and perpendicular lines.

Problem Solving

Make different types of polygons (e.g. rhombus, pentagon, heptagon) on a square grid paper and ask pupils to identify vertical, horizontal, perpendicular and parallel lines.

Activities

Teach pupils to make a plumb line and explain that the weight keeps the rope vertical and is a good tool to see if the object has vertical lines.

Resources

- string
- weight
- markers
- square grid paper (Activity Handbook 3 P43)

Mathematical Communication Support

Ask pupils to identify vertical, horizontal, perpendicular and parallel lines and give reasons for their identification. For example, two lines are vertical as the gap between them is always the same and they will never meet regardless of how long they are, and hence are parallel to each other. A vertical and horizontal line will meet and are perpendicular to each other as a right angle is formed at the point where they meet.

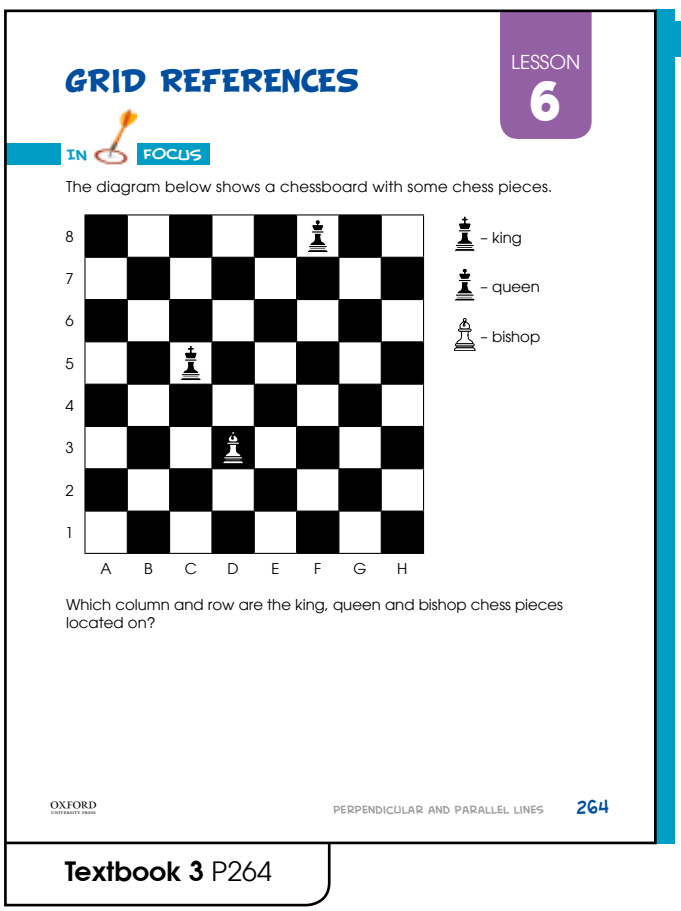
LESSON

6

GRID REFERENCES

LEARNING OBJECTIVE

1. Read grid references.
2. Describe the position of an object using a grid reference.



GRID REFERENCES

LESSON 6

IN FOCUS

The diagram below shows a chessboard with some chess pieces.

8 7 6 5 4 3 2 1

A B C D E F G H

– king

– queen

– bishop

Which column and row are the king, queen and bishop chess pieces located on?

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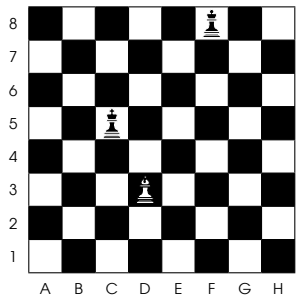
Textbook 3 P264

IN FOCUS

Ask pupils to look at the chessboard, and the numbers and alphabets labelled at the two sides of the chessboard. Ask pupils to identify the squares where the king and queen chess pieces are located on respectively. Ask for suggestions to identify the column and row the king and queen chess pieces are located on respectively.

LET'S LEARN

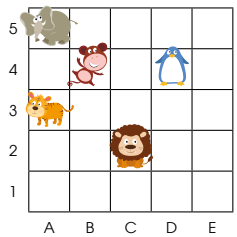
1. Horizontal lines form the **rows**.
Vertical lines form the **columns**.
When we give the position of an object with the help of columns and rows, it is called a **grid reference**.



The king is located at column C, row 5.

The queen is located at column F, row 8.

2.



The tiger is located at column A, row 3.

The monkey is located at column B, row 4.

The lion is located at column C, row 2.

The elephant is located at A5.

The penguin is located at D4.

Textbook 3 P265

LET'S LEARN

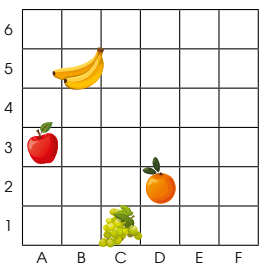
Introduce the terms **rows** and **columns** to the pupils. Explain to them that a grid reference consists of rows and columns, where each row and column are labelled, and therefore the position of an object can be described using a grid reference.

Guide them to place a ruler along the column that the king chess piece is located on, and use a highlighter to highlight the column to identify the column the chess piece is located on. They should be able to see that it is located on column F. Then, guide them to place the ruler along the row that the king chess piece is located on, and use a highlighter to highlight the row to identify the row the chess piece is located on. Lead them to see that the row the chess piece is located on is row 8.

In Let's Learn 2, get the pupils to locate the animals on the grid reference using a ruler and highlighter. Lead them to identify the correct row and column.

PRACTICE

Look at the following grid and answer the questions below.



The grapes are located at column C, row 1.

(a) The apple is located at column A and row 3.

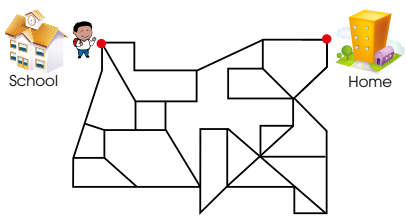
(b) The bananas are located at B5.

(c) The orange is located at column 4, row 2.

Complete Workbook 3B, Worksheet 6 • Pages 120 – 121

MIND WORKOUT

Bala is on his way home from school.
He can only turn left or right through perpendicular lines to get home.
Can you help Bala find his way home?



Textbook 3 P266

PRACTICE

Check the pupils' understanding by asking if they know what a column and a row are. If possible, get another pupil to verify the answer.

For better understanding, select items from **Worksheet 6** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 6 (Workbook 3B P120 − 121).

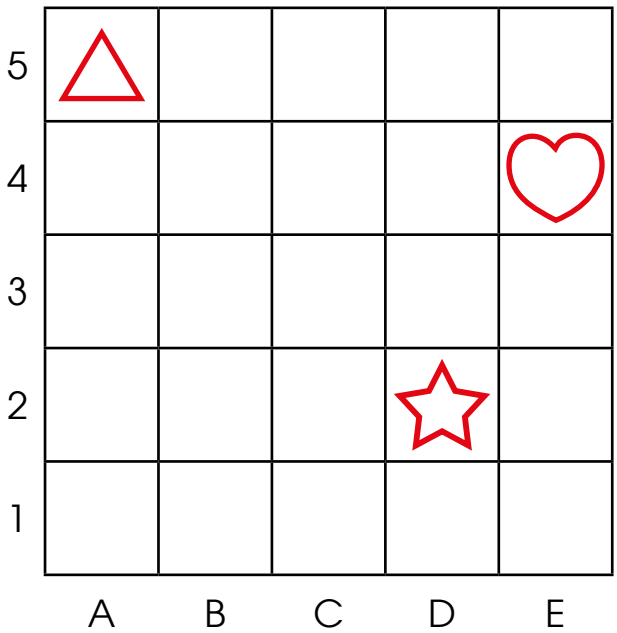
Answers Worksheet 6 (Workbook 3B P120 – 121)

1. (a)

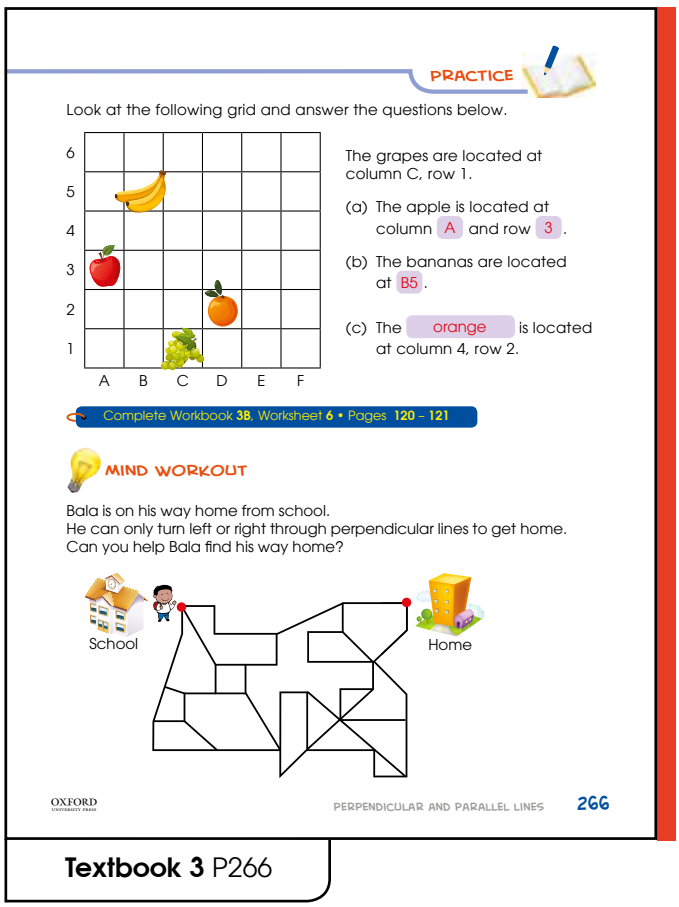
Child	column	row
Bina 	A	2
Ahmad 	B	6
Xinyi 	C	7
Sam 	D	4

Child	column	row
Meiling 	E	1
Kate 	F	7
Bala 	F	4
Ann 	G	3

2.



PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



PRACTICE

Look at the following grid and answer the questions below.

The grapes are located at column C, row 1.

(a) The apple is located at column A and row 3.

(b) The bananas are located at B5.

(c) The orange is located at column 4, row 2.

Complete Workbook 3B, Worksheet 6 • Pages 120 – 121

MIND WORKOUT

Bala is on his way home from school.
He can only turn left or right through perpendicular lines to get home.
Can you help Bala find his way home?

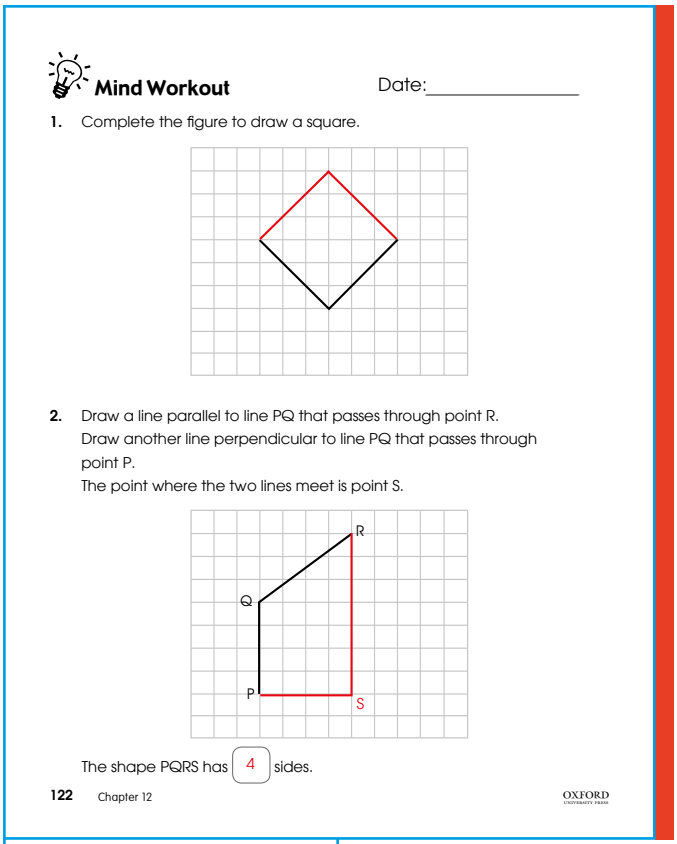
OXFORD

PERPENDICULAR AND PARALLEL LINES 266

Textbook 3 P266

MIND WORKOUT

Alert pupils to the condition of how Bala should move along the map.



Mind Workout Date:_____

1. Complete the figure to draw a square.

2. Draw a line parallel to line PQ that passes through point R.
Draw another line perpendicular to line PQ that passes through point P.
The point where the two lines meet is point S.

The shape PQRS has 4 sides.

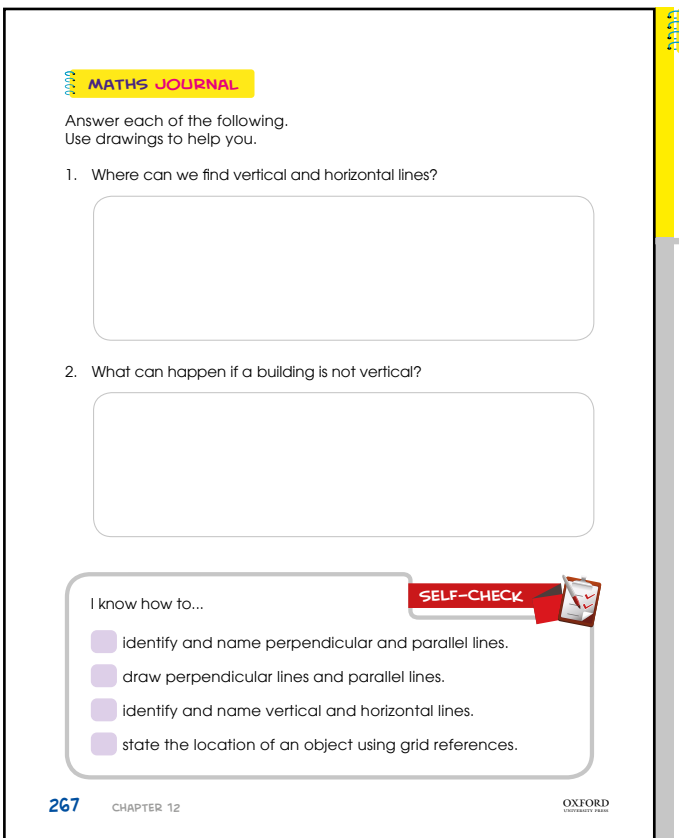
122 Chapter 12 OXFORD

Workbook 3B P122

Mind Workout

1. Ask pupils to visualise the shape of a square using the two given sides. (Hint: Look at how the side cuts the square grids.)

2. Pupils would not have difficulty if they use the lines of the square grid as a guide.



MATHS JOURNAL

Answer each of the following.
Use drawings to help you.

1. Where can we find vertical and horizontal lines?

2. What can happen if a building is not vertical?

I know how to... SELF-CHECK

- identify and name perpendicular and parallel lines.
- draw perpendicular lines and parallel lines.
- identify and name vertical and horizontal lines.
- state the location of an object using grid references.

267 CHAPTER 12 OXFORD

Textbook 3 P267

MATHS JOURNAL

This is an open-ended task. Accept all reasonable responses that are logical to a Grade 3 pupil.

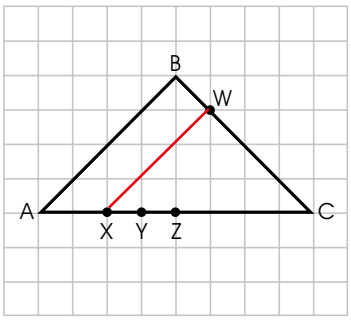
SELF-CHECK

Before the pupils do the self-check, review the important concepts once more by asking for examples learnt for each objective.

This self-check can be done after pupils have completed **Review 12** (Workbook 3B P123 – 124) as consolidation of understanding for the chapter.

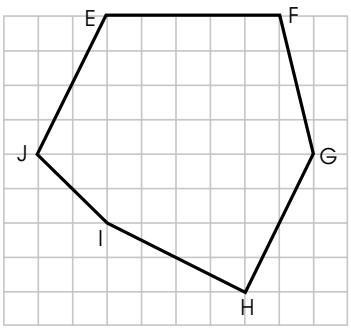
Answers Review 12 (Workbook 3B P123 – 124)

1.



AB // XW

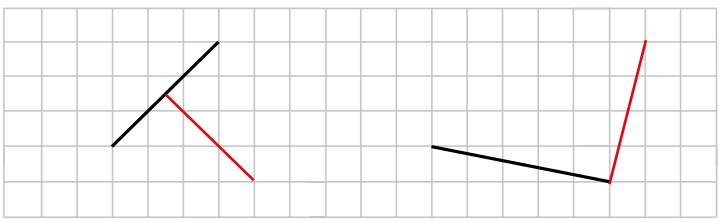
2.



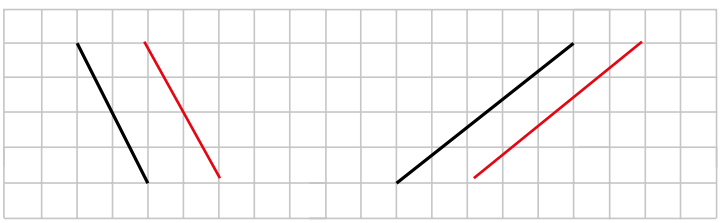
EJ // GH

IH ⊥ HG

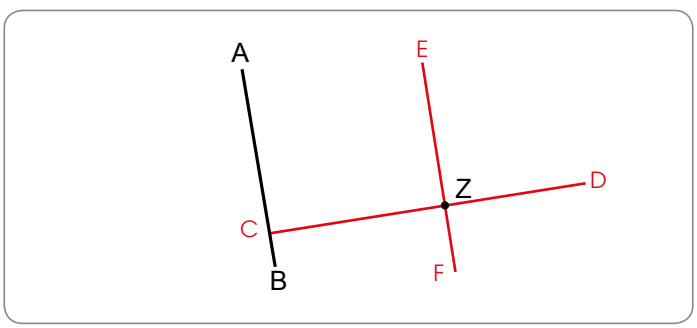
3.



4.



5. (a)
(b)



AREA AND PERIMETER

CHAPTER 13

Textbook 3 P268

Related Resources
NSPM Textbook 3 (P268 – 293)
NSPM Workbook 3B (P125 – 148)

Materials
String, square tiles, scissors, square grid paper, coloured tape, metre ruler

Lesson

Lesson 1	Perimeter
Lesson 2	Area in Square Units
Lesson 3	Area in cm^2 and m^2
Lesson 4	More On Area and Perimeter

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

Pupils are introduced to the concepts of area and perimeter of a plane figure. To help them make sense of these concepts, teachers could provide real-life examples in their explanation. Pupils also could work together to make different rectangles and investigate the relationship between the breadth, length and area of a rectangle.

LESSON 1

PERIMETER

LEARNING OBJECTIVE

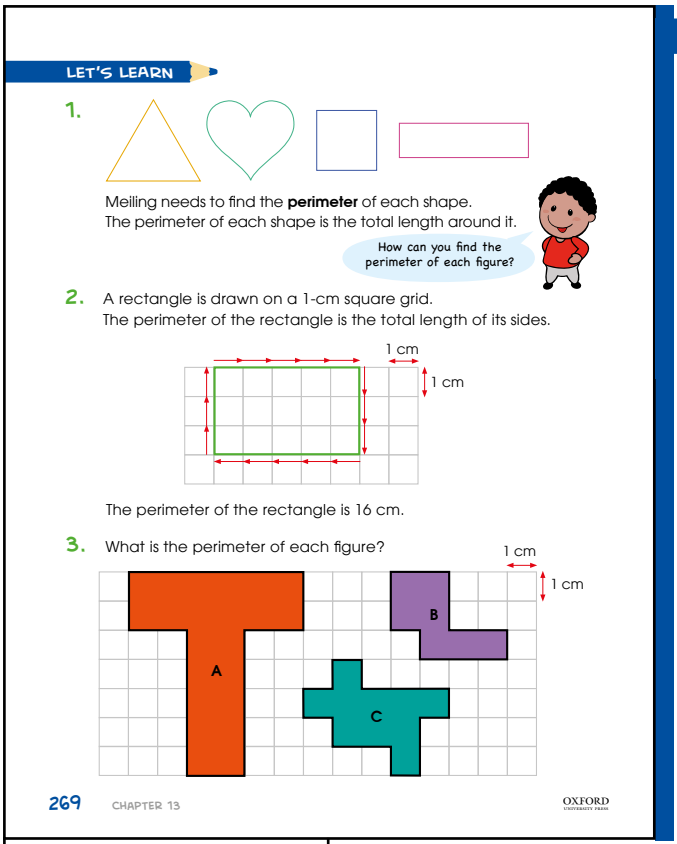
1. Find the perimeter of a plane figure.

Textbook 3 P268

IN FOCUS

Discuss the answer to the question in the chapter opener. Ask pupils what they will do to find the length of yarn needed for each shape. For shapes with straight lines, pupils mention using a ruler to measure the lengths of all the sides and add them up. For shapes with curves, pupils can mention using the yarn to go around the shape, then measuring the length of the yarn.

Elicit words such as ‘go around’, ‘add up’ or ‘all the sides’.



Textbook 3 P269

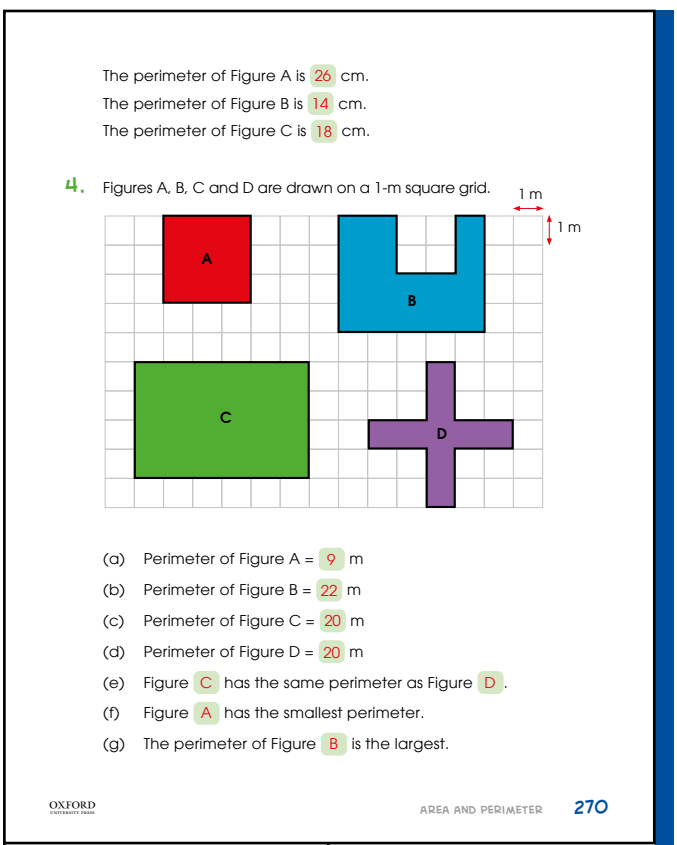
LET'S LEARN

Introduce the word perimeter and tell pupils that it means the length around a shape.

Pupils can be asked to find the perimeter of the shapes in Let's Learn 1 using some string and a ruler.

Demonstrate how the perimeter of each figure is found.

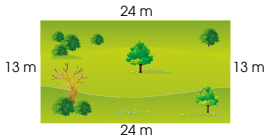
A common error is that pupils miss out some lengths in the calculation of the perimeter. Demonstrate how a marking can be made at the starting point, so that pupils will not forget where they started adding from. Another strategy would be to highlight the sides that have already been added up.

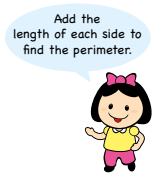


Textbook 3 P270

Highlight to pupils that the units of a square grid may not always be in centimetres and that it is important to take note of the units.

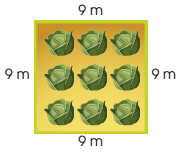
Reinforce the practice of making markings or highlighting the sides when calculating the perimeter of the figures.

5. 



24 + 13 + 24 + 13 = 74

The perimeter of the field is 74 m.

6. 

9 + 9 + 9 + 9 = 36

9 × 4 = 36

The perimeter of the vegetable plot is 36 m.

7. 

15 + 12 + 8 + 10 = 45

The perimeter of the flower bed is 45 m.

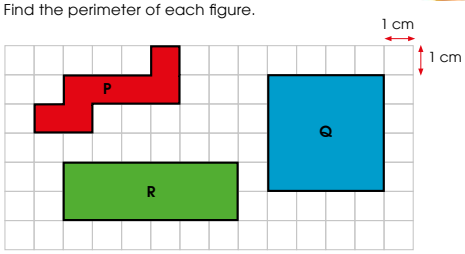
271 CHAPTER 13 OXFORD

Textbook 3 P271

As these examples require the addition of more than two numbers, remind pupils to do their working in multiple steps to avoid careless mistakes. Demonstrate how they can find the perimeter by adding two numbers a time, and tick numbers that have already been added along the way.

PRACTICE

1. Find the perimeter of each figure.

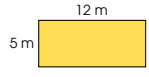


(a) Perimeter of Figure P = 16 cm

(b) Perimeter of Figure Q = 16 cm

(c) Perimeter of Figure R = 16 cm

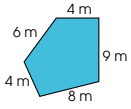
2. Find the perimeter of each figure.

(a) 

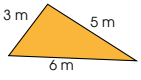
34 m

(b) 

24 m

(c) 

31 m

(d) 

14 m

Complete Workbook 3B, Worksheet 1 • Pages 125 – 128

OXFORD AREA AND PERIMETER 272

Textbook 3 P272

PRACTICE

Work on the practice questions with pupils.

For better understanding, select items from **Worksheet 1** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 3B P125 – 128).

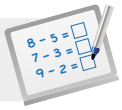
Answers Worksheet 1 (Workbook 3B P125 – 128)

1. (a) 22
   (b) 16
   (c) 6
   (d) 12

2. (a) 16
   (b) 16
   (c) 20
   (d) 22

3. (a) 10
   (b) 24
   (c) 35
   (d) 41
   (e) 62

LESSON PLAN



Specific Learning Focus

- Find the perimeter of a plane figure.

Suggested Duration

2 periods

Prior Learning

Pupils have learnt about two-dimensional figures and their dimensions. The concept of area and perimeter is introduced in this chapter.

Pre-emptive Pitfalls

This lesson requires spatial visualisation and the concept of space and its dimensions. This might be challenging for most pupils.

Introduction

Use words like ‘add up’, ‘go around’, ‘sum of the lengths of all the sides’ when introducing perimeter to pupils formally. ‘In Focus’ (Textbook 3 P268) helps pupils to distinguish between curved lines and straight vertical or horizontal lines, and the correct and practical usage of the ruler and string. Once perimeter has been formally introduced, have pupils work in pairs to calculate the perimeter of shapes around the classroom. Make pupils mark out the starting point so that they do not over count or under count the lengths as they tend to either miss out some lengths or add the same length more than once. Lead pupils to recognise that the unit of measurement of perimeter is ‘metres’ or ‘centimetres’ depending on the units of the square grid.

Problem Solving

Since the perimeter of a shape is the total length around it, lots of shapes can be given to pupils to practise finding the perimeter. The correct unit of measurement should be pointed out.

Activities

Since this is a hands-on chapter, give pupils lots of practice in finding the perimeter of shapes around the classroom and in worksheets.

Resources

- string
- ruler

Mathematical Communication Support

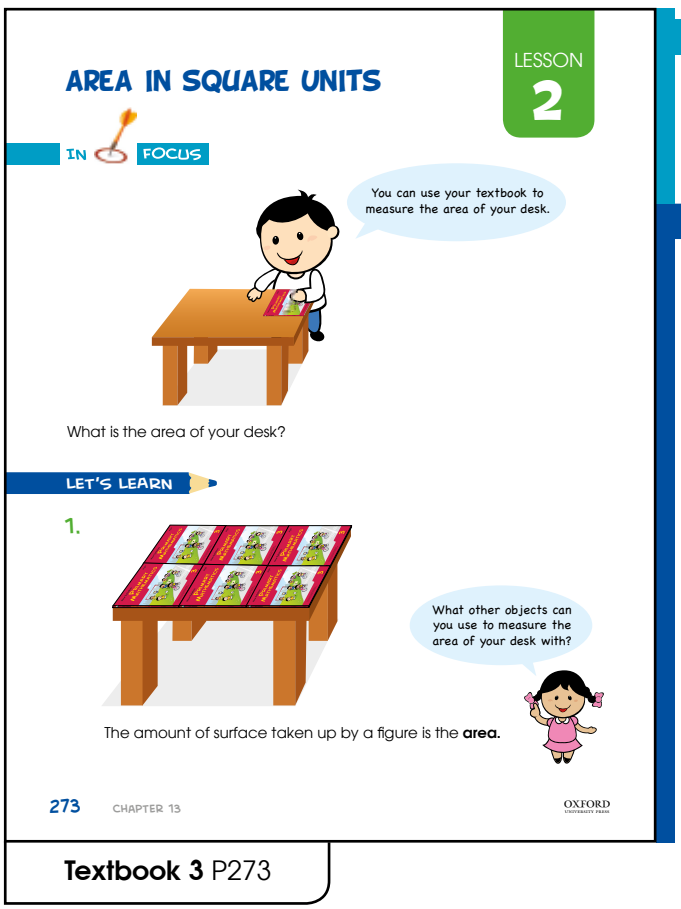
Give individual attention to the groups. Ask them for the starting point while calculating the perimeter and adding up the lengths of all the sides. Ask if the shapes have curved or straight lines and if they will use a string or ruler to measure the perimeter.

LESSON 2

AREA IN SQUARE UNITS

LEARNING OBJECTIVE

1. Measure the area of a plane figure in square units.



Textbook 3 P273

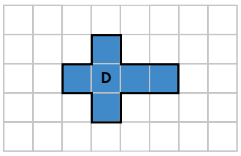
IN FOCUS

Get pupils to use the same textbooks to cover one desk and ask pupils how many textbooks are needed.

LET'S LEARN

Introduce the word **area** to mean the amount of surface taken up by a figure.

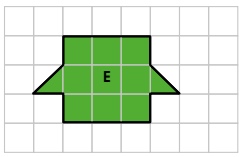
2.

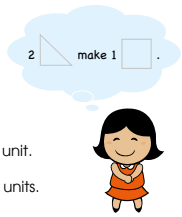


Each ☐ is 1 square unit.

Figure D covers a surface of 6 square units.
The area of Figure D is 6 square units.

3.





Each ◺ is $\frac{1}{2}$ square unit or half a square unit.

There are 9 square units and 2 half square units.

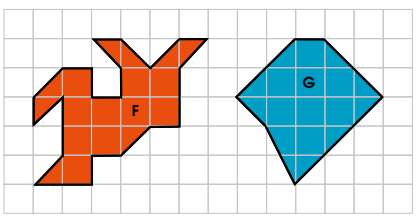
The area of Figure E is 10 square units.

Textbook 3 P274

Demonstrate how the area of the figure in Let's Learn 2 can be obtained by ticking each square as it is counted.

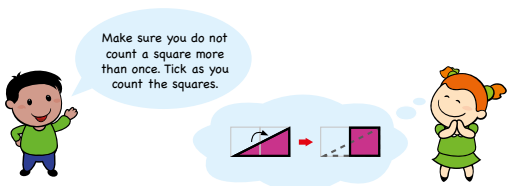
Use tiles to show that 2 triangles make up 1 square. Demonstrate how to obtain the area of the figure in Let's Learn 3 by ticking each square as it is counted.

4.

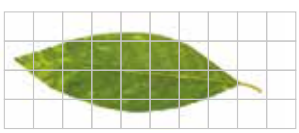


(a) Figure F has 10 square units and 8 half square units.
It has an area of 14 square units.

*(b) Figure G has an area of 13 square units.



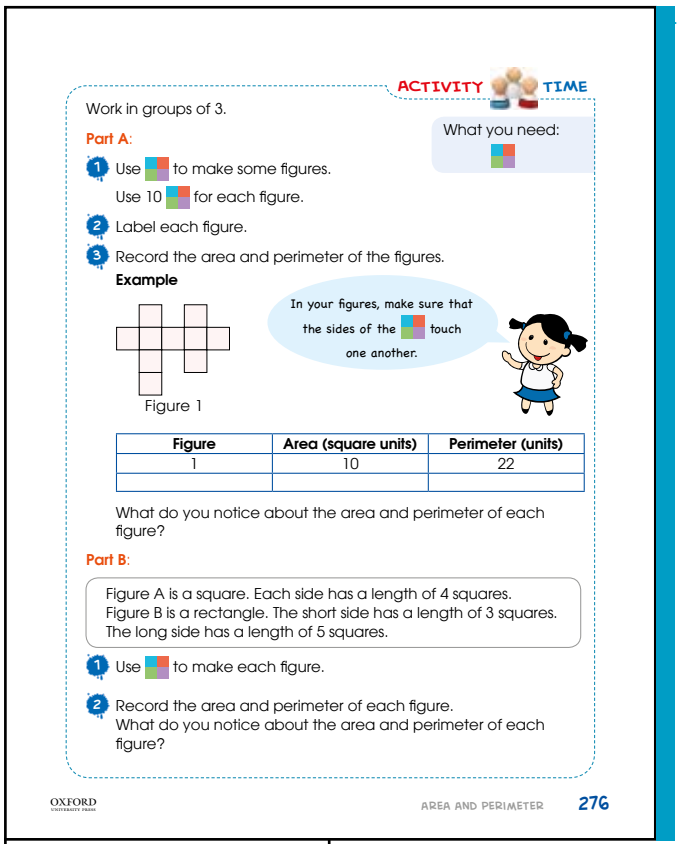
5. What is the area of the leaf?



The area of the leaf is about 13 square units.

Textbook 3 P275

Let pupils work on their own to solve Let's Learn 4 and 5. Get pupils to explain how they obtain their answers. Remind pupils to tick each square as it is counted.



ACTIVITY TIME

Work in groups of 3.

What you need:

Part A:

1. Use to make some figures.
   Use 10 for each figure.
2. Label each figure.
3. Record the area and perimeter of the figures.

Example

Figure 1

In your figures, make sure that the sides of the touch one another.

Figure	Area (square units)	Perimeter (units)
1	10	22

What do you notice about the area and perimeter of each figure?

Part B:

Figure A is a square. Each side has a length of 4 squares.
Figure B is a rectangle. The short side has a length of 3 squares.
The long side has a length of 5 squares.

1. Use to make each figure.
2. Record the area and perimeter of each figure.
   What do you notice about the area and perimeter of each figure?

OXFORD UNIVERSITY PRESS AREA AND PERIMETER 276

Textbook 3 P276

ACTIVITY TIME

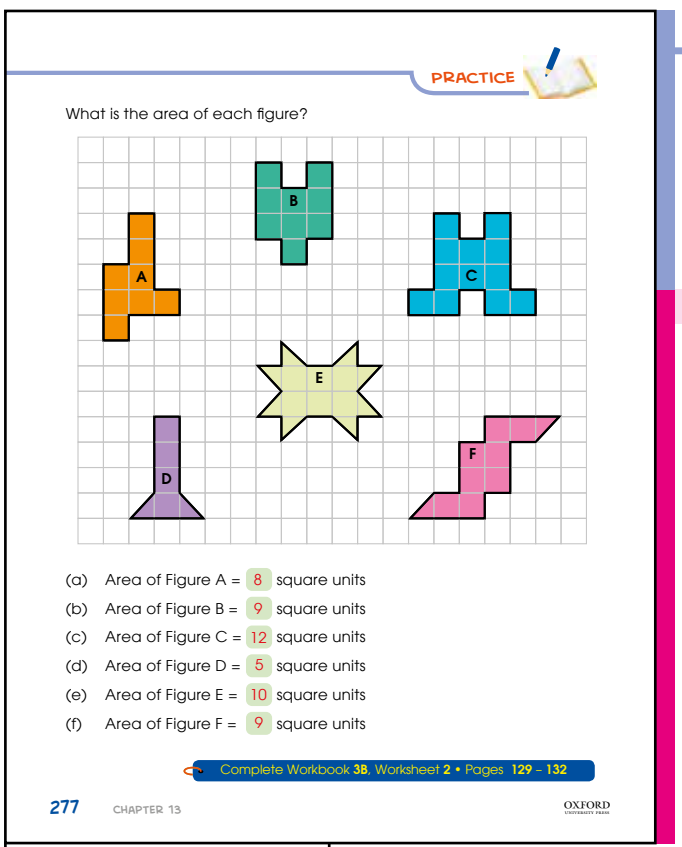
Assign pupils to work in groups of 3.

For part A, distribute the materials to pupils and demonstrate to pupils how the figures can be made. Remind pupils that the sides of the tiles must touch one another.

For part B, pupils use the tiles to create the figures described.

Allow pupils time to discuss their observations for part A and part B.

Pupils are to recognise that figures can have the same area, but need not have the same perimeter. From part B, they will realise that it is possible for a square to have the same perimeter and same area. A square and a rectangle can also have the same perimeter, but may not have the same area.



PRACTICE

What is the area of each figure?

(a) Area of Figure A = 8 square units
(b) Area of Figure B = 9 square units
(c) Area of Figure C = 12 square units
(d) Area of Figure D = 5 square units
(e) Area of Figure E = 10 square units
(f) Area of Figure F = 9 square units

Complete Workbook 3B, Worksheet 2 • Pages 129 – 132

277 CHAPTER 13 OXFORD UNIVERSITY PRESS

Textbook 3 P277

PRACTICE

Work on the practice questions with pupils.

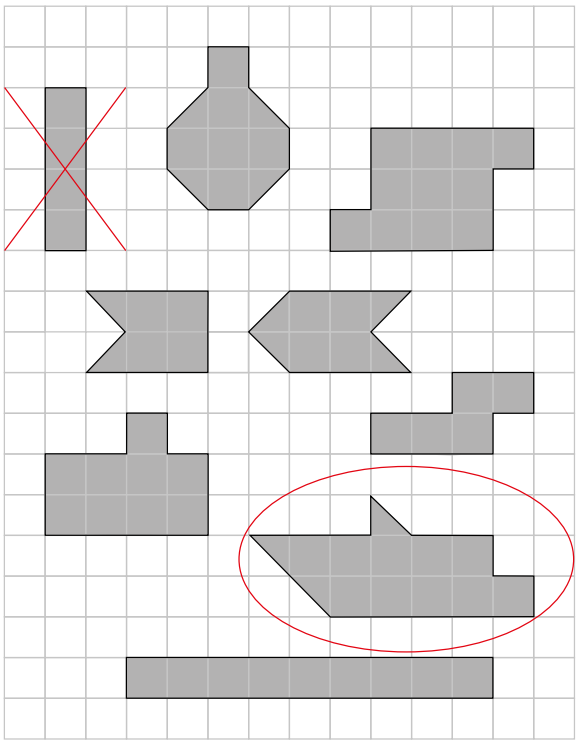
For better understanding, select items from **Worksheet 2** and work these out with the pupils.

Independent seatwork

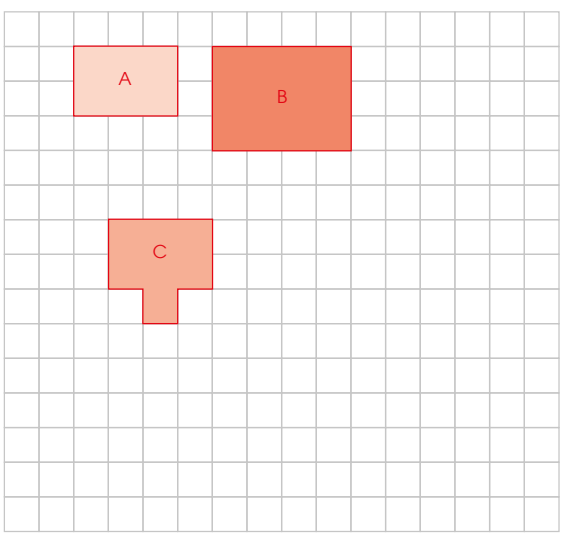
Assign pupils to complete Worksheet 2 (Workbook 3B P129 – 132).

Answers Worksheet 2 (Workbook 3B P129 – 132)

1. (a) 7
   (b) 12
   (c) 9
   (d) 10

2. 

3. (a) 24
   (b) 19
   (c) 7
   *(d) 7
   (e) A

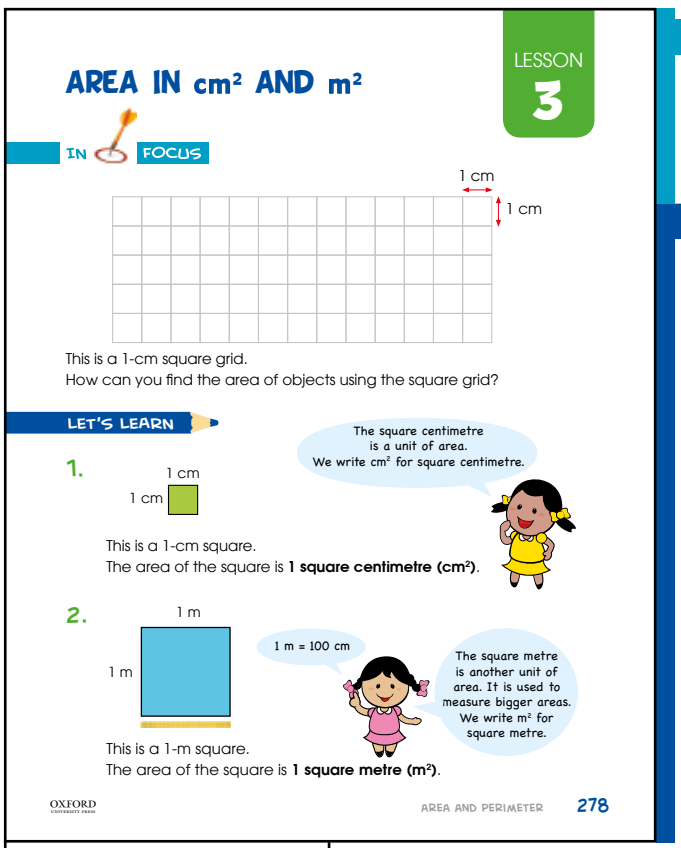
4. 

LESSON 3

AREA IN cm^2 AND m^2

LEARNING OBJECTIVE

1. Measure the area of a plane figure in cm^2 and m^2.



Textbook 3 P278

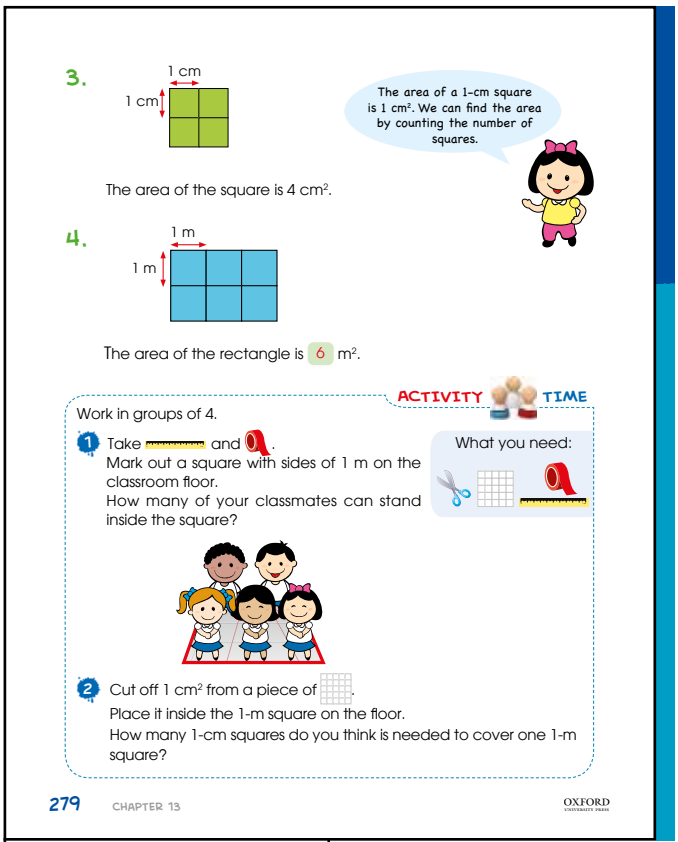
IN FOCUS

Discuss with pupils the possible answers to the question posed.

LET'S LEARN

Introduce the units cm^2 and m^2 to pupils.

Draw a 1-cm square and a 1-m square on the whiteboard so pupils can compare and get a sense of the size of 1 cm^2 and 1 m^2.



Textbook 3 P279

Show pupils how to find the area of the square in Let's Learn 3 by counting the small squares.

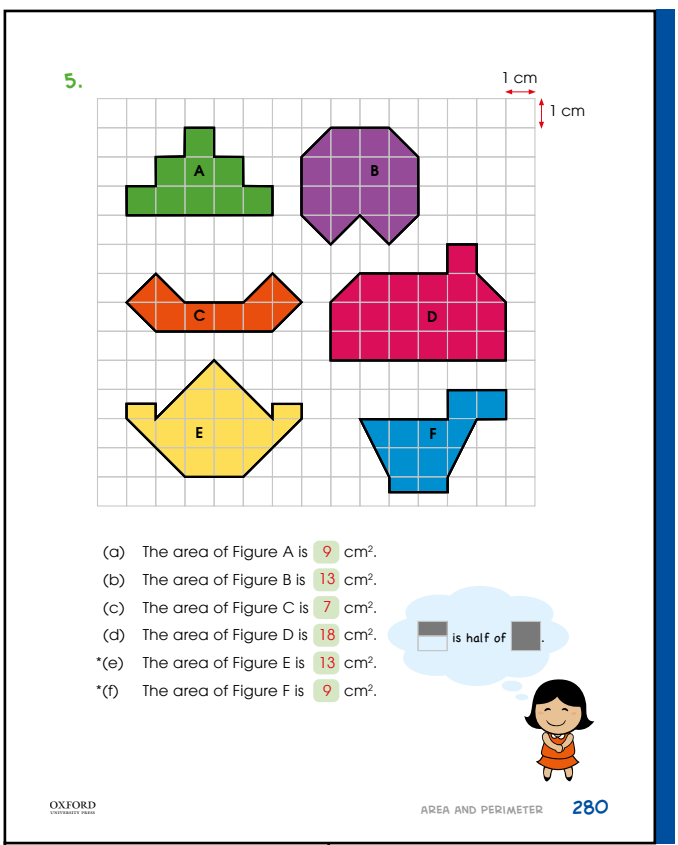
Let pupils try finding the area of the rectangle in Let's Learn 4. Get pupils to explain how they arrive at their answer.

ACTIVITY TIME

Assign pupils to work in groups of 4.

Pupils are to estimate how many classmates can stand inside the square. After they have estimated, pupils may be allowed to physically try standing in the square.

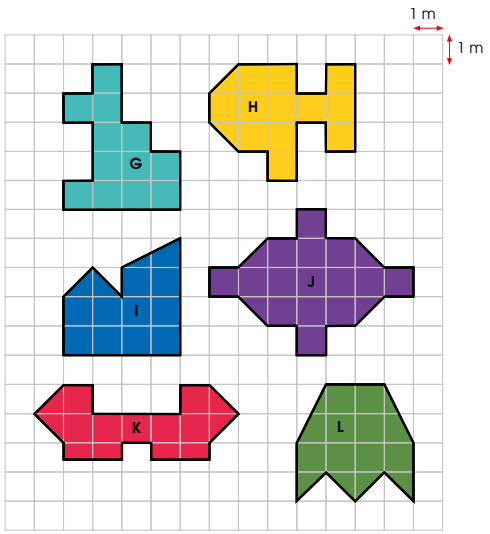
Discuss how many small squares can be fitted into the 1-m square without acting it out.



Textbook 3 P280

Let pupils work on Let's Learn 5 on their own. Remind pupils that some of the squares are half-shaded. Get pupils to explain how they arrive at their answer.

6.



(a) The area of Figure G is 12 m².
(b) The area of Figure H is 13 m².
(c) The area of Figure I is 12 m².
(d) The area of Figure J is 17 m².
*(e) The area of Figure K is 11 m².
*(f) The area of Figure L is 12 m².

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Textbook 3 P281

Let pupils work on Let's Learn 6 on their own. Remind pupils that some of the squares are half-shaded. Get pupils to explain how they arrive at their answer.

ACTIVITY TIME

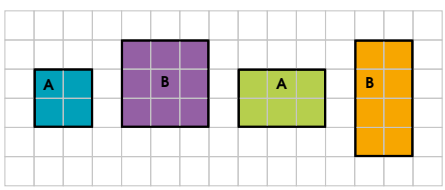
Work in pairs.

1. Draw squares and rectangles of different sizes on a .

What you need:

2. Find the areas of the squares and rectangles by counting the number of squares they cover.
3. Record the areas and lengths of each side of the rectangles and squares.

Example



Square	Length (cm)	Length (cm)	Area (cm²)
A	2	2	4
B	3	3	9

Rectangle	Length (cm)	Length (cm)	Area (cm²)
A	3	2	6
B	2	4	8

How are the area and the length of each side of each figure related?

OXFORD UNIVERSITY PRESS AREA AND PERIMETER 282

Textbook 3 P282

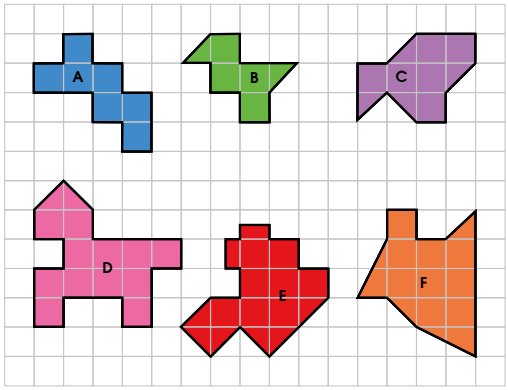
ACTIVITY TIME

Assign pupils to work in pairs.

Let pupils discover on their own that area = length × breadth.

PRACTICE

Find the area of each figure in the 1-cm square grid.



(a) Area of Figure A = 7 cm²
(b) Area of Figure B = 5 cm²
(c) Area of Figure C = 8 cm²
(d) Area of Figure D = 13 cm²
*(e) Area of Figure E = 12 cm²
*(f) Area of Figure F = 12 cm²

Complete Workbook 3B, Worksheet 3A • Pages 133 – 134

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Textbook 3 P283

PRACTICE

Work on the practice questions with pupils.

For better understanding, select items from **Worksheet 3A** and work these out with the pupils.

Independent seatwork

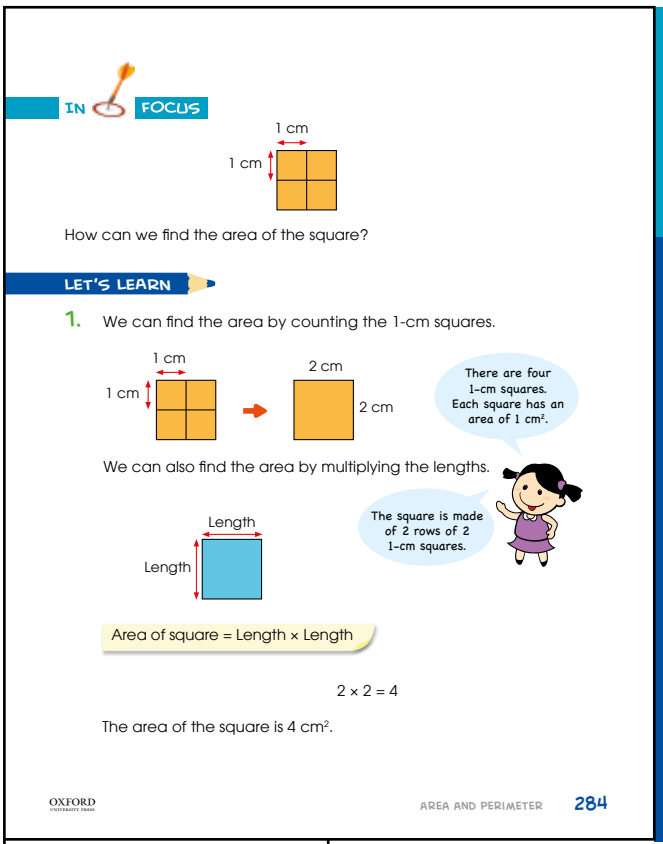
Assign pupils to complete Worksheet 3A (Workbook 3B P133 – 134).

Answers

Worksheet 3A (Workbook 3B P133 – 134)

1. (a) 10
   (b) 7
   (c) 8
   (d) 13
   (e) 12

2. (a) 7
   (b) 15
   (c) 6
   (d) 8
   (e) C
   (f) B
   (g) C, A, D, B



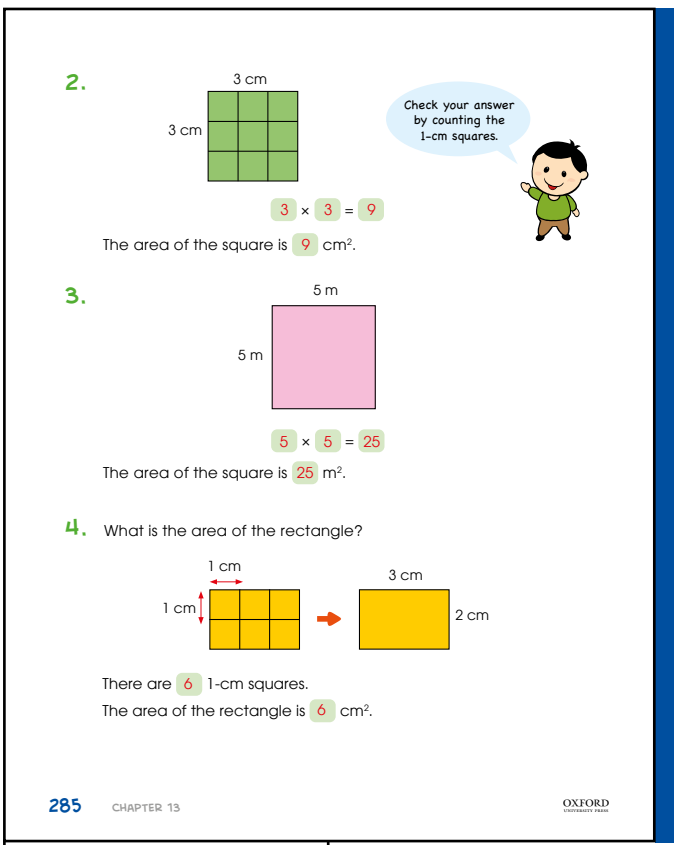
Textbook 3 P284

IN FOCUS

Relate what pupils have learnt in Activity Time (P282) to the square. Ask them how they can find the area of the square.

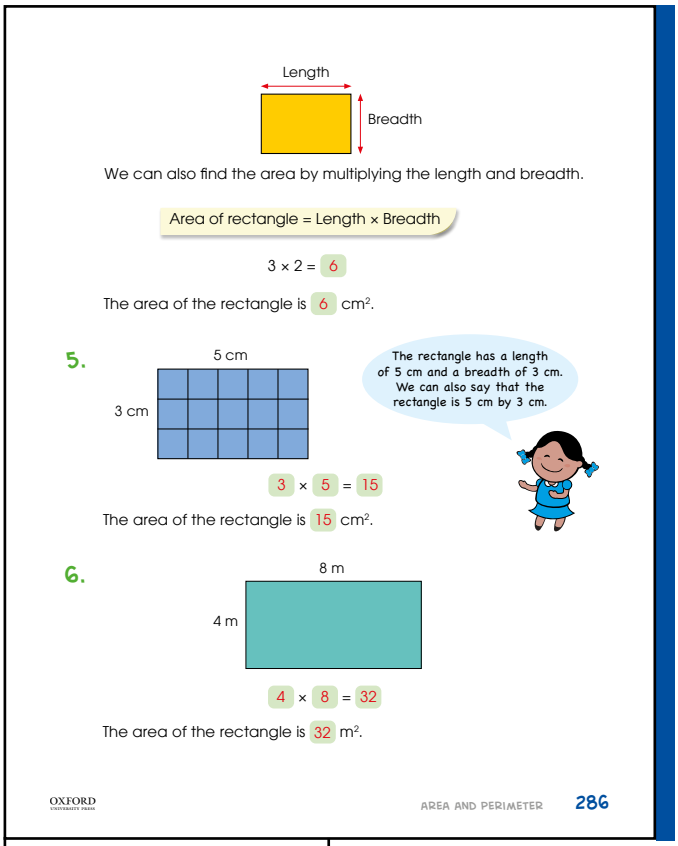
LET'S LEARN

Pupils are to apply what they have learnt from Activity Time (P282) to solve the problem. The formula of the area of a square is formally introduced in Let's Learn 1. Get pupils to memorise this formula.



Textbook 3 P285

Using the formula introduced in Let's Learn 1, pupils are to find the area of the squares in Let's Learn 2 and 3. Draw the pupils' attention to the units of the lengths. Emphasise to pupils that the units of the area is related to the units of the lengths.

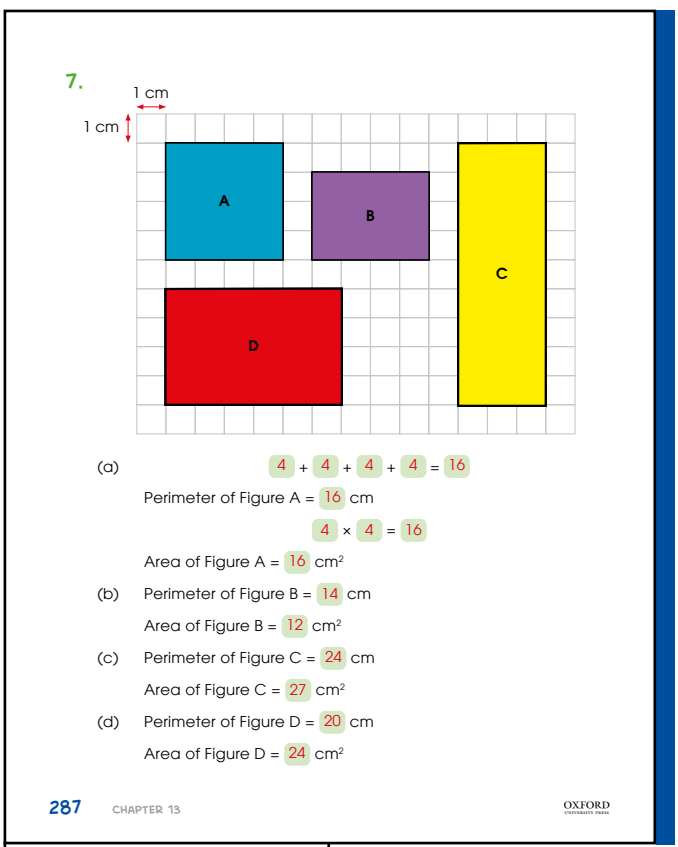


Textbook 3 P286

Pupils have learnt that the area of a plane figure is given by multiplying the sides. In Let's Learn 4, the formula of the area of a rectangle is formally introduced.

Unlike the area of a square, the formula here is given by multiplying two different lengths of a rectangle. Tell pupils that **breadth** usually refers to the **shorter side** of a rectangle while **length** usually refers to the **longer side** of a rectangle.

Using the formula introduced in Let's Learn 4, pupils are to find the area of the rectangles in Let's Learn 5 and 6. Remind pupils to be mindful of the units given.



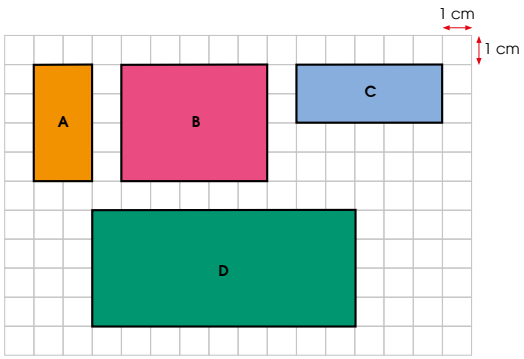
Textbook 3 P287

Allow pupils to attempt the questions in Let's Learn 7. Ensure that they do not get confused by the terms area and perimeter. Pupils are required to apply the formulae they have learnt to find the area of each figure.

Encourage pupils to label the length and breadth of each figure before finding the area.

PRACTICE

1.



(a) Perimeter of Figure A = 12 cm
Area of Figure A = 8 cm^2

(b) Perimeter of Figure B = 18 cm
Area of Figure B = 20 cm^2

(c) Perimeter of Figure C = 14 cm
Area of Figure C = 10 cm^2

(d) Perimeter of Figure D = 26 cm
Area of Figure D = 36 cm^2

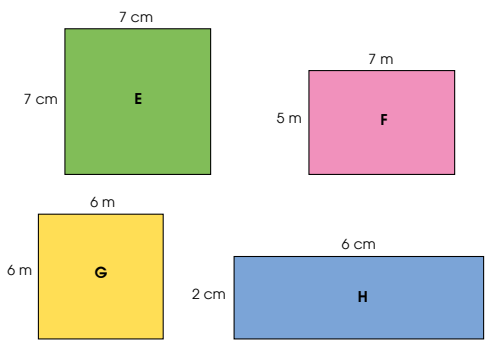
Textbook 3 P288

PRACTICE

Work on the practice questions with pupils.

For better understanding, select items from **Worksheet 3B** and work these out with the pupils.

2. Find the area and perimeter of each figure.



(a) Perimeter of Figure E = 28 cm
Area of Figure E = 49 cm^2

(b) Perimeter of Figure F = 24 m
Area of Figure F = 35 m^2

(c) Perimeter of Figure G = 24 m
Area of Figure G = 36 m^2

(d) Perimeter of Figure H = 16 cm
Area of Figure H = 12 cm^2

Complete Workbook 3B, Worksheet 3B • Pages 135 – 138

Textbook 3 P289

Independent seatwork

Assign pupils to complete Worksheet 3B (Workbook 3B P135 – 138).

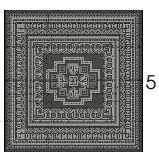
Answers Worksheet 3B (Workbook 3B P135 – 138)

1. (a) $4 \times 4 = 16$
   Area of Figure A = 16 cm^2
   (b) $2 \times 5 = 10$
   Area of Figure B = 10 cm^2
   (c) $5 \times 7 = 35$
   Area of Figure C = 35 cm^2

2. (a) $3 + 8 + 3 + 8 = 22$
   Perimeter of Figure A = 22 m
   $3 \times 8 = 24$
   Area of Figure A = 24 m^2
   (b) $3 + 3 + 3 + 3 = 12$
   Perimeter of Figure B = 12 m
   $3 \times 3 = 9$
   Area of Figure B = 9 m^2
   (c) $2 + 6 + 2 + 6 = 16$
   Perimeter of Figure C = 16 m
   $2 \times 6 = 12$
   Area of Figure C = 12 m^2

3. (a) Area = 8 cm × 3 cm
   = 24 cm^2
   Perimeter = 8 cm + 3 cm + 8 cm + 3 cm
   = 22 cm
   (b) $7 \times 7 = 49$
   Area = 49 cm^2
   $7 + 7 + 7 + 7 = 28$
   Perimeter = 28 cm
   (c) $3 \times 6 = 18$
   Area = 18 m^2
   $3 + 6 + 3 + 6 = 18$
   Perimeter = 18 m

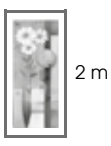
4. **Carpet**



Tablecloth

Area = 25 m^2 Area = 3 m^2

Painting

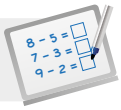


Wallpaper

Area = 2 m^2 Area = 20 m^2

(a) Carpet
(b) Painting
(c) 18 m^2

LESSON PLAN



Specific Learning Focus

- Measure the area of a plane figure in square units.
- Measure the area of a plane figure in cm^2 and m^2.

Suggested Duration

Lesson 2: 4 periods
Lesson 3: 6 periods

Prior Learning

They have learnt to identify the faces of three-dimensional figures in Grade 2. Area is a new concept to pupils at Grade 3.

Pre-emptive Pitfalls

Identifying the correct dimensions and carrying out multiplication to calculate the area might be a bit challenging for some pupils. The introduction of the units of area (cm^2 and m^2) would also be new to pupils.

Introduction

Let's Learn 1 (Textbook 3 P273) introduces area as the amount of space taken up by a figure and the use of a non-standard unit to measure area. The lesson progresses to introducing the square unit on a square grid and counting the squares to find the area. The leaf in Let's Learn 5 (Textbook 3 P275) has curved edges and its area is estimated, hence the term 'about' is used.

Problem Solving

A 1 cm by 1 cm or 1 m by 1 m square has an area of 1 cm^2 or 1 m^2. It is important to explain the notation of a power in the units 'cm^2' and 'm^2'. Emphasise that in a rectangle, the lengths of all four sides are not the same. The shorter side is the 'breadth' and the longer side is the 'length'.

Activities

'Activity Time' (Textbook 3 P279) can also be carried out in the playground, where the square can be marked out on the sand.

Resources

- metre ruler
- scissors
- square tiles
- coloured tape
- square grid paper (Activity Handbook 3 P43)
- table of areas and lengths (Activity Handbook 3 P44)

Mathematical Communication Support

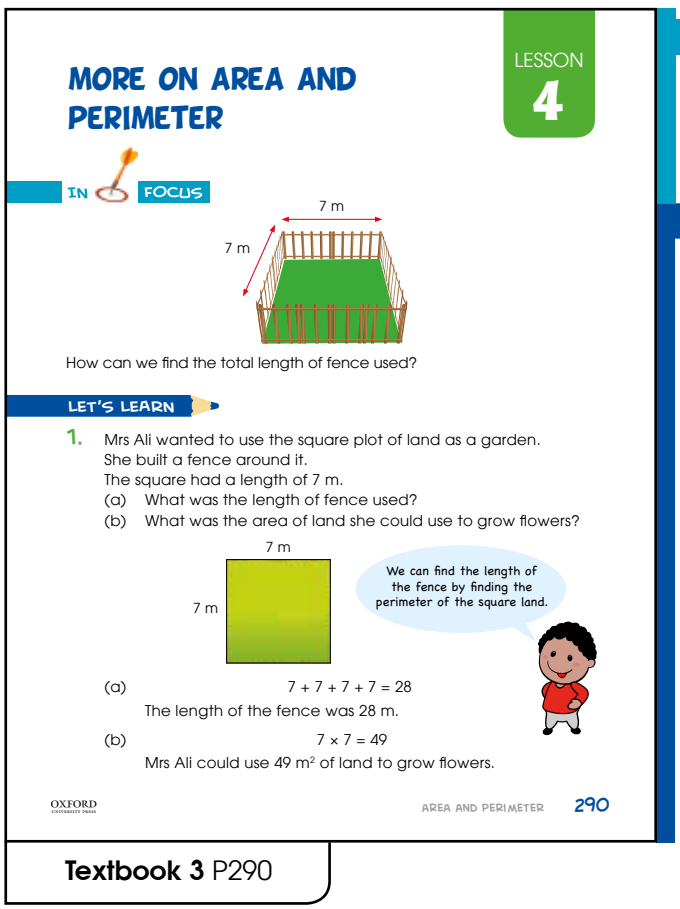
Differentiate between area and perimeter by emphasising that area is the amount of surface taken up by a figure while perimeter is the total length around a figure. Encourage hands-on experiences of finding the perimeter and area of the classroom table, cover of a book, etc. Verbalise the dimensions and ask pupils to add the lengths of all sides to find perimeter and multiply the lengths of two sides to find area. Reinforce to them the formulae: Area of a square = $\ell \times \ell$ = ☐ cm^2 or m^2, area of a rectangle = $\ell \times b$ = ☐ cm^2 or m^2.

LESSON
4

MORE ON AREA AND PERIMETER

LEARNING OBJECTIVE

1. Solve problems related to finding the area and perimeter of a rectangle or square.



MORE ON AREA AND PERIMETER

LESSON 4

IN FOCUS

How can we find the total length of fence used?

LET'S LEARN

1. Mrs Ali wanted to use the square plot of land as a garden.
She built a fence around it.
The square had a length of 7 m.
(a) What was the length of fence used?
(b) What was the area of land she could use to grow flowers?

(a) 7 + 7 + 7 + 7 = 28
The length of the fence was 28 m.

(b) 7 × 7 = 49
Mrs Ali could use 49 m^2 of land to grow flowers.

OXFORD UNIVERSITY PRESS AREA AND PERIMETER 290

Textbook 3 P290

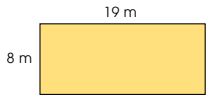
IN FOCUS

Discuss with pupils how the problem can be solved. Get pupils to explain their answers.

LET'S LEARN

Recap with pupils the formula for area and perimeter.

2. A rectangular carpet is used to cover the floor of a room.
The carpet has a length of 19 m and a breadth of 8 m.
(a) What is the perimeter of the carpet?
(b) What is the area covered by the carpet?



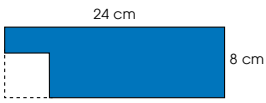
(a) 19 + 8 + 19 + 8 = 54

The perimeter of the carpet is 54 m.

(b) 19 × 8 = 152

The area covered by the carpet is 152 m².

3. A rectangular piece of paper had a length of 24 cm and a breadth of 8 cm.
Raju cut a square with an area of 25 cm² from the piece of paper.
What was the area of the remaining piece of paper?



24 × 8 = 192

The area of piece of paper before cutting was 192 cm².

192 − 25 = 167

The area of the remaining piece of paper was 167 cm².

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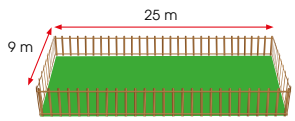
Textbook 3 P291

When going through Let's Learn 2 and 3, remind pupils to include all the lengths when calculating the perimeter.

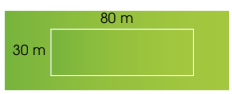
PRACTICE

Solve.

1. A rectangular land shown is surrounded by a fence.
(a) What is the length of the fence? 25 + 9 + 25 + 9 = 68 m
(b) What is the area of the land? 25 × 9 = 225 m²



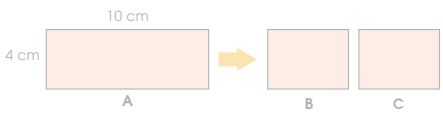
2. A rectangular section of a field is marked out with white paint as shown.
What is the perimeter of this section? 80 + 30 + 80 + 30 = 220 m



Complete Workbook 3B, Worksheet 4 • Pages 139 – 141

MIND WORKOUT

Junhao cuts a rectangular piece of paper into two identical pieces.



He says that the total area and perimeter of B and C is the same as the area and perimeter of A.
Do you agree? Why?

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Textbook 3 P292

PRACTICE

Work on the practice questions with pupils.

For better understanding, select items from **Worksheet 4** and work these out with the pupils.

Independent seatwork

Assign pupils to complete Worksheet 4 (Workbook 3B P139 – 141).

Answers Worksheet 4 (Workbook 3B P139 – 141)

1. (a) 7 + 45 + 7 + 45 = 104
   The perimeter of the plot of land is 104 m.

   (b) 45 × 7 = 315
   The area of the land marked out is 315 m^2.

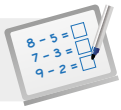
2. 7 + 7 + 7 + 7 = 28
   Each square frame is made with 28 cm of wire.
   28 × 5 = 140
   The steel wire is 140 cm long.

3. 3 × 2 = 6
   6 m^2 of glass is needed to make each window.
   25 × 6 = 150
   150 m^2 of glass is needed to make 25 such windows.

4. 8 × 8 = 64
   The land has an area of 64 m^2.
   64 ÷ 4 = 16
   Each plot has an area of 16 m^2.

5. 12 × 3 = 36
   The length of the rectangular field is 36 m.
   12 + 36 + 12 + 36 = 96
   The perimeter of the field is 96 m.

LESSON PLAN



Specific Learning Focus

- Solve problems related to finding the area and perimeter of a rectangle or square.

Suggested Duration

4 periods

Prior Learning

In this lesson, pupils are formally introduced to the concept of perimeter and area of shapes.

Pre-emptive Pitfalls

This lesson involves word problems. Pupils will have to identify the dimensions given, understand if area or perimeter is to be calculated and then decide on the mode of operation.

Introduction

Follow the 4-steps approach to problem solving. It should be relatively easy to carry out step 2 as the diagram is already shown in the question.

Problem Solving

In this lesson, pupils are required to have good critical-thinking skills as they have to analyse the word problem, extract the important information given and decide on the mode of operation and then carry out the mathematical computation.

Activities

Each word problem in this lesson can be solved in pairs and colourful cut-outs can be made to give them a hands-on experience.

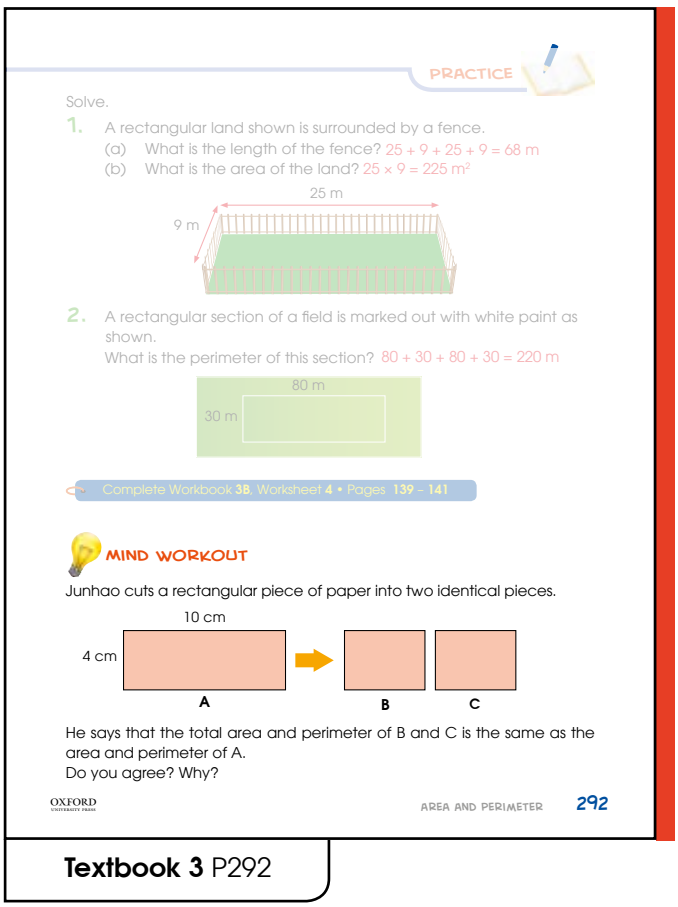
Resources

- markers
- chart paper
- rectangles (Activity Handbook 3 P45)

Mathematical Communication Support

Encourage classroom discussions while going through the word problems. Ask them which dimensions are given, what needs to be calculated, what the unit of measurement must be, what operation is to be employed, and why we add to find perimeter and multiply to find area (array concept can be revisited).

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



PRACTICE

Solve.

1. A rectangular land shown is surrounded by a fence.
   (a) What is the length of the fence? 25 + 9 + 25 + 9 = 68 m
   (b) What is the area of the land? 25 × 9 = 225 m²

25 m
9 m

2. A rectangular section of a field is marked out with white paint as shown.
   What is the perimeter of this section? 80 + 30 + 80 + 30 = 220 m

80 m
30 m

Complete Workbook 3B, Worksheet 4 • Pages 139 – 141

MIND WORKOUT

Junhao cuts a rectangular piece of paper into two identical pieces.

10 cm
4 cm
A
B
C

He says that the total area and perimeter of B and C is the same as the area and perimeter of A.
Do you agree? Why?

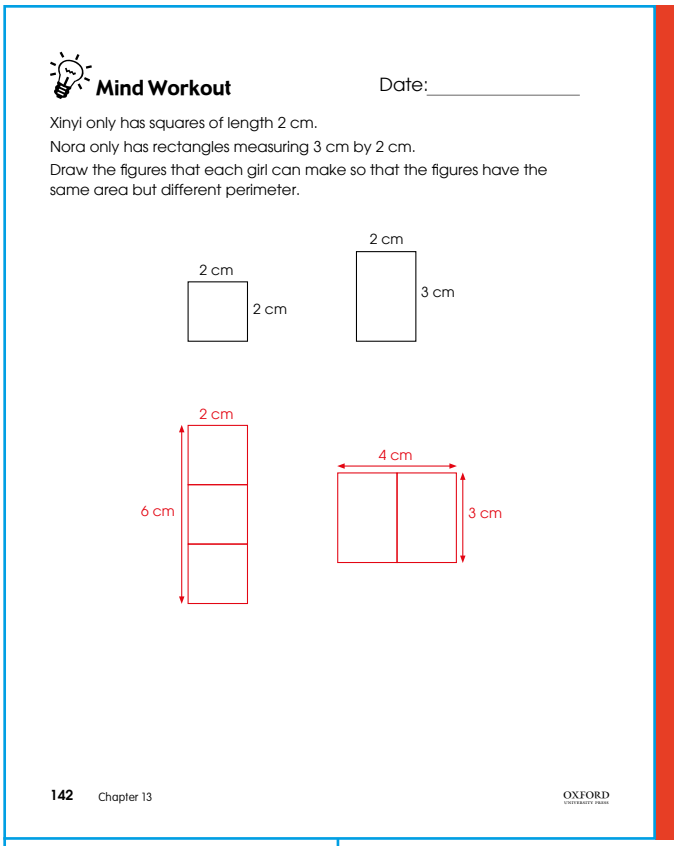
OXFORD
AREA AND PERIMETER 292

Textbook 3 P292

MIND WORKOUT

If pupils have difficulties in solving the problem, facilitate by asking them questions such as:

- Did you discard or remove any part of the paper? Should the area be the same?
- How can you find out the area of B and the area of C?
- What is the perimeter of A? What is the perimeter of B? What is the perimeter of C?



Mind Workout Date:_____

Xinyi only has squares of length 2 cm.
Nora only has rectangles measuring 3 cm by 2 cm.
Draw the figures that each girl can make so that the figures have the same area but different perimeter.

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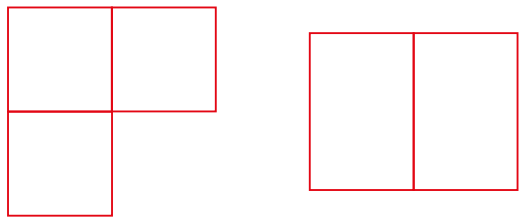
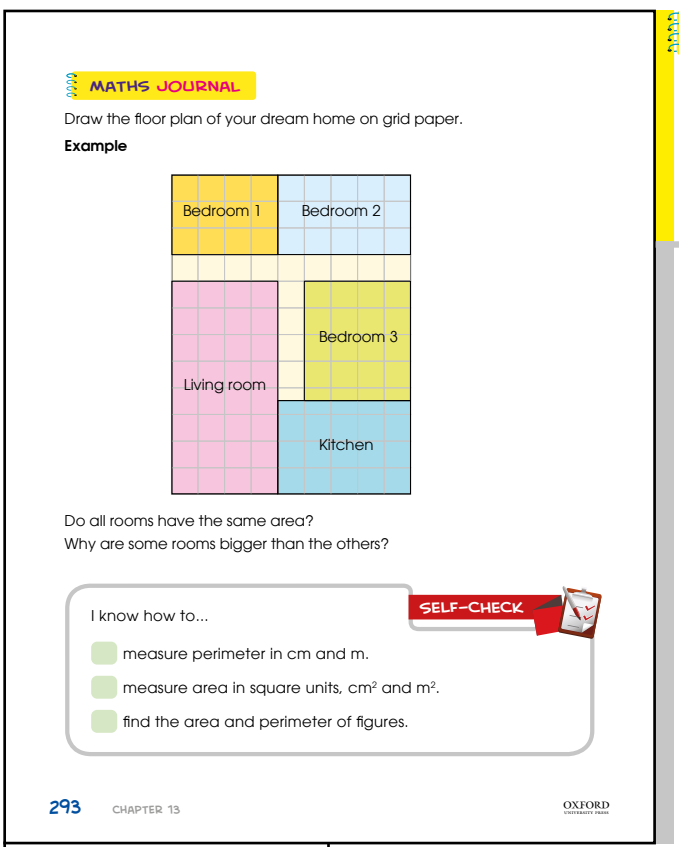
Workbook 3B P142

Mind Workout

Give an example of how the activity can be done by drawing a diagram.





MATHS JOURNAL

Draw the floor plan of your dream home on grid paper.

Example

Do all rooms have the same area?
Why are some rooms bigger than the others?

I know how to...

SELF-CHECK

- measure perimeter in cm and m.
- measure area in square units, cm^2 and m^2.
- find the area and perimeter of figures.

293 CHAPTER 13 OXFORD

Textbook 3 P293

MATHS JOURNAL

Distribute grid paper to pupils to carry out the activity. Remind pupils that some space should be given for walking. Facilitate the class discussion.

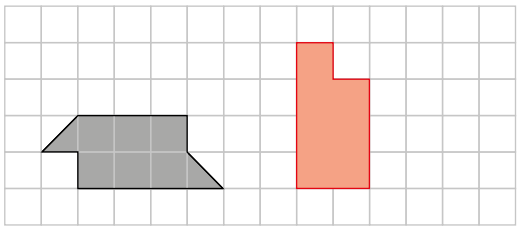
SELF-CHECK

Before the pupils do the self-check, review the important concepts once more by asking for examples learnt for each objective.

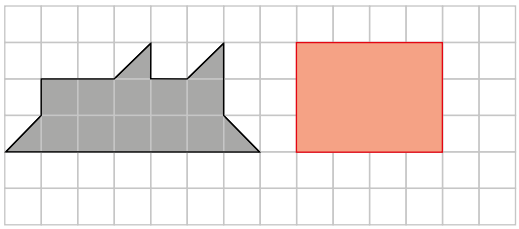
This self check can be done after pupils have completed **Review 13** (Workbook 3B P143 – 148) as consolidation of understanding for the chapter.

Answers Review 13 (Workbook 3B P143 – 148)

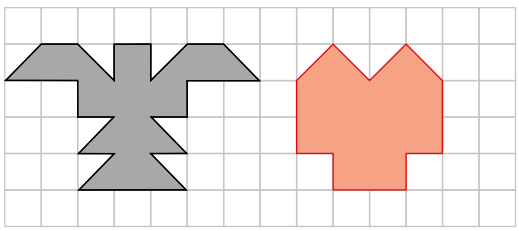
1. (a)



(b)



(c)



2. (a) 32
   *(b) 48
   *(c) 60

3. (a) 36
   (b) 27
   (c) 63

4. (a) 100
   (b) 160
   *(c) 220

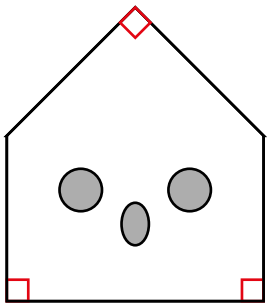
5. (a) $5 \times 4 = 20$
   The area of the carpet was 20 m^2.
   (b) $5 + 4 + 5 + 4 = 18$
   The perimeter of the carpet was 18 m.

6. $6 + 4 + 6 + 4 = 20$
   The length of the string used is 20 cm.

7. $27 \times 8 = 216$
   Each plot of land is 216 cm^2.
   $216 \times 3 = 648$
   The total area of the 3 plots of land is 648 m^2.

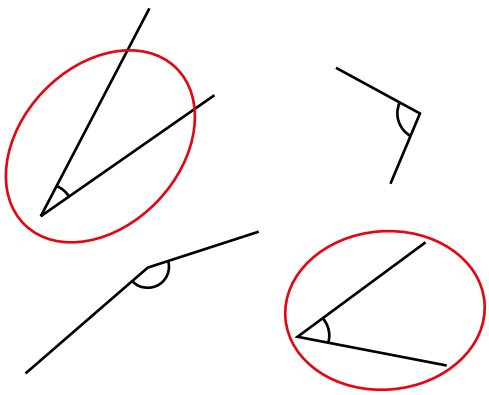
Answers Revision 4A (Workbook 3B P149 – 152)

1.

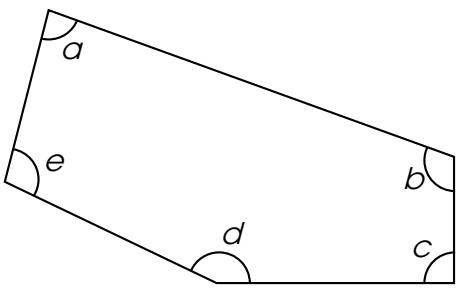


There are 3 right angles.

2.

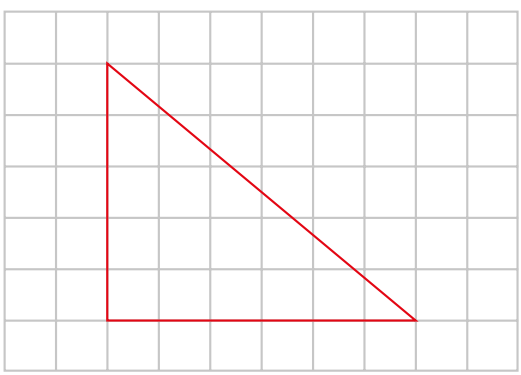


3.



The obtuse angles are angle b, angle d and angle e.

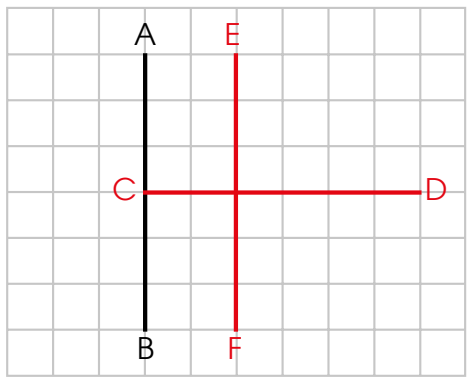
4.



5. AB // FE
BC ⊥ CD

*6. (a) Robinson Road, Cecil Street
(b) Boon Tat Street, McCallum Street
(c) Boon Tat Street, McCallum Street
(d) Boon Tat Street

7.



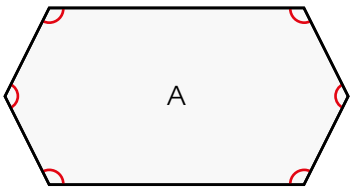
8. (a) C, 5
(b) bakery
(c) park
(d) bakery, school
(e) E, 5

9. 20 cm

10. 20 m^2

Answers Revision 4B (Workbook 3B P153 – 158)

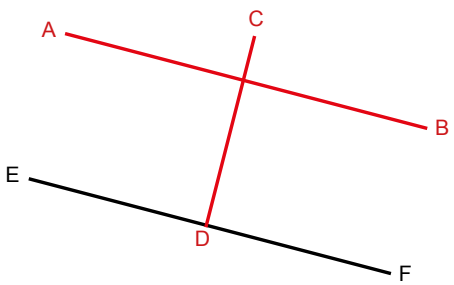
1.



2. (a) BF
   (b) AE, FH

3. (a) RM ⊥ MN
   RQ ⊥ QP
   MR // NO
   (b) TU ⊥ UV
   SX // TU

4.



5. Area = 11 cm^2
   Perimeter = 24 cm

6. (a) Perimeter of Figure P = 18 cm
   (b) Perimeter of Figure Q = 20 cm

7. The perimeter of the figure is 28 m.

8. (a) 16
   (b) 13
   (c) 18

9. 30 + 30 + 30 + 30 = 120
   Mr Gopal needs 120 m of fence for 1 square field.
   5 × 120 = 600
   Mr Gopal needs 600 m of fence for 5 square fields.

10. 3 × 2 = 6
    6 m^2 of cloth is need to make a flag.
    15 × 6 = 90
    90 m^2 of cloth is needed to make 15 such flags.

Answers End-of-Year Revision (Workbook 3B P159 – 176)

1. 2

2. 4

3. 3

4. 3

5. 2

6. 4

7. 1

8. 2

9. 2

10. 1

11. (a) 5115
    (b) 8080

12. 300

13. 6107

14. thousands

15. (a) 2 m, 5 cm
    (b) 4 kg, 280 g
    (c) 3290 ml

16. 85.15

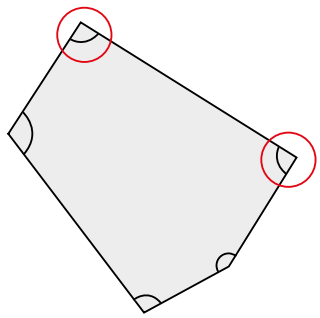
17. 6.75

18. (a) $\frac{2}{3}$
    (b) $\frac{2}{3}$

19. $\frac{2}{3}, \frac{1}{2}, \frac{4}{9}$

20. (a) 6.02
    (b) 2.18

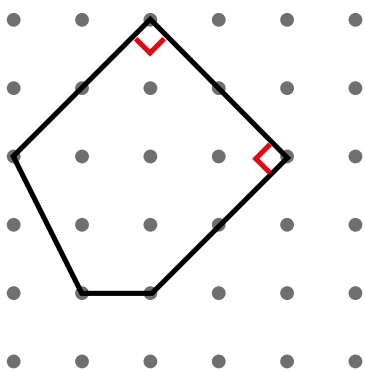
21. (a) 234
    (b) 5 hr 15 min

22. 

    2

23. (a) badminton
    (b) 18
    (c) badminton
    (d) swimming

24. (a) RV ⊥ VU, VS ⊥ VU, VS ⊥ ST, UT ⊥ ST
    (b) RS // UT, VU // ST

25. 

26. AB and CD

27. Area of Figure A = 13 square units
    Area of Figure B = 10 square units

28. (a) 50
    (b) Priya
    (c) 375

29. $\frac{2}{5} = \frac{6}{15} = \frac{14}{35}$

30. (a) $\frac{1}{4} + \frac{1}{12} = \frac{3}{12} + \frac{1}{12}$

$= \frac{4}{12}$

$= \frac{1}{3}$

(b) $\frac{2}{3} - \frac{1}{6} = \frac{4}{6} - \frac{1}{6}$

$= \frac{3}{6}$

$= \frac{1}{2}$

31. XY // WZ
ZY // WX
WX ⊥ XA

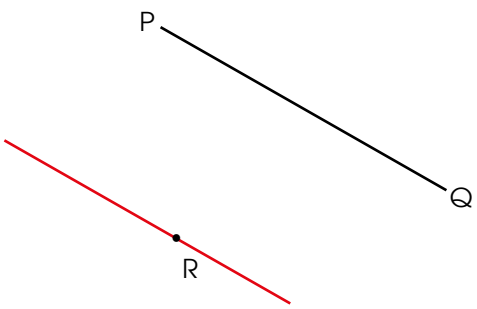
32. Biscuits, Sardines

33. 44.60

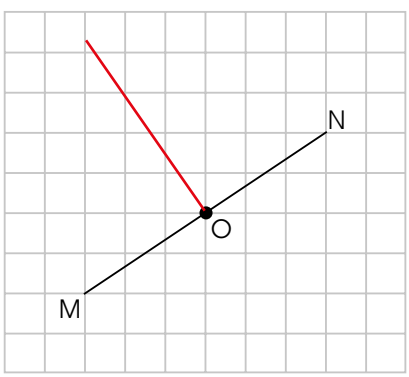
34. (a) 1 hr 20 min
(b) 1 hr 10 min

35. Perimeter = 16 cm
Area = 13 cm^2

36.



37.

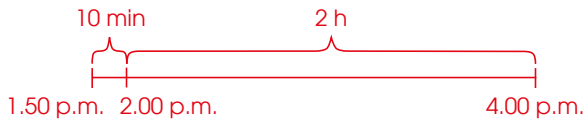


38. (a) Figure B and Figure D have the same perimeter.
(b) Figure A and Figure D have the same area.

39. (a) B, 5
(b) table
(c) E4
(d) C2

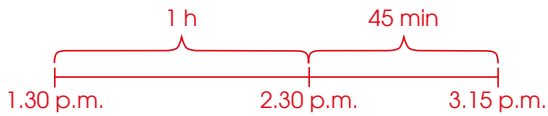
*40. Patience

41.



Raju started watching the movie at 1.50 p.m.

42.



Nora finished baking the muffins at 3.15 p.m.

43. $10.00 – $0.90 = $9.10
Kate spent $9.10.
$9.10 – $2.50 = $6.60
The box of biscuits cost $6.60.

44. 25 + 25 + 25 + 25 = 100
Weiming needs 100 cm of string to decorate 1 card.
100 × 8 = 800
Weiming needs 800 cm of string to decorate 8 cards.

*45. 30 – 1 – 2 = 27
27 ÷ 3 = 9
Meiling wrote 9 pages on the first day.

NAVIGATING THROUGH THE ASSESSMENT EXERCISES AND ACTIVITIES

For teachers to assess pupils' achievement of the learning objectives, the Teacher's Resource Book provides direction for teachers on how to use the following assessment and exercises. Summarising the evaluative aspect of this series, the following exercises can be utilised optimally.

TEXTBOOK

CHAPTER OPENER

Chapter Opener consists of familiar events or occurrences that serve as an introduction of the topic to pupils.

IN FOCUS

Questions related to the lesson objectives are asked as an introductory activity for pupils. The activity allows pupils to explore different ways to solve the problem.

LET'S LEARN

Main concepts are introduced in Let's Learn. The consolidation and formalising of concepts are achieved. The exercises can be used by teachers to test their pupils' prior knowledge. Teachers can provide valuable assessment-based feedback to pupils. Having pupils attempt these exercises will help teachers identify the focus of each lesson and the adjustments they need to make to their teaching in order to help pupils meet the intended learning outcomes.

ACTIVITY TIME

Most of the activities in the book are to be carried out in pairs or groups. Pupils explore mathematical concepts in a fun way through games. Observing pupils' approach and dexterity while doing the activity will give a clear indication to teachers on how the lesson should be conducted.

PRACTICE

The questions in Practice enable teachers to gauge if pupils have grasped the concepts. Practice can be done as an independent exercise in class or as homework.

Through the questions, teachers get to understand what their pupils have learned. They will be able to find the answers to the following questions:

(i) Are there any common gaps in my pupils' knowledge of the topic which I need to revisit?
(ii) In which aspects of my pupils' learning of the topic did they achieve mastery?
(iii) What are the strengths and weaknesses in my planning for teaching?

MIND WORKOUT

Pupils' critical and problem-solving skills are enhanced when working on the Mind Workout. Teachers can use the exercises to challenge advanced learners. It is advisable to use the exercise as an independent assignment for pupils.

MATHS JOURNAL

Maths Journal enhances pupils' skills such as mathematical communication, reasoning, organisation and tabulation of data. The exercises can be done in a group or individually in class or at home.

SELF-CHECK

Key concepts required in the syllabus that must be learnt are highlighted in Self-Check. It would be beneficial for pupils when teachers revise the key concepts in class as this allows pupils to assess their own learning at the end of each chapter and facilitates their revision in preparation for the examination.

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WORKBOOK

Worksheets
Well-structured questions covering all the concepts taught in each lesson, are found in each worksheet. A suggested approach would be to have pupils do alternate questions from each worksheet or do the questions that will build their foundation of the concepts. The skipped questions can be revisited during revision before the examination. The worksheets in the workbooks can be done as a complimentary practice exercise to augment the concepts learnt.

Maths Journal
Maths Journal tests pupils' understanding of the mathematical concepts learnt in the chapter and further enhances their learning of the concepts.

Mind Workout
Mind Workout consists of higher-order thinking tasks which enable pupils to apply relevant heuristics and extend the concepts and skills learnt.

Revision
Revision exercises at the end of a set of chapters consist of questions that enable pupils to apply all the concepts and skills taught. The exercises can be done before an examination or a test. They serve as good revision exercises for pupils to do in class or as homework with guidance from their parents when necessary. They also enable teachers to evaluate the pupils' understanding of the concepts across strands and topics and can be used as an effective preparatory exercise for examinations.

Review
The Review Exercise consists of questions that requires the application of a consolidation of concepts learnt in the chapter. The exercises can be done as a group assignment for teachers to gauge the pupils' ability to grasp the consolidated concepts learnt in the chapter. Group assignments help pupils to learn together as they gather feedback from one another. Teachers can also get pupils to submit their completed exercises and mark them as a form of informal assessment.

Mid-Year and End-of-Year Revisions
These are assessment exercises with multiple choice questions, short-answer questions and word problems. Teachers can use the revision exercises as mock examinations to help pupils prepare for the examinations. Feedback provided to pupils will be extremely beneficial as they will be aware of the areas that they are weak in and work on them. The revision exercises test pupils' ability to recall the concepts taught and apply them. They also allow teachers to analyse the effectiveness of their spiral approach of teaching concepts. Teaching concepts by revisiting, re-linking to other concepts and creating a mind map help pupils do their examinations in a more effective way. A good evaluative assessment should not consist of questions that encourage rote learning, but should consist of questions that encourage learning by the spiral approach.

Examination papers should not be considered by teachers as the only means of evaluation. Informal evaluation involves classroom discussions, participation, exchange of ideas, multiple strategies, activities, group assignments, presentations and above all, mind-mapping, before they embark on independent work. It is essential for the pupils to receive feedback on their work which provides an important opportunity for reflection on what they have learnt. Similarly, teachers should be able to diagnose the progress and achievement of the pupils and decide on the future course of action, which is where the assessment activities and exercises come in.

Notes