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OXFORD

New Syllabus

PRIMARY MATHEMATICS

Teacher's
Resource Book



2

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CHAPTER 1

Numbers to 1000

Estimated number of periods: 12

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	<p>Counting in Hundreds, Tens and Ones</p> <ul style="list-style-type: none"> Count in hundreds, tens and ones to tell the number of objects in a given set. 	<ul style="list-style-type: none"> Work in groups using concrete objects/the base-ten set to: <ul style="list-style-type: none"> count in tens/hundreds to establish 10 tens make 1 hundred and 10 hundreds make 1 thousand. represent and compare numbers. Make sense of the size of 100 and use it to estimate the number of objects in the size of hundreds. 	Textbook 2 P1 – 5	Worksheet 1 Workbook 2A P1 – 4	Textbook 2 P5	Base-ten sets, containers, seeds
2	2	<p>Place Value</p> <ul style="list-style-type: none"> Represent numbers within 1000 in hundreds, tens and ones. State the values of the digits in a given number. Read and write numbers to 1000 in numerals and in words. 	<ul style="list-style-type: none"> Use place-value cards to illustrate and explain place values, e.g. the digit 3 stands for 300, 30 or 3 depending on where it appears in a number. 	Textbook 2 P6 – 8	Worksheet 2 Workbook 2A P5 – 10	Textbook 2 P7	Base-ten sets, place-value cards
3	2	<p>Comparing and Ordering Numbers</p> <ul style="list-style-type: none"> Compare and order numbers within 1000. 	<ul style="list-style-type: none"> Use 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 2 P9 – 13	Worksheet 3 Workbook 2A P11 – 18	Textbook 2 P12	‘0’ to ‘9’ dices, place-value cards, place- value charts

4	2	<p>Number Patterns</p> <ul style="list-style-type: none"> Recognise and complete number patterns. Use the base-ten set to represent a number that is 1, 10 or 100 more than/less than a 3-digit number. Describe a given number pattern before continuing the pattern or finding the missing number(s). 	Textbook 2 P14 – 18	Worksheet 4 Workbook 2A P19 – 20	Teacher's Resource Book P18	Drawing block, markers
5	2	<p>Odd and Even Numbers</p> <ul style="list-style-type: none"> Recognise odd and even numbers. 	Textbook 2 P19 – 23	Worksheet 5 Workbook 2A P21 – 23	Textbook 2 P22 Teacher's Resource Book P24	2-colour counters
–	2	<p>Problem Solving, Maths Journal and Pupil Review</p> <ul style="list-style-type: none"> Give examples of numbers in everyday situations, and talk about how and why the numbers are used. 	–	Review 1 Workbook 2A P25 – 28	Textbook 2 P23 – 24 Workbook 2A P24	–

CHAPTER 2

Addition and Subtraction Within 1000

Estimated number of periods: 28

Subtraction Within 1000

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	Addition and Subtraction <ul style="list-style-type: none"> Recapitulate writing a family of four basic facts within 20 given any one of the basic facts. 	<ul style="list-style-type: none"> Write addition and subtraction equations for number stories and explain the meaning of the equal sign. Achieve mastery of basic addition and subtraction facts within 20 by <ul style="list-style-type: none"> writing a family of 4 basic facts within 20 given any one of the basic facts (e.g. $9 + 7 = 16$, $7 + 9 = 16$, $16 - 9 = 7$ and $16 - 7 = 9$ are a family of addition and subtraction facts). playing games, including applets and digital games. 	Textbook 2 P25 – 26	Worksheet 1 Workbook 2A P29 – 30	Textbook 2 P26	A4 papers, numeral cards, pencils
2	2	Addition without Regrouping <ul style="list-style-type: none"> Add a 3-digit number and a 1-digit number/a ten/a hundred without regrouping. Add two 3-digit numbers without regrouping. 	–	Textbook 2 P27 – 31	Worksheet 2 Workbook 2A P31 – 36	–	Base-ten sets
3	6	Addition with Regrouping <ul style="list-style-type: none"> Add a 3-digit number and a 1-digit number/a ten with regrouping. Add two 3-digit numbers with regrouping. 	<ul style="list-style-type: none"> Work in groups using the base-ten set to illustrate the standard algorithms for addition up to 3 digits. 	Textbook 2 P32 – 39	Worksheet 3 Workbook 2A P37 – 40	Textbook 2 P38	Base-ten sets, drawing block, markers

4	2	<p>Subtraction without Regrouping</p> <ul style="list-style-type: none"> Subtract a 1-digit number/a ten/ a hundred from a 3-digit number without regrouping. Subtract a 3-digit number from another 3-digit number without regrouping. 	–	Textbook 2 P40 – 44	Worksheet 4 Workbook 2A P41 – 44	–	–
5	6	<p>Subtraction with Regrouping</p> <ul style="list-style-type: none"> Subtract a 1-digit number/1 ten from a 3-digit number with regrouping. Subtract a 3-digit number from another 3-digit number with regrouping. 	<ul style="list-style-type: none"> Work in groups using the base-ten set to illustrate the standard algorithms for subtraction up to 3 digits. Achieve mastery of addition and subtraction algorithms up to 3 digits by playing games, including applets and digital games. 	Textbook 2 P45 – 52	Worksheet 5 Workbook 2A P45 – 48	Textbook 2 P51	Base-ten sets, drawing block, markers
6	8	<p>Solving Word Problems</p> <ul style="list-style-type: none"> Solve 1-step word problems involving addition and subtraction. 	<ul style="list-style-type: none"> Use the part-whole and comparison models to illustrate the concepts of addition and subtraction and use the models to determine which operation (addition or subtraction) to use when solving 1-step word problems. Use the comparison model to reinforce the language of comparison such as “Ali has 30 more stickers than Siti.” 	Textbook 2 P53 – 55	Worksheet 6A Workbook 2A P49 – 52	–	Multilink cubes
–	2	<p>Problem Solving, Maths Journal and Pupil Review</p>	–	Textbook 2 P56 – 60	Worksheet 6B Workbook 2A P53 – 55	–	–
–	–	–	–	–	Review 2 Workbook 2A P57 – 62	Textbook 2 P60 – 61 Workbook 2A P56	–

CHAPTER 3

Multiplication

Tables of 2, 5 and 10

Estimated number of periods: 16

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	Multiplication <ul style="list-style-type: none"> Recall the concept of multiplication. Relate multiplication to repeated addition and '___ groups of ___'. 	<ul style="list-style-type: none"> Work in groups to make multiplication stories, write a multiplication equation for each story and explain the meaning of the equal sign. 	Textbook 2 P62 – 64	Worksheet 1 Workbook 2A P63 – 66	Textbook 2 P64	Drawing block, markers
2	2	Multiplication Table of 2 <ul style="list-style-type: none"> Memorise the multiplication table of 2. 	<ul style="list-style-type: none"> Use concrete objects and pictorial representations to illustrate the concepts of multiplication such as 'multiplying 3 by 5'. 	Textbook 2 P65 – 68	Worksheet 2 Workbook 2A P67 – 70	Teacher's Resource Book P78	Multilink cubes, rubber bands, seeds
3	2	Multiplication Table of 5 <ul style="list-style-type: none"> Memorise the multiplication table of 5. 	–	Textbook 2 P69 – 72	Worksheet 3 Workbook 2A P71 – 76	Teacher's Resource Book P82	Dot cards, paper clips
4	2	Multiplication Table of 10 <ul style="list-style-type: none"> Memorise the multiplication table of 10. 	<ul style="list-style-type: none"> Achieve mastery of multiplication facts by using multiplication-fact cards. 	Textbook 2 P73 – 75	Worksheet 4 Workbook 2A P77 – 80	Textbook 2 P75	Dot cards, multiplication cards
5	4	Solving Word Problems <ul style="list-style-type: none"> Solve 1-step word problems involving multiplication within the tables of 2, 5 and 10. 	–	Textbook 2 P76 – 77	Worksheet 5 Workbook 2A P81 – 85	–	–
–	4	Problem Solving, Maths Journal and Pupil Review	–	–	Review 3 Workbook 2A P87 – 90	Textbook 2 P77 – 78 Workbook 2A P86	–

CHAPTER 4

Dividing by 2, 5 and 10

Estimated number of periods: 16

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	3	Grouping and Sharing <ul style="list-style-type: none"> Use \div correctly. Relate division to grouping and sharing. 	<ul style="list-style-type: none"> Work in groups to make division stories, write a division equation for each story and explain the meaning of the equal sign. 	Textbook 2 P79 – 81	Worksheet 1 Workbook 2A P91 – 92	Textbook 2 P80	Drawing block, markers, multilink cubes
2	3	Dividing by 2, 5 and 10 <ul style="list-style-type: none"> Divide within the multiplication tables of 2, 5 and 10. 	<ul style="list-style-type: none"> Achieve mastery of division facts by using division-fact cards. 	Textbook 2 P82 – 84	Worksheet 2 Workbook 2A P93 – 96	Textbook 2 P84	Division cards
3	2	Multiplication and Division <ul style="list-style-type: none"> Relate multiplication and division. 	<ul style="list-style-type: none"> Achieve mastery of multiplication and division facts by writing a family of 4 basic facts within the multiplication tables given any one of the basic facts (e.g. $3 \times 4 = 12$, $4 \times 3 = 12$, $12 \div 4 = 3$ and $12 \div 3 = 4$ are a family of multiplication and division facts). 	Textbook 2 P85 – 87	Worksheet 3 Workbook 2A P97 – 100	Textbook 2 P87	Drawing block, markers, multiplication cards
4	4	Solving Word Problems <ul style="list-style-type: none"> Solve 1-step word problems involving division by 2, 5 and 10. 	<ul style="list-style-type: none"> – 	Textbook 2 P88 – 89	Worksheet 4 Workbook 2A P101 – 103	–	–
–	4	Problem Solving, Maths Journal and Pupil Review	<ul style="list-style-type: none"> Solve non-routine problems using heuristics such as ‘act it out’ and ‘draw a diagram’ and share their ideas. 	–	Review 4 Workbook 2A P105 – 106	Textbook 2 P90 Workbook 2A P104	Marbles

CHAPTER 5

Multiplication

Tables of 3 and 4

Estimated number of periods: 12

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	Multiplication Table of 3 <ul style="list-style-type: none"> Memorise the multiplication table of 3. 	<ul style="list-style-type: none"> Achieve mastery of multiplication facts by using multiplication-fact cards. 	Textbook 2 P91 – 94	Worksheet 1 Workbook 2A P115 – 120	Textbook 2 P94	Multilink cubes, multiplication cards
2	2	Multiplication Table of 4 <ul style="list-style-type: none"> Memorise the multiplication table of 4. 	<ul style="list-style-type: none"> Achieve mastery of multiplication facts by playing games, including applets and digital games. 	Textbook 2 P95 – 97	Worksheet 2 Workbook 2A P121 – 124	Textbook 2 P97	Dot cards
3	4	Solving Word Problems <ul style="list-style-type: none"> Solve 1-step word problems involving multiplication within the tables of 3 and 4. 	–	Textbook 2 P98 – 100	Worksheet 3 Workbook 2A P125 – 127	–	–
–	4	Problem Solving, Maths Journal and Pupil Review	<ul style="list-style-type: none"> Explore number patterns in the multiplication tables of 2, 3, 4, 5 and 10 through activities such as colouring the hundred chart. 	–	Review 5 Workbook 2A P129 – 132	Textbook 2 P100 – 101 Workbook 2A P128	–

CHAPTER 6

Dividing by 3 and 4

Estimated number of periods: 13

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	3	Dividing by 3 and 4 <ul style="list-style-type: none"> Divide within the multiplication tables of 3 and 4. 	<ul style="list-style-type: none"> Achieve mastery of division facts by <ul style="list-style-type: none"> using division-fact cards. playing games, including applets and digital games. 	Textbook 2 P102 – 105	Worksheet 1 Workbook 2A P133 – 136	Textbook 2 P104	Division cards
2	2	Multiplication and Division <ul style="list-style-type: none"> Relate multiplication and division by writing families of multiplication and division facts based on the multiplication tables of 3 and 4. 	<ul style="list-style-type: none"> Achieve mastery of multiplication and division facts by writing a family of 4 basic facts within the multiplication tables given any one of the basic facts (e.g. $3 \times 4 = 12$, $4 \times 3 = 12$, $12 \div 4 = 3$, $12 \div 3 = 4$ are a family of multiplication and division facts). 	Textbook 2 P106 – 107	Worksheet 2 Workbook 2A P137 – 138	Textbook 2 P107	Multilink cubes
3	4	Solving Word Problems <ul style="list-style-type: none"> Solve 1-step word problems involving multiplication or division. 	<ul style="list-style-type: none"> Work in groups to create word problems (with pictorial representation if necessary) involving multiplication and division for other groups to solve. 	Textbook 2 P108 – 111	Worksheet 3 Workbook 2A P139 – 141	Textbook 2 P110	Drawing block, markers, multiplication and division cards
–	4	Problem Solving, Maths Journal and Pupil Review	–	–	Review 6 Workbook 2A P143 – 144	Textbook 2 P111 – 112 Workbook 2A P142	–

CHAPTER 7

Length

Estimated number of periods: 15

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	3	Measuring Length in Metres <ul style="list-style-type: none"> Estimate and measure length in metres. 	<ul style="list-style-type: none"> Use everyday examples to develop a sense of how long 1 m is, e.g. using a measuring tape. Use their arm span to show 1 m and estimate length in metres. 	Textbook 2 P113 – 115	Worksheet 1 Workbook 2A P145 – 148	Textbook 2 P115	Measuring tape, metre ruler, paper clips
2	3	Measuring Length in Centimetres <ul style="list-style-type: none"> Estimate and measure length in centimetres. 	<ul style="list-style-type: none"> Use everyday examples to develop a sense of how long 1 cm is, e.g. using a 15-cm ruler. Work in groups to measure length using appropriate units and explain their choices of units and how the measurement is done, e.g. measure the length of a longer object in metres. 	Textbook 2 P116 – 119	Worksheet 2 Workbook 2A P149 – 152	Textbook 2 P118	15-cm ruler, measuring tape
3	3	Comparing Lengths <ul style="list-style-type: none"> Compare and order lengths. Measure straight lines and curves. 	<ul style="list-style-type: none"> Work in groups to measure the length of curves using a string. Estimate length before measuring it and use the word 'about' (e.g. about 20 cm) to describe the estimation and measurement. 	Textbook 2 P120 – 122	Worksheet 3A Workbook 2A P153 – 156	–	–
4	3	Solving Word Problems <ul style="list-style-type: none"> Solve word problems involving length (addition and subtraction). Solve word problems involving length (multiplication and division). 	–	Textbook 2 P123 – 126	Worksheet 3B Workbook 2A P157 – 158	Textbook 2 P125	15-cm ruler, pencil, scissors, string
–	3	Problem Solving, Maths Journal and Pupil Review	–	Textbook 2 P127 – 129	Worksheet 4A Workbook 2A P159 – 162	–	–
–	3	–	–	Textbook 2 P130 – 132	Worksheet 4B Workbook 2A P163 – 165	–	–
–	3	–	–	–	Review 7 Workbook 2A P167 – 172	Textbook 2 P132 Workbook 2A P166	–

CHAPTER 8

Mass

Estimated number of periods: 15

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	4	Measuring Mass in Kilograms <ul style="list-style-type: none"> Estimate and measure mass in kilograms. 	<ul style="list-style-type: none"> Recognise that the term 'weight' is commonly used to mean mass in everyday situations. Compare masses of objects using balance scales. Use everyday examples to develop a sense of how heavy 1 kg is, e.g. packets of sugar/flour/rice. Estimate mass before measuring it and use the word 'about' (e.g. about 1 kg) to describe the estimation and measurement. 	Textbook 2 P134 – 140	Worksheet 1 Workbook 2A P173 – 176	Textbook 2 P139	1 kg mass, balance, bathroom scale, packets of rice/sugar in 1 kg/ 2 kg/ 5 kg, weighing scale
2	3	Measuring Mass in Grams <ul style="list-style-type: none"> Estimate and measure mass in grams. 	<ul style="list-style-type: none"> Use everyday examples to develop a sense of how heavy 1 g is, e.g. paper clip, coins. 	Textbook 2 P141 – 144	Worksheet 2 Workbook 2A P177 – 180	Textbook 2 P143	1 g mass, balance, coins, packets of rice weighing from 20g to 750g, paper clips, weighing scale
3	2	Comparing Masses <ul style="list-style-type: none"> Compare and order masses. 	<ul style="list-style-type: none"> Work in groups to measure mass using appropriate units and explain their choices of units and how the measurement is done, e.g. measure the mass of a heavier object in kg. 	Textbook 2 P145 – 148	Worksheet 3 Workbook 2A P181 – 182	Textbook 2 P147	Bathroom scale
4	3	Solving Word Problems <ul style="list-style-type: none"> Solve word problems involving mass (addition and subtraction). Solve word problems involving mass (multiplication and division). 	–	Textbook 2 P149 – 150	Worksheet 4A Workbook 2A P183 – 186	–	–
–	3	Problem Solving, Maths Journal and Pupil Review	–	Textbook 2 P151	Worksheet 4B Workbook 2A P187 – 188	–	–
–	3	Problem Solving, Maths Journal and Pupil Review	–	–	Review 8 Workbook 2A P189 – 194	Textbook 2 P152 Workbook 2A P188	–

CHAPTER 9

More Word Problems

Estimated number of periods: 16

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	6	2-Part Word Problems <ul style="list-style-type: none"> Solve 2-part word problems. 	<ul style="list-style-type: none"> Use the comparison model to reinforce the language of comparison such as “Ali has 30 more stickers than Siti.” Solve 2-part word problems (1 step for each part) before solving 2-step word problems. 	Textbook 2 P153 – 156	Worksheet 1 Workbook 2B P1 – 6	–	–
2	6	2-Step Word Problems <ul style="list-style-type: none"> Solve 2-step word problems. 	<ul style="list-style-type: none"> Work in groups to create word problems involving addition and subtraction for other groups to solve. 	Textbook 2 P157 – 161	Worksheet 2 Workbook 2B P7 – 13	Textbook 2 P160	Drawing block, markers
–	4	Problem Solving, Maths Journal and Pupil Review	–	–	Review 9 Workbook 2B P15 – 16	Textbook 2 P161 – 162 Workbook 2B P14	–

CHAPTER 10

Dollars, Cents and Rupees

Estimated number of periods: 14

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	3	Counting Dollars and Cents <ul style="list-style-type: none"> Count the amount of money in a given set of notes and coins. Read and write in decimal notation. 	<ul style="list-style-type: none"> Read the prices of items from a supermarket advertisement or a grocery shopping list, write the price in dollars and cents and in decimal notation, e.g. \$3.45 is 3 dollars and 45 cents, and use play money to make up an amount of money to pay for a selected item. 	Textbook 2 P163 – 168	Worksheet 1 Workbook 2B P17 – 20	Textbook 2 P167	Mini whiteboard, newspapers, play money
2	3	Changing Dollars and Cents <ul style="list-style-type: none"> Convert an amount of money in decimal notation to cents only and vice versa. 	<ul style="list-style-type: none"> Use play money to make up a given amount of money in different ways (e.g. \$1 is made up of 2 fifty-cent coins or 5 twenty-cent coins), and write the amount in different ways (e.g. \$1, \$1.00 and 100 cents). 	Textbook 2 P169 – 173	Worksheet 2 Workbook 2B P21 – 24	Textbook 2 P172	Blank cards, markers, play money
3	2	Comparing Amounts of Money <ul style="list-style-type: none"> Compare two or three amounts of money. 	<ul style="list-style-type: none"> Compare two or three amounts of money by comparing the dollars first, followed by the cents. 	Textbook 2 P174 – 177	Worksheet 3 Workbook 2B P25 – 32	–	–
4	4	Solving Word Problems <ul style="list-style-type: none"> Solving word problems involving money in dollars only or cents only. 	<ul style="list-style-type: none"> Use play money to make different amounts of money and to add, subtract and make change during shopping activities. Work in groups to create word problems involving shopping using data from supermarket advertisements etc. for other groups to solve. 	Textbook 2 P178 – 182	Worksheet 4A Workbook 2B P33 – 38	Textbook 2 P181	Play money
–	2	Problem Solving, Maths Journal and Pupil Review	–	Textbook 2 P183 – 185	Worksheet 4B Workbook 2B P39 – 40	Textbook 2 P184	Drawing block, markers
–	–	–	–	–	Review 10 Workbook 2B P41 – 44	Textbook 2 P185 – 186 Workbook 2B P40	Play money

CHAPTER 11

Two-Dimensional Shapes

Estimated number of periods: 16

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	Straight Lines and Curves <ul style="list-style-type: none"> Identify straight lines and curves in 2D figures. 	<ul style="list-style-type: none"> Identify straight lines and curves with the use of rulers and CDs. 	Textbook 2 P187 – 189	Worksheet 1 Workbook 2B P45 – 46	Teacher's Resource Book P225	Drawing block, markers
2	2	Semicircles and Quarter Circles <ul style="list-style-type: none"> Explore the relationship between circle, semicircle and quarter circle. 	<ul style="list-style-type: none"> Relate semicircle and quarter circle to circle. 	Textbook 2 P190 – 192	Worksheet 2 Workbook 2B P47 – 50	Textbook 2 P191	A4 papers, CD, glue, scissors
3	3	Making Figures from Shapes <ul style="list-style-type: none"> Recognize the shapes used to form a figure. Form different figures with shapes. 	<ul style="list-style-type: none"> Recognise and describe the differences/similarities between two 2D shapes according to attributes such as straight lines, curves, sizes and colours. Work in groups to create composite figures (e.g. picture of a boat) using 2D shapes and get other groups to identify the basic shapes that make up the composite figures. 	Textbook 2 P193 – 196	Worksheet 3 Workbook 2B P51 – 54	Textbook 2 P195	2D cut-outs (square, rectangle, triangle, circle, semicircle and quarter circle), A4 papers, glue, pencils
4	2	Copying Figures <ul style="list-style-type: none"> Copy figures onto square grids and square dot grids. 	<ul style="list-style-type: none"> Use spatial visualisation skills to copy figures by following the position, orientation and composition of the figures. 	Textbook 2 P197 – 199	Worksheet 4 Workbook 2B P55 – 58	Textbook 2 P198	Dot-grid papers, pencils
5	2	Symmetrical Figures <ul style="list-style-type: none"> Identify symmetrical figures and draw the lines of symmetry. 	<ul style="list-style-type: none"> Understand what symmetrical figures are and identify the line(s) of symmetry. 	Textbook 2 P200 – 202	Worksheet 5 Workbook 2B P59 – 60	Textbook 2 P202	cut-outs of alphabets, marker, drawing block, real-life objects
6	3	Making Patterns <ul style="list-style-type: none"> Make and complete patterns with cut-outs of 2D shapes using one or two of the following attributes: shape, size, orientation and colour. 	<ul style="list-style-type: none"> Guess 2D shapes from given descriptions of the shapes. Make/complete patterns with 2D shapes according to one or two attributes (size, colour, shape and orientation) and explain the patterns. 	P203 – 205	Worksheet 6 Workbook 2B P61 – 63	Textbook 2 P205	2D cut-outs, drawing block, glue
–	2	Problem Solving, Maths Journal and Pupil Review	–	–	Review 11 Workbook 2B P65 – 70	Textbook 2 P206 Workbook 2B P64	–

CHAPTER 12

Three-Dimensional Shapes

Estimated number of periods: 10

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	Recognising Three-Dimensional Shapes <ul style="list-style-type: none"> Recognise flat faces and curved surfaces. Name and describe sphere, cuboid, cube, cylinder and cone. 	<ul style="list-style-type: none"> Recognise, name and describe 3D shapes found in their environment. Make a guess of the 3D shapes in a bag by touch and feel only. Recognise and describe the differences/similarities between two 3D shapes according to attributes such as faces, edges, corners, sizes, colours and rolling. 	Textbook 2 P208 – 212	Worksheet 1 Workbook 2B P71 – 74	Textbook 2 P210	3-D Mini GeoSolids (cone, cube, cuboid, cylinder and sphere), bag, blindfold
2	2	Grouping Three-Dimensional Shapes <ul style="list-style-type: none"> Sort and classify 3D shapes according to attributes. 	<ul style="list-style-type: none"> Work in groups to sort 3D shapes in different ways and explain how the shapes are sorted. 	Textbook 2 P213 – 215	Worksheet 2 Workbook 2B P75 – 76	Textbook 2 P215	3-D Mini GeoSolids
3	2	Forming Three-Dimensional Figures <ul style="list-style-type: none"> Form different figures with shapes. 	<ul style="list-style-type: none"> Work in groups to create different 3D figures using 3D shapes. 	Textbook 2 P216 – 217	Worksheet 3 Workbook 2B P77 – 78	Textbook 2 P217	3-D Mini GeoSolids
4	2	Making Patterns <ul style="list-style-type: none"> Make and complete patterns with 3D shapes 	<ul style="list-style-type: none"> Make/complete patterns with 3D shapes (except sphere) according to one or two attributes (size, shape, colour and orientation) and explain the patterns. Work in groups to create a pattern and invite other groups to guess the missing shape(s) and explain the pattern. 	Textbook 2 P218 – 220	Worksheet 4 Workbook 2B P79 – 80	Textbook 2 P219	3-D Mini GeoSolids
–	2	Problem Solving, Maths Journal and Pupil Review	–	–	Review 12 Workbook 2B P83 – 84	Textbook 2 P220 – 221 Workbook 2B P83 – 84	–

CHAPTER 13

Fractions

Estimated number of periods: 21

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	5	<p>Understanding Fractions</p> <ul style="list-style-type: none"> • Fraction as part of a whole. • Notation and representations of fractions. 	<ul style="list-style-type: none"> • Give examples of fractions in everyday situations and use language such as '2 out of 3' to describe fractions. • Use concrete objects, fraction discs and pictorial representations to represent and interpret fractions in terms of unit fractions, e.g. $\frac{3}{5}$ is 3 units of $\frac{1}{5}$, $\frac{1}{5} + \frac{1}{5} + \frac{1}{5}$, or 3 fifths, and to compare the sizes of fractions referring to the same whole. 	Textbook 2 P222 – 228	Worksheet 1 Workbook 2B P99 – 104	Textbook 2 P227	A4 papers, fraction discs, pencils
2	5	<p>More Fractions</p> <ul style="list-style-type: none"> • Make one whole. • Notation for writing a fraction in one whole. 	<ul style="list-style-type: none"> • Achieve mastery of fraction recognition by playing games using fraction cards (picture and symbols). 	Textbook 2 P297 – 299	Worksheet 2 Workbook 2B P105 – 106	Textbook 2 P231	Fraction cards

		<p>Comparing and Ordering Fractions</p> <ul style="list-style-type: none"> Compare 2 or 3 unit fractions with denominators not exceeding 12. Compare 2 or 3 like fractions with denominators not exceeding 12. 	<ul style="list-style-type: none"> Use fraction discs to represent and compare two unit fractions and explain why the greater the denominator, the smaller the unit fraction, e.g. $\frac{1}{6}$ is smaller than $\frac{1}{3}$. Use fraction discs to represent and compare two like fractions (i.e. fractions with the same denominator) and explain why the greater the numerator, the greater the like fraction, e.g. $\frac{6}{7}$ is greater than $\frac{4}{7}$. Achieve mastery of fraction comparison by playing games, including applets and digital games. 	Textbook 2 P233 – 238	Worksheet 3 Workbook 2B P107 – 110	Textbook 2 P237	Fraction cards, fraction discs
3	4		<p>Adding and Subtracting Like Fractions</p> <ul style="list-style-type: none"> Add like fractions within one whole with denominators not exceeding 12. Subtract like fractions within one whole with denominators not exceeding 12. 	Textbook 2 P239 – 241	Worksheet 4A Workbook 2B P111 – 112	–	–
4	5		<p>Problem Solving, Maths Journal and Pupil Review</p>	Textbook 2 P242 – 245	Worksheet 4B Workbook 2B P113 – 114	Textbook 2 P244	Fraction discs, mahjong paper, markers
–	2			–	Review 13 Workbook 2B P117 – 118	Textbook 2 P245 – 246 Workbook 2B P116	–

CHAPTER 14

Time

Estimated number of periods: 12

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	4	Telling and Writing Time to 5 Minutes <ul style="list-style-type: none"> Telling time to 5 minutes. Writing time to 5 minutes. 	<ul style="list-style-type: none"> Use a geared clock to tell time to 5 minutes and relate it to the events of a day. Count aloud in steps of 5 while the minute hand of a geared clock moves from one number to the next and make connections to the multiplication table of 5. 	Textbook 2 P247 – 250	Worksheet 1 Workbook 2B P119 – 122	Textbook 2 P96	12-h demonstration geared clock
2	2	Using a.m. and p.m. <ul style="list-style-type: none"> Write time using a.m. or p.m. Indicate a.m. or p.m. given some events. 	<ul style="list-style-type: none"> Show time using a geared clock for others to read the time. Tell time and relate words such as ‘morning’, ‘afternoon’, ‘night’ to a.m. and p.m., and give examples such as “I watched a movie with my father at 7.30 p.m.” 	Textbook 2 P251 – 253	Worksheet 2 Workbook 2B P123 – 126	Textbook 2 P100	12-h demonstration geared clock
3	4	Telling Time After <ul style="list-style-type: none"> Tell the time one hour later. Tell the time half an hour later. Write min for minute(s). Write h for hour(s). 	<ul style="list-style-type: none"> Use everyday examples such as TV programmes and bus schedules to tell and write time and to identify events that last about 1 hour/half hour, e.g. the Mathematics lesson lasted half an hour. 	Textbook 2 P255 – 257	Worksheet 3 Workbook 2B P127 – 130	Textbook 2 P104	–
–	2	Problem Solving, Maths Journal and Pupil Review	–	–	Review 14 Workbook 2B P133 – 134	Textbook 2 P258 Workbook 2B P132	–

CHAPTER 15

Volume

Estimated number of periods: 8

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	3	Measuring Volumes in Litres <ul style="list-style-type: none"> Use 1-litre containers to measure the volumes of water in different containers. Estimate and measure volumes in litres (£). 	<ul style="list-style-type: none"> Work in groups to measure volume of liquid using appropriate units and explain how the measurement is done. Estimate volume before measuring it and use the word 'about' (e.g. about 1 £) to describe the estimation and measurement. 	Textbook 2 P259 – 262	Worksheet 1 Workbook 2B P135 – 138	Textbook 2 P261	1-litre bottle, containers of various shapes and sizes
2	3	Solving Word Problems <ul style="list-style-type: none"> Solve word problems involving volumes (addition and subtraction). Solve word problems involving volumes (multiplication and division). 	–	Textbook 2 P263 – 265	Worksheet 2A Workbook 2B P139 – 140	–	–
–	2	Problem Solving, Maths Journal and Pupil Review	–	Textbook 2 P266 – 267	Worksheet 2B Workbook 2B P141 – 142	–	–
–	–			–	Review 15 Workbook 2B P143 – 144	Textbook 2 267 – 268 Workbook 2B P42	Newspaper clippings

CHAPTER 16

Picture Graphs and Tally Charts

Estimated number of periods: 8

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	4	Reading Picture Graphs with Scales <ul style="list-style-type: none"> Read and interpret picture graphs with scales. Read and interpret horizontal and vertical picture graphs. Solve 1-step word problems using picture graphs. 	<ul style="list-style-type: none"> Work in groups to write a question and answer it by collecting data from more than one class. 	Textbook 2 P270 – 275	Worksheet 1 Workbook 2B P145 – 147	Textbook 2 P274	Drawing block, markers
2	2	Reading Tally Charts <ul style="list-style-type: none"> Read and interpret tally charts. Solve 1-step word problems using tally charts. 	<ul style="list-style-type: none"> Read and interpret tally charts by counting the number of tally marks. Infer data from tally charts and solve 1-step word problems. 	Textbook 2 P276 – 278	Worksheet 2 Workbook 2B P148 – 149	–	Drawing block, markers, newspaper clippings
–	2	Problem Solving, Maths Journal and Pupil Review	<ul style="list-style-type: none"> Use data from the Internet to make a picture graph and explain why a scale is used instead of one-to-one representation. Represent and interpret picture graphs in both vertical and horizontal forms. Discuss real-world examples of data presented in picture graphs found in newspapers and magazines. 	–	Review 16 Workbook 2B P151 – 152	Textbook 2 P279 – 280 Workbook 2B P150	Newspaper clippings

CHAPTER 17

Rotation

Estimated number of periods: 4

Lesson	Number of Periods	Learning Objectives	Learning Experiences	Textbook Learning	Workbook Practice	Pupil-centred Activities	Concrete Materials
1	2	Rotation <ul style="list-style-type: none"> Understand what rotation means. Draw the shape after a rotation in the clockwise or anticlockwise direction. 	<ul style="list-style-type: none"> Rotate real-life objects and discuss if the objects look the same or different after rotation. Draw the shape in the correct orientation after a rotation. 	Textbook 2 P281 – 283	Worksheet 1 Workbook 2B P153	-	Sticker 😊, shape cut-outs
2	2	Problem Solving, Maths Journal and Pupil Review	-	-	Review 17 Workbook 2B P151 – 152	Textbook 2 P284 Workbook 2B P154	Real-life objects

SYLLABUS MATCHING GRID

CAMBRIDGE PRIMARY MATHEMATICS STAGE 2

Learning Objective	Reference
1. Number	
Numbers and the number system	
Count, read and write numbers to at least 100 and back again.	Book 1 Chapters 1, 6, 10 and 15
Count up to 100 objects, e.g. beads on a bead bar.	Book 1 Chapters 1, 6, 10 and 15
Count on in ones and tens from single- and two-digit numbers and back again.	Book 1 Chapters 1, 6, 10 and 15
Count in twos, fives and tens, and use grouping in twos, fives or tens to count larger groups of objects.	Chapters 1 and 3
Begin to count on in small constant steps such as threes and fours.	Chapter 5
Know what each digit represents in two-digit numbers; partition into tens and ones.	Chapters 10, 11, 15 and 16
Find 1 or 10 more/less than any two-digit number.	Book 1 Chapters 6, 10, 15
Round two-digit numbers to the nearest multiple of 10.	Book 4 Chapter 1
Say a number between any given neighbouring pairs of multiples of 10, e.g. 40 and 50.	Book 1 Chapter 15
Recognise and use ordinal numbers up to at least the 10th number and beyond.	Book 1 Chapter 5
Order numbers to 100; compare two numbers using the > and < signs.	Book 1 Chapters 1, 6, 10 and 15
Understand even and odd numbers and recognise these up to at least 20.	Chapter 1
Sort numbers, e.g. odd/even, multiples of 2, 5 and 10.	Chapter 3
Recognise that we write one half $\frac{1}{2}$, one quarter $\frac{1}{4}$ and three quarters $\frac{3}{4}$.	Chapter 13
Recognise that $\frac{2}{2}$ or $\frac{4}{4}$ make a whole and $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent.	Chapter 13
Recognise which shapes are divided in halves or quarters and which are not.	Chapter 13
Find halves and quarters of shapes and small numbers of objects.	Chapter 13
2. Calculation	
Mental strategies	
Find and learn by heart all number pairs to 10 and pairs with a total of 20.	Book 1 Chapters 3 and 7
Partition all numbers to 20 into pairs and record the related addition and subtraction facts.	Book 1 Chapters 3 and 7
Find all pairs of multiples of 10 with a total of 100 and record the related addition and subtraction facts.	Book 1 Chapter 16
Learn and recognise multiples of 2, 5 and 10 and derive the related division facts.	Chapter 4
Addition and Subtraction	
Relate counting on/back in tens to finding 10 more/less than any two-digit number and then to adding and subtracting other multiples of 10, e.g. $75 - 30$.	Book 1 Chapters 7, 11 and 16
Use the = sign to represent equality, e.g. $16 + 4 = 17 + 3$.	Chapter 2
Recognise the use of a symbol such as \square or Δ to represent an unknown, e.g. $\Delta + \square = 10$.	Book 3 Chapter 2
Solve number sentences such as $27 + \square = 30$.	Chapter 2
Add and subtract a single digit to and from a two-digit number.	Chapter 2
Add pairs of two-digit numbers.	Chapter 2
Find a small difference between pairs of two-digit numbers.	Chapter 2
Understand that addition can be done in any order, but subtraction cannot.	Chapter 2
Understand subtraction as both difference and take away.	Chapter 2

Multiplication and division	
Understand multiplication as repeated addition and use the \times sign.	Chapters 3 and 5
Understand multiplication as describing an array.	Chapters 3 and 5
Understand division as grouping and use the \div sign.	Chapters 4 and 6
Use counting in twos, fives or tens to solve practical problems involving repeated addition.	Chapters 3, 4, 5 and 6
Find doubles of multiples of 5 up to double 50 and corresponding halves.	Chapters 3, 4, 5 and 6
Double two-digit numbers.	Chapters 3, 4, 5 and 6
Work out multiplication and division facts for the $3\times$ and $4\times$ tables.	Chapters 3, 4, 5 and 6
Understand that division can leave some left over.	Chapters 4 and 6
3. Geometry	
Shapes and geometric reasoning	
Sort, name, describe, visualise and draw 2D shapes (e.g. squares, rectangles, circles, regular and irregular pentagons and hexagons) referring to their properties; recognise common 2D shapes in different positions and orientations.	Book 1 Chapter 8
Sort, name, describe and make 3D shapes (e.g. cubes, cuboids, cones, cylinders, spheres and pyramids) referring to their properties; recognise 2D drawings of 3D shapes.	Chapter 12
Identify reflective symmetry in patterns and 2D shapes; draw lines of symmetry.	Chapter 11
Find examples of 2D and 3D shape and symmetry in the environment.	Chapter 11
Position and movement	
Follow and give instructions involving position, direction and movement.	Book 1 Chapter 22
Recognise whole, half and quarter turns, both clockwise and anti-clockwise.	Book 1 Chapter 22
Recognise that a right angle is a quarter turn.	Chapter 17
4. Measure	
Money	
Recognise all coins and notes.	Chapter 10
Use money notation.	Chapter 10
Find totals and the coins and notes required to pay a given amount; work out change.	Chapter 10
Length, mass and capacity	
Estimate, measure and compare lengths, weights and capacities, choosing and using suitable uniform non-standard and standard units and appropriate measuring instruments.	Chapters 7, 8 and 15
Compare lengths, weights and capacities using the standard units: centimetre, metre, 100 g, kilogram, and litre.	Chapters 7, 8 and 15
Time	
Know the units of time (seconds, minutes, hours, days, weeks, months and years).	Chapter 14
Know the relationships between consecutive units of time.	Chapter 14
Read the time to the half hour on digital and analogue clocks.	Chapter 14
Measure activities using seconds and minutes.	Chapter 14
Know and order the days of the week and the months of the year.	Chapter 14
5. Handling data	
Organising, categorising and representing data	
Answer a question by collecting and recording data in lists and tables, and representing it as block graphs and pictograms to show results.	Chapter 16

6. Problem solving

Using techniques and skills in solving mathematical problems	
Choose appropriate mental strategies to carry out calculations and explain how they worked out the answer.	Chapter 2
Explain methods and reasoning orally.	Chapter 2
Explore number problems and puzzles.	Chapters 2, 3, 4, 5, 6, 9
Make sense of simple word problems (single and easy two-step), decide what operations (addition or subtraction, simple multiplication or division) are needed to solve them and, with help, represent them, with objects or drawings or on a number line.	Chapter 9
Make up a number story to go with a calculation, including in the context of money.	Chapters 9 and 10
Check the answer to an addition by adding the numbers in a different order or by using a different strategy, e.g. $35 + 19$ by adding 20 to 35 and subtracting 1, and by adding $30 + 10$ and $5 + 9$.	Chapter 9
Check a subtraction by adding the answer to the smaller number in the original subtraction.	Chapter 9
Describe and continue patterns which count on in twos, threes, fours or fives to 30 or more.	Chapter 1
Identify simple relationships between numbers and shapes, e.g. this number is double ...; these shapes all have ... sides.	Chapter 11
Make a sensible estimate for the answer to a calculation.	Chapter 9
Consider whether an answer is reasonable.	Chapter 9

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:

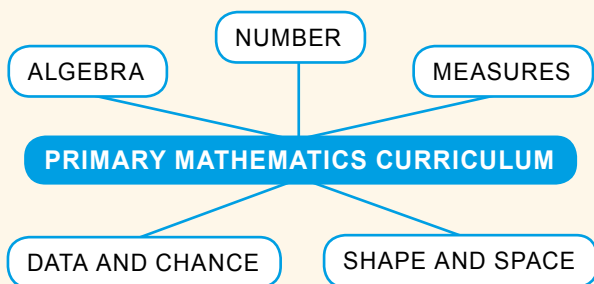
1. pupil-centred learning
2. active participation
3. problem solving
4. critical thinking
5. real-life contextual exercises
6. mathematical communication and reasoning

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.

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NUMBERS TO 1000

CHAPTER

1

Numbers to 1000

CHAPTER 1

How many jelly beans are there altogether?

COUNTING IN HUNDREDS, TENS AND ONES

LESSON 1

RECAP

10 ones make 1 ten.

Use to show that 10 ones make 1 ten. How many tens make 1 hundred?

1 CHAPTER 1

Textbook 2 P1

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Related Resources

NSPM Textbook 2 (P1 – 24)
NSPM Workbook 2A (P1 – 28)

Materials

'0' to '9' dice, 2-colour counters, 3000 seeds, base-ten sets, containers, drawing block, markers, place-value cards, place-value chart

Lesson

- Lesson 1 Counting in Hundreds, Tens and Ones
 - Lesson 2 Place Value
 - Lesson 3 Comparing and Ordering Numbers
 - Lesson 4 Number Patterns
 - Lesson 5 Odd and Even Numbers
- Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

Pupils will learn to count, read and write numbers up to 1000 in numerals and in words. They revisit the concepts taught in Grade 1 on numbers up to 100. Place-value concept of hundreds, tens and ones is reinforced with the use of concrete materials such as base-ten sets and place-value cards. Pupils will also be taught on how to compare and order 3-digit numbers as well as recognise and complete number patterns. In addition, odd and even numbers are introduced to pupils in this chapter.

LESSON

1

COUNTING IN HUNDREDS, TENS AND ONES

LEARNING OBJECTIVES

1. Count in hundreds, tens and ones to tell the number of objects in a given set.

Numbers to 1000 CHAPTER 1



How many jelly beans are there altogether?

COUNTING IN HUNDREDS, TENS AND ONES LESSON 1

RECAP

10 ones make 1 ten.



Use  to show that 10 ones make 1 ten. How many tens make 1 hundred?

1 CHAPTER 1 OXFORD UNIVERSITY PRESS

Textbook 2 P1



RECAP

Use the base-ten blocks to recap 10 ones = 1 ten with pupils.



Count in hundreds.
How many jelly beans are there?

LET'S LEARN

1.



Show the number of jelly beans using .



Use the chapter opener to guide pupils to count in tens, then in hundreds. Ask the following questions to help them to count in tens:

- How many jelly beans are there in each packet?
- How many jellybeans are there in 3 packets?
- How many tens make 1 hundred?

Write **10 tens = 1 hundred** on the whiteboard.

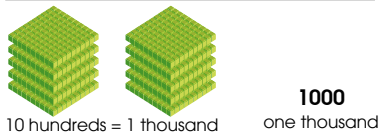
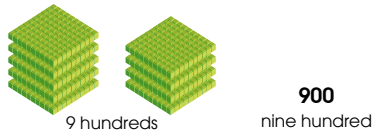
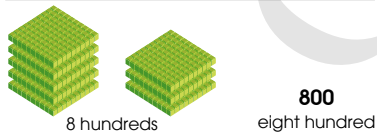
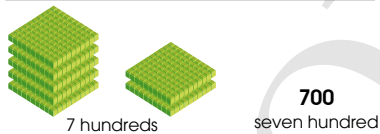
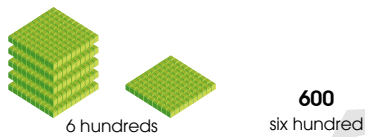
Next, ask the following questions to help pupils to count in hundreds:

- How many jelly beans are there in each bottle?
- Should we count in tens or hundreds to find out how many jelly beans there are in 10 bottles?
- How many jellybeans are there in 10 bottles?
- How many hundreds make a thousand?

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

LET'S LEARN

Pupils can be given base-ten blocks and asked to count in hundreds as they stack up the blocks.

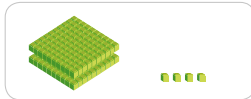


How many hundreds make 1 thousand?



As pupils stack up the blocks to make one thousand, ask them how many hundreds make one thousand.

2. How many  are there?

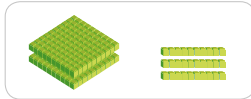


100, 200, 201, 202, 203, 204

Count on in ones from 200.



3. How many  are there?



100, 200, 210, 220, 230

Count on in tens from 200.



4. How many  are there?



100, 200, 210, 220, 230, 240, 250, 251, 252, 253

Count on in tens and ones.



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NUMBERS TO 1000

4






Textbook 2 P4

Pupils can use base-ten blocks to represent what they see in each example in Let's Learn. In Let's Learn 2, lead pupils to count in hundreds first, followed by ones.

In Let's Learn 3, ask pupils if they should first count the hundreds or the tens. After which, guide them to count in hundreds, followed by tens.

Likewise, repeat the procedure for Let's Learn 4. Allow pupils to do the counting this time. Alternatively, get pupils to work in pairs, allowing one pupil to represent the number using base-ten blocks and the other pupil to count in hundreds, tens, then ones to find out the number of units.


Work in groups of 4.

- Count 100  and put them in . Pour the rest into .
- Compare the two containers. Guess the number of  in .

ACTIVITY TIME

What you need:



I count the  in tens. There are 100 beans in jar A.



There are about 300 beans in Jar B.

- Check your guess.

PRACTICE

Count. Write in numerals and in words.

(a)  300 three hundred

(b)  210 two hundred and eleven

Complete Workbook 2A, Worksheet 1 • Pages 1 – 4

5 CHAPTER 1

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Textbook 2 P5

ACTIVITY TIME



Assign pupils to work in groups of 4 and give 400 seeds to each group.

This activity allows pupils to have a feel of how large the numbers are. At the end of the activity, show pupils a jar with 1000 seeds or conduct a class game and get pupils to guess the number of seeds in a jar.

PRACTICE



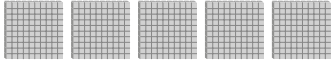
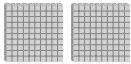
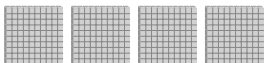
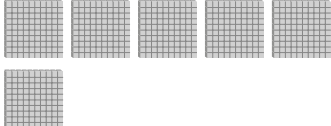
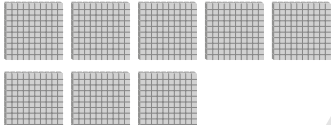
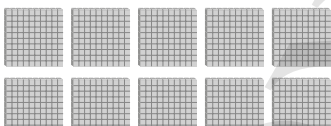
Work with pupils on the questions and selected examples from **Worksheet 1**.

Independent seatwork

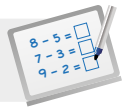
Assign pupils to complete Worksheet 1 (Workbook 2A P1 – 4).

1. (a) 7
(b) 800

2.

Number of blocks	Numerals	Words
	500	five hundred
	200	two hundred
	400	four hundred
	600	six hundred
	800	eight hundred
	1000	one thousand

3. (a) 160
(b) 205
(c) 327
(d) 444
(e) 808
(f) 999

**Specific Learning Focus**

- Count in hundreds, tens and ones to tell the number of objects in a given set.

Suggested Duration

2 periods

Prior Learning

Pupils have been introduced to 'ty' numbers and one hundred in Grade 1. They understand that it is easier to count numbers when numbers are 'stacked' or 'organised' systematically in 'tens' or bundles of tens. For example, ten such bundles of tens make one hundred. Similarly, multiple stacks of hundred make 2, 3, 4 hundreds and so on. An introductory 'jog the memory' exercise can be done as a quick 'Recap' with base-ten blocks or stacks of tens. Similarly, the teacher can bring a jar of jelly beans to class and explain the importance of counting in tens when counting large numbers (e.g. 100).

Pre-emptive Pitfalls

The introductory 'Recap' class can be carried out with a quick 5-minute worksheet as revision. The recap of concept learnt previously is important as 'one thousand' is introduced in this lesson. Unless the concept of tens and hundreds is completely understood, introducing the next place value (thousands) might be a challenge. Similarly, going beyond one hundred and dealing with 3-digit numbers will be new to the pupils. Several hands-on activities should be done for 3-digit numbers.

Introduction

Encourage pupils to relate numbers to real life. But before making the numbers tangible, introductory activities using base-ten blocks, ten-frame and hundred chart should be carried out. Various activities can be done verbally in class as well. For example, distribute a whiteboard to each pupil and ask 'I have 3 blocks of hundred, 2 blocks of ten and 5 cubes. What number am I?'. Have them write the number both in numeral and in words and raise the whiteboard in the air. In Let's Learn 1 (Textbook 1 P3), the question asks for the number of hundreds that make 1 thousand. Pupils are expected to stack up ten blocks of hundred to make one thousand.

Problem Solving

Help pupils demonstrate their proficiency by applying their knowledge in real-life problem-solving. Ask them to use the internet to find towns that have a population of less than a thousand. Then, get them to arrange the towns in the order of smallest population size to largest population size. Encourage presentation on chart paper and put up on the soft board in the classroom. Similarly, the teacher can list down on chart paper other real-life examples of large numbers in thousands such as house numbers, total number of pupils in a certain grade or in the entire school, their car license number, etc. These numbers can be expressed in numeral words and expanded form. This will enhance their understanding of numbers and develop their problem-solving skills.

Activities

'Practice' (Textbook 2 P5) can be done as an activity in groups or in pairs. Explain to pupils that it is easier to count 3-digit numbers in stacks of hundred. Paper clips, straws, pebbles, etc. can be used to enhance this concept.

Resources

- base-ten sets
- ice-cream sticks
- numeral cards (Activity Handbook 2 P1 – 3)
- straws
- magazine with real-life pictures of buildings etc. (with numbers)
- number word cards (Activity Handbook 2 P4 – 6)

Mathematical Communication Support

Distribute numeral cards and number word cards to pupils. Arrange three numeral cards to make a 3-digit number and ask pupils to write the number in words by understanding how many hundreds, tens and ones there are in the number. Get them to re-arrange the order of the three numeral cards such that we get a smaller or greater number. In addition, teachers can write a 3-digit number on the board and ask pupils to raise the correct numeral cards that make that number. Ask pupils for the spellings of some 3-digit numbers and get them to complete the worksheets (Workbook 2A P1 – 4).

LEARNING OBJECTIVES

1. Represent numbers within 1000 in hundreds, tens and ones.
2. State the values of the digits in a given number.
3. Read and write numbers to 1000 in numerals and in words.

LESSON
2

PLACE VALUE

IN FOCUS

100
crayons

100
crayons

100
crayons

100
crayons

10
crayons

10
crayons

There are 427 crayons.
What does the digit 4 in 427 stand for?

LET'S LEARN

1.

The digit 4 is in the hundreds place. Which digit is in the tens place and in the ones place?

Hundreds	Tens	Ones
4	2	7

$427 = 4 \text{ hundreds } 2 \text{ tens } 7 \text{ ones}$
 $427 = 400 + 20 + 7$

400
 20
 7
 \rightarrow

427

The digit 4 stands for 4 **hundreds** or 400.
 The digit 2 stands for 2 **tens** or 20.
 The digit 7 stands for 7 **ones** or 7.

We write 427 as **four hundred and twenty-seven** in words.

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NUMBERS TO 1000
6

IN FOCUS

Discuss what the word 'digit' means by asking the following questions:

- What is the question asking for?
- What is the value of the digit 4 in 427?

LET'S LEARN

Place a blank place-value chart on the board or visualiser:

Hundreds	Tens	Ones

Introduce to pupils that a place-value chart is used to show the values of the digits in a number and the place values of the digits. Use the base-ten blocks to represent the number of crayons and write 427 on the chart. Go through what each digit stands for.

Alternatively, use place-value cards to represent 427 on the chart. Individual cards can be used to show the value of each digit.

Show how 427 can be written in words. Recapitulate what pupils have learnt in Lesson 1 on counting in hundreds, tens and ones.

2. What is the value of each digit in 530?

Hundreds	Tens	Ones
5	3	0

530 = 5 hundreds 3 tens 0 ones

$$530 = 500 + 30 + 0$$

The value of the digit 5 is 500.

5 0 0

The value of the digit 3 is 30.

3 0 → 5 3 0


The value of the digit 0 is 0.

0

We write 530 as **five hundred and thirty** in words.

ACTIVITY TIME

Work in pairs.

1 Pupil A shows a 3-digit number with .

What you need:



2 Pupil B uses  to show the number.

3 Tell the value of each digit in the number. Write the number in words.



4 Switch roles and repeat 1 to 3.

7

CHAPTER 1

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Textbook 2 P7

Likewise, repeat the procedure in Let's Learn 2 using the place-value chart and place-value cards.

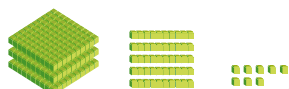
ACTIVITY TIME



Provide pupils with the necessary materials and demonstrate the activity with a pupil to the class.

Allow pupils to spend 10 minutes on this activity. An accompanying worksheet or blank paper can be given to pupils to record their answers.

1. Count in hundreds, tens and ones.



Hundreds	Tens	Ones
3	5	8

358 = 3 hundreds 5 tens 8 ones

$$358 = 300 + 50 + 8$$

The digit 8 is in the ones place.

The digit 3 stands for 300.

The value of the digit 5 is 50.

2. Write in numerals.

- (a) Five hundred and sixty-two 562
- (b) Six hundred and forty 640
- (c) Nine hundred and three 903

3. Write in words.

- (a) 213 two hundred and thirteen
- (b) 305 three hundred and five
- (c) 751 seven hundred and fifty-one
- (d) 840 eight hundred and forty

Complete Workbook 2A, Worksheet 2 • Pages 5 – 10

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NUMBERS TO 1000

8

Textbook 2 P8

PRACTICE



Work with pupils on the questions and selected examples from **Worksheet 2**.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2A P5 – 10).

1. (a)

Hundreds	Tens	Ones
1	1	1

111 = 1 hundred 1 ten 1 one
 $111 = 100 + 10 + 1$

(b)

Hundreds	Tens	Ones
2	0	9

209 = 2 hundreds 0 tens 9 ones
 $209 = 200 + 0 + 9$

(c)

Hundreds	Tens	Ones
5	4	5

545 = 5 hundreds 4 tens 5 ones
 $545 = 500 + 40 + 5$

(d)

Hundreds	Tens	Ones
6	6	0

660 = 6 hundreds 6 tens 0 ones
 $660 = 600 + 60 + 0$

(e)

Hundreds	Tens	Ones
7	8	0

780 = 7 hundreds 8 tens 0 ones
 $780 = 700 + 80 + 0$

2. (a) 1, 3, 6
 (b) hundreds, tens, ones
 (c) 5, 4, 3
 (d) 100, 0, 5
 (e) 9
 (f) 300, 30, 3
 (g) hundreds

3. (a) 125
 (b) 307
 (c) 613
 (d) 986

4. (a) Two hundred and forty
 (b) Five hundred and three
 (c) Eight hundred and twenty-one
 (d) One thousand

**Specific Learning Focus**

- Represent numbers within 1000 in hundreds, tens and ones.
- State the values of the digits in a given number.
- Read and write numbers to 1000 in numerals and in words.

Suggested Duration

2 periods

Prior Learning

Place value was formally introduced in Grade 1, where the concepts of tens and ones were explained using concrete materials. Base-ten blocks and templates helped pupils to progress better from 1-digit numbers to 2-digit numbers. Numbers from 10 to 20 were introduced first and the spiral approach for numbers from 40 to 100 was reinforced in stages.

Pre-emptive Pitfalls

Learning numbers beyond 100 might be challenging for some pupils. Breaking up 3-digit numbers into hundreds, tens and ones using the place-value chart or place-value cards helps pupils understand 3-digit numbers better. Real-life objects and 3-digit numbers found around us play a crucial role in making the numbers tangible to pupils. Pupils should not count numbers by rote. To prevent this, a lot of practice using 3-digit numbers on cards and writing the digits on place-value charts should be done.

Introduction

Base-ten blocks and stacks of standard or non-standard materials should be placed on the desk and encourage pupils to write numbers in (i) numerals, (ii) words, and (iii) expanded form. Introduce the place-value chart in a colour code. Colour each place value with a different colour to emphasise the different place values. Alternatively use base-ten blocks to show the numeric value of the 3-digit number. Explain that counting on by 1 ten from 9 tens, we get 10 tens which makes a hundred. Similarly, counting on by 1 hundred from 9 hundreds, we get 10 hundreds which makes a thousand. The thousands place value in the place-value chart will be introduced later.

Problem Solving

Encourage expansion of numbers with a lot of practice worksheets and exercises (Textbook 2 P7 – 8). Breaking up a 3-digit number by placing each digit in each column of the place-value chart and expressing them in words are important for pupils to understand the value of each digit.

Activities

The use of base-ten blocks, place-value charts (Activity Handbook 2 P8) and cards are essential for this lesson. The activity (Textbook 2 P7) encourages peer learning, mathematical communication and teamwork.

Resources

- place-value chart (Activity Handbook 2 P8)
- base-ten blocks (Activity Handbook 2 P14)
- numeral cards (Activity Handbook 2 P9)
- number word cards (Activity Handbook 2 P4 – 6)

Mathematical Communication Support

Teach by asking the breakup of 3-digit numbers. Ask pupils to write the numbers in words and in the expanded form. Have pupils scramble the digits of a 3-digit number to make either a greater or a smaller number. Ask them why 379 is smaller than 739. Several discussions in class will help pupils clear any misconceptions they might have with 3-digit numbers.

LESSON

3

COMPARING AND ORDERING NUMBERS

LEARNING OBJECTIVES

1. Compare and order numbers within 1000.

COMPARING AND ORDERING NUMBERS

LESSON
3

RECAP

Compare 16, 38 and 34.



Tens	Ones
1	6

16 = 1 ten 6 ones

Tens	Ones
3	8

38 = 3 tens 8 ones

Tens	Ones
3	4

34 = 3 tens 4 ones

1 ten is smaller than 3 tens.
16 is the smallest.

What should we compare first?



Compare 38 and 34.
8 ones is greater than 4 ones.
38 is greater than 34.
38 is the greatest.

Both 38 and 34 have 3 tens.
What should we compare next?



Arrange the numbers in order.
Start with the greatest.

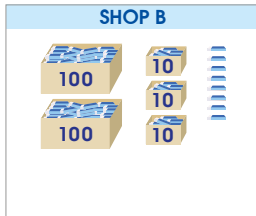
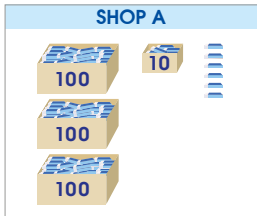
38, 34, 16
greatest → smallest

RECAP

Ask the following question before reviewing the comparison of three 2-digit numbers:

- What should we compare first, the tens or the ones?

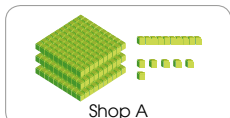
Remind pupils to start with the largest place value for comparison.



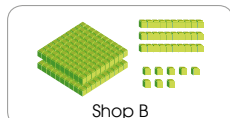
Which shop has more erasers? How do you know?

LET'S LEARN

1. Which number is greater, 316 or 238?



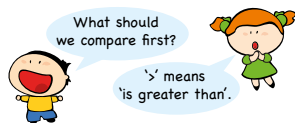
Hundreds	Tens	Ones
3	1	6



Hundreds	Tens	Ones
2	3	8

3 hundreds is greater than 2 hundreds.
316 is greater than 238.
We write it as $316 > 238$.

Shop A has more erasers.



Textbook 2 P10

Using the given context, discuss with pupils how to compare the number of erasers between Shop A and Shop B by asking the following questions:

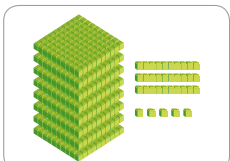
- How many erasers does Shop A have?
- How many erasers does Shop B have?
- Recall how we compared the 2-digit numbers earlier. What do you think we should do now?

LET'S LEARN

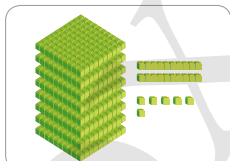
Write down the numbers 316 and 238 on the place-value chart. Ask pupils whether to compare the hundreds, tens or ones first. Remind them to start with the greatest place value.

Cover the digits in tens and ones place to compare the digits in hundreds place. Since 3 hundreds is greater than 2 hundreds, 316 is greater than 238. Check with pupils if there is a need to compare the tens and ones place.

2. Which number is smaller, 835 or 826?



Hundreds	Tens	Ones
8	3	5



Hundreds	Tens	Ones
8	2	6

The digits in the hundreds place are the same. What should we compare next?

We compare the digits in the tens place.



2 tens is smaller than 3 tens.
826 is smaller than 835.
We write it as $826 < 835$.

'<' means 'is smaller than'.



Do you know how to compare 472 and 479? Which is greater?



Textbook 2 P11

3. Arrange 325, 235 and 253 in order. Start with the smallest.

3 2 5 **2 3 5** **2 5 3**

3 hundreds is greater than 2 hundreds.

325 is the greatest.

Now, compare 235 and **253**.

3 tens is smaller than 5 tens.

235 is smaller than **253**.

235 is the smallest.

We write it as $235 < 253 < 325$.

235, 253, 325
smallest → greatest

ACTIVITY 1 TIME

Play in groups of 3.

- 1 Take turns to roll the three times.

- 2 Write each number you roll on the to form a 3-digit number.

- 3 Use to show your number.

- 4 Compare the numbers.

What you need:



9 hundreds is greater than 7 hundreds and 8 hundreds.



932 is the greatest.

The player with the greatest number wins!

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NUMBERS TO 1000

12

Textbook 2 P12

Repeat the procedure for Let's Learn 3 by asking the same questions.

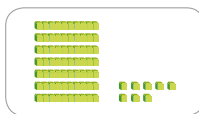
ACTIVITY 1 TIME

Distribute the necessary materials to the groups and demonstrate the activity with 2 pupils to the class.

Encourage pupils to use terms such as **greater than**, **greatest**, **smaller than**, **smallest** and **the same as** to describe the comparison.

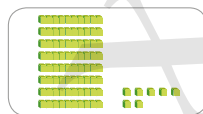
1. Compare the numbers.

(a)



7 8

78 is smaller than **87**.



8 7

(b)

3 2 5

2 3 5

325 is greater than **235**.

2. Arrange the numbers in order.

(a) 74 , 47 , 77 (b) 128 , 124 , 182

47 , **74** , **77**

124 < **128** < **182**

smallest → greatest

3. Fill in the blanks with < or >.

(a) 35 > 24

(b) 58 < 77

(c) 145 < 300

(d) 727 > 413

(d) 214 < 224

(e) 546 > 532

Complete Workbook 2A, Worksheet 3 + Pages 11 – 18

13

CHAPTER 1

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Textbook 2 P13

PRACTICE

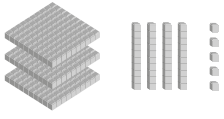
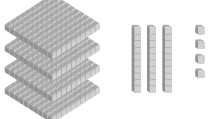
Work with pupils on the questions and selected examples from **Worksheet 3**.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 2A P11 – 18).

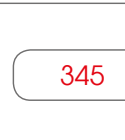
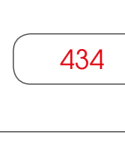
1. (a) 65, 56
 (b) 78, 72
 (c) 59, 68
 (d) 81, 84

2. (a)

	345
	434

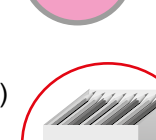

434 is greater than 345.

(b)

	295
	299

299 is greater than 295.
 295 is smaller than 299.


(c)

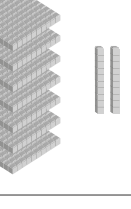
	722
	751


751 is greater than 722.
 722 is smaller than 751.

3. (a) 374, 294
 (b) 513, 581
 (c) 603, 593
 (d) 119, 128

4. (a) 

(b) 

5. (a) 

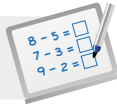
(b) 

6. (a) 53, 54, 57
 (b) 88, 89, 98

7. (a) 39, 33, 31
 (b) 66, 60, 56

8. (a) 71, 107, 170
 (b) 112, 122, 211
 (c) 900, 909, 919, 990

9. (a) 720, 702, 72
 (b) 453, 354, 345
 (c) 816, 681, 618, 186

**Specific Learning Focus**

- Compare and order numbers within 1000.

Suggested Duration

2 periods

Prior Learning

Pupils have prior knowledge of ordering numbers in ascending and descending order by comparing the place values of the numbers. The concept of place value was introduced in the later chapter of Grade 1 to compare numbers. It was emphasised that when comparing two different numbers (A and B), if the value of the digit in the ones place of A is smaller than that of B, but the value of the digit in the tens place of A is greater than that of B, A is greater than B (e.g. in 37, the '7' is smaller than the '9' in 29 but 37 is greater than 29 as we should always compare the largest place value first). This is reinforced in 'Recap' (Textbook 2 P9).

Pre-emptive Pitfalls

The concept mentioned above can be quite challenging for pupils when they proceed to learn addition of 3-digit numbers. For example, when adding 289 and 342 using the standard algorithm method, they might face difficulty in arriving at the correct answer. Another concept to be reinforced when comparing two 3-digit numbers is that if the digit in the hundreds place are the same, then we compare the digits in the tens place. For example, when comparing 363 and 328, since the digit in the hundreds place is the same for both numbers, we compare the digit in the tens place and since 6 is greater than 2, 363 is greater than 328.

Introduction

Comparing and ordering of numbers is best done using the place-value chart. Encourage pupils to place the digits in the place-value chart to compare the digits in the place values. Mathematical symbols '>' and '<' should be used as pupils are slowly being introduced to mathematical symbols and equations. Help them understand what the signs mean by explaining to them that in '>', the left-hand side is opened while in '<', the right-hand side is opened. You may also ask them to open their hands and place them on the desk to show both symbols to help them remember that '>' is greater than and '<' is smaller than.

Problem Solving

Teach pupils to recognise the format of comparison. Get them to start comparing the hundreds and if one digit is greater than the other digit in the hundreds place, then comparison of the tens and ones are not required. For example, when comparing 328 and 298, since 3 hundreds is greater than 2 hundreds, 328 is greater than 298. In another example, when comparing 328 and 349, since the digit in the hundreds place for both numbers is the same, we proceed to compare the tens. Since 4 tens is greater than 2 tens, $349 > 328$. This concept can be repeated excessively in class until pupils are familiar with the concept.

Activities

Cards can be used to show 3-digit numbers and the above mentioned activity can be carried out as a fun game. Similarly, get pupils to carry out the activity (Textbook 2 P12) in groups of 3. In the activity, pupils are to roll the dice three times and place each number in each column of the place-value chart.

Resources

- numeral cards (Activity Handbook 2 P9)
- place-value chart (Activity Handbook 2 P8)
- dice
- base-ten blocks (Activity Handbook 2 P14)

Mathematical Communication Support

Symbols '>' and '<' should be reinforced by encouraging pupils to use them instead of 'less than' or 'greater than'. Key comparison words 'more than', 'less than', 'greater than', 'smaller than' should be put up on the soft board in the classroom as cue cards. Encourage pupils to explain how they compare numbers using the place-value chart.

LEARNING OBJECTIVES

1. Recognise and complete number patterns.

LESSON
4

NUMBER PATTERNS

RECAP

Look at the number patterns.

51	52	53	54	?
----	----	----	----	---

100	99	98	97	?
-----	----	----	----	---

What is the next number in each pattern?

FOCUS

How do you know?
Use to help you.

211	212	213	214	?
-----	-----	-----	-----	---

What is the missing number?

FOCUS

How do you find out?

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RECAP

Review what pupils have learnt on number pattern in Grade 1 using the given examples. Get pupils to describe the patterns.

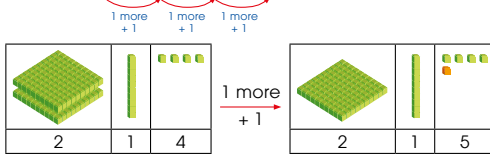
FOCUS

Ask pupils to describe the pattern in the given example and predict the missing number.

Use  to help you.

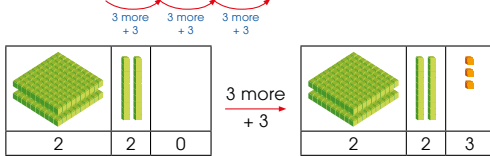
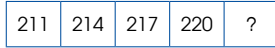


1.




1 more than 214 is 215.
The missing number is 215.
The number pattern is 211, 212, 213, 214, 215.

2.



3 more than 220 is 223.
The number pattern is 211, 214, 217, 220, 223.

329, 326, 323, 320, **317**
What number comes next? Can you tell the pattern?
Use  to help you.

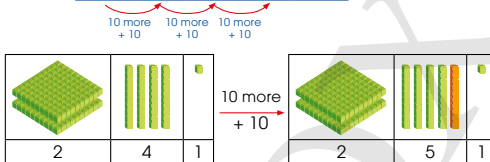


Use base-ten blocks to demonstrate the patterns in the examples.

Let's Learn 1 shows the addition of 1 to the preceding number.

Let's Learn 2 shows the addition of 3 to the preceding number.

3.

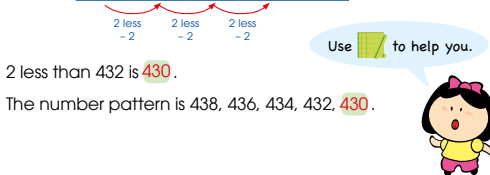


10 more than 241 is **251**.
The number pattern is 211, 221, 231, 241, **251**.


498, 488, 478, 468, **458**, 448, 438
What is the missing number?



4.



2 less than 432 is **430**.
The number pattern is 438, 436, 434, 432, **430**.

Use  to help you.



Use base-ten blocks to demonstrate the patterns in the examples.

Let's Learn 3 shows the addition of 10 to the preceding number.

Let's Learn 4 shows the subtraction of 2 from the preceding number.

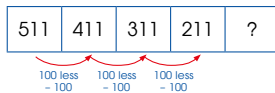
Activity Making number patterns

Materials Drawing block, markers

Procedure

1. Assign pupils to work in pairs.
2. Provide each pair with a piece of drawing paper and markers.
3. Ask pupils to create their own number patterns.
4. Exchange with other pupils and solve their number patterns.
5. Get some pupils to describe their number patterns to the class.

5. What is the missing number?



100 less than 211 is 111.

The missing number is 111.

The number pattern is 511, 411, 311, 211, 111.

6. What is the missing number?

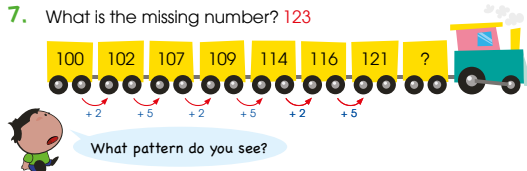


310 is 5 more than 305.

315 is 5 more than 310.

The missing number is 315.

7. What is the missing number? 123



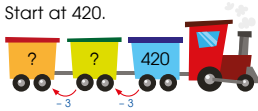
Let's Learn 5 shows the subtraction of 100 from the preceding number. Ask pupils to describe the number patterns in Let's Learn 6 and 7 before they fill in the missing numbers.



1. Find the missing numbers.

- (a) 1 more than 259 is **260**. (b) 100 more than 662 is **762**.
 (c) 5 less than 135 is **130**. (d) 10 less than 384 is **374**.

2. Start at 420.



Draw 2 jumps of 3 backward.

Which numbers do you land on? **414, 417**

3. Complete the number patterns.

- (a) 768, 668, 568, 468, 368, **268**
 (b) 572, 574, 576, 578, **580**, 582
 (c) **704**, 699, 694, 689, 684, 679
 (d) 931, **929**, 927, 925, 923, 921
 (e) 816, 811, 806, 801, **796**, 791
 (f) 224, 225, 227, 228, 230, 231, 233, **234**

Complete Workbook 2A, Worksheet 4 • Pages 19 – 20

Work with pupils on the questions and selected examples from **Worksheet 4**.

Independent seatwork

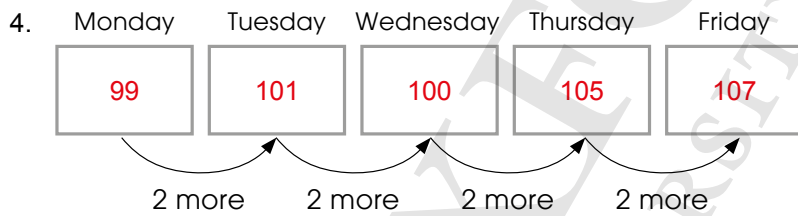
Assign pupils to complete Worksheet 4 (Workbook 2A P19 – 20).

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1. (a) 25
(b) 29
(c) 51
(d) 55
(e) 90

2. (a) 30, 31
(b) 59, 58
(c) 77, 79
(d) 72, 68
(e) 50, 40

3. (a) 191
(b) 399
(c) 672, 172
(d) 599, 594
(e) 55



He reads 107 pages on Friday.

**Specific Learning Focus**

- Recognise and complete number patterns.

Suggested Duration

2 periods

Prior Learning

Pupils are aware of skip counting and number patterns learnt in Grade 1. They should be able to recognise number patterns involving less than or more than in ones, twos, fives and tens. They have dealt with number patterns in tens for the 'ty' numbers. 'Recap' (Textbook 2 P14) can be carried out as a quick 'jog your memory' introductory exercise.

Pre-emptive Pitfalls

Since pupils have been dealing with 2-digit numbers previously, recognising patterns in 3-digit numbers might be challenging for most pupils. Explain to pupils that recognising the pattern between successive 3-digit numbers is similar to comparing numbers using the place-value chart. To find the pattern, compare the hundreds first, and if the digit in the hundreds place is the same for both numbers, proceed to compare the tens and if the digit in the tens place is the same for both numbers, proceed to compare the ones.

Introduction

Emphasise the fact that the numbers in a number pattern should be arranged in an increasing or a decreasing order. Once it is identified if the number is 'less than' or 'more than' the preceding number in a number pattern, the difference between successive numbers can be found and then this difference can be added or subtracted to find the next number in the number pattern.

Problem Solving

To enhance their critical-thinking skills, 'Practice' (Textbook 2 P18) can be done verbally in class first. In addition, the teacher can call out random numbers (e.g. 420) and ask pupils to create a number pattern in increasing or decreasing order. More challenging sums in Let's Learn 3 (Textbook 2 P16) can then be introduced where the cue is not given and pupils have to identify if the numbers are arranged in increasing or decreasing order and find the missing number in the number pattern.

Activities

Write 3-digit numbers on colourful A4-sized papers. Prepare a string long enough to be hung across the length of the classroom. Get pupils to arrange the numbers on the string using pegs. The teacher can create 10 such strings of number patterns in class.

Resources

- base-ten blocks (Activity Handbook 2 P14)
- colourful A4-sized papers
- drawing block
- markers

Mathematical Communication Support

Question 4 (Workbook 2A P20) can be done verbally in class. Number patterns can be made tangible by giving real-life examples such as the sequence of house numbers located along a street. We may see that even-numbered houses are located on the right side of the street while odd-numbered houses are located on the left side of the street. This can then lead to the next lesson on odd and even numbers.

ODD AND EVEN NUMBERS

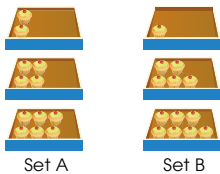
LEARNING OBJECTIVES

1. Recognise odd and even numbers.

ODD AND EVEN NUMBERS

LESSON
5

IN FOCUS



Compare the boxes of cupcakes in Sets A and B.
What do you notice?

LET'S LEARN

1.



4 cupcakes

The cupcakes in a tray from Set A are evenly paired.
The number 4 is an **even** number.

Are the cupcakes in the other boxes in Set A evenly paired?



5 cupcakes

The cupcakes from Set B are not evenly paired.
One cupcake is the odd one out.
The number 5 is an **odd** number.

Do you know other odd and even numbers?



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IN FOCUS

Using the given context, get pupils to compare the boxes of cupcakes in Set A and Set B. Guide them to notice that the cupcakes in Set A can be paired up with none remaining, while there is one remainder after pairing the cupcakes in Set B.

LET'S LEARN

Highlight to pupils that when 4 cupcakes are paired up, there is no odd one out. Hence the 4 cupcakes are evenly paired and 4 is called an **even** number.

However, there is an odd one out when 5 cupcakes are paired up. Thus 5 is called an **odd** number.

Textbook 2 P19

2.

	1	Odd
	2	Even
	3	Odd
	4	Even
	5	Odd
	6	Even
	7	Odd
	8	Even
	9	Odd
	10	Even



What do you notice about even and odd numbers?

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NUMBERS TO 1000

20

Textbook 2 P20

Go through the chart on P20 and ask questions such as 'Why is 7 an odd number?' to check on the pupils' understanding. Show pupils the consecutive numbers follow a pattern of 'odd, even, odd, even,... ..'.

3. How do you find out if 11 is an odd or even number?

11

We look at the number in the ones place to find out.



For odd numbers, the number in the ones place can be 1, 3, 5, 7 or 9.

For even numbers, the number in the ones place can be 0, 2, 4, 6 or 8.

1 is an odd number.
So 11 is an odd number.

4. **12** **13** **14** **15** **16** **17**

13, **15** and **17** are odd numbers.

12, **14** and **16** are even numbers.

5. **101** **102** **103** **104**

Do you know which numbers are even and which numbers are odd?

How do I find out if a 3-digit number is odd or even?



21

CHAPTER 1

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Textbook 2 P21

Involve pupils in the class demonstration to illustrate odd and even numbers. Select 11 pupils to participate in the demonstration. Ask them to pair up and leave an odd one out. Get pupils to explain why 11 is an odd number before continuing with 12, 13 and 14 pupils.

End the activity by concluding that odd numbers have 1, 3, 5, 7 or 9 in the ones place whereas even numbers have 2, 4, 6, 8 or 0 in the ones place.

Activity Odd and even numbers


Procedure

1. Get pupils to add 2 even numbers and ask if the sum is odd or even. Allow pupils to try more examples before concluding that **the sum of 2 even numbers is always even.**
2. Get pupils to add 2 odd numbers and ask if the sum is odd or even. Allow pupils to try more examples before concluding that **the sum of 2 odd numbers is always even.**
3. Get pupils to add 1 even number and 1 odd number and ask if the sum is odd or even. Allow pupils to try more examples before concluding that **the sum of 1 even number and 1 odd number is always odd.**


ACTIVITY TIME

Work in pairs.

1 Look at the numbers from 21 to 30. Circle the even numbers and cross out the odd numbers.

What you need: 

21	22	23	24	25	26	27	28	29	30
---------------	----	---------------	----	---------------	----	---------------	----	---------------	----

Use  to help you.

2 Think of the numbers from 31 to 40. Which numbers are even? Which numbers are odd?

What do you notice about the digits in the ones place?

3 Are the numbers below even or odd? Why?
(a) 67 (b) 90 (c) 489 (d) 752

PRACTICE

1. Look at the numbers given. Which are even numbers? Which are odd numbers?

158 3 54 109 625
21 12 96 210 887

Even numbers: 158, 12, 54, 96, 210
Odd numbers: 21, 3, 109, 625, 887

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Textbook 2 P22

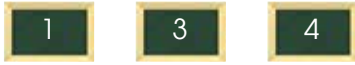
ACTIVITY TIME

Distribute the 2-colour counters to pupils and allow them to work in pairs to solve the problems. After which, discuss as a class to verify the answers.

PRACTICE

Work with pupils on the questions and selected examples from **Worksheet 5**.

2. Look at the numbers.



- (a) Form the greatest 2-digit even number. **34**
(b) Form the smallest 3-digit odd number. **143**

Complete Workbook 2A, Worksheet 5 • Pages 21 – 23

 MIND WORKOUT

Kate is thinking of a 3-digit number.
The number is greater than 900.

The digit in the ones place is the smallest odd number.
The digit in the tens place is the greatest even number.

What is the smallest 1-digit odd number?
What is the greatest 1-digit even number?

What is the number? **981**

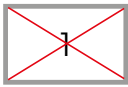


23 CHAPTER 1

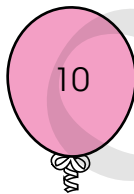
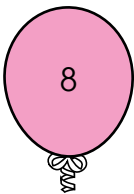
Textbook 2 P23

Answers Worksheet 5 (Workbook 2A P21 – 23)

1.



2.



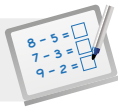
3. 31, 33, 35, 37, 39

4. Odd numbers: 5, 601, 19, 729, 325
Even numbers: 400, 106, 8, 32, 1000

5. (a) 61
(b) 394
(c) 850
(d) 805

Independent seatwork

Assign pupils to complete Worksheet 5
(Workbook 2A P21 – 23).

**Specific Learning Focus**

- Recognise odd and even numbers.

Suggested Duration

2 periods

Prior Learning

At this point, pupils are not aware of 'odd' and 'even' numbers, but since they have just done number patterns in the earlier lesson, this mathematical concept can be linked and introduced easily.

Pre-emptive Pitfalls

'Odd and even numbers' is a completely new concept for pupils, and therefore introducing this concept with concrete materials is important. Pupils might not be able to understand this concept unless it is made tangible with the implementation of several hands-on activities.

Introduction

Ask pupils to gather in the classroom and start playing a song. Get them to find a partner to pair up with as soon as the song stops playing. If the total number of pupils is even, point out that the class has 'even sets of twos'. But if it is odd numbered, point out that since there is one pupil left without a partner, the total number of pupils is odd. Another way to introduce this concept is to bring in cupcakes or sweets to the classroom and carry out the activity in 'In Focus' (Textbook 2 P19). Highlight the fact that on each tray in Set B, there is one cupcake that is left unpaired. The teacher can reinforce the key terms 'odd' and 'even' by calling out a number and have pupils raise the 'odd' or 'even' cards in the air (Activity Handbook 2 P11). Once pupils are able to identify 1-digit numbers that are odd (1, 3, 5, 7, 9) and even (2, 4, 6, 8) by carrying out hands-on activity, dealing with odd and even 3-digit numbers will be easier. To identify if a 3-digit number is odd or even, pupils should identify if the last digit of the 3-digit number is odd or even.

Problem Solving

Explain to pupils that in identifying if a 3-digit number is odd or even, the digits in the hundreds and tens place do not determine if the number is odd or even. The digit in the ones place is the deciding factor. Pupils should also be aware that even if the digit in the hundreds or tens place is odd (e.g. 3 hundreds or 5 tens), the 3-digit number is even as long as the digit in the ones place is even.

Activities

The hundred chart can be given out where the pupils can colour all the even and odd numbers with the same colour. Similarly, 'Activity Time' (Textbook 2 P22) can be done in pairs but while they are crossing out the odd numbers, teach by asking them how they identify the odd and even numbers.

Resources

- hundred chart (Activity Handbook 2 P7)
- 2-colour counters
- cupcakes

Mathematical Communication Support

Apart from the introduction of the key terms 'odd' and 'even', encourage pupils to discuss among themselves how they identify an odd or even 3-digit number. Emphasise that the digit in the ones place of a 3-digit number determines whether the 3-digit number is odd or even by getting pupils to colour the even numbers on a square grid of numbers.

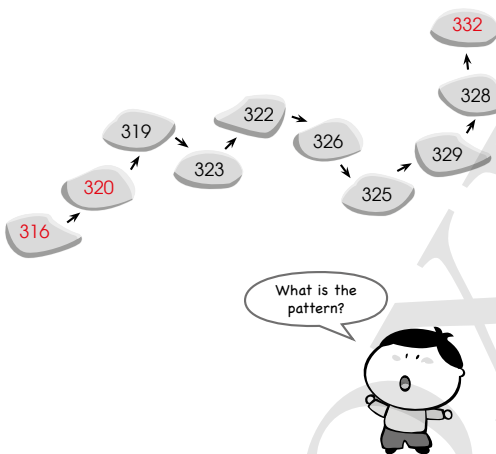
PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout

Fill in the missing numbers.

Date: _____



24 Chapter 1

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Mind Workout

Get pupils to study the pattern of the given numbers. They should observe the pattern is $+ 4, - 1, + 4, - 1$. Remind pupils not to be too quick to conclude what the pattern is, but to check that the pattern applies to all the numbers.

Workbook 2A P24

2. Look at the numbers.



- (a) Form the greatest 2-digit even number. 34
(b) Form the smallest 3-digit odd number. 143

Complete Workbook 2A, Worksheet 5 + Pages 21 – 23

MIND WORKOUT

Kate is thinking of a 3-digit number.
The number is greater than 900.

The digit in the ones place is the smallest odd number.
The digit in the tens place is the greatest even number.

What is the smallest 1-digit odd number?
What is the greatest 1-digit even number?

What is the number? **981**



23 CHAPTER 1

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Textbook 2 P23

MIND WORKOUT

Allow pupils to work independently and ask them to explain how they arrived at their answer. Help the weaker pupils by asking questions such as 'If it is a 3-digit number and greater than 900, what must the first digit be?'

MATHS JOURNAL

Look for numbers around you.



What are some uses of numbers that you can see around you?

Why do we use numbers?



I know how to...

- count to 1000.
- write up to 1000 in numerals and in words.
- tell the value of a digit in a number.
- compare and order numbers within 1000.
- complete number patterns.
- recognise odd and even numbers.

SELF-CHECK

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NUMBERS TO 1000

24

Textbook 2 P24

MATHS JOURNAL

Assign pupils into groups to discuss some of the uses of numbers that they can see around them.

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

SELF-CHECK



This self check can be done after pupils have completed **Review 1** (Workbook 2A P25 – 28) as consolidation of understanding for the chapter.

1.

One thousand	•	360
Eight hundred and seven	•	1000
Three hundred and sixty	•	265
Two hundred and sixty-five	•	807

2. (a) 969
 (b) 696
 (c) 969, 966, 696

3. (a) 70
 (b) 500
 (c) 0
 (d) 0

4. (a) 10
 (b) 100
 (c) 1000
 (d) 999
 (e) 989
 (f) 899

5. (a) 255
 (b) 251
 (c) 500, 490
 (d) 704, 707
 (e) 1000, 985
 (f) 400, 395

6.

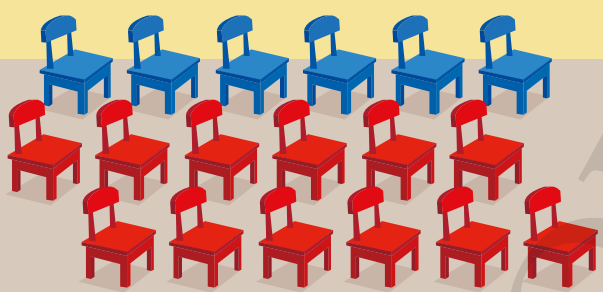
7	121	40	99	
605	15	22	333	716
51	447	9	18	
26	1	130	869	36
202	27	1000	500	

Addition and Subtraction Within 1000

CHAPTER 2


Addition and Subtraction Within 1000 CHAPTER 2

How many chairs are there in the classroom altogether?




ADDITION AND SUBTRACTION LESSON 1

RECAP



6 blue chairs



12 red chairs

25 CHAPTER 2 OXFORD UNIVERSITY PRESS

Textbook 2 P25

Related Resources

NSPM Textbook 2 (P25 – 61)
NSPM Workbook 2A (P29 – 62)

Materials

A4 papers, base-ten sets, drawing block, markers, multilink cubes, numeral cards, pencils

Lesson

Lesson 1 Addition and Subtraction
Lesson 2 Addition without Regrouping
Lesson 3 Addition with Regrouping
Lesson 4 Subtraction without Regrouping
Lesson 5 Subtraction with Regrouping
Lesson 6 Solving Word Problems
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

Pupils revisit the concepts of addition and subtraction taught in Grade 1 on numbers up to 100. They will continue to add and subtract numbers up to 1000, with and without regrouping. Pupils are taught how to solve word problems involving addition and subtraction with the use of model drawing to represent the quantities given in the word problems.

LESSON

1

ADDITION AND SUBTRACTION

LEARNING OBJECTIVES

1. Recapitulate writing a family of four basic facts within 20 given any one of the basic facts.

Addition and Subtraction Within 1000 CHAPTER **2**

How many chairs are there in the classroom altogether?

ADDITION AND SUBTRACTION LESSON **1**

RECAP

6 blue chairs 12 red chairs

25 CHAPTER 2 OXFORD UNIVERSITY PRESS



Use the chapter opener to guide pupils in the addition of blue chairs and red chairs to obtain the total number of chairs.

Textbook 2 P25

$6 + 12 = 18$ or $12 + 6 = 18$

There are 18 chairs altogether.

$18 - 12 = 6$

There are 6 blue chairs.

$18 - 6 = 12$

There are 12 red chairs.

We can write a family of addition and subtraction facts.

$6 + 12 = 18$

$18 - 12 = 6$

$12 + 6 = 18$


$18 - 6 = 12$

We add to find the total.
We subtract to find the parts.

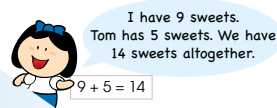
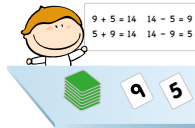


ACTIVITY TIME

Work in pairs.

- 1 Open two .
- 2 Get your partner to write a family of addition and subtraction facts.
- 3 Use the fact family to tell number stories.

What you need:



- 4 Take turns and repeat 1 to 3.

ACTIVITY TIME

- 1 Go to <http://www.shinglee.com.sg/StudentResources/NSPM2>.
- 2 Click on 'Fact Family'.

How many fact families can you form?



Complete Workbook 2A, Worksheet 1 • Pages 29–30

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ADDITION AND SUBTRACTION WITHIN 1000

26

Textbook 2 P26

After which, ask pupils how they can find the number of blue or red chairs when given the total number of chairs and the number of chairs of the other colour. Show pupils the writing of addition and subtraction facts.

Give more examples and get pupils to practise the writing of the family of addition and subtraction facts.

ACTIVITY TIME



Provide pupils with the necessary materials and demonstrate how to write a family of addition and subtraction facts with the numeral cards. Thereafter, use the fact family to tell number stories.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2A P29 – 30).

Answers Worksheet 1 (Workbook 2A P29 – 30)

1. (a) $8 + 9 = 17$ $17 - 9 = 8$
 $9 + 8 = 17$ $17 - 8 = 9$
(b) $11 + 5 = 16$ $16 - 5 = 11$
 $5 + 11 = 16$ $16 - 11 = 5$

2. $7 + 4 = 11$ $11 - 4 = 7$
 $4 + 7 = 11$ $11 - 7 = 4$

3. (a) $46 + 34 = 80$
They have 80 marbles altogether.
(b) $52 - 29 = 23$
Siti has 23 red ribbons.
(c) $95 - 48 = 47$
Meiling has 47 sweets left.

**Specific Learning Focus**

- Recapitulate writing a family of four basic facts within 20 given any one of the basic facts.

Suggested Duration

2 periods

Prior Learning

Addition and subtraction have been introduced formally with mathematical stories translating to facts and equations with symbols. This needs to be revised to remind pupils about the use of mathematical language such as symbols (+, -, =). Jog their memory and have a class discussion on Egyptian hieroglyphs to emphasise this concept. Prepare a worksheet (Workbook 2A P29 – 30) for pupils to do simple additions and subtractions to revisit the concept of ‘counting all’ for addition and ‘counting backwards’ for subtraction. Use key terms like ‘sum’, ‘difference’ and ‘equal to’ to reinforce mathematical facts. Carry out the activity (Textbook 2 P26) as a ‘Recap’ activity. Writing the family of addition and subtraction facts will help them understand the link between the two operations.

Pre-emptive Pitfalls

In Grade 1, pupils have learnt to add and subtract two-digit numbers. In this chapter, pupils are required to add and subtract three-digit numbers. It can be challenging to most of the pupils as it requires mental calculation.

Introduction

This lesson is a recap of addition and subtraction learnt in Grade 1. Addition and subtraction facts can be used to write word problems or stories. For example, using the subtraction fact $16 - 11 = 5$, the teacher can create a word problem “Sara had 16 sweets. Then, after she gave 11 sweets to her friends, she had 5 sweets left.”. The teacher can write addition or subtraction equations on the whiteboard and then encourage pupils to create stories that involves the equations.

Problem Solving

Develop pupils’ critical-thinking skills by getting them to do the second activity in ‘Activity Time’ (Textbook 2 P26). Encourage them to come up with mathematical stories and hence form mathematical facts or equations.

Activities

Divide the class into groups of 4 and assign each group with a mathematical fact. Ask them to write a mathematical story and draw it out on a drawing block. These can be pinned onto the soft board in the classroom.

Resources

- markers
- colour pencils
- drawing block
- numeral cards (Activity Handbook 2 P12)

Mathematical Communication Support

Addition and subtraction are inverse operations of each other. Write the family of addition and subtraction facts ($14 + 3 = 17$, $17 - 3 = 14$, $3 + 14 = 17$, $17 - 14 = 3$) and ask pupils what can be deduced from these 4 equations. Get them to discuss how they are related to one another. In addition, ask them for the mental strategy employed when adding and subtracting. Check if they understand that 17 is the ‘whole’ while 14 and 3 are the ‘parts’ of the ‘whole’. Discuss with them that when subtracting 14 from 17, the ones should be subtracted first ($7 - 4 = 3$) and then subtract the tens ($1 - 1 = 0$), which gives $17 - 14 = 3$. These concepts have been taught in Grade 1 and are to be revisited and reinforced through quizzes and exercises.

LESSON 2

ADDITION WITHOUT REGROUPING

LEARNING OBJECTIVES

1. Add a 3-digit number and a 1-digit number/a ten/a hundred without regrouping.
2. Add two 3-digit numbers without regrouping.

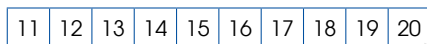
ADDITION WITHOUT REGROUPING

LESSON
2

RECAP

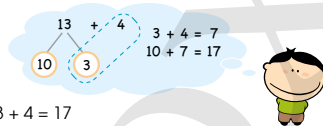
1. Add 13 and 4.

Method 1 Count on from 13.



$$13 + 4 = 17$$

Method 2 Add ones.



$$13 + 4 = 17$$

2. Add 23 and 14.

Step 1 Add the ones.

	T	O
	2	3
+	1	4
<hr/>		
	7	

Step 2 Add the tens.

	T	O
	2	3
+	1	4
<hr/>		
	3	7

How can we add 13 and 40?



RECAP

Recapitulate the two methods of adding a 2-digit number and a 1-digit number:

- Method 1: Count on.
- Method 2: Add ones.

Then, review the steps in the addition of two 2-digit numbers:

- Step 1: Add the ones.
- Step 2: Add the tens.

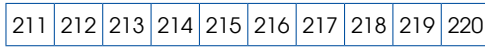
There are 213 books in the library.
Mrs Lim donates 4 books.
How many books are there now?



LET'S LEARN

1. Add 213 and 4.

Method 1 Count on from 213.



$$213 + 4 = 217$$

Method 2 Add ones.

213 + 4 = 217

Textbook 2 P28

From the recap, ask pupils what the two possible methods to add a 3-digit number and a 1-digit number are.

LET'S LEARN

Explain how to add 213 and 4 using the following two methods:

- Method 1: Count on.
- Method 2: Add ones.

2. Add 213 and 40.

Method 1 Count on in tens from 213.

$$213 + 40 = 253$$

213, 223, 233, 243, 253

Method 2 Add tens.

213 + 40 = 253

3. Add 213 and 400.

Method 1 Count on in hundreds from 213.

$$213 + 400 = 613$$

213, 313, 413, 513, 613

Method 2 Add hundreds.

213 + 400 = 613


Textbook 2 P29

Ask pupils how to add a 3-digit number and a ten as well as a 3-digit number and a hundred. Use the following questions to guide the discussion:

- Can we use the two methods as shown in Let's Learn 1?
- How do you count on in ones/tens/hundreds?

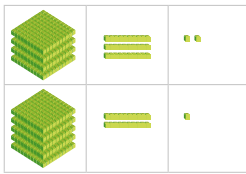
Use the base-ten blocks to illustrate the addition in Let's Learn 2 and 3.

4. Add 432 and 521.

Use  to help you add.

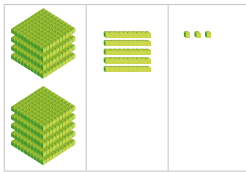


Step 1 Add the ones.
2 ones + 1 one = 3 ones



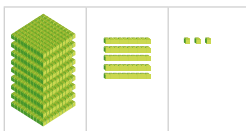
H	T	O
4	3	2
+ 5	2	1
		3

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



H	T	O
4	3	2
+ 5	2	1
	5	3

Step 3 Add the hundreds.
4 hundreds + 5 hundreds = 9 hundreds



H	T	O
4	3	2
+ 5	2	1
9	5	3

$432 + 521 = 953$

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ADDITION AND SUBTRACTION WITHIN 1000

30

Textbook 2 P30

Use base-ten blocks to illustrate the addition of two 3-digit numbers without regrouping. Emphasise the steps (i.e. add the ones, add the tens and then add the hundreds).

PRACTICE



Add.

1. (a) $153 + 2 = 155$
 (b) $153 + 20 = 173$
 (c) $153 + 200 = 353$

2. (a) $214 + 3 = 217$
 (b) $214 + 30 = 244$
 (c) $214 + 300 = 514$

3. (a)

H	T	O
3	2	5
+ 1	4	
3	6	5

(b)

H	T	O
2	3	6
+ 5	4	3
7	7	9

(c)

H	T	O
4	5	7
+ 4	3	2
8	8	9

(d)

H	T	O
5	0	0
+ 1	7	1
6	7	1

(e) $23 + 456 = 479$

H	T	O
4	5	6
+ 2	3	
4	7	9

(f) $605 + 384 = 989$

H	T	O
6	0	5
+ 3	8	4
9	8	9

Complete Workbook 2A, Worksheet 2 + Pages 31 – 36

31

CHAPTER 2

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Textbook 2 P31

PRACTICE



Work with pupils on the questions and selected examples from **Worksheet 2**.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2A P31 – 36).

1. (a) 92
(b) 98
(c) 95
(d) 99
2. (a) 298
(b) 676
(c) 473
(d) 851
(e) 727
(f) 769
3. (a) 429
(b) 379
4. (a) 394
(b) 867
5. (a) 855
(b) 790
6. (a) 165
(b) 827
(c) 375
(d) 668
(e) 739
(f) 627
7. (a) 559
(b) 532
(c) 895
(d) 939
(e) 728
(f) 999

8. (a) $56 + 422 = 478$

$$\begin{array}{r} \boxed{4} \ \boxed{2} \ \boxed{2} \\ + \ \boxed{} \ \boxed{5} \ \boxed{6} \\ \hline \boxed{4} \ \boxed{7} \ \boxed{8} \end{array}$$

(b) $300 + 600 = 900$

$$\begin{array}{r} \boxed{6} \ \boxed{0} \ \boxed{0} \\ + \ \boxed{3} \ \boxed{0} \ \boxed{0} \\ \hline \boxed{9} \ \boxed{0} \ \boxed{0} \end{array}$$

(c) $532 + 240 = 772$

$$\begin{array}{r} \boxed{5} \ \boxed{3} \ \boxed{2} \\ + \ \boxed{2} \ \boxed{4} \ \boxed{0} \\ \hline \boxed{7} \ \boxed{7} \ \boxed{2} \end{array}$$

(d) $261 + 108 = 369$

$$\begin{array}{r} \boxed{2} \ \boxed{6} \ \boxed{1} \\ + \ \boxed{1} \ \boxed{0} \ \boxed{8} \\ \hline \boxed{3} \ \boxed{6} \ \boxed{9} \end{array}$$

9. (a) 198

$$\begin{array}{r} 1 \ 0 \ 6 \\ + \ 9 \ 2 \\ \hline 1 \ 9 \ 8 \end{array}$$

(b) 677

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

(c) 979

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

**Specific Learning Focus**

- Add a 3-digit number and a 1-digit number in tens/a hundred without regrouping.
- Add two 3-digit numbers without regrouping.

Suggested Duration

2 periods

Prior Learning

In Grade 1, pupils have been introduced to addition of two-digit numbers using three different methods – count-on strategy, adding ones using a number bond and standard algorithm method (vertical addition). Revisit these concepts by carrying out the exercise in Let's Learn (Textbook 2 P28 – 30). In Let's Learn 1 to 3 (Textbook 2 P28 – 29), Method 1 involves the counting-on strategy while method 2 involves adding ones using number bonds. In Let's Learn 4 (Textbook 2 P30), vertical addition is used.

Pre-emptive Pitfalls

This lesson involves addition without regrouping. Be sure to use standard and non-standard materials like base-ten blocks and real-life objects to introduce this type of addition. Use place-value chart to reinforce the concept of addition.

Introduction

The sums in Let's Learn 1 and 2 (Textbook 2 P28 – 29) involve simple counting as an introductory concept. The sums in Let's Learn 3 and 4 (Textbook 2 P29 – 30) involve challenging concepts. The 3-step method of vertical alignment sums will be easy to understand. Since there is no regrouping involved, the 3 steps required in vertical addition should be easy to understand. Such vertical additions can be made fun for pupils by prompting them for each step during class discussions.

Problem Solving

In Question 1 and 2 of 'Practice' (Textbook 2 P31), pupils are required to apply the number bond strategy. Ask them to visualise the place-value chart in their minds. Identify the place value that involves addition and add up the digits (e.g. In Question 2(b), $214 + 30$, 3 tens is added to 1 ten and the answer is 244). The digits in the hundreds and ones places remain the same. Similarly, in the vertical addition, emphasise that addition of ones must be done first, followed by tens and then hundreds. Encourage them to write 'H', 'T' and 'O' on top of the numbers.

Activities

Use base-ten blocks and place-value charts while doing addition without regrouping. The teacher may ask pupils to work on the questions in Workbook 2A (P35 – 36) as a quiz and then get them to check each other's work in pairs, while helping to point out each other's mistakes if any. This encourages peer-learning. The teacher may go through some questions on the whiteboard to address any misconceptions pupils may have.

Resources

- place-value chart
- base-ten blocks

Mathematical Communication Support

The number bond and standard algorithm method should be discussed in class. Ask pupils which method they would use and explain why and how they use the method. Make them write the key terms in their exercise books: 'counting all', 'mathematical stories', 'part-part-whole', 'vertical addition', 'add the ones, tens and hundreds'.

LESSON 3

ADDITION WITH REGROUPING

LEARNING OBJECTIVES

1. Add a 3-digit number and a 1-digit number/a ten with regrouping.
2. Add two 3-digit numbers with regrouping.

ADDITION WITH REGROUPING

LESSON
3

RECAP

Add 69 and 13.

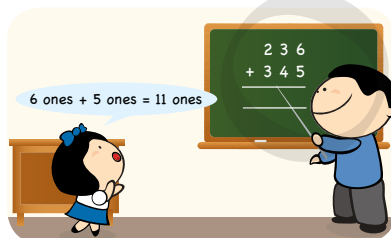
Step 1 Add the ones.
Regroup 12 ones
into 1 ten 2 ones.

$$\begin{array}{r} \text{T} \quad \text{O} \\ 6 \quad 9 \\ + 1 \quad 3 \\ \hline \quad 2 \end{array}$$

Step 2 Add the tens.

$$\begin{array}{r} \text{T} \quad \text{O} \\ 16 \quad 9 \\ + 1 \quad 3 \\ \hline 8 \quad 2 \end{array}$$

IN FOCUS



What should Xinyi do next?

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ADDITION AND SUBTRACTION WITHIN 1000

32

Textbook 2 P32

RECAP


Review the addition of two 2-digit numbers with regrouping. Emphasise to pupils that they need to regroup the ones into tens and ones as they cannot write 2 digits in the ones column.

IN FOCUS

Write the vertical representation of $236 + 345$ on the board and ask pupils what they should do first. Use base-ten blocks to represent the numbers and show the addition of ones first. Lead pupils to the concept of regrouping by asking the following questions:

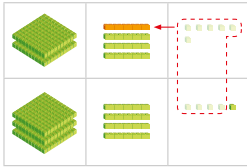
- Can we write 11 in the ones column?
- What should we do when we cannot write 2 digits in the ones column?

1. Add 236 and 345.

Use  to help you add.

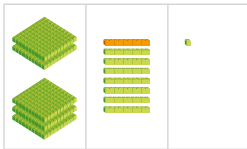


Step 1 Add the ones. 6 ones + 5 ones = 11 ones
Regroup the ones. 11 ones = 1 ten 1 one



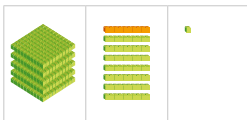
H	T	O
2	3	6
+ 3	4	5
		1

Step 2 Add the tens.
1 ten + 3 tens + 4 tens = 8 tens



H	T	O
2	3	6
+ 3	4	5
	8	1

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



H	T	O
2	3	6
+ 3	4	5
5	8	1

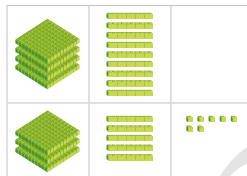
$$236 + 345 = 581$$

Use base-ten blocks to demonstrate the regrouping of ones. At the same time, show the addition of 1 ten to the tens column in the algorithm.

Move on to show the adding of the tens and hundreds with base-ten blocks and in the algorithm.

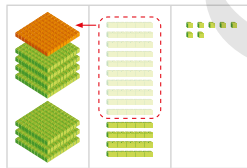
2. Add 490 and 357.

Step 1 Add the ones.



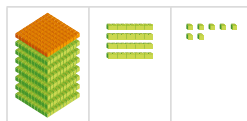
H	T	O
4	9	0
+ 3	5	7
		7

Step 2 Add the tens. 9 tens + 5 tens = 14 tens
Regroup the tens. 14 tens = 1 hundred 4 tens



H	T	O
4	9	0
+ 3	5	7
	4	7

Step 3 Add the hundreds.
1 hundred + 4 hundreds + 3 hundreds = 8 hundreds



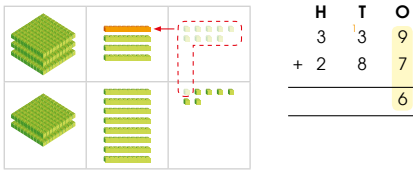
H	T	O
4	9	0
+ 3	5	7
8	4	7

$$490 + 357 = 847$$

Write the vertical representation of $490 + 357$ on the board and ask pupils what they should do first. Use base-ten blocks to represent the numbers and show the addition of ones. Move on to the tens since there is no need for regrouping. Get pupils to add the tens and ask them what they should do since the answer is 14 tens. Lead pupils to the concept of regrouping by using the base-ten blocks and the algorithm.

3. Add 339 and 287.

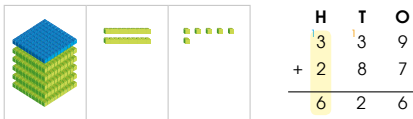
Step 1 Add the ones. 9 ones + 7 ones = 16 ones
Regroup the ones. 16 ones = 1 ten 6 ones



Step 2 Add the tens. 1 ten + 3 tens + 8 tens = 12 tens
Regroup the tens. 12 tens = 1 hundred 2 tens



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



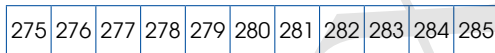
$$339 + 287 = 626$$

Write the vertical representation of $339 + 287$ on the board and ask pupils what they should do first. Go through the steps as follows:

- Step 1: Add the ones. Is it necessary to regroup? If yes, regroup. If no, proceed to add the tens.
- Step 2: Add the tens. Is it necessary to regroup? If yes, regroup. If no, proceed to add the hundreds.
- Step 3: Add the hundreds.

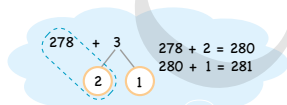
4. Add 278 and 3 without using .

Method 1 Count on from 278.



$$278 + 3 = 281$$


Method 2 Make tens.



$$278 + 3 = 281$$



Let's Learn 4 shows the addition of a 3-digit number and a 1-digit number. Go through the two methods of adding the numbers. Give another example to see if pupils can apply these two methods.

5. Add 278 and 30 without using .

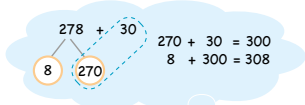
Method 1 Count on in tens from 278.

$$278 + 30 = 308$$

278, 288, 298, 308



Method 2 Make hundreds.



$$278 + 30 = 308$$



Which method do you prefer?



Let's Learn 5 shows the addition of a 3-digit number and a 2-digit number. Go through the two methods of adding the numbers. Give another example to see if pupils can apply the two methods. Ask pupils to choose their preferred method and explain why they chose that method.

Work in pairs.

$$24 + 137 = ?$$

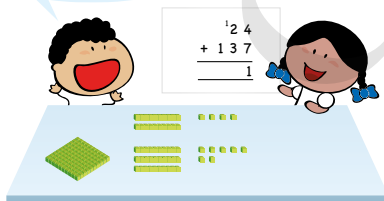
ACTIVITY TIME


What you need:



- Use base-ten blocks to show how you add.
- Get your partner to show the addition.

4 ones + 7 ones = 11 ones
 Regroup 10 ones into 1 ten.



- Compare your answers. Do you get the same answer?
- Use base-ten blocks and  to show the addition.

- | | |
|----------------------|-----------------------|
| (a) $96 + 46 = 142$ | (b) $248 + 329 = 577$ |
| (c) $558 + 42 = 600$ | (d) $147 + 605 = 752$ |
| (e) $369 + 25 = 394$ | (f) $614 + 88 = 702$ |

ACTIVITY TIME



Provide pupils with base-ten blocks to work on the given sums in the activity. Get one pupil to use base-ten blocks to demonstrate the addition and the other pupil to work on the same sum using the vertical algorithm. Exchange their roles when they are done with the sums.



Add.

$$\begin{array}{r} \text{H T O} \\ 4 \text{ ' } 3 \text{ ' } 5 \\ + 1 \text{ ' } 2 \text{ ' } 7 \\ \hline 5 \text{ ' } 6 \text{ ' } 2 \end{array}$$

$$\begin{array}{r} \text{H T O} \\ \text{' } 3 \text{ ' } 6 \text{ ' } 4 \\ + \quad 6 \text{ ' } 2 \\ \hline 4 \text{ ' } 2 \text{ ' } 6 \end{array}$$

(e) $328 + 569 = 897$

$$\begin{array}{r} \text{H T O} \\ 3 \text{ ' } 2 \text{ ' } 8 \\ + 5 \text{ ' } 6 \text{ ' } 9 \\ \hline 8 \text{ ' } 9 \text{ ' } 7 \end{array}$$

2. (a) $263 + 7 = 270$

3. (a) $414 + 9 = 423$

$$\begin{array}{r} \text{H T O} \\ 2 \text{ ' } 1 \text{ ' } 4 \\ + 5 \text{ ' } 3 \text{ ' } 9 \\ \hline 7 \text{ ' } 5 \text{ ' } 3 \end{array}$$

$$\begin{array}{r} \text{H T O} \\ \text{' } 3 \text{ ' } 5 \text{ ' } 2 \\ + 3 \text{ ' } 7 \text{ ' } 8 \\ \hline 7 \text{ ' } 3 \text{ ' } 0 \end{array}$$

(f) $86 + 245 = 331$

$$\begin{array}{r} \text{H T O} \\ \text{' } 8 \text{ ' } 6 \\ + 2 \text{ ' } 4 \text{ ' } 5 \\ \hline 3 \text{ ' } 3 \text{ ' } 1 \end{array}$$

(b) $263 + 70 = 333$

(b) $414 + 90 = 504$

Complete Workbook 2A, Worksheet 3 • Pages 37 – 40



Work with pupils on the practice questions.

Independent seatwork

Assign pupils to complete Worksheet 3 independently (Workbook 2A P37 – 40).

$$\begin{array}{r} 158 \\ + 12 \\ \hline \boxed{7} \boxed{0} \end{array}$$

$$\begin{array}{r} 147 \\ + 19 \\ \hline \boxed{6} \boxed{6} \end{array}$$

$$\begin{array}{r} 169 \\ + 26 \\ \hline \boxed{9} \boxed{5} \end{array}$$

$$\begin{array}{r} 154 \\ + 37 \\ \hline \boxed{9} \boxed{1} \end{array}$$

$$\begin{array}{r} 116 \\ + 76 \\ \hline \boxed{9} \boxed{2} \end{array}$$

$$\begin{array}{r} 123 \\ + 48 \\ \hline \boxed{7} \boxed{1} \end{array}$$

$$\begin{array}{r} 4175 \\ + 115 \\ \hline \boxed{4} \boxed{9} \boxed{0} \end{array}$$

$$\begin{array}{r} 2136 \\ + 359 \\ \hline \boxed{5} \boxed{9} \boxed{5} \end{array}$$

$$\begin{array}{r} 1183 \\ + 694 \\ \hline \boxed{8} \boxed{7} \boxed{7} \end{array}$$

$$\begin{array}{r} 1568 \\ + 142 \\ \hline \boxed{7} \boxed{1} \boxed{0} \end{array}$$

$$\begin{array}{r} 924 \\ + 628 \\ \hline 924 \end{array}$$

$$\begin{array}{r} 540 \\ + 89 \\ \hline 540 \end{array}$$


$$\begin{array}{r} 917 \\ + 369 \\ \hline 917 \end{array}$$

4. (a) 282

(b) 318

(c) 546

(d) 609

5. 

4 ¹ 51
+ 129
580

1 ² 48
+ 259
507

2 ¹ 48
+ 237
485

School

1 ¹ 73
+ 246
419

1 ⁴ 86
+ 47
533

4 ¹ 39
+ 58
497

Library

3 ¹ 66
+ 129
495

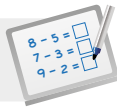
1 ³ 69
+ 195
564

1 ⁴ 26
+ 75
501

Post office

Stadium

Raju went to the stadium.

**Specific Learning Focus**

- Add a 3-digit number and a 1-digit number in tens with regrouping.
- Add two 3-digit numbers with regrouping.

Suggested Duration

6 periods

Prior Learning

Pupils are aware of putting together the concept of number bonds and place value when adding tens and ones and the need to carry over when the sum of ones is more than 9. The sum is regrouped using number bonds or using base-ten blocks when the sum is more than 9 and becomes a 2-digit number. Revisit the concept of regrouping in the addition of 2-digit numbers. Emphasise the need to employ mental sums when using the counting-on strategy.

Pre-emptive Pitfalls

Since regrouping in 3-digit numbers might require regrouping of ones to tens and then tens to hundreds, pupils should be familiar with addition of 2-digit numbers with regrouping before proceeding to add 3-digit numbers with regrouping.

Introduction

The sums in Let's Learn 3 to 5 (Textbook 2 P34 – 37) should be done on the whiteboard. Ask pupils if we should start adding the ones first or the hundreds first. Emphasise to them that if the addition of ones gives more than 10, we regroup 10 ones to 1 ten. Then, we add the tens and if the addition of tens gives more than 10, we regroup 10 tens to 1 hundred.

Problem Solving

The abovementioned concept is important and needs to be reinforced as this builds the foundation of adding 4-digit numbers in future grades.

Activities

Use numeral cards and base-ten blocks to carry out the activity in 'Activity Time' (Textbook 2 P38). Encourage peer checking and mathematical communication by encouraging pupils to ask their partner to explain the strategy employed when adding with regrouping. If one pupil uses the base-ten blocks to add, the other pupil should use another method (vertical addition). Exchange their roles for the next sum.

Resources

- equation cards
- base-ten blocks (Activity Handbook 2 P14)
- drawing block
- markers

Mathematical Communication Support

'Mind Workout' (Workbook 2A P56) can be an activity discussed in class. Ask the pupils to solve Question 2(a) independently, and ask them how they came up with the answer. They should be able to explain that since the ones digit of the final number in the sum is 0, regrouping of 10 ones to 1 ten was involved, hence the missing digit in the ones place is '4' ($4 + 6 = 10$). Bearing in mind that 1 ten has been carried over to the tens column, the missing digit in the tens place is '6' ($1 + 6 + 2 = 9$). Lastly, since there is no regrouping of tens to hundreds, the missing digit in the hundreds place is '5' ($3 + 5 = 8$). Encourage mathematical conversations where strategies are discussed before getting the pupils to answer each question.

SUBTRACTION WITHOUT REGROUPING

LEARNING OBJECTIVES

1. Subtract a 1-digit number/a ten/a hundred from a 3-digit number without regrouping.
2. Subtract a 3-digit number from another 3-digit number without regrouping.

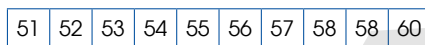
SUBTRACTION WITHOUT REGROUPING

LESSON
4

RECAP

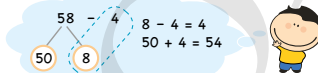
1. Subtract 4 from 58.

Method 1 Count back from 58.



$$58 - 4 = 54$$

Method 2 Subtract ones.



$$58 - 4 = 54$$

2. Subtract 14 from 55.

Step 1 Subtract the ones. **Step 2** Subtract the tens.

	T	O
	5	5
-	1	4
<hr/>		
	4	1

	T	O
	5	5
-	1	4
<hr/>		
	4	1

How can you subtract 40 from 58?



RECAP

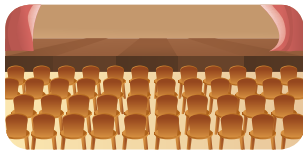
Review what pupils have learnt in Grade 1 using the given examples.

For example 1, find out first from pupils the possible ways to solve the question. Go through the two methods:

- Method 1: Count back.
- Method 2: Subtract ones.

Then, write the vertical representation of example 2 on the board and review the steps in the subtraction of two 2-digit numbers.

- Step 1: Subtract the ones.
- Step 2: Subtract the tens.

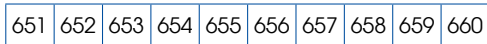


There are 658 chairs in the school hall.
Bina takes 4 chairs away.
How many chairs are there now?

LET'S LEARN

1. Subtract 4 from 658.

Method 1 Count back from 658.



$$658 - 4 = 654$$

Method 2 Subtract ones.

$658 - 4 = 654$
 $8 - 4 = 4$
 $650 + 4 = 654$

Textbook 2 P41

Go through the scenario with pupils and discuss the methods to solve the question.

LET'S LEARN

Explain how to subtract 4 from 658 using the following two methods:

Method 1: Count back.

Method 2: Subtract ones.

2. Subtract 40 from 658.

Method 1 Count back in tens from 658.

$$658 - 40 = 618$$

658, 648, 638, 628, 618

Method 2 Subtract tens.

$658 - 40 = 618$
 $50 - 40 = 10$
 $608 + 10 = 618$

3. Subtract 400 from 658.

Method 1 Count back in hundreds from 658.

$$658 - 400 = 258$$

658, 558, 458, 358, 258

Method 2 Subtract hundreds.

$658 - 400 = 258$
 $600 - 400 = 200$
 $58 + 200 = 258$

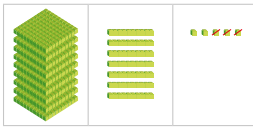
Textbook 2 P42

Go through the two methods in the subtraction of a ten from a 3-digit number as well as a hundred from a 3-digit number.

Use base-ten blocks to show subtraction in tens and in hundreds for weaker pupils.

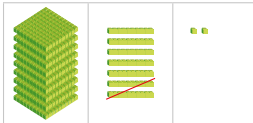
4. Subtract 723 from 975.

Step 1 Subtract the ones.
5 ones - 3 ones = 2 ones



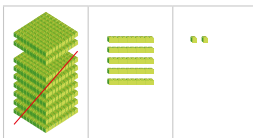
H	T	O
9	7	5
-	7	2
-	-	3
-	-	2

Step 2 Subtract the tens.
7 tens - 2 tens = 5 tens



H	T	O
9	7	5
-	7	2
-	-	3
-	5	2

Step 3 Subtract the hundreds.
9 hundreds - 7 hundreds = 2 hundreds



H	T	O
9	7	5
-	7	2
-	-	3
2	5	2

$975 - 723 = 252$

Write the vertical representation of $975 - 723$ on the board and show 975 using base-ten blocks. Demonstrate the subtraction of ones and relate it to the working in the vertical algorithm. Move on to the subtraction of the tens and then the hundreds.

PRACTICE

Subtract.

1. (a) $453 - 2 = 451$
 (b) $453 - 20 = 433$
 (c) $453 - 200 = 253$

2. (a) $794 - 3 = 791$
 (b) $794 - 30 = 764$
 (c) $794 - 300 = 494$

3. (a)

H	T	O
3	7	5
-	1	4
-	-	2
2	3	3

(b)

H	T	O
5	4	8
-	-	1
-	-	0
5	3	8

(c)

H	T	O
6	8	9
-	4	1
-	-	7
2	7	2

(d)

H	T	O
9	1	6
-	4	0
-	-	3
5	1	3

(e) $963 - 41 = 922$

H	T	O
9	6	3
-	4	1
-	-	-
9	2	2

(f) $577 - 304 = 273$

H	T	O
5	7	7
-	3	0
-	-	4
2	7	3

PRACTICE

Work with pupils on the questions and selected examples from **Worksheet 4**.

Independent seatwork

Assign pupils to complete **Worksheet 4** (Workbook 2A P41 - 44).

1. (a) 54
(b) 43
(c) 41
(d) 54
2. (a) 380
(b) 661
(c) 567
(d) 801
(e) 725
(f) 358
3. (a) 781
(b) 833
4. (a) 462
(b) 904
5. (a) 271
(b) 120
6. (a) 492
(b) 853
(c) 615
(d) 303
(e) 468
(f) 510

$$\begin{array}{r} 7. \text{ (a)} \quad 3 \quad 5 \quad 2 \\ - 2 \quad 3 \quad 1 \\ \hline \end{array}$$

$$\begin{array}{|c|c|c|} \hline 1 & 2 & 1 \\ \hline \end{array}$$

$$\begin{array}{r} \text{(b)} \quad 9 \quad 4 \quad 7 \\ - 5 \quad 4 \quad 2 \\ \hline \end{array}$$

$$\begin{array}{|c|c|c|} \hline 4 & 0 & 5 \\ \hline \end{array}$$

$$\text{(c) } 713$$

$$\begin{array}{|c|c|c|} \hline 8 & 2 & 6 \\ \hline \end{array}$$

$$\begin{array}{|c|c|c|} \hline - 1 & 1 & 3 \\ \hline \end{array}$$

$$\begin{array}{|c|c|c|} \hline 7 & 1 & 3 \\ \hline \end{array}$$

$$\text{(d) } 33$$

$$\begin{array}{|c|c|c|} \hline 6 & 6 & 7 \\ \hline \end{array}$$

$$\begin{array}{|c|c|c|} \hline - 6 & 3 & 4 \\ \hline \end{array}$$

$$\begin{array}{|c|c|c|} \hline \square & 3 & 3 \\ \hline \end{array}$$

$$8. \text{ (a) } 431$$

$$\begin{array}{r} 6 \quad 5 \quad 9 \\ - 2 \quad 2 \quad 8 \\ \hline 4 \quad 3 \quad 1 \\ \hline \end{array}$$

$$\text{(b) } 423$$

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

**Specific Learning Focus**

- Subtract a 1-digit number/a ten/a hundred from a 3-digit number without regrouping.
- Subtract a 3-digit number from another 3-digit number without regrouping.

Suggested Duration

2 periods

Prior Learning

Pupils have prior knowledge of subtracting 2-digit numbers without regrouping in Grade 1. This concept helps them to subtract 3-digit numbers without regrouping. They should be able to recall that when subtracting 2-digit numbers, the ones must be subtracted first followed by the tens. They should also be aware of the mental strategy of counting backwards along the number line and splitting a two-digit number into tens and ones, as shown in Method 2 of 'Recap' (Textbook 2 P40). Pupils should also be familiar with the standard algorithm method (vertical subtraction). The abovementioned strategies can be revisited by revisiting 2-digit subtraction without regrouping on the whiteboard and encourage individual responses. Discuss why a particular strategy is employed and elaborate the steps.

Pre-emptive Pitfalls

Before embarking on subtraction of 3-digit numbers, it is important that pupils have mastered the abovementioned methods of subtracting 2-digit numbers. Otherwise, any misconceptions and confusion pupils may have will snowball.

Introduction

After a comprehensive set of exercises involving subtraction of 2-digit numbers without regrouping, carried out in both verbal and written forms, addition of 3-digit numbers can be introduced. Reinforce that subtraction of ones must be done first, followed by tens and then hundreds. 'In Focus' and 'Let's Learn' (Textbook 2 P41 – 43) take the pupils through all the three strategies: (i) counting back, (ii) subtracting using number bonds and (iii) standard algorithm method (vertical subtraction). In all these methods, use base-ten blocks to subtract. Using the place-value chart, show how the base-ten blocks get crossed out when taking away ones, tens and hundreds.

Problem Solving

The questions in 'Practice' (Textbook 2 P44) will test the pupils' mathematical application skills. In questions 1 and 2, pupils are required to mentally subtract ones, tens and hundreds respectively. In Question 3, they will have to identify each place-value column in the vertical subtraction, keeping in mind the place-value chart. Pupils should generally find the standard algorithm method easier to carry out when subtracting without regrouping, as compared to subtracting with regrouping.

Activities

Distribute the base-ten blocks for pupils to carry out 'Let's Learn' and 'Practice' (Textbook 2 P41 – 44). The use of concrete materials helps pupils understand the concepts and strategies better.

Resources

- base-ten blocks (Activity Handbook 2 P14)

Mathematical Communication Support

Discuss the count-back strategy. Do several verbal exercises of making number bonds and then subtracting the ones or tens or hundreds (Textbook 2 P42). Encourage individual responses while writing either a horizontal or vertical subtraction on the whiteboard. Acknowledge pupils for the application of the correct strategy and if confusion arises, explain the strategy slowly and allow pupils to practice a few more subtraction questions.

SUBTRACTION WITH REGROUPING

LEARNING OBJECTIVES

1. Subtract a 1-digit number/1 ten from a 3-digit number with regrouping.
2. Subtract a 3-digit number from another 3-digit number with regrouping.

SUBTRACTION WITH REGROUPING

LESSON
5

RECAP

Subtract 14 from 31.

Step 1 Regroup 1 ten into 10 ones.
Subtract the ones.

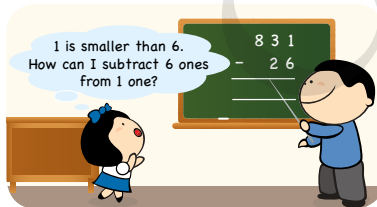
$$\begin{array}{r} \text{T} \quad \text{O} \\ 3 \quad 11 \\ - 1 \quad 4 \\ \hline 7 \end{array}$$

Step 2 Subtract the tens.

$$\begin{array}{r} \text{T} \quad \text{O} \\ 2 \quad 11 \\ - 1 \quad 4 \\ \hline 1 \quad 7 \end{array}$$

How can we subtract 26 from 51?

IN FOCUS



How can Xinyi subtract to find the answer?

RECAP

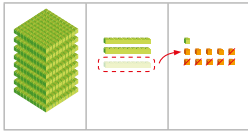
Review the subtraction of a 2-digit number from another 2-digit number with regrouping using the given example.

IN FOCUS

Discuss the question in the scenario with the class.
Lead pupils to the concept of regrouping.

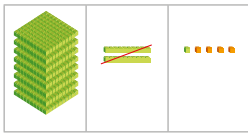
1. Subtract 26 from 831.

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



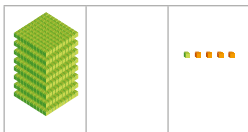
H	T	O
8	3	1
-	2	6
	0	5

Step 2 Subtract the tens. 2 tens - 2 tens = 0 tens



H	T	O
8	2	1
-	2	6
	0	5

Step 3 Subtract the hundreds.



H	T	O
8	2	1
-	2	6
8	0	5

$$831 - 26 = 805$$

Textbook 2 P46

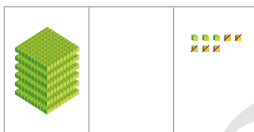
Use base-ten blocks to show the regrouping of 1 ten into 10 ones. At the same time, show the subtraction of 1 ten in the tens column and the addition of 10 ones to the ones column in the algorithm. Then, subtract the ones.

Next, use base-ten blocks to show the subtraction of tens and subtract the tens in the algorithm.

8 hundred remains as it is. The final answer is 805.

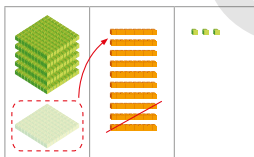
2. Subtract 135 from 608.

Step 1 Subtract the ones.
8 ones - 5 ones = 3 ones



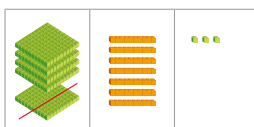
H	T	O
6	0	8
-	1	3
		3

Step 2 Regroup 1 hundred into 10 tens.
Subtract the tens.
10 tens - 3 tens = 7 tens



H	T	O
6	0	8
-	1	3
	7	3

Step 3 Subtract the hundreds.
5 hundreds - 1 hundred = 4 hundreds



H	T	O
6	0	8
-	1	3
4	7	3

$$608 - 135 = 473$$

Textbook 2 P47

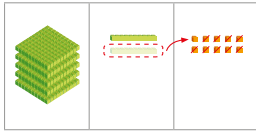
Write the vertical representation of $608 - 135$ on the board and ask pupils what they should do first. Proceed to subtract the ones since there is no need for regrouping.

Move on to the tens and ask pupils how 3 tens can be subtracted from 0 ten. Lead pupils to the concept of regrouping. Use base-ten blocks to demonstrate that 1 hundred is regrouped into 10 tens. Show that 6 hundreds become 5 hundreds and 0 ten becomes 10 tens on the vertical algorithm. Proceed to subtract the tens.

Lastly, show the subtraction of the hundreds using the base-ten blocks and in the algorithm.

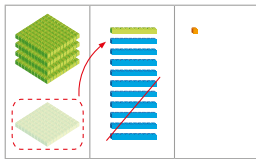
3. Subtract 269 from 520.

Step 1 Regroup 1 ten into 10 ones.
Subtract the ones.
10 ones - 9 ones = 1 one



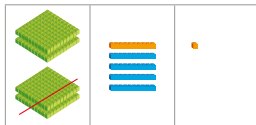
H	T	O
5	2	0 ¹⁰
- 2	6	9
2	5	1

Step 2 Regroup 1 hundred into 10 tens.
Subtract the tens.
11 tens - 6 tens = 5 tens



H	T	O
4 ⁵	2 ¹¹	0 ¹⁰
- 2	6	9
2	5	1

Step 3 Subtract the hundreds.
4 hundreds - 2 hundreds = 2 hundreds



H	T	O
4 ⁵	2 ¹¹	0 ¹⁰
- 2	6	9
2	5	1

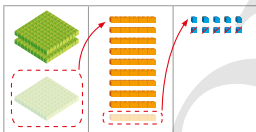
$520 - 269 = 251$

Textbook 2 P48

Write the vertical representation of $520 - 269$ on the board and use base-ten blocks to represent 520. Lead pupils to the concept of regrouping by asking questions such as 'How do we take 9 ones away when there are no ones?' Use the base-ten blocks to show the regrouping and relate it to the algorithm. Move on from the ones to the tens, then to the hundreds.

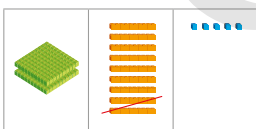
4. Subtract 125 from 300.

Step 1 Regroup 1 hundred into 10 tens.
Regroup 1 ten into 10 ones.
Subtract the ones.
10 ones - 5 ones = 5 ones



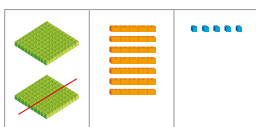
H	T	O
3 ²	0 ¹⁰	0 ¹⁰
- 1	2	5
2	7	5

Step 2 Subtract the tens.
9 tens - 2 tens = 7 tens



H	T	O
3 ²	0 ¹⁰	0 ¹⁰
- 1	2	5
2	7	5

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



H	T	O
3 ²	0 ¹⁰	0 ¹⁰
- 1	2	5
1	7	5

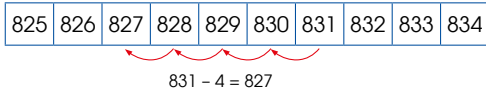
$300 - 125 = 175$

Textbook 2 P49

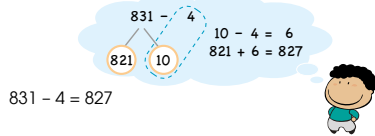
Write the vertical representation of $300 - 125$ on the board and use base-ten blocks to represent 300. Lead pupils to the concept of regrouping by asking how to take away 5 ones when there are no ones. Show the regrouping with the base-ten blocks. Move on from the ones to the tens, and then the hundreds.

5. Subtract 4 from 831 without using \square .

Method 1 Count back from 831.

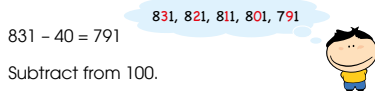


Method 2 Subtract from 10.

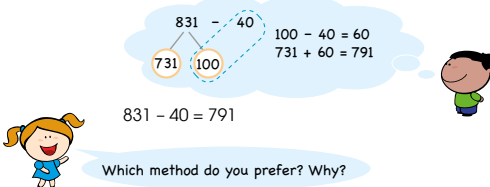


6. Subtract 40 from 831 without using \square .

Method 1 Count back in tens from 831.



Method 2 Subtract from 100.



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ADDITION AND SUBTRACTION WITHIN 1000

50

Textbook 2 P50

Let's Learn 5 shows the subtraction of a 1-digit number from a 3-digit number. Go through the two methods of subtracting the numbers. Give another example to see if pupils can apply the two methods.

Let's Learn 6 shows the subtraction of a 2-digit number from a 3-digit number. Go through the two methods of subtracting the numbers. Give another example to see if pupils can apply the two methods. Ask pupils to choose their preferred method and explain why they chose that method.

ACTIVITY TIME

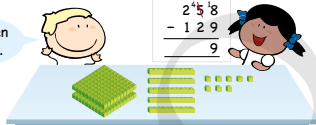
Work in pairs.

- Write down two 3-digit numbers.
- Use base-ten blocks to show how you subtract the numbers.
- Get your partner to show the subtraction.

What you need:



Regroup 1 ten into 10 ones.



- Compare your answers. Do you get the same answer?
- Take turns and repeat 1 to 4.

ACTIVITY TIME

- Go to <http://www.shinglee.com.sg/StudentResources/NSPM2>.
- Click on 'Addition and Subtraction'.
- Answer the questions shown.

Can you win the game of Tic Tac Toe?



ACTIVITY TIME



Provide pupils with base-ten blocks to work on the subtractions in the activity. Get one pupil to use base-ten blocks to demonstrate the subtraction and the other pupil to work on the same subtraction using the vertical algorithm. Exchange their roles when they are done with the subtractions.

51

CHAPTER 2

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Textbook 2 P51



Subtract.

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 6 \quad 2 \quad 4 \\ - 8 \quad 3 \\ \hline 5 \quad 4 \quad 1 \end{array}$$

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 7 \quad 2 \quad 1 \\ - 4 \quad 0 \quad 9 \\ \hline 3 \quad 1 \quad 2 \end{array}$$

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 8 \quad 0 \quad 2 \\ - 2 \quad 3 \quad 7 \\ \hline 5 \quad 6 \quad 5 \end{array}$$

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 5 \quad 0 \quad 0 \\ - 3 \quad 2 \quad 8 \\ \hline 1 \quad 7 \quad 2 \end{array}$$

(e) $456 - 368 = 88$

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 4 \quad 5 \quad 6 \\ - 3 \quad 6 \quad 8 \\ \hline 8 \quad 8 \end{array}$$

(f) $800 - 553 = 247$

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{O} \\ 8 \quad 0 \quad 0 \\ - 5 \quad 5 \quad 3 \\ \hline 2 \quad 4 \quad 7 \end{array}$$

2. (a) $413 - 4 = 409$

(b) $413 - 40 = 373$

3. (a) $722 - 3 = 719$

(b) $722 - 30 = 692$

Complete Workbook 2A, Worksheet 5 • Pages 45 – 48



Work with pupils on the questions and selected examples from **Worksheet 5**.

Independent seatwork

Assign pupils to complete Worksheet 5 (Workbook 2A P45 – 48).

Textbook 2 P52

$$\begin{array}{r} 1. \text{ (a)} \quad \overset{4}{5} \quad \overset{1}{5} \\ - \quad 1 \quad 9 \\ \hline \boxed{3} \quad \boxed{6} \end{array}$$

$$\begin{array}{r} \text{(b)} \quad \overset{8}{9} \quad \overset{1}{6} \\ - \quad 2 \quad 8 \\ \hline \boxed{6} \quad \boxed{8} \end{array}$$

$$\begin{array}{r} \text{(c)} \quad \overset{7}{8} \quad \overset{1}{2} \\ - \quad 3 \quad 7 \\ \hline \boxed{4} \quad \boxed{5} \end{array}$$

$$\begin{array}{r} \text{(d)} \quad \overset{8}{9} \quad \overset{1}{1} \\ - \quad 7 \quad 4 \\ \hline \boxed{1} \quad \boxed{7} \end{array}$$

$$\begin{array}{r} \text{(e)} \quad \overset{5}{6} \quad \overset{1}{0} \\ - \quad 3 \quad 9 \\ \hline \boxed{2} \quad \boxed{1} \end{array}$$

$$\begin{array}{r} \text{(f)} \quad \overset{8}{9} \quad \overset{1}{0} \\ - \quad 2 \quad 5 \\ \hline \boxed{6} \quad \boxed{5} \end{array}$$

$$\begin{array}{r} 2. \text{ (a)} \quad 2 \quad \overset{5}{6} \quad \overset{1}{5} \\ - \quad \quad 3 \quad 6 \\ \hline \boxed{2} \quad \boxed{2} \quad \boxed{9} \end{array}$$

$$\begin{array}{r} \text{(b)} \quad \overset{5}{6} \quad \overset{1}{1} \quad 6 \\ - \quad 5 \quad 3 \quad 5 \\ \hline \boxed{} \quad \boxed{8} \quad \boxed{1} \end{array}$$

$$\begin{array}{r} \text{(c)} \quad \overset{7}{8} \quad \overset{11}{2} \quad \overset{1}{7} \\ - \quad 6 \quad 5 \quad 9 \\ \hline \boxed{1} \quad \boxed{6} \quad \boxed{8} \end{array}$$

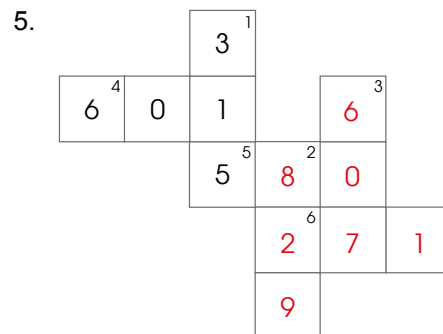
$$\begin{array}{r} \text{(d)} \quad \overset{8}{9} \quad \overset{9}{0} \quad \overset{1}{1} \\ - \quad 2 \quad 8 \quad 7 \\ \hline \boxed{6} \quad \boxed{1} \quad \boxed{4} \end{array}$$

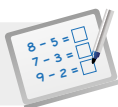
$$\begin{array}{r} 3. \text{ (a)} \quad 409 \\ \quad \quad \quad \overset{6}{3} \quad \overset{4}{4} \quad \overset{1}{7} \\ - \quad 2 \quad 3 \quad 8 \\ \hline \quad \quad \quad \overset{4}{0} \quad \overset{0}{9} \end{array}$$

$$\begin{array}{r} \text{(b)} \quad 372 \\ \quad \quad \quad \overset{3}{4} \quad \overset{14}{4} \quad \overset{5}{5} \quad \overset{1}{1} \\ - \quad \quad \quad 7 \quad 9 \\ \hline \quad \quad \quad \overset{3}{7} \quad \overset{2}{2} \end{array}$$

$$\begin{array}{r} \text{(c)} \quad 189 \\ \quad \quad \quad \overset{2}{8} \quad \overset{9}{9} \quad \overset{1}{0} \\ - \quad 1 \quad 1 \quad 1 \\ \hline \quad \quad \quad \overset{1}{8} \quad \overset{8}{9} \end{array}$$

4. (a) 207
 (b) 180
 (c) 837
 (d) 792



**Specific Learning Focus**

- Subtract a 1-digit number/1 ten from a 3-digit number with regrouping.
- Subtract a 3-digit number from another 3-digit number with regrouping.

Suggested Duration

6 periods

Prior Learning

At this point, pupils should be familiar with subtraction with regrouping. In this lesson, revisit the concept of regrouping and reinforce when regrouping is required. When the ones or tens to be subtracted are larger than the ones or tens of the number to be subtracted from, regrouping is required. Discuss with the pupils why Xinyi (Textbook 2 P45) cannot subtract 6 ones from 1 one. Pose multiple questions on the whiteboard similar to the subtraction in 'Recap' (Textbook 2 P41) to revisit the concept of regrouping.

Pre-emptive Pitfalls

Employing the correct steps for subtraction with regrouping can be quite challenging to pupils. They might be unsure as to when regrouping should be done. Work on multiple questions on the whiteboard with the pupils.

Introduction

Explain that 1 ten = 10 ones, hence when we regroup 1 ten to 10 ones, subtraction in the ones column can be carried out (Refer to 'Recap' in Textbook 2 P45). Start with the subtraction of a 2-digit number from a 3-digit number first (Textbook 2 P46) and once pupils have sufficient practice, move on to subtraction of a 3-digit number from another 3-digit number.

Help pupils remember the rule to regrouping by writing the following on the whiteboard:

1 ten $\xrightarrow{\text{regroup}}$ 10 ones

1 hundred $\xrightarrow{\text{regroup}}$ 10 tens

Counting backwards and using number bonds (Textbook 2 P50) can be explained as alternative methods. Explain to pupils that splitting 831 into 731 and 100 enables us to subtract 40 from 100. Then 60 is added to 731 which gives us 791.

Problem Solving

The teacher should explain to pupils that when subtracting, they need to recognise if regrouping is required.

Activities

Provide each pair with drawing block, markers and base-ten blocks to carry out 'Activity Time' (Textbook 2 P51). Encourage peer learning and let group members explain the strategy if any one has problems carrying out the regrouping.

Resources

- drawing block
- markers
- base-ten blocks (Activity Handbook 2 P14)

Mathematical Communication Support

Worksheet 5 (Workbook 2A P45 – 48) can be done in class. Before asking the pupils to work independently, discuss the strategy to be employed for each question. Key terms like 'carry over', 'big enough to subtract', '1 hundred has 10 tens', '1 ten has 10 ones', 'regroup', 'place value' and 'number bonds' need to be highlighted and pinned to the soft board in the classroom for pupils to refer to.

SOLVING WORD PROBLEMS

LEARNING OBJECTIVES

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

SOLVING WORD PROBLEMS

LESSON
6

IN FOCUS


I have 5 pencils.

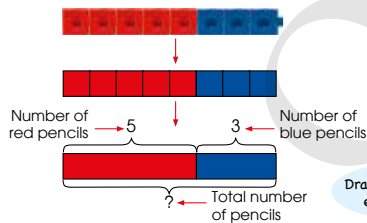


I have 3 pencils.

What should we do to find the total number of pencils?

LET'S LEARN

1. Use  to show the number of pencils.



$$5 + 3 = 8 \quad \text{or} \quad 3 + 5 = 8$$

There are 8 pencils altogether.

Draw bars to show each number.



IN FOCUS

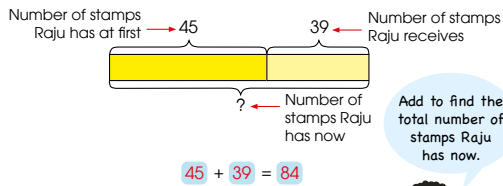
Discuss the question in the scenario with pupils. Most pupils should be able to indicate that the total number of pencils can be found by adding 5 and 3 together.

LET'S LEARN

As pupils are learning model drawing for the first time, the explanation should be done slowly. First, the number of pencils can be represented by multilink cubes. Show that the cubes can be represented by squares and draw the squares on the board. Use different colours to represent the girl's pencils and the boy's pencils.

Then, erase the lines in between the squares and show that the bars can also represent the number of pencils that each child has. Write the corresponding numbers and labels on the model. Show that the two numbers can be added to find the total number of pencils.

2. Raju has 45 stamps.
His father gives him 39 stamps.
How many stamps does Raju have now?

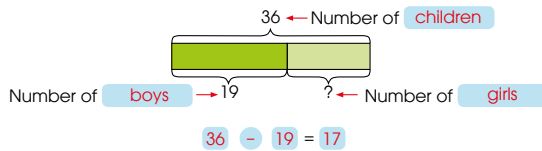


Raju has **84** stamps now.

Add to find the total number of stamps Raju has now.



3. There are 36 children in the school band.
19 of them are boys.
How many girls are there?



There are **17** girls.

What does '=' show?
Should we add or subtract to find the number of girls?



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ADDITION AND SUBTRACTION WITHIN 1000

54

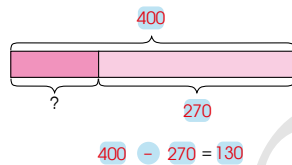
Textbook 2 P54

For Let's Learn 2, draw two joining bars on the board and make sure one bar is longer than the other. Guide pupils to solve the word problem with model drawing by asking the following questions:

- Which bar represents the number of stamps Raju has at first?
- Which bar represents the number of stamps Raju receives?
- Explain your answers.
- What does the total of the two bars represent?
- How to find the total?

Likewise, guide pupils to solve Let's Learn 3 with model drawing. Ask them how Let's Learn 3 differs from Let's Learn 2 and whether they should add or subtract in this case. Get some pupils to present their models and explain their answers.

4. Melling baked 400 tarts.
She gave 270 tarts away.
How many tarts did Melling have left?



Melling had **130** tarts left.

Should we add or subtract?



PRACTICE



Ask pupils whether they should add or subtract to find the remaining number of tarts and fill in the missing blanks for Let's Learn 4. Get them to explain their answers.

Work with pupils on the questions and selected examples from **Worksheet 6A**.

Solve.

1. There are 24 marbles in a jar.
Farhan puts 124 more marbles into the jar.
How many marbles are there in the jar now? **148**
2. A farmer collects 127 tomatoes and 235 strawberries.
How many fruits does he collect together? **362**
3. Siti has 500 buttons.
She sells 201 buttons.
How many buttons does Siti have left? **299**
4. A postman has to deliver 358 letters.
He delivers some letters and has 289 letters left to deliver.
How many letters has he delivered? **69**

Complete Workbook 2A, Worksheet 6A • Pages 49 – 52

55

CHAPTER 2

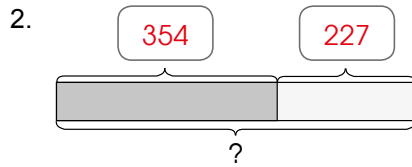
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Textbook 2 P55

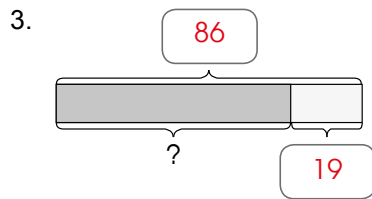
Independent seatwork

Assign pupils to complete Worksheet 6A (Workbook 2A P49 – 52).

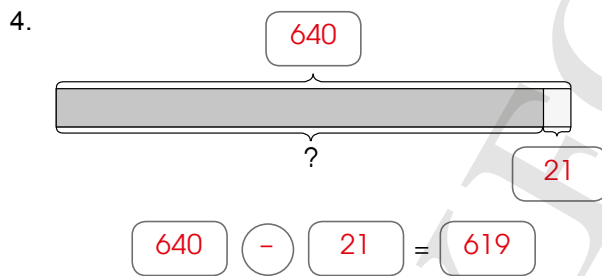
1. $582 + 341 = 923$
Mrs Lee had Rs 923 at first.



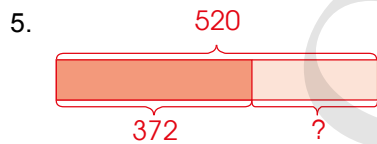
$354 + 227 = 581$
There are 581 pages in the book.



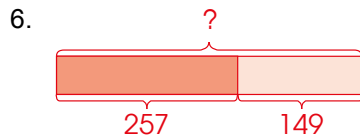
$86 - 19 = 67$
Raju had 67 balloons left.



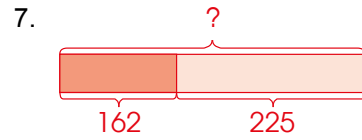
$640 - 21 = 619$
619 guests remained.



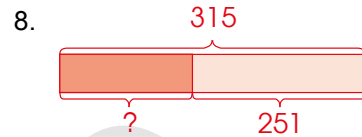
$520 - 372 = 148$
The farmer had 148 eggs left.



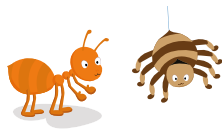
$257 + 149 = 406$
Xinyi has 406 stickers now.



$162 + 225 = 387$
Sam had 387 toy cars at first.



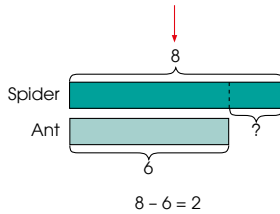
$315 - 251 = 64$
The baker gave away 64 cookies.



How many more legs does a spider have than an ant?

LET'S LEARN

1. A spider has 8 legs.
An ant has 6 legs.



A spider has 2 more legs than an ant.

Textbook 2 P56

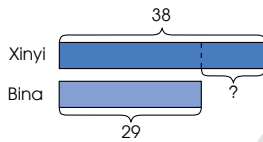
Go through the scenario with pupils and ask them how they would solve the problem.

LET'S LEARN

Use multilink cubes or squares to represent the number of legs the spider and the ant have. Erase the lines in between the squares to show the two bars. Guide pupils to understand that they have to subtract 6 from 8 to obtain the answer.

Draw a part-whole model to represent the information in a different way and ask pupils which model helps them to compare the number of legs better.

2. Xinyi has 38 stickers.
Bina has 29 stickers.
How many more stickers does Xinyi have than Bina?



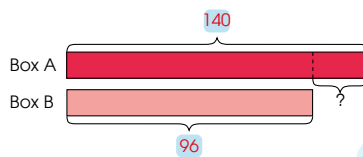
$$38 - 29 = 9$$

Xinyi has 9 more stickers than Bina.

Subtract to find the answer.



3. There are 140 erasers in Box A and 96 erasers in Box B.
How many fewer erasers are there in Box B than in Box A?



$$140 - 96 = 44$$

There are 44 fewer erasers in Box B than in Box A.

Should we add or subtract? Why?



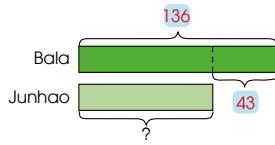
In Let's Learn 2, draw two separate bars on the board and make sure one bar is longer than the other. Guide pupils to solve the word problem with model drawing by asking the following questions:

- Which bar represents the number of stickers Xinyi has?
- Which bar represents the number of stickers Bina has?
- Explain your answers.
- Should we add or subtract? Why?

Likewise, repeat the procedure for Let's Learn 3. Remind pupils to label and write down the corresponding numbers on the models.

Textbook 2 P57

4. Bala has 136 stamps.
Junhao has 43 fewer stamps than Bala.
How many stamps does Junhao have?



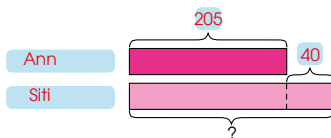
$$136 - 43 = 93$$

Junhao has 93 stamps.

Should we add or subtract?



5. Ann has 205 beads.
Siti has 40 beads more than Ann.
How many beads does Siti have?



$$205 + 40 = 245$$

Siti has 245 beads.

Who has more beads?



Should we add or subtract?



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ADDITION AND SUBTRACTION WITHIN 1000

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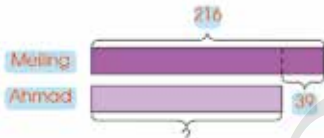
Textbook 2 P58

In Let's Learn 4, draw two separate bars on the board and make sure one bar is longer than the other. Guide pupils to solve the word problem with model drawing by asking the following questions:

- What does this bar represent?
- Should the bar representing Junhao's stamps be longer or shorter? Why?
- Should we add or subtract? Why?

Likewise, repeat the procedure for Let's Learn 5. Remind pupils to label and write down the corresponding numbers on the models.

6. Meiling folds 216 paper cranes.
She folds 39 more paper cranes than Ahmad.
How many paper cranes does Ahmad fold?



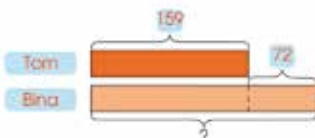
$$216 - 39 = 177$$

Ahmad folds 177 paper cranes.

Who folds more paper cranes?



7. Tom collects 159 pressed flowers.
He collects 72 fewer pressed flowers than Bina.
How many pressed flowers does Bina collect?



$$159 + 72 = 231$$

Bina collects 231 pressed flowers.

Who collects fewer pressed flowers?



In Let's Learn 6, draw two separate bars on the board and make sure one bar is longer than the other. Guide pupils to solve the word problem with model drawing by asking the following questions:

- Which bar represents the number of paper cranes Meiling has?
- Which bar represents the number of paper cranes Ahmad has?
- Explain your answers.
- Should we add or subtract? Why?

Likewise, repeat the procedure for Let's Learn 7. Remind pupils to label and write down the corresponding numbers on the models.

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CHAPTER 2

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Textbook 2 P59



Solve.

- In a school, there are 748 boys and 864 girls.
How many more girls than boys are there?
- Priya has 419 seashells.
Nora has 184 seashells more than Priya.
How many seashells does Nora have?
- There are 141 women at a concert.
There are 52 more women than men at the concert.
How many men are there at the concert?

Complete Workbook 2A, Worksheet 6B • Pages 53 – 55



MIND WORKOUT

Some numbers are given.

1	3	4	5	7	8
---	---	---	---	---	---

Use the numbers to form two 3-digit numbers.
Subtract the numbers to get the greatest answer.

Show your working on
 $875 - 134 = 741$

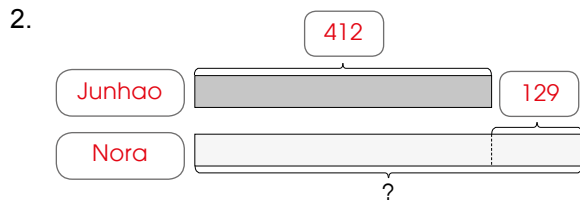


Work with pupils on the questions. Allow them to draw models for the word problems and discuss if they should add or subtract in each case. Observe if the models are drawn accurately (i.e. the longer bar represents the larger number etc.).

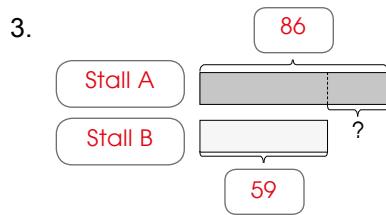
Independent seatwork

Assign pupils to complete Worksheet 6B
(Workbook 2A P53 – 55).

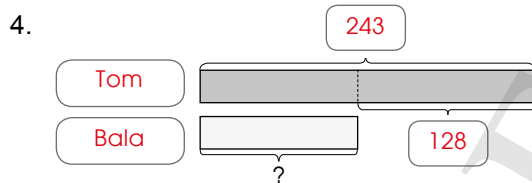
1. $91 - 72 = 19$
Kate spent Rs 19 more than Meiling.



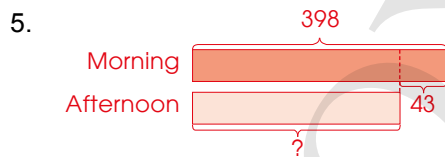
$412 + 129 = 541$
Nora has 541 bookmarks.



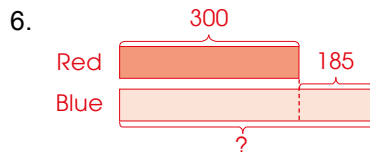
$86 - 59 = 27$
Stall B sold 27 fewer oranges than Stall A.



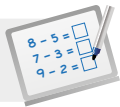
$243 - 128 = 115$
Bala scored 115 points.



$398 - 43 = 355$
Mr Tan sold 355 curry puffs in the afternoon.



$300 + 185 = 485$
There are 485 blue pens.

**Specific Learning Focus**

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

Suggested Duration

8 periods

Prior Learning

In this lesson, it is the first time that pupils learn to solve real-world problems by drawing bar models. They are required to understand the word problem and extract the important information to decide on the operation to be employed. If the total quantity is asked for in the question, we use addition. If objects are taken away and the difference is to be determined, we use subtraction.

Pre-emptive Pitfalls

Explaining bar model drawing should be done slowly and gradually. Start by using multilink cubes in different colours (Textbook 2 P53) which can then be converted to bars to represent the part-part-whole concept. This is a new strategy and will require careful explanation.

Introduction

Bar modelling is best explained by extending the part-part-whole concept. In Let's Learn 3 (Textbook 2 P53), 36 represents the whole bar and 19 is a part of the whole (36). Similarly, in Let's Learn 2, 45 and 39 are two parts which form a whole (84) altogether. Bar modelling helps pupils to decide the mode of operation quicker, as the data representing the 'whole' and 'part' can be clearly seen from the bar models.

Problem Solving

There are multiple steps to carry out when solving a word problem. First, the information is presented in a bar model. Then, the operation (addition or subtraction) is decided. Once it is figured that a 'sum' or 'difference' has to be found, the operation is then carried out by standard algorithm method or horizontal representation employing mental strategies. This entails a lot of reflection and application of problem-solving skills for pupils. To develop these skills, work on the problems on the whiteboard slowly and systematically. Explain each step methodically and then let the pupils work independently. Provide one-to-one assistance as they work on the problems on their exercise books workbooks (P49 – 52). The word problems progress from 2 digits to 3 digit/2 digit and finally 3 digit/3 digit operations.

Activities

Cut-outs of bar models can be handed to pupils. These can be laminated and pupils can be provided with markers to label and section the bars.

Resources

- multilink cubes
- markers
- cut-outs of bar models (Activity Handbook 2 P21)

Mathematical Communication Support

Explain the comparison bars when drawing two separate bar models. The fact that one bar will be longer than the other should be highlighted. Emphasise the importance of labelling the bars. Ask pupils to explain why they have decided to add or subtract. Discuss each word problem verbally before asking them to work independently.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout

Date: _____

1. Find the missing numbers.

(a) $\heartsuit - 200 = 256$

$\heartsuit = 456$

Do you add or subtract to find the answer?



(b) $559 - \star = 500$

$\star = 59$

2. Fill in the missing numbers.

(a)

3	6	4
+	5	2 6
8 9 0		

(b)

7	2	6
-	5 9	8
1 2 8		

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Mind Workout

Use a simple question to show pupils how to tackle question 1:

$$5 - 2 = ?$$

The answer is 3. How do we get 5 from the values 2 and 3? Similarly, how do we find the answer with the numbers 200 and 256?

Allow pupils to solve question 2 independently and thereafter ask them to explain their answers.

Workbook 2A P56

PRACTICE

Solve.

- In a school, there are 748 boys and 864 girls. How many more girls than boys are there?
- Priya has 419 seashells. Nora has 184 seashells more than Priya. How many seashells does Nora have?
- There are 141 women at a concert. There are 52 more women than men at the concert. How many men are there at the concert?

Complete Workbook 2A, Worksheet 6B • Pages 53 – 55



MIND WORKOUT

Some numbers are given.



Use the numbers to form two 3-digit numbers. Subtract the numbers to get the greatest answer.

Show your working on .
875 - 134 = 741

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ADDITION AND SUBTRACTION WITHIN 1000

60

Textbook 2 P60



MIND WORKOUT

Provide an example to the class and get pupils to work on the task independently.

MATHS JOURNAL

Look at the subtraction fact.

$$136 - 75 = 61$$

Write a word problem using the subtraction fact. Show how you solve your word problem using a model.

I know how to...

- add numbers without regrouping.
- add numbers with regrouping.
- subtract numbers without regrouping.
- subtract numbers with regrouping.
- solve word problems involving addition and subtraction.

SELF-CHECK



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CHAPTER 2

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Textbook 2 P61

MATHS JOURNAL

Show pupils an example of a word problem using the given subtraction equation.

Example Ann has \$136. She spends \$75 on a printer. How much money does she have left?

Get pupils to write their own word problems.



SELF-CHECK





Before pupils proceed to do the self check, review the important concepts by asking for examples learnt for each objective. For instance, a pupil is able to give an example $234 + 312$ under the objective of 'Add numbers without regrouping'.

This self check can be done after pupils have completed **Review 2** (Workbook 2A P57 – 62) as consolidation of understanding for the chapter.

1. (a) 979
- (b) 313
- (c) 711
- (d) 199
- (e) 817
- (f) 825
- (g) 521
- (h) 224
- (i) 792
- (j) 329
- (k) 303
- (l) 481

2. (a)  499
- (b)  410


3.
$$\begin{array}{r} 117 \\ + 81 \\ \hline 198 \end{array}$$
 


$$\begin{array}{r} 248 \\ - 148 \\ \hline 100 \end{array}$$
 

$$\begin{array}{r} 963 \\ - 222 \\ \hline 741 \end{array}$$
 


$$\begin{array}{r} 755 \\ + 12 \\ \hline 767 \end{array}$$
 

$$\begin{array}{r} 878 \\ - 101 \\ \hline 777 \end{array}$$
 

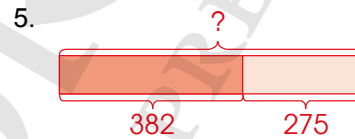
$$\begin{array}{r} 757 \\ + 220 \\ \hline 977 \end{array}$$
 

4. 

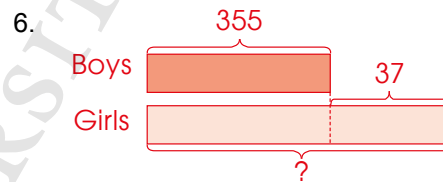
$\begin{array}{r} 109 \\ + 118 \\ \hline 227 \end{array}$	$\begin{array}{r} 675 \\ - 448 \\ \hline 227 \end{array}$	$\begin{array}{r} 719 \\ - 492 \\ \hline 227 \end{array}$
$\begin{array}{r} 128 \\ + 325 \\ \hline 453 \end{array}$	$\begin{array}{r} 129 \\ + 98 \\ \hline 227 \end{array}$	$\begin{array}{r} 542 \\ - 225 \\ \hline 317 \end{array}$
$\begin{array}{r} 956 \\ - 693 \\ \hline 263 \end{array}$	$\begin{array}{r} 300 \\ - 73 \\ \hline 227 \end{array}$	$\begin{array}{r} 329 \\ + 182 \\ \hline 511 \end{array}$



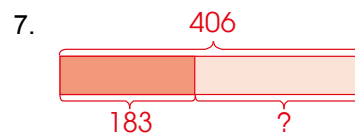
The hidden letter is T.



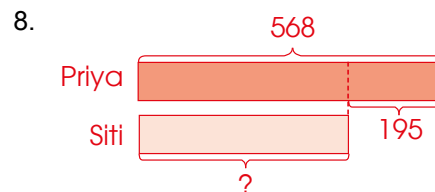
$382 + 275 = 657$
He has 657 coins altogether.



$355 + 37 = 392$
There are 392 girls.



$406 - 183 = 223$
Weiming read 223 pages on Sunday.



$568 - 195 = 373$
Siti has 373 stickers.

Multiplication Tables of 2, 5 and 10

CHAPTER

3

Multiplication Tables of 2, 5 and 10 CHAPTER **3**

How many balloons are there altogether?



MULTIPLICATION LESSON **1**

RECAP

$3 + 3 + 3 + 3 = 12$
4 threes = 12
 $4 \text{ groups of } 3 = 12$
 $4 \times 3 = 12$

There are 4 groups.
Each group has 3 balloons.

$4 \times 3 = 12$ is read as 4 times 3 equals 12.

There are 12 balloons altogether.

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MULTIPLICATION TABLES OF 2, 5 AND 10 **62**

Textbook 2 P62

Related Resources

NSPM Textbook 2 (P62 – 78)
NSPM Workbook 2A (P63 – 90)

Materials

Dot cards, drawing block, markers, multilink cubes, multiplication cards ($\times 2$, $\times 5$ and $\times 10$), paper clips, rubber bands, seeds

Lesson

Lesson 1 Multiplication
Lesson 2 Multiplication Table of 2
Lesson 3 Multiplication Table of 5
Lesson 4 Multiplication Table of 10
Lesson 5 Solving Word Problems
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

In this chapter, pupils revisit the concept of multiplication that they have learnt in Grade 1. They will move on to learn the commutative property of multiplication. Activities are planned to help pupils build up and memorise the multiplication tables of 2, 5 and 10. Towards the end of the chapter, pupils will solve word problems on multiplication of 2, 5 and 10.

LESSON

1

MULTIPLICATION

LEARNING OBJECTIVES

1. Recall the concept of multiplication.
2. Relate multiplication to repeated addition and '___ groups of ___'.

Multiplication Tables of 2, 5 and 10

CHAPTER

3

How many balloons are there altogether?

MULTIPLICATION

RECAP

$3 + 3 + 3 + 3 = 12$
 4 threes = 12
 4 groups of 3 = 12
 $4 \times 3 = 12$

There are 12 balloons altogether.

LESSON

1

There are 4 groups. Each group has 3 balloons.

$4 \times 3 = 12$ is read as 4 times 3 equals 12.

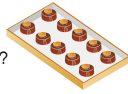
OXFORD UNIVERSITY PRESS MULTIPLICATION TABLES OF 2, 5 AND 10 62



Use the chapter opener to discuss the various ways of counting the number of balloons such as repeated addition, 4 threes, ___ groups of ___ and 4×3 . Remind pupils what the symbol 'x' means and how the number sentence can be read.

Textbook 2 P62

How many chocolates are there in each box?



LET'S LEARN

1. $5 \times 2 = 10$ $2 \times 5 = 10$
 $5 \times 2 = 10$ is the same as $2 \times 5 = 10$. $5 \times 2 = 2 \times 5$

2. How many dots are there?
 $2 \times 3 = 6$ $3 \times 2 = 6$
 $2 \times 3 = 6$ is the same as $3 \times 2 = 6$.

3. Multiply 3 by 4. Number of groups
 $3 \times 4 = 12$
 Number of objects in each group
 We can also write $4 \times 3 = 12$.
 3×4 is the same as 4×3 .

4. Multiply 2 by 8.
 $2 \times 8 = 16$
 We can also write $8 \times 2 = 16$.
 2×8 is the same as 8×2 .

Use the scenario to discuss the different ways of counting how many pieces of chocolate there are. Pupils could say 2 fives, 5 twos, $2 + 2 + 2 + 2 + 2$, $5 + 5$, 2 groups of 5, 5 groups of 2, etc.

LET'S LEARN

Highlight to pupils that the chocolates can be grouped in twos or fives and show that $5 \times 2 = 2 \times 5$.

In Let's Learn 2, the dots can be arranged in twos or threes and it can be written as $2 \times 3 = 6$ or $3 \times 2 = 6$. Highlight to pupils that $2 \times 3 = 3 \times 2$.

Likewise, go through the remaining examples and show pupils the different ways of grouping the objects. Emphasise the commutative property of multiplication in each case without introducing the word 'commutative' to pupils.

ACTIVITY TIME

Work in groups of 4.

1. Make three multiplication stories. Draw to show your stories.

Example

There are 3 boxes.
Each box has 2 balls.



$3 \times 2 = 6$

There are 6 balls in all.

What you need:



What is the meaning of '='?



PRACTICE

1. How many dots are there?
 (a) $3 \times 5 = 15$
 $5 \times 3 = 15$
 (b) $3 \times 4 = 12$
 $4 \times 3 = 12$

2. (a) Multiply 5 by 4. $5 \times 4 = 20$
 (b) Multiply 6 by 3. $6 \times 3 = 18$

ACTIVITY TIME

Give each group the necessary materials for this activity and go through the example on P64 with pupils. Encourage them to draw pictures to accompany their multiplication stories.

PRACTICE

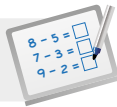
Work with pupils on the questions and selected examples from **Worksheet 1**.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2A P63 – 66).

1. (a) $4 + 4 + 4 = 12$
3 groups of 4 = 12
 $3 \times 4 = 12$
- (b) $6 + 6 + 6 + 6 + 6 = 30$
5 groups of 6 = 30
 $5 \times 6 = 30$
- (c) $7 + 7 + 7 + 7 = 28$
4 groups of 7 = 28
 $4 \times 7 = 28$
2. (a) $5 \times 3 = 15$
 $3 \times 5 = 15$
- (b) $3 \times 7 = 21$
 $7 \times 3 = 21$
- (c) $6 \times 5 = 30$
 $5 \times 6 = 30$
3. (a) 10, 10
(b) $3 \times 6 = 18$
 $6 \times 3 = 18$

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**Specific Learning Focus**

- Recall the concept of multiplication.
- Relate multiplication to repeated addition and ‘ ____ groups of ____’.

Suggested Duration

2 periods

Prior Learning

Pupils have learnt repeated addition of equal numbers or equal sets. With the help of the Concrete-Pictorial-Abstract (C-P-A) approach they have also learnt the multiplication stories translated into symbols (e.g. 3 groups of two is mathematically written as $3 \times 2 = 6$). ‘Recap’ (Textbook 2 P62) recapitulates the multiplication concept well.

Pre-emptive Pitfalls

Addition is the operation that pupils are comfortable to deal with. The multiplication operation is new to them and can get confusing. Repeated addition of the same number can be explained better by saying that it is a quicker way to get an answer. Number patterns and skip counting can also be correlated to this topic. The rote learning of multiplication tables will also be quite challenging, but since in this grade only the multiplication tables of 2, 5 and 10 will be introduced, pupils should be able to grasp the concept well.

Introduction

The commutative property of multiplication is explained in this lesson. This concept can be better explained with the use of ‘arrays’. When carrying out the activities in Textbook 2 (P63 – 64), real-life objects can be placed on the teacher’s desk or in groups to show the array concept of grouping. So 15 can be ‘arranged’ or ‘arrayed’, commutatively as 3×5 or 5×3 . 3 groups of 5 or 5 groups of 3 will give the same result.

Problem Solving

The commutative aspect of multiplication should be emphasised with array cards and by making sets with real-life objects (e.g. seeds, pebbles, paper clips, stationeries, etc.).

Activities

Activities can be carried out using real-life objects and made concrete and pictorial for the pupils to grasp. ‘Activity Time’ (Textbook 2 P64) should be encouraged to describe mathematically (equation) in words and pictorially. So 6 balls can be represented as $6 \times 1 = 6$, $3 \times 2 = 6$ and $2 \times 3 = 6$.

Resources

- real-life objects (e.g. seeds, pebbles, etc.)
- array cards (Activity Handbook 2 P22 – 23)
- dot cards (Activity Handbook 2 P24)
- multiplication cards

Mathematical Communication Support

Key terms and symbols (e.g. commutative, repeated addition, multiplication, ‘ \times ’, ‘ $=$ ’) should be enunciated using cards during class discussions.

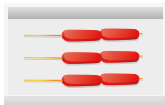
MULTIPLICATION TABLE OF 2

LEARNING OBJECTIVES

1. Memorise the multiplication table of 2.

MULTIPLICATION TABLE OF 2

IN FOCUS



How many sausages are there?

LET'S LEARN

1. 1 stick has 2 sausages.



1 group of 2
 $1 \times 2 = 2$



2 groups of 2
 $2 \times 2 = 4$



3 groups of 2
 $3 \times 2 = 6$

There are 6 sausages altogether.

LESSON 2




IN FOCUS











Ask pupils to brainstorm for various ways to count the total number of sausages. Lead pupils to count in twos.

LET'S LEARN

In Let's Learn 1, highlight that 1 group of 2 can also be written as 1×2 , 2 groups of 2 can be written as 2×2 and so on.

2.

Use    to make groups of 2.

	$1 \times 2 = 2$
	$2 \times 2 = 4$
	$3 \times 2 = 6$
	$4 \times 2 = 8$
	$5 \times 2 = 10$
	$6 \times 2 = 12$
	$7 \times 2 = 14$
	$8 \times 2 = 16$
	$9 \times 2 = 18$
	$10 \times 2 = 20$

What do you notice when you add one more group of 2?

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MULTIPLICATION TABLES OF 2, 5 AND 10

66

Textbook 2 P66

Assign pupils into groups of 4 and give each group multilink cubes. Ask pupils to use the cubes to enact ___ groups of 2 and relate the number of groups of 2 to multiplication. In addition, get pupils to observe that each successive multiple is 2 more than the multiple before and predict what 11×2 will be.

3. Count in twos.

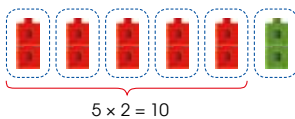


2, 4, 6, 8, 10, 12, 14, 16, 18, 20

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

What number pattern do you see?

4. $6 \times 2 = 12$



$$6 \times 2 = 10 + 2 = 12$$

6×2 is 2 more than 10.

$10 \times 2 = 20$
What is 9×2 ?

67

CHAPTER 3

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Textbook 2 P67

In Let's Learn 3, the multiples of 2 are listed horizontally. Confirm the pupils' observations in Let's Learn 2.

Let's Learn 4 is used to show that 6×2 is 2 more than 5×2 . Give more examples to pupils to aid them in understanding the multiplication of 2. For example: ' 7×2 is 14, what is 8×2 ?' or ' 4×2 is 8, what is 3×2 '

Activity Counting in twos
Materials Rubber bands, seeds

Procedure

1. Assign pupils to work in pairs.
2. Provide each pair with seeds and rubber bands.
3. Ask pupils to put their stationery in groups of 2 and count in twos to find out how many items there are in total.
4. Change and put seeds within the rubber bands to show groups of twos.



PRACTICE

1. Complete the multiplication facts.

(a)



$$5 \times 2 = 10$$

(b)



$$3 \times 2 = 6$$

2. Complete the multiplication table.

$1 \times 2 = 2$	$2 \times 1 = 2$
$2 \times 2 = 4$	$2 \times 2 = 4$
$3 \times 2 = 6$	$2 \times 3 = 6$
$4 \times 2 = 8$	$2 \times 4 = 8$
$5 \times 2 = 10$	$2 \times 5 = 10$
$6 \times 2 = 12$	$2 \times 6 = 12$
$7 \times 2 = 14$	$2 \times 7 = 14$
$8 \times 2 = 16$	$2 \times 8 = 16$
$9 \times 2 = 18$	$2 \times 9 = 18$
$10 \times 2 = 20$	$2 \times 10 = 20$

Complete Workbook 2A, Worksheet 2 • Pages 67 – 70

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MULTIPLICATION TABLES OF 2, 5 AND 10

68

PRACTICE

Work with pupils on the questions and selected examples from **Worksheet 2**.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2A P67 – 70).

1. 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

2. (a) $4 \times 2 = 8$
(b) $5 \times 2 = 10$
(c) $8 \times 2 = 16$

3. (a) $4 \times 2 = 8$
 $2 \times 4 = 8$
(b) $7 \times 2 = 14$
 $2 \times 7 = 14$
(c) $9 \times 2 = 18$
 $2 \times 9 = 18$
(d) $6 \times 2 = 12$
 $2 \times 6 = 12$

4. 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

(a)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

- (b) Each successive multiple of 2 is 2 more than the multiple before.

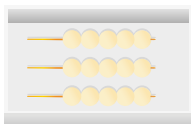
MULTIPLICATION TABLE OF 5

LEARNING OBJECTIVES

1. Memorise the multiplication table of 5.

MULTIPLICATION TABLE OF 5

IN  FOCUS



What is the total number of fish balls?

LET'S LEARN 

1. 1 stick has 5 fish balls.



1 group of 5
 $1 \times 5 = 5$



2 groups of 5
 $2 \times 5 = 10$



3 groups of 5
 $3 \times 5 = 15$

There are 15 fish balls altogether.

LESSON
3

IN  FOCUS

Ask pupils to think of ways to count the total number of fish balls. Lead them to count in fives.

LET'S LEARN 

In Let's Learn 1, highlight that 1 group of 5 can also be written as 1×5 , 2 groups of 5 can be written as 2×5 and so on.

2.

Use dot cards to show groups of 5.

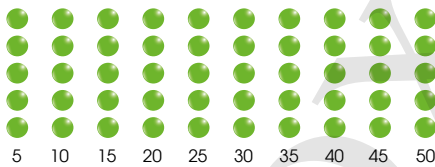


	$1 \times 5 = 5$
	$2 \times 5 = 10$
	$3 \times 5 = 15$
	$4 \times 5 = 20$
	$5 \times 5 = 25$
	$6 \times 5 = 30$
	$7 \times 5 = 35$
	$8 \times 5 = 40$
	$9 \times 5 = 45$
	$10 \times 5 = 50$

Textbook 2 P70

Go through the multiplication table using the dot cards and use terms such as 1 group of 5, 2 groups of 5, etc. to describe the multiplication of 5. Show that 1 group of 5 = 1×5 , 2 groups of 5 = 2×5 , etc. In addition, get pupils to observe that each successive multiple is 5 more than the multiple before and predict what 11×5 will be.

3. Count in fives.



5, 10, 15, 20, 25, 30, 35, 40, 45, 50



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

What number pattern do you see?



4. $9 \times 5 = ?$

$$9 \times 5 = 50 - 5 = 45$$

$10 \times 5 = 50$
 9×5 is 5 less than 50.



Guide pupils to count in fives for Let's Learn 3 and ask them to describe the pattern that they see in the multiples of 5. Pupils should think along the line that each multiple is 5 more than the previous multiple.

In Let's Learn 4, ask questions such as 'Since 10×5 is 50, what is 9×5 ?' to guide pupils to reason that 9 x 5 is 5 less than 10×5 . Ask more reasoning questions such as '6 x 5 is 30, so what is 7 x 5?' to aid pupils in understanding multiplication.

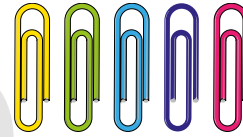
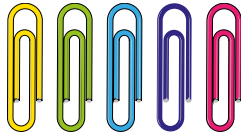
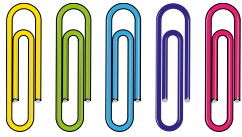
Textbook 2 P71

Activity Counting in fives

Materials Paper clips

Procedure

1. Assign pupils to work in pairs.
2. Provide each pair with paper clips.
3. Ask pupils to put the paper clips in groups of 5 and count in fives to find out how many paper clips there are in total.
4. Practice with other objects around them.



PRACTICE

1. Complete the multiplication fact.



$$4 \times 5 = 20$$

There are 20 marbles.

2. Complete the multiplication table.

$1 \times 5 = 5$	$5 \times 1 = 5$
$2 \times 5 = 10$	$5 \times 2 = 10$
$3 \times 5 = 15$	$5 \times 3 = 15$
$4 \times 5 = 20$	$5 \times 4 = 20$
$5 \times 5 = 25$	$5 \times 5 = 25$
$6 \times 5 = 30$	$5 \times 6 = 30$
$7 \times 5 = 35$	$5 \times 7 = 35$
$8 \times 5 = 40$	$5 \times 8 = 40$
$9 \times 5 = 45$	$5 \times 9 = 45$
$10 \times 5 = 50$	$5 \times 10 = 50$

Complete Workbook 2A, Worksheet 3 • Pages 71 – 76

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MULTIPLICATION TABLES OF 2, 5 AND 10

72

PRACTICE

Work with pupils on the practice questions.

Independent seatwork

Assign pupils to complete Worksheet 3 independently (Workbook 2A P71 – 76).

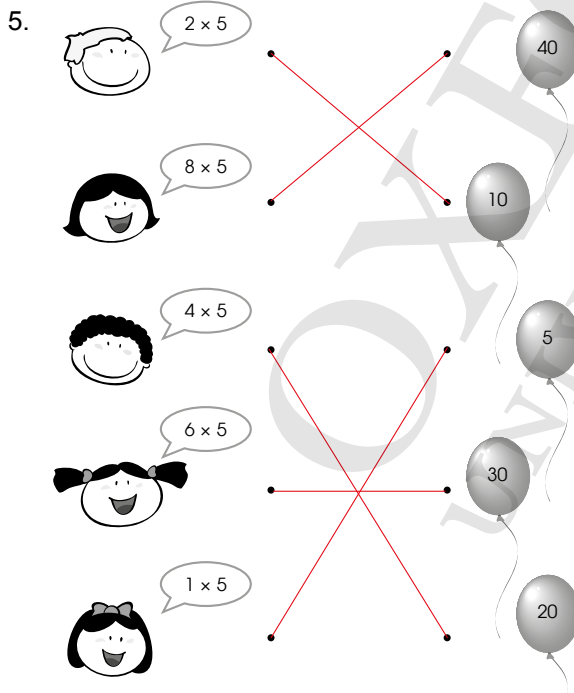
Textbook 2 P72

1. 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

2. (a) $2 \times 5 = 10$
 (b) $4 \times 5 = 20$
 (c) $3 \times 5 = 15$

3. (a) $2 \times 5 = 10$
 $5 \times 2 = 10$
 (b) $3 \times 5 = 15$
 $5 \times 3 = 15$
 (c) $6 \times 5 = 30$
 $5 \times 6 = 30$

4. (a) $5 \times 5 = 25$
 $5 \times 5 = 25$
 (b) $9 \times 5 = 45$
 $5 \times 9 = 45$
 (c) $10 \times 5 = 50$
 $5 \times 10 = 50$
 (d) $8 \times 5 = 40$
 $5 \times 8 = 40$

5. 

Children's multiplication problems: 2×5 , 8×5 , 4×5 , 6×5 , 1×5

Balloons with numbers: 40, 10, 5, 30, 20

6. 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

(a)

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

(b) Each successive multiple of 5 is 5 more than the multiple before.

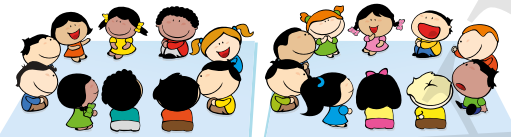
MULTIPLICATION TABLE OF 10

LEARNING OBJECTIVES

1. Memorise the multiplication table of 10.

MULTIPLICATION TABLE OF 10


IN FOCUS




How many children are there?

LET'S LEARN

1. 1 group has 10 children.



1 group of 10
 $1 \times 10 = 10$



2 groups of 10
 $2 \times 10 = 20$

There are 20 children.

LESSON

4

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IN FOCUS

Find out from pupils the different ways to count the number of children in the scenario. Lead them to count in tens by first asking them how many children there are in each group. Since there are 2 groups of 10 children, the answer is 20 children.

LET'S LEARN

In Let's Learn 1, highlight that 1 group of 10 can also be written as 1×10 , 2 groups of 10 can be written as 2×10 and so on.

2.

Use dot cards to show groups of 10.

	$1 \times 10 = 10$
	$2 \times 10 = 20$
	$3 \times 10 = 30$
	$4 \times 10 = 40$
	$5 \times 10 = 50$
	$6 \times 10 = 60$
	$7 \times 10 = 70$
	$8 \times 10 = 80$
	$9 \times 10 = 90$
	$10 \times 10 = 100$

Do you know how to skip count in tens?

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MULTIPLICATION TABLES OF 2, 5 AND 10

74

Textbook 2 P74

Go through the multiplication table using the dot cards and use terms such as 1 group of 10, 2 groups of 10, etc. to describe the multiplication of 10. Show that 1 group of 10 = 1×10 , 2 groups of 10 = 2×10 , etc. In addition, ask pupils to observe that each successive multiple is 10 more than the multiple before and predict what 11×10 will be.

Play in groups of 3.

- Shuffle . Put them face down on the table.
- Open a card.
- The first player to say the correct answer keeps the card.
- Repeat **2** and **3** until no cards are left. The player with the most cards wins!

ACTIVITY 1 2 3 TIME

What you need:



PRACTICE

1. Complete the multiplication fact.



$$4 \times 10 = 40$$

2. Complete the multiplication table.

$1 \times 10 = 10$	$10 \times 1 = 10$	$6 \times 10 = 60$	$10 \times 6 = 60$
$2 \times 10 = 20$	$10 \times 2 = 20$	$7 \times 10 = 70$	$10 \times 7 = 70$
$3 \times 10 = 30$	$10 \times 3 = 30$	$8 \times 10 = 80$	$10 \times 8 = 80$
$4 \times 10 = 40$	$10 \times 4 = 40$	$9 \times 10 = 90$	$10 \times 9 = 90$
$5 \times 10 = 50$	$10 \times 5 = 50$	$10 \times 10 = 100$	$10 \times 10 = 100$

Complete Workbook 2A, Worksheet 4 + Pages 77 – 80

75

CHAPTER 3

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Textbook 2 P75

ACTIVITY 1 2 3 TIME

Each group of pupils will be given a set of multiplication cards ($\times 2$, $\times 5$ and $\times 10$). Demonstrate how the activity is carried out and give pupils 5 minutes to complete it.

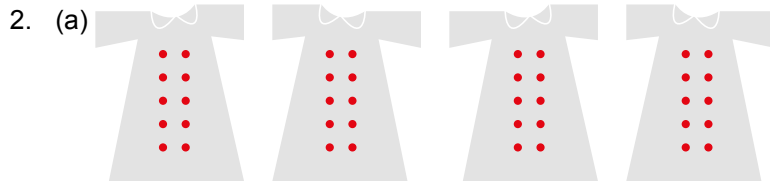
PRACTICE

Work with pupils on the questions and selected examples from **Worksheet 4**.

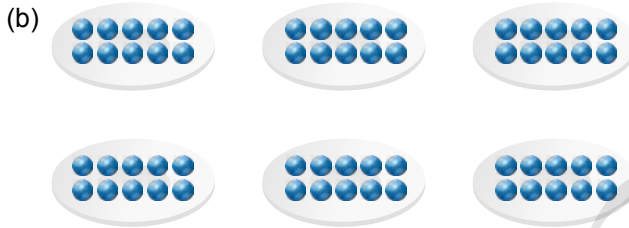
Independent seatwork

Assign pupils to complete **Worksheet 4** (Workbook 2A P77 – 80).

1. 10, 20, 30, 40, 50, 60, 70, 80, 90, 100



$4 \times 10 = 40$
There are 40 dots altogether.



$6 \times 10 = 60$
There are 60 marbles in all.

3. (a) $7 \times 10 = 70$
 $10 \times 7 = 70$

(b) $9 \times 10 = 90$
 $10 \times 9 = 90$

(c) $10 \times 10 = 100$
 $10 \times 10 = 100$

4. 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

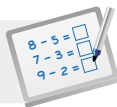
(a)

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

(b) Each successive multiple of 10 is 10 more than the multiple before.

Note for teachers: Lessons 2, 3 and 4 are combined into one lesson plan as the same concept is covered in all three lessons. However, they should be done separately over a number of classes.

LESSON PLAN



Chapter 3 Lessons 2, 3 & 4

Specific Learning Focus

- Memorise the multiplication table of 2.
- Memorise the multiplication table of 5.
- Memorise the multiplication table of 10.

Suggested Duration

Lesson 2: 2 periods

Lesson 3: 2 periods

Lesson 4: 2 periods

Prior Learning

At this stage, pupils should be aware of the repetitive addition concept of multiplication. They have done multiplication in arrays and understand that a set of numbers can be grouped into equal sets to form a multiplication mathematical equation.

Pre-emptive Pitfalls

In lessons 2, 3 and 4, pupils are introduced to the multiplication tables of 2, 5 and 10. Rote learning will be required (Textbook 2 P66, 70, 74) but before doing so, the teacher can show the pattern in multiplication by skip counting in 2s, 5s and 10s. Pupils should find it easier to memorise the multiplication tables if they first relate multiplication to real-life scenarios.

Introduction

Conduct a group activity when introducing the multiplication tables of 2, 5 and 10. Provide pupils with multilink cubes and let them find the product by arranging the multilink cubes in sets of 2s, 5s and 10s respectively. Challenge them by going beyond sets of 10. For example, get them to find 2×11 , 5×12 or 10×13 . Prompt them by asking which multiplication table each multiplication is related to and hence skip count accordingly.

Problem Solving

Let's Learn 4 (Textbook 2 P67, 71) shows that multiplication can be found by addition or subtraction of another product: since $9 \times 5 = 45$ and $10 \times 5 = 50$, 9×5 is 5 less than 10×5 . This develops the pupils' critical thinking skills and mathematical class discussions will reinforce their understanding.

Activities

Multilink cubes can be used to explain the multiplication tables through the C-P-A approach. The activities (P__, __) using paper clips, seeds or any other real-life objects will give pupils the hands-on experience of multiplication tables. Use the hundred chart to show the multiples of 2, 5 and 10 by getting pupils to colour code them.

Resources

- multilink cubes
- real-life objects (e.g. seeds, pebbles, paper clips, rubber bands, etc.)
- multiplication cards (Activity Handbook 2 P25 – 27)
- hundred chart (Activity Handbook 2 P7)

Mathematical Communication Support

Completing the multiplication tables (Textbook 2 P68, 72, 75) using multilink cubes is necessary. It is important that pupils enunciate each equation in words (e.g. $6 \times 5 = 30$, six groups of fives equals thirty, or six, fives and thirty). Once pupils are well-versed with the repetitive pattern of multiples, the oral pop quizzes can be done and individual responses encouraged from pupils. Avoid class chanting. Show the multiplication table cards and ask for individual answers.

SOLVING WORD PROBLEMS

LEARNING OBJECTIVES

1. Solve 1-step word problems involving multiplication within the tables of 2, 5 and 10.

SOLVING WORD PROBLEMS

LESSON
5

IN FOCUS



Priya buys 3 boxes of chicken wings.
How many chicken wings does she buy altogether?

LET'S LEARN

1.

$$3 \times 2 = 6$$

Priya buys 6 chicken wings altogether.

How many chicken wings are there in each box?

There are 3 groups of 2.



2.

Junhao uses 5 toothpicks to form each shape as shown. He forms 6 such shapes.



How many toothpicks does Junhao use in all?

$$5 \times 6 = 30$$

Junhao uses 30 toothpicks in all.

'Each' means 'one'. Each shape has 5 toothpicks.

Multiply 5 by 6.



IN FOCUS

Go through the word problem with the class and get pupils to explain their answers.

LET'S LEARN

Guide pupils to solve Let's Learn 1 by asking the following questions:

- How many groups of chicken wings are there?
- How many chicken wings are there in each box?

Allow pupils to attempt writing the number sentence on their own and give their final answer.

Likewise for Let's Learn 2, lead pupils to find the answer by asking questions such as 'How many shapes are there?' and 'How many toothpicks are used to form each shape?' Allow pupils to form the number sentence and give the final answer.



Solve.

1. A bicycle has 2 wheels.
How many wheels do 4 bicycles have? 8



2. Meiling has 7 pies.
She cuts each pie into 5 slices.
How many slices of pie are there in all? 35



3. One bag can hold 3 apples.
How many apples can Raju put in 5 bags? 15



Complete Workbook 2A, Worksheet 5 • Pages 81 – 85



MIND WORKOUT

Nora wants to arrange 20 cards for a memory game.
Each row should have the same number of cards.
This is one way she can arrange the cards.



2 rows of 10

Draw another way that she can arrange the cards.
You may use to help you.



Work with pupils on the questions and selected examples from **Worksheet 5**.

Guide pupils in solving the word problems by asking questions such as:

- How many groups are there?
- How many items are there in each group?

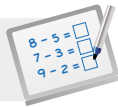
Ask pupils to highlight the crucial data in each word problem.

Independent seatwork

Assign pupils to complete Worksheet 5 (Workbook 2A P81 – 85).

Answers Worksheet 5 (Workbook 2A P81 – 85)

- $2 \times 5 = 10$
Weiming has 10 balls altogether.
- $3 \times 10 = 30$
There are 30 eggs in all.
- (a) $2 \times 5 = 10$
Siti must sew 10 stripes altogether.
(b) $4 \times 10 = 40$
There are 40 sticks in all.
(c) $2 \times 6 = 12$
Bina baked 12 samosas.
(d) $6 \times 2 = 12$
2 ladybirds have 12 legs altogether.
- $3 \times 2 = 6$
There are 6 scoops of ice cream altogether.
- $10 \times 2 = 20$
The farmer has 20 sheep altogether.
- $5 \times 10 = 50$
He has \$50.
- $9 \times 2 = 18$
Nora uses 18 beads in all.
- $8 \times 5 = 40$
She can put 40 tarts in 5 such boxes.
- $5 \times 7 = 35$
She needs 35 cups of sand to completely fill up 7 buckets.

**Specific Learning Focus**

- Solve 1-step word problems involving multiplication within the tables of 2, 5 and 10.

Suggested Duration

6 periods

Prior Learning

Pupils have learnt the multiplication tables using real-life objects and concrete materials. Multiplication stories have been expressed and translated into symbols and equations. Reading a word problem and then forming a multiplication sentence to find the answer is a natural progression from the earlier lessons 2, 3 and 4.

Pre-emptive Pitfalls

Multiple steps are involved when solving word problems: (i) reading and understanding the word problem; (ii) identifying the important information given; and then (iii) forming a multiplication sentence. This can be quite challenging for pupils. Pictorial representation of a word problem, and then forming mathematical equations and symbols accompanied with a concluding statement, will be much easier for pupils to solve word problems.

Introduction

The word problem in this lesson (Priya buying 3 boxes of 2 chicken wings) is very relatable to daily life. To solve the word problem, pupils should relate it to the multiplication table as it helps them find the answer to the multiplication. Let's Learn 2 (Textbook 2 P76) can be done individually by each pupil using pictorial depiction (visualisation) and then finding the answer by forming a multiplication sentence. Get pupils to work on the questions in 'Practice' (Textbook 2 P77) in their exercise books by writing the multiplication sentence and then finding the answer. For example, in Question 1, we take $4 \times 2 = 8$. Alternatively, $2 + 2 + 2 + 2 = 8$ (but this repeated addition need not be written in their exercise books).

Problem Solving

In 'Mind Workout' (Workbook 2A P86 and Textbook 2 P77), encourage drawing and then writing the multiplication sentence. In Textbook 2 P77, ask pupils to arrange cards in different ways and write the relevant mathematical equations. This will build on their concept of commutative property of multiplication and common multiples in various time tables, leading to LCM (lowest common multiples) in the later grades.

Activities

Each word problem (Textbook 2 P77 and Workbook 2A P87 – 90) can be done pictorially or with concrete materials, and as group activities. Form mixed-ability groups and assign each pupil with a different step and then exchange roles for the next word problem.

Resources

- mathematical story cards (Activity Handbook 2 P20)
- real-life objects

Mathematical Communication Support


Ask pertinent questions when posing a word problem on the whiteboard (e.g. 'How many wheels does a bicycle have? What do you think we should do to get the total number of wheels on 4 bicycles? Will it be easier to solve using the multiplication table of 2? Should we add 2 four times? Why or why not?'). These questions will elicit pupils' thinking and they will understand that multiplication is the faster way to obtain the correct answer.

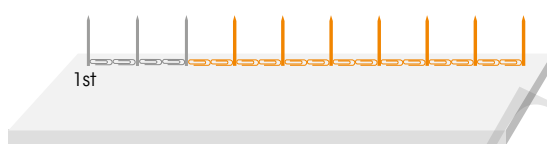
PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW




Mind Workout

Date: _____

Ann is building a model for a project.
She puts some toothpicks in a row.
She wants to put 2  between 2 toothpicks.



Ann uses 10 toothpicks in all.
How many  does Ann need altogether?

$$9 \times 2 = 18$$

Draw on the model
to help you find the
answer.



Ann needs 18  altogether.

86 Chapter 3

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Mind Workout

Pupils may draw on the picture to find the answer. Ask them how they will write the number sentence to obtain the answer. In addition, get pupils to explain why they multiply 2 by 9 instead of 10 even though there were 10 toothpicks.

PRACTICE

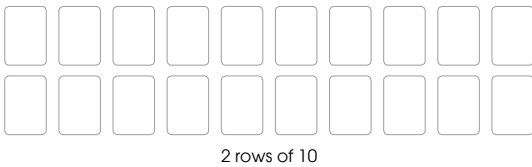
Solve.


1. A bicycle has 2 wheels.
How many wheels do 4 bicycles have? **8** 
2. Meiling has 7 pies.
She cuts each pie into 5 slices.
How many slices of pie are there in all? **35** 
3. One bag can hold 3 apples.
How many apples can Raju put in 5 bags? **15** 

Complete Workbook 2A, Worksheet 5 • Pages 81 – 85

MIND WORKOUT

Nora wants to arrange 20 cards for a memory game.
Each row should have the same number of cards.
This is one way she can arrange the cards.



Draw another way that she can arrange the cards.
You may use  to help you.

Textbook 2 P77



MIND WORKOUT

Assign pupils into groups of 4 for this activity. Cards may be given to do this task if there is sufficient time. Alternatively, allow pupils to draw out their solutions and explain how they arrive at their answers.

MATHS JOURNAL

MATHS JOURNAL

Complete the two problems.
Ask your classmates to solve each problem.

1. has packets.
(name) (number from 1-10)
Each packet has 5 .
(object)
How many does have altogether?
(object) (name)
2. gives 10 to each of her children.
(name) (object)
She has children.
(number from 1-10)
How many does give altogether?
(object) (name)

I know how to...

- multiply a number by 2. multiply a number by 5.
- multiply a number by 10.
- write multiplication facts.
- solve word problems involving the multiplication tables of 2, 5 and 10.

SELF-CHECK



Textbook 2 P78

Show how the word problem can be completed. Get pupils to complete their word problems and exchange them with other pupils so that they can solve their classmates' word problems.

SELF-CHECK

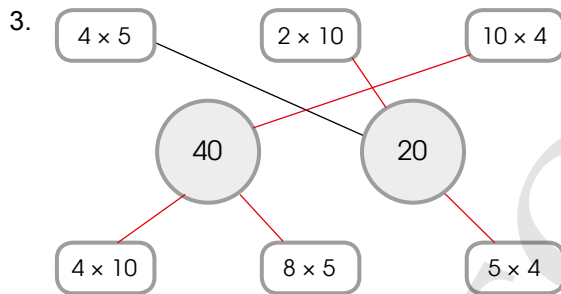
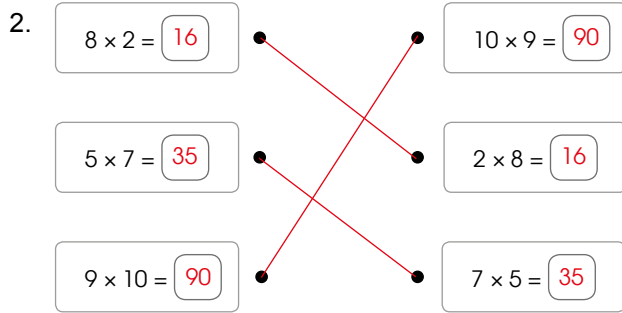


Before pupils proceed to do the self check, review the important concepts by asking for examples learnt for each objective. For instance, review the multiplication tables of 2, 5 and 10 with pupils by asking them to recite in class.

This self check can be done after pupils have completed **Review 3** (Workbook 2A P87 – 90) as consolidation of understanding for the chapter.

Answers Review 3 (Workbook 2A P87 – 90)

1. (a) $7 \times 2 = 14$
 (b) $4 \times 5 = 20$
 (c) $6 \times 10 = 60$



$4 \times 5 = 20$
 Priya bakes 20 cookies in all.



$3 \times 10 = 30$
 There are 30 flowers altogether.

5. $2 \times 8 = 16$
 There are 16 chickens altogether.

6. $10 \times 10 = 100$
 She puts 100 cookies in the jars altogether.
7. $5 \times 5 = 25$
 They have 25 oranges in all.

Dividing by 2, 5 and 10

CHAPTER

4

Dividing by
2, 5 and 10

CHAPTER
4

How many bags of chocolate
can Mrs Lim pack altogether?

GROUPING AND SHARING

IN FOCUS

LESSON
1

How many bags of chocolate can Mrs Lim pack?

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Textbook 2 P79

Related Resources

NSPM Textbook 2 (P79 – 90)
NSPM Workbook 2A (P91 – 106)

Materials

Division cards ($\div 2$, $\div 5$ and $\div 10$), drawing
block, marbles, markers, multilink cubes,
multiplication cards ($\times 2$, $\times 5$ and $\times 10$),
magnetic buttons (if necessary)

Lesson

Lesson 1 Grouping and Sharing
Lesson 2 Dividing by 2, 5 and 10
Lesson 3 Multiplication and Division
Lesson 4 Solving Word Problems
Problem Solving, Maths Journal and
Pupil Review

INTRODUCTION

In this chapter, pupils will revisit the two concepts of division that were covered in Grade 1: **grouping** and **sharing equally**. The division symbol (\div) is introduced at this level and pupils will learn to use it in the number sentence. Pupils are taught on the connection between multiplication and division which allows them to do division by 2, 5 and 10 with reference to the corresponding multiplication tables. At the last part of the chapter, pupils are presented with word problems involving division by 2, 5 and 10.

GROUPING AND SHARING


LEARNING OBJECTIVES

1. Use \div correctly.
2. Relate division to grouping and sharing.


Dividing by 2, 5 and 10

CHAPTER 4


How many bags of chocolate can Mrs Lim pack altogether?



GROUPING AND SHARING

IN  FOCUS

LESSON 1



How many bags of chocolate can Mrs Lim pack?

79 CHAPTER 4

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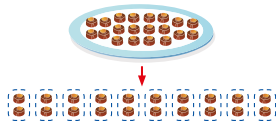
IN  FOCUS

Use the chapter opener to discuss how many bags of chocolate Mrs Lim can pack if she packs 2 pieces of chocolate into each bag. Ask some pupils to present their answers.

Textbook 2 P79

LET'S LEARN

- There are 20 chocolates. Put 2 chocolates in each bag.



Divide 20 by 2 to find the number of groups. There are 10 groups of 2.

÷ is to divide. $20 \div 2$ is the same as 10.

$$20 \div 2 = 10$$

$20 \div 2 = 10$ is a **division fact**.

$20 \div 2 = 10$ is read as twenty **divided by** two **equals** ten.

- Put 18 sausages equally on 2 plates.



$$18 \div 2 = 9$$

There are 9 sausages on each plate.

$$9 \times 2 = 18$$

ACTIVITY TIME

Work in groups of 4.

- Write three division stories. Draw to show your stories.
- Use to show how to divide.

What you need:



What is the meaning of '÷'?



Teachers can use magnetic buttons to represent the chocolates. Move the buttons to show the distribution of chocolates.

In Let's Learn 1, highlight to pupils that division is used to find out the number of bags used. Explain the symbol '÷' is used for division and it is read as '**divided by**'. Get pupils to read the division equation and ask if pupils can see how division is related to multiplication from the numbers in the division equation. Generalise the division equation as '**Total number of items ÷ Number of items in each group = Number of groups**'.

Let's Learn 2 is an example on sharing. 18 sausages are placed equally on 2 plates and each plate has 9 sausages. The division equation can be written as $18 \div 2 = 9$. Read the division equation with pupils: 18 divided by 2 equals 9.

Ask pupils if they can see how division is related to multiplication. Highlight that division is used in Let's Learn 2 to find out how many sausages there are on each plate. Hence, the division equation can be generalised as '**Total number of items ÷ Number of groups = Number of items in each group**'.

ACTIVITY TIME

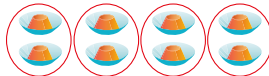


Give a drawing block and a marker to each group. Demonstrate the activity by giving an example of a division story and use multilink cubes to represent the items in the story. Show the division with the distribution of cubes. Encourage pupils to include pictures in their stories and write down the division equation.

PRACTICE



- Circle to show groups of 2. How many groups are there?



$$8 \div 2 = 4$$

There are 4 groups.

- Farhan has 10 fish. He puts them equally into 5 bowls.



$$2 \times 5 = 10$$

$$10 \div 5 = 2$$

There are 2 fish in each bowl.

Complete Workbook 2A, Worksheet 1 + Pages 91 – 92

Work with pupils on the questions and selected examples from **Worksheet 1**.

Independent seatwork

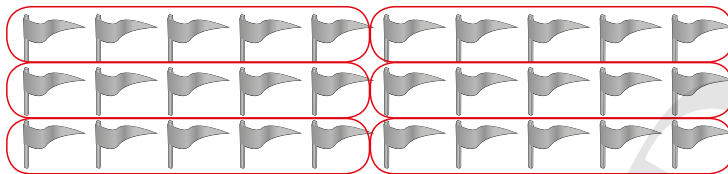
Assign pupils to complete Worksheet 1 (Workbook 2A P91 – 92).

1. (a)



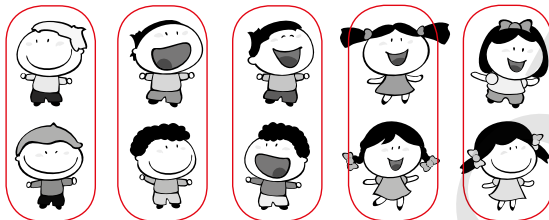
$14 \div 2 = 7$
There are 7 groups.

(b)



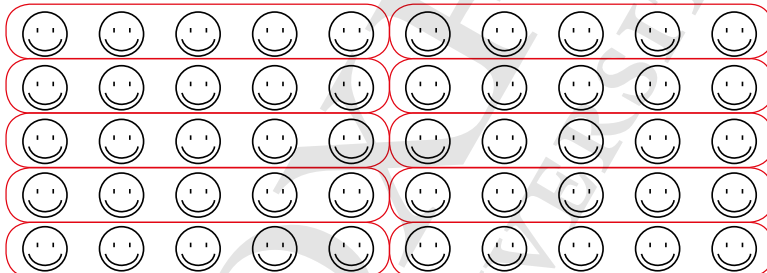
$30 \div 5 = 6$
There are 6 groups.

(c)

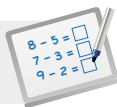


$10 \div 5 = 2$
There are 2 children in each group.

(d)



$50 \div 10 = 5$
There are 5 ☺ in each group.

**Specific Learning Focus**

- Use \div correctly.
- Relate division to grouping and sharing.

Suggested Duration

3 periods

Prior Learning

In Grade 1, the concept of grouping and sharing has been introduced, but pupils have not been introduced to division formally and will be introduced in this lesson. Pupils have learnt how to find the total number of equal groups through the C-P-A approach, accompanied with hands-on activities and real-life objects. Hence, pupils should be well versed with the concept of grouping and sharing, otherwise this concept can be revisited using 'In Focus' (Textbook 2 P79).

Pre-emptive Pitfalls

Firstly, it is important to reinforce the concept of distributing 'equally' the total number of items without any 'remainder'. Similarly, grouping and sharing require these concepts: (i) total number of items divided by number of items in each group gives the number of groups (grouping), and (ii) total number of items divided by the number of groups gives the number of items in each group (sharing). The concept of grouping and sharing has to be made very clear to pupils. Just like how addition and subtraction are inverse operations to each other, division can be introduced as the inverse operation of multiplication.

Introduction

Division is formally introduced in this lesson with the symbol ' \div '. A division fact or equation is introduced (e.g. $12 \div 3 = 4$; $12 \div 4 = 3$ can be translated to 'there are 3 groups of 4' or 'there are 4 groups of 3', where the total number of items is 12). The '=' sign can be explained as the symbol which means the left-hand side of the equation is equal to the right-hand side of the equation. Real-life objects should be brought to class (Textbook 2 P80) to explain the division fact through the C-P-A approach.

Problem Solving

The questions in 'Practice' (Textbook 2 P81) will help pupils develop their critical-thinking skills. To fill in the first blank of the division equation, pupils will have to count the total number of items to be divided. The second number is '2' as 'groups of 2' indicates that there are 2 items in each group. Through the C-P-A approach, have the pupils circle and group the items and use the multiplication table of 2 to complete the division fact. The teacher may create the context to a word problem by telling pupils a story. For example, 'I have 20 sweets and I want to give two sweets to each friend. How many friends can I share the sweets with?' or 'I have 20 sweets and I want to distribute to 10 friends. How many sweets will each friend receive?'.

Activities

To carry out 'Activity Time' (Textbook 2 P80), multilink cubes may be used. The teacher can also use real-life objects. Encourage pupils to role-play in real-life scenarios such as the above-mentioned story. Encourage creativity by getting pupils to make stories of sharing items equally amongst friends or family members.

Resources

- multilink cubes
- real-life objects (e.g. sweets, stationery, etc.)

Mathematical Communication Support

Reinforce that a division equation can represent: (i) 'Total number of items \div Number of items in each group = Number of groups' or (ii) 'Total number of items \div Number of groups = Number of items in each group'. Although at this stage it is not necessary to formally introduce the terms 'dividend', 'divisor', 'quotient' and 'remainder', the teacher should still explain to pupils using these concepts without mentioning the vocabulary. Encourage pupils to make mathematical division stories applicable to real-life situations. Get pupils to discuss in groups and share their stories.

LESSON 2

DIVIDING BY 2, 5 AND 10

LEARNING OBJECTIVES


1. Divide within the multiplication tables of 2, 5 and 10.

DIVIDING BY 2, 5 AND 10

LESSON
2

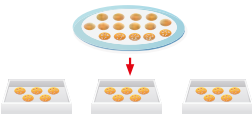
IN FOCUS

Raju puts 5 cookies on each tray.
How many trays of cookies are there?



LET'S LEARN

1. There are 15 cookies.
Put 5 cookies on each tray.




Divide 15 by 5 to find the number of trays of cookies.

$3 \times 5 = 15$
 $15 \div 5 = 3$

$15 \div 5 = 3$

There are 3 trays of cookies.

2. 5 children share 10 tarts equally.



$2 \times 5 = 10$
 $10 \div 5 = 2$

$10 \div 5 = 2$

Each child gets 2 tarts.

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DIVIDING BY 2, 5 AND 10

82

Textbook 2 P82

IN FOCUS

Lead pupils in writing the division equation by asking the following questions:

- How many cookies are there in total?
- How many cookies are on each tray?

LET'S LEARN

Go through Let's Learn 1 and check if pupils have written the division equation correctly. Use magnetic buttons to represent the cookies and show the distribution to find the answer. Since there are 3 groups of five, $15 \div 5 = 3$. There are 3 trays of cookies. Ask pupils to articulate how division is related to multiplication for this example.

In the given examples, pupils are asked to find the answer for each division story by using the multiplication tables of 2, 5 and 10. Remind pupils to fill in the answers in the bubbles to help them to find the final answers.

In Let's Learn 2, 10 tarts are shared equally by 5 children. Therefore, we use $10 \div 5$ to find the number of tarts each child gets.

3. Mrs Salim packs 8 bread rolls in some baskets. Each basket has 2 bread rolls.



$$8 \div 2 = 4$$

Mrs Salim needs 4 baskets.

$$4 \times 2 = 8$$

$$8 \div 2 = 4$$



4. Ann has 20 beads. She uses 10 beads to make a bracelet.



$$20 \div 10 = 2$$

Ann can make 2 bracelets.

$$2 \times 10 = 20$$

$$20 \div 10 = 2$$



5. 60 sweets are packed into jars. Each jar contains 10 sweets.



$$60 \div 10 = 6$$

There are 6 jars of sweets.

$$6 \times 10 = 60$$

$$60 \div 10 = 6$$



83

CHAPTER 4

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Textbook 2 P83

Division is used in Let's Learn 3 to find how many groups there are. Hence, the number of baskets equals to $8 \div 2$.

In Let's Learn 4, division is used to find out how many groups there are when 20 beads are used to make bracelets of 10 beads. The number of bracelets Ann can make is equal to $20 \div 10$.

Likewise for Let's Learn 5, division is used to find out how many groups there are. The number of jars can be found with $60 \div 10$.

Teachers may provide a few more division examples to give pupils more practice in mental calculation.

Play in pairs.

- Shuffle
- Put the cards face up on the table.
- Answer as quickly as you can. Turn over the card to check your answer. The first player to answer correctly gets to keep the card.
- After 10 rounds, the player with more cards wins!

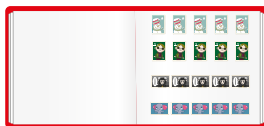
ACTIVITY 1 2 3 TIME

What you need:



PRACTICE

1. Farhan puts 20 stamps in groups of 5.



$$20 \div 5 = 4$$

There are 4 groups of stamps.

2. Priya has 10 balloons. She divides the balloons equally between her 2 friends.



$$10 \div 2 = 5$$

Each friend gets 5 balloons.

Complete Workbook 2A, Worksheet 2 • Pages 93 – 96

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DIVIDING BY 2, 5 AND 10

84

Textbook 2 P84

ACTIVITY 1 2 3 TIME

Each pair is given a set of division cards ($\div 2$, $\div 5$ and $\div 10$). Demonstrate how the activity is carried out and give pupils 5 minutes to complete it.

PRACTICE

Work with pupils on the questions and selected examples from **Worksheet 2**.

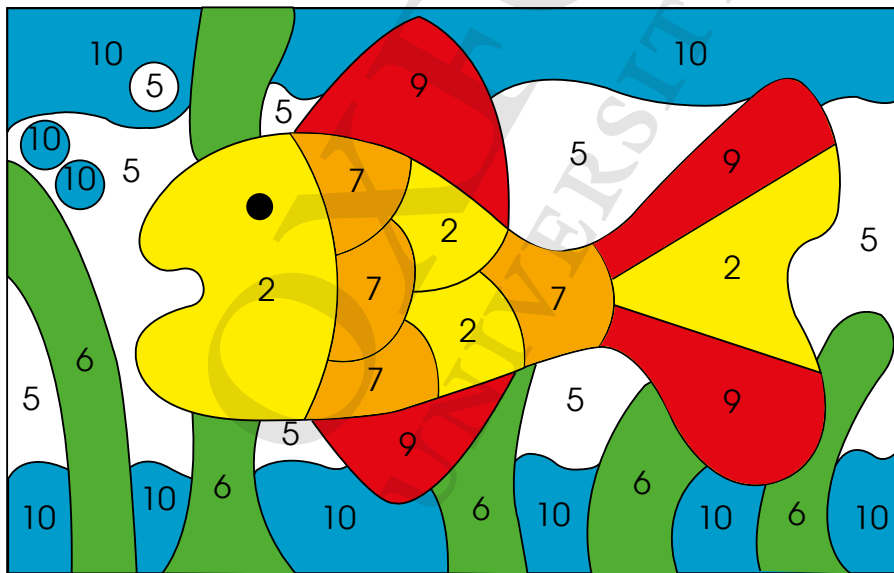
Independent seatwork

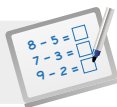
Assign pupils to complete Worksheet 2 (Workbook 2A P93 – 96).

1. (a) $6 \div 2 = 3$
Sam needs 3 stands.
- (b) $15 \div 5 = 3$
The shopkeeper needs 3 baskets.
- (c) $30 \div 5 = 6$
Mr Smith needs 6 boxes.
- (d) $18 \div 2 = 9$
Ahmad needs 9 keychains.
- (e) $30 \div 10 = 3$
Each child gets 3 sweets.
- (f) $40 \div 5 = 8$
There are 8 paper clips in each bag.

2.

$20 \div 2 = 10$	blue	$20 \div 10 = 2$	yellow
$50 \div 10 = 5$	white	$30 \div 5 = 6$	green
$18 \div 2 = 9$	red	$35 \div 5 = 7$	orange



**Specific Learning Focus**

- Divide within the multiplication tables of 2, 5 and 10.

Suggested Duration

3 periods

Prior Learning

Pupils have been formally introduced to division and division facts. Similarly, they should know the multiplication tables of 2, 5 and 10 as they will come in handy in this lesson. In continuation from lesson 1 earlier, 2, 5 and 10 are used as divisions to get the quotient. Hence revising the multiplication tables of 2, 5 and 10 will be beneficial.

Pre-emptive Pitfalls

Pupils might have difficulty initially when linking the multiplication tables to division facts. To help them understand, the teacher can explain that in $2 \times 5 = 10$, for example, the multiple '10' is being divided equally into 2s or 5s, and therefore $10 \div 5 = 2$ or $10 \div 2 = 5$ since 2 groups of 5 gives 10. It is beneficial for pupils to work on several questions and carry out board activities as these help pupils to grasp the concept of division facts.

Introduction

Ask 10 pupils to volunteer for a demonstration of a real-life scenario. Distribute 2 sweets to each of the 10 pupils and ask them how many sweets there are altogether. Translate this to two division equations ' $20 \div 10 = 2$ ' and ' $20 \div 2 = 10$ '. Explain to pupils that a total of 20 sweets were distributed equally among 10 pupils. Alternatively, 2 pupils can get 10 sweets each when distributing 20 sweets equally between 2 pupils. Let's Learn 1 to 5 (Textbook 2 P82 – 83) have division facts involving the 2, 5 and 10 multiplication tables. This helps pupils to complete the division fact easily. To enhance and put in play the C-P-A approach, role-play each scenario in 'Let's Learn' with pupils using real-life objects. Once pupils experience it by experiential observation and process, translating it to a division fact will be easier.

Problem Solving

Things like $15 \div 3 = 5$ and $15 \div 5 = 3$, distributing 15 cookies amongst 3 friends, ways to make 5 cookies in each bag, or 15 cookies distributed equally into groups of 5 makes 3 equal groups, are things that the teacher will have to communicate with the pupils and pupils will have to experience with hands-on activities. The two different equations with the dividend '15' will help pupils link multiplication to division.

Activities

Using division cards (Activity Handbook 2 P29 – 31), 'Activity Time' (Textbook 2 P84) can be made into a short fun activity. Since the first player to answer correctly gets to keep the card, pupils will be challenged to apply mental strategies quickly.

Resources

- real-life objects (e.g. beads, sweets, cookies, trays, baskets, etc.)
- division equation cards (Activity Handbook 2 P28)
- division cards (Activity Handbook 2 P29 – 31)

Mathematical Communication Support

It is important that pupils relate division to their everyday lives. Since they have learnt multiplication tables of 2, 5 and 10 only, the dividends in the word problems in this lesson should be multiples of 2, 5 or 10 only. Pupils can get ample practice by working on questions in Workbook 2A P93 – 96. However, all division facts should be verbally discussed. Some questions that can be asked during the discussions are: (i) How many items are there altogether? (ii) How many items are to be shared equally? (iii) How many items are distributed in each group? (iv) Is the number of items equal in each group? (v) What is the total number of groups, where each group has the same number of items?

MULTIPLICATION AND DIVISION

LEARNING OBJECTIVES

1. Relate multiplication and division.

MULTIPLICATION AND DIVISION

LESSON
3

IN FOCUS



How can we put the buns in equal groups?

LET'S LEARN

1. Put 10 buns in groups of 2.
How many plates are there?



$$10 \div 2 = 5$$

There are 5 plates.

There are 5 plates.
There are 2 buns on each plate.
 $5 \times 2 = 10$



IN FOCUS

Guide pupils in solving the problem by asking the following questions:

- How many buns are there altogether?
- Can we group them in groups of 2/3/4/5 etc.?
- If we group them in groups of 2, what will the division equation be?

LET'S LEARN

In Let's Learn 1, 10 buns are divided into groups of 2. Write the division equation $10 \div 2$. From the picture, we can see that there are 5 plates. Hence, $10 \div 2 = 5$.

Ask pupils if they can see 5 groups of 2 and how they would write a multiplication equation for 5 groups of 2.

Put 10 buns equally on 5 plates.
How many buns are there on each plate?



$$10 \div 5 = 2$$

There are 2 buns on each plate.

There are 2 buns on each plate.
There are 5 plates.
 $2 \times 5 = 10$



We can make a family of multiplication and division facts.

$$5 \times 2 = 10 \quad \text{---} \quad 10 \div 2 = 5$$

$$2 \times 5 = 10 \quad \text{---} \quad 10 \div 5 = 2$$

5×2 gives the same value as 2×5 ,
but $10 \div 2$ is not the same as $2 \div 10$.



2. Look at the picture.
Make a family of multiplication and division facts.



$$2 \times 10 = 20 \quad \text{---} \quad 20 \div 10 = 2$$

$$10 \times 2 = 20 \quad \text{---} \quad 20 \div 2 = 10$$

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DIVIDING BY 2, 5 AND 10

86

Textbook 2 P86


Ask pupils how the division equation can be written when 10 buns are placed equally on 5 plates. Write the division equation $10 \div 5$. From the picture, we can see that there are 2 buns on each plate. Hence, $10 \div 5 = 2$. Show that the multiplication equation can be written as $2 \times 5 = 10$.

Write the family of multiplication and division facts on the board and ask pupils to articulate how multiplication and division are related.

Likewise, go through Let's Learn 2 and ask pupils to fill in the blanks.

ACTIVITY  TIME

Work in pairs.

- Shuffle .
Put them face down on the table.
- Open a card.
Write the family of multiplication and division facts.

ACTIVITY  TIME

What you need:



$$5 \times 2 = 10$$

$$10 \div 5 = 2$$

$$10 \div 2 = 5$$

2 times 5 equals 10.



- Get your partner to check your answers.
- Take turns and repeat **2** and **3**.

PRACTICE 

Each pair is given a set of multiplication cards ($\times 2$, $\times 5$ and $\times 10$), a drawing block and a marker. Remind pupils to check their partners' answers.

Work with pupils on the questions and selected examples from **Worksheet 3**.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 2A P97 – 100).

Make a family of multiplication and division facts.



$$10 \times 5 = 50 \quad \text{---} \quad 50 \div 5 = 10$$

$$5 \times 10 = 50 \quad \text{---} \quad 50 \div 10 = 5$$

Complete Workbook 2A, Worksheet 3 • Pages 97 – 100

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CHAPTER 4

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Textbook 2 P87

1. (a) $15 \div 5 = 3$
 $5 \times 3 = 15, 15 \div 3 = 5$
 - (b) $12 \div 2 = 6$
 $2 \times 6 = 12, 12 \div 6 = 2$
 - (c) $40 \div 10 = 4$
 $10 \times 4 = 40, 40 \div 4 = 10$
 - (d) $16 \div 2 = 8$
 $2 \times 8 = 16, 16 \div 8 = 2$
 - (e) $6 \times 10 = 60, 60 \div 10 = 6$
 $10 \times 6 = 60, 60 \div 6 = 10$
 - (f) $9 \times 5 = 45, 45 \div 5 = 9$
 $5 \times 9 = 45, 45 \div 9 = 5$
-
2. (a) $14 \div 2 = 7$
 $14 \div 7 = 2$
 - (b) $20 \div 5 = 4$
 $20 \div 4 = 5$
 - (c) $20 \div 10 = 2$
 $20 \div 2 = 10$
 - (d) $5 \div 5 = 1$
 $5 \div 1 = 5$

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SOLVING WORD PROBLEMS

LEARNING OBJECTIVES

1. Solve 1-step word problems involving division by 2, 5 and 10.

SOLVING WORD PROBLEMS

LESSON
4

IN
FOCUS

How can Mrs Ali divide 12 key chains between 2 children?

LET'S LEARN

1. Mrs Ali has 12 key chains. She divides the key chains equally between 2 children. How many key chains does each child get?

$12 \div 2 = 6$

Each child gets 6 key chains.
2. Kate has 15 marshmallows. She packs 5 marshmallows into each bag. How many bags does Kate need?

$15 \div 5 = 3$

Kate needs 3 bags.

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DIVIDING BY 2, 5 AND 10

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IN FOCUS

Lead pupils to solve the problem by asking the following questions:

- How do you write the division equation?
- How do you obtain the answer?

Guide them to understand that since $2 \times 6 = 12$, therefore $12 \div 2 = 6$.

LET'S LEARN

Allow pupils to attempt writing the number sentence for Let's Learn 1 on their own and give their final answer.

Likewise for Let's Learn 2 and 3, lead pupils to solve the word problems by asking the following questions:

- How do you write the division equation?
- How do you obtain the answer?

Encourage pupils to use the multiplication tables to find the answers.

3. Mrs Tan has 50 paper clips.
She gives 10 paper clips to each of her children.
How many children does Mrs Tan have?

$$50 \div 10 = 5$$

$$10 \times 5 = 50$$

Mrs Tan has 5 children.

You can draw pictures to help you.



PRACTICE



Solve.

- Tom needs to pack 16 oranges into boxes.
He puts 2 oranges in each box.
How many boxes does he need? **8**
- Bala arranges 100 chairs into rows.
There are 10 chairs in each row.
How many rows are there? **10**
- Xinyi has 35 pebbles.
She puts them equally into 5 boxes.
How many pebbles are there in each box? **7**



Complete Workbook 2A, Worksheet 4 • Pages 101 – 103

For Let's Learn 3, allow pupils to draw pictures to check if their answer is correct.

PRACTICE



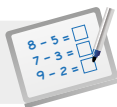
Work with pupils on the practice questions and ask questions such as 'what multiplied by 2 gives you 16?' to find the answers.

Independent seatwork

Assign pupils to complete Worksheet 4 (Workbook 2A P101 – 103).

Answers Worksheet 4 (Workbook 2A P101 – 103)

- (a) $14 \div 2 = 7$
There are 7 cookies on each plate.
(b) $20 \div 5 = 4$
Mrs Ali needs 4 boxes.
- $20 \div 2 = 10$
There are 10 chairs in each row.
- $70 \div 10 = 7$
Priya can make 7 necklaces.
- $40 \div 5 = 8$
There are 8 groups of pupils.
- $35 \div 5 = 7$
Raju needs 7 boxes.
- $20 \div 5 = 4$
Each grandchild gets 4 bookmarks.
- $80 \div 10 = 8$
Kate needs 8 envelopes.



Specific Learning Focus

- Relate multiplication and division.
- Solve 1-step word problems involving division by 2, 5 and 10.

Suggested Duration

Lesson 3: 2 periods

Lesson 4: 4 periods

Prior Learning

Lesson 3 is a continuation of division and additionally, the relation between multiplication and division as inverse operations of each other is formally introduced. Lesson 4 is a continuation of the real-life division stories that pupils have been discussing in class in the previous lessons. Lesson 4 formally introduces the concept of reading a word problem, extracting important information, and then finding the total number of items that needs to be divided into a number of equal groups.

Pre-emptive Pitfalls

Multiple mathematical facts come into play and these form a family of multiplication and division facts (e.g. in Textbook 2 P86, $5 \times 2 = 10$ and $2 \times 5 = 10$ (multiplication facts), $10 \div 2 = 5$ and $10 \div 5 = 2$ (division facts)). If mathematical facts are not made tangible by relating numbers to real-life objects, pupils will face difficulty in understanding (e.g. 10 buns, 5 plates, 2 buns on each plate).

Introduction

Just as addition and subtraction are related to each other as inverse operations, multiplication and division are related to each other as inverse operations as well. It has to be reinforced that the product in the multiplication equation becomes the 'subject' in the division equation, to be distributed equally into groups.

The multiplicand becomes the divisor or quotient. These terms cannot be mentioned to the pupils but it is essential for the pupils to be mindful of the contextual understanding of these key terms. In Let's Learn 2 (Textbook 2 P86), the teacher may provide pupils with smiley stickers as interesting standard models to be used in class. The teacher may provide two pupils with a set of 20 stickers each for them to create multiplication and division facts. Hand them blank cards to fill in (Activity Handbook 2 P34).

Problem Solving

Lesson 3 is a great exercise to be carried out to enhance pupils' thinking skills. The two multiplication and two division facts enhance their ability to apply mental and multiple strategies. This sharpens their problem-solving skills and strengthens their understanding that division and multiplication are inverse operations. 'Mind Workout' (Textbook 2 P90) is a good exercise in developing critical-thinking skills. Pupils can work in pairs, where one pupil can hand over the marbles one at a time to the partner until both pupils have the same number of marbles. Alternatively, the teacher can have them form a division equation $\square \div \square = \square$ to find the number of marbles each pupil should have and then derive the answer from there.

Activities

Question 2 in 'Practice' (Textbook 2 P89) can be done as a fun activity in class using the chairs in the auditorium. Alternatively, the number '100' can be replaced with '20' and chairs in the classroom can be used. Rows can be created in different arrays.

Resources

- blank cards (Activity Handbook 2 P34)
- 4-step approach to problem solving template (Activity Handbook 2 P35)
- multiplication cards (Activity Handbook 2 P25 – 27)
- drawing block
- markers

Mathematical Communication Support

In Lesson 4, encourage role-play by enacting the scenarios in the word problems. Use real-life objects while attempting the word problems. Encourage pupils to write statements of (i) information given, (ii) mathematical operation, and (iii) information asked. You may refer to the template in the Activity Handbook P35. Encourage the breaking down of the story into organised data, mathematical operation and answer. Before doing the questions in Workbook 2A P101 – 103, discuss verbally in class. Encourage pupils to come up with the breakup of the word problem. Remember to explain to them the contextual meaning of the division equation.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout

Date: _____

The first three figures in a pattern are shown below.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5

Which Figure will have 10 dots?
Draw to help you find out.



Maths Journal

The picture shows some doughnuts.



Make a division story.
Show how you solve it.

Raju has 15 doughnuts.

He wants to put 5 doughnuts into each box.

How many boxes does he need?

$$15 \div 5 = 3$$

He needs 3 boxes.

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Mind Workout

Allow pupils to work on the problem independently and get some to present their solutions. Pupils' responses should include key terms such as 'two more dots in the next figure' and 'divide 10 by 2 to get 5'.



Maths Journal

Allow pupils to write the division story independently. For the weaker pupils, give an example and allow them to modify the example slightly.

Workbook 2A P104



MIND WORKOUT

Look at the picture.



How many marbles should Sam give to Siti so that they have the same number of marbles?

Sam should give Siti **2** marbles.

Use to help you. How many marbles do they have altogether?



MATHS JOURNAL

Look at the sentence.

Divide 35 by 5.



Write a division fact and make a division story.

Use to help you divide.

I know how to...

- divide a number by 2.
- divide a number by 5.
- divide a number by 10.
- write division facts.
- write a family of multiplication and division facts.
- solve word problems involving division.

SELF-CHECK



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DIVIDING BY 2, 5 AND 10

90

Textbook 2 P90



MIND WORKOUT

If possible, allow pupils to enact the scenario in Mind Workout. Alternatively, pupils can be given marbles to help them visualise the problem. Guide pupils to derive the division equation to solve this question.



MATHS JOURNAL

Give an example of a division story and use multilink cubes to represent the items in the story. Demonstrate the division with the distribution of the cubes. An example of a division story is as follows:

5 children are playing a game.
They divide 35 cards equally among themselves.
How many cards does each child get?

SELF-CHECK















Before pupils proceed to do the self check, review the important concepts by asking for examples learnt for each objective. For instance, show pupils a picture similar to the one below and ask them to write a family of multiplication and division equations based on the picture.



This self check can be done after pupils have completed **Review 4** (Workbook 2A P105 – 106) independently as consolidation of understanding for the chapter.

1.

 $9 \times 5 = 45$	
 $3 \times 5 = 15$	
 $9 \times 2 = 18$	
 $10 \times 2 = 20$	
 $6 \times 10 = 60$	
 $10 \times 10 = 100$	

Connections: A black line connects the first box to the second box. Red lines connect the second, third, fourth, and fifth boxes to the first, second, third, and fourth boxes on the right respectively.

2. $45 \div 5 = 9$
Junhao needs 9 shelves.

3. $16 \div 2 = 8$
Each of them gets 8 sweets.

4. $40 \div 10 = 4$
There are 4 pencils in each box.

1. Six hundred and forty-seven

2. (a) 610, 613

(b) 638, 648

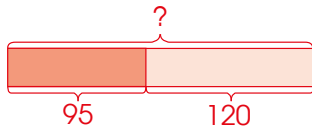
3. $8 + 5 = 13$, $13 - 5 = 8$

$5 + 8 = 13$, $13 - 8 = 5$

4. 138

$$\begin{array}{r} 34 \\ - 1 \\ \hline 2 \end{array}$$

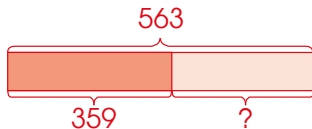
6.



$$95 + 120 = 215$$

Raju has 215 stamps now.

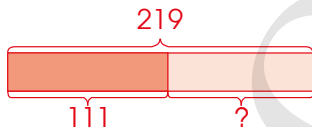
7.



$$563 - 359 = 204$$

There are 204 pink roses.

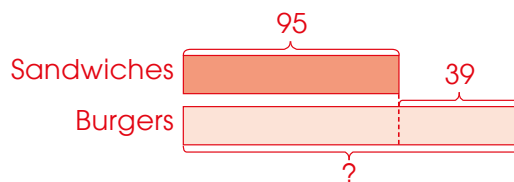
8.



$$219 - 111 = 108$$

They have to pack 108 more goodie bags.

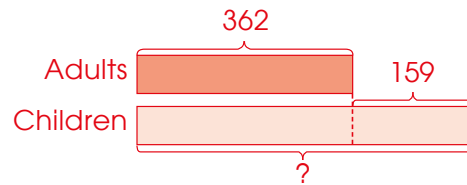
9.



$$95 + 39 = 134$$

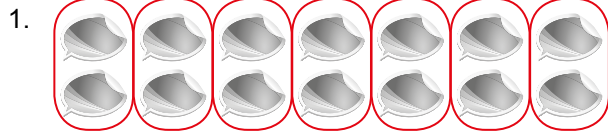
Mr Smith sold 134 burgers that day.

10.



$$362 + 159 = 521$$

There were 521 children at the carnival in all.



$$7 \times 2 = 14$$

There are 7 groups of 2.

2. $40 \div 5 = 8$

There are 8 marbles in each group.

3. $20 \div 2 = 10$

There are 10 marbles in each box.

4.

5×2	$10 \div 2$	$10 \div 5$	10×2
--------------	-------------	-------------	---------------

5. $5 \times 4 = 20$, $20 \div 4 = 5$

$$4 \times 5 = 20, 20 \div 5 = 4$$

6. $7 \times 2 = 14$

She drew 14 circles altogether.

7. $6 \times 2 = 12$

There were 12 pieces of tart.

8. $3 \times 5 = 15$

He has 15 marbles.

9. $60 \div 10 = 6$

There are 6 buttons in each box.

10. $40 \div 5 = 8$

There are 8 pieces in each row.

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Multiplication Tables of 3 and 4

CHAPTER

5

Multiplication Tables of 3 and 4

CHAPTER

5

What are the different ways to count the number of flowers?

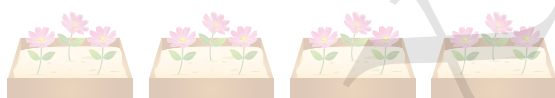


MULTIPLICATION TABLE OF 3

LESSON

1

IN FOCUS



How many flowers are there altogether?

91

CHAPTER 5

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Related Resources

NSPM Textbook 2 (P91 – 101)

NSPM Workbook 2A (P115 – 132)

Materials

Dot cards, multilink cubes, multiplication cards ($\times 3$ and $\times 4$)

Lesson

Lesson 1 Multiplication Table of 3

Lesson 2 Multiplication Table of 4

Lesson 3 Solving Word Problems

Problem Solving, Maths Journal and Pupil Review

Textbook 2 P91

INTRODUCTION

In this chapter, pupils briefly revisit the concept of multiplication as addressed in Chapter 3. They will move on to learn the multiplication tables of 3 and 4. Interesting activities are included to help pupils build up and memorise the multiplication tables. At the end of the chapter, pupils will solve word problems related to the multiplication of 3 and 4.

LESSON

1


MULTIPLICATION TABLE OF 3

LEARNING OBJECTIVES

1. Memorise the multiplication table of 3.


Multiplication Tables of 3 and 4 CHAPTER 5

What are the different ways to count the number of flowers?



MULTIPLICATION TABLE OF 3 LESSON 1

IN FOCUS



How many flowers are there altogether?

91 CHAPTER 5 OXFORD UNIVERSITY PRESS

Textbook 2 P91

IN FOCUS

Use the chapter opener to discuss the various ways of counting the flowers with the class. Lead them to understand that they can count in threes or there are 4 groups of 3. Get pupils to count in threes to find the total number of flowers.

1.



1 group of 3
 $1 \times 3 = 3$



2 groups of 3
 $2 \times 3 = 6$



3 groups of 3
 $3 \times 3 = 9$




4 groups of 3
 $4 \times 3 = 12$











There are 12 flowers altogether.

In Let's Learn 1, highlight that 1 group of 3 can be written as 1×3 , 2 groups of 3 can be written as 2×3 and so on.

2.

Use  to make groups of 3.



	$1 \times 3 = 3$
	$2 \times 3 = 6$
	$3 \times 3 = 9$
	$4 \times 3 = 12$
	$5 \times 3 = 15$
	$6 \times 3 = 18$
	$7 \times 3 = 21$
	$8 \times 3 = 24$
	$9 \times 3 = 27$
	$10 \times 3 = 30$



Do you know how to skip count in threes?



Give interlocking cubes to each group of pupils. Use the cubes to enact ___ groups of 3 and relate the number of groups of 3 to multiplication. Ask pupils to make observations on the multiples of 3 (i.e., each successive multiple is 3 more than the multiple before).

Encourage pupils to skip count in threes until they are familiar with the multiplication table. Alternatively, use songs to help them to memorise the multiplication table.

Play in pairs.

- 1 Shuffle .
Put them face up on the table.
- 2 Answer as quickly as you can.
The first player to answer correctly keeps the .
- 3 After 10 rounds, the player with more cards wins!

ACTIVITY **1** TIME **2 3**

What you need:



PRACTICE 

1. Complete the multiplication fact.



$$6 \times 3 = 18$$

2. Complete the multiplication table.

$1 \times 3 = 3$	$3 \times 1 = 3$
$2 \times 3 = 6$	$3 \times 2 = 6$
$3 \times 3 = 9$	$3 \times 3 = 9$
$4 \times 3 = 12$	$3 \times 4 = 12$
$5 \times 3 = 15$	$3 \times 5 = 15$
$6 \times 3 = 18$	$3 \times 6 = 18$
$7 \times 3 = 21$	$3 \times 7 = 21$
$8 \times 3 = 24$	$3 \times 8 = 24$
$9 \times 3 = 27$	$3 \times 9 = 27$
$10 \times 3 = 30$	$3 \times 10 = 30$

Complete Workbook 2A, Worksheet 1 • Pages 115 – 120

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MULTIPLICATION TABLES OF 3 AND 4

94

Textbook 2 P94

Each pair is given a set of multiplication cards ($\times 3$). Demonstrate how the activity is carried out and give pupils 5 minutes to complete it.

PRACTICE 

Work with pupils on the questions and selected examples from **Worksheet 1**.

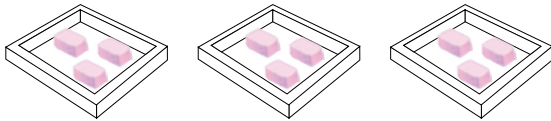
Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2A P115 – 120).

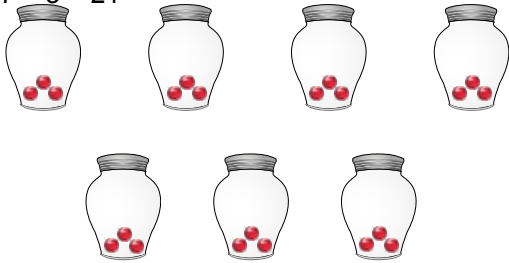
1. (a) $2 \times 3 = 6$
 (b) $6 \times 3 = 18$

2. 3, 6, 9, 12, 15, 18, 21, 24, 27, 30

3. (a) $3 \times 3 = 9$

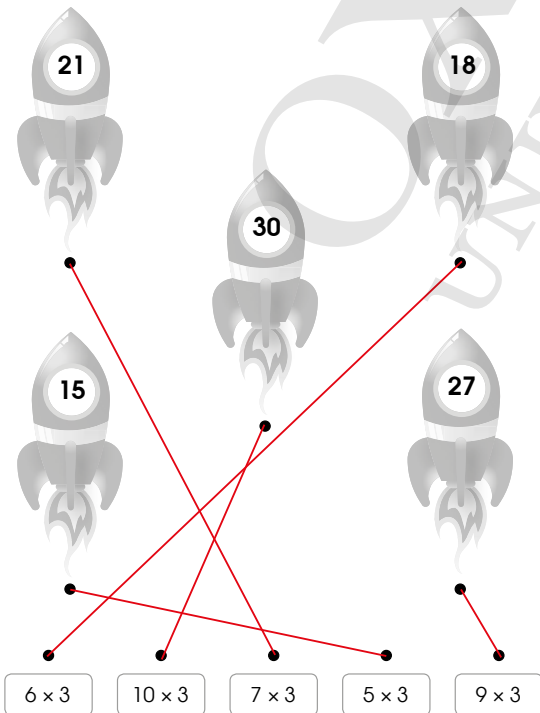


- (b) $7 \times 3 = 21$

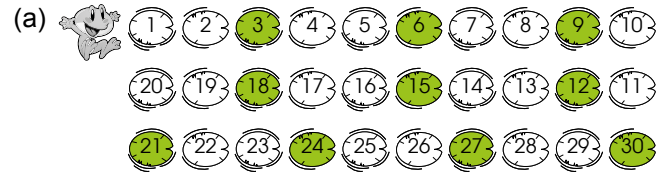


4. (a) $6 \times 3 = 18$
 $3 \times 6 = 18$
 (b) $4 \times 3 = 12$
 $3 \times 4 = 12$
 (c) $5 \times 3 = 15$
 $3 \times 5 = 15$
 (d) $9 \times 3 = 27$
 $3 \times 9 = 27$

- 5.



6. 3, 6, 9, 12, 15, 18, 21, 24, 27, 30



- (b) Each successive multiple of 3 is 3 more than the multiple before.

MULTIPLICATION TABLE OF 4

LEARNING OBJECTIVES

1. Memorise the multiplication table of 4.

MULTIPLICATION TABLE OF 4

LESSON
2

IN  FOCUS



How many fish are there in all?

LET'S LEARN 

1. 1 bowl has 4 fish.



1 group of 4
 $1 \times 4 = 4$



2 groups of 4
 $2 \times 4 = 8$



6 groups of 4
 $6 \times 4 = 24$



There are 24 fish in all.

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CHAPTER 5

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IN  FOCUS

Discuss the following question with pupils:

- What are the different ways to count how many fishes there are in total?

Lead pupils to observe that they can count in fours.

LET'S LEARN 

In Let's Learn 1, highlight that 1 group of 4 can also be written as 1×4 , 2 groups of 4 can be written as 2×4 and so on.

Textbook 2 P95

2.

Use dot cards to make groups of 4.



	$1 \times 4 = 4$
	$2 \times 4 = 8$
	$3 \times 4 = 12$
	$4 \times 4 = 16$
	$5 \times 4 = 20$
	$6 \times 4 = 24$
	$7 \times 4 = 28$
	$8 \times 4 = 32$
	$9 \times 4 = 36$
	$10 \times 4 = 40$

Do you know how to skip count in fours?



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MULTIPLICATION TABLES OF 3 AND 4

96

Textbook 2 P96

Go through the multiplication table using the dot cards and use terms such as 1 group of 4, 2 groups of 4, etc. to describe the multiplication of 4. Show that 1 group of 4 = 1×4 , 2 groups of 4 = 2×4 , etc. In addition, ask pupils to observe that each successive multiple is 4 more than the multiple before and predict what 11×4 will be.

Encourage pupils to skip count in fours until they are familiar with the multiplication table.

ACTIVITY TIME

- Go to <http://www.shinglee.com.sg/StudentResources/NSPM2>.
- Click on 'Fun With Multiplication'.
- Answer the questions shown.

How many questions can you answer correctly?



PRACTICE

- Complete the multiplication fact.



$$6 \times 4 = 24$$

- Complete the multiplication table.

$1 \times 4 = 4$	$4 \times 1 = 4$
$2 \times 4 = 8$	$4 \times 2 = 8$
$3 \times 4 = 12$	$4 \times 3 = 12$
$4 \times 4 = 16$	$4 \times 4 = 16$
$5 \times 4 = 20$	$4 \times 5 = 20$
$6 \times 4 = 24$	$4 \times 6 = 24$
$7 \times 4 = 28$	$4 \times 7 = 28$
$8 \times 4 = 32$	$4 \times 8 = 32$
$9 \times 4 = 36$	$4 \times 9 = 36$
$10 \times 4 = 40$	$4 \times 10 = 40$

Complete Workbook 2A, Worksheet 2 • Pages 121 – 124

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CHAPTER 5

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Textbook 2 P97

ACTIVITY TIME

Alternatively, conduct a game session using the multiplication cards ($\times 4$).

PRACTICE

Work with pupils on the questions and selected examples from **Worksheet 2**.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2A P121 – 124).

1. 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

2. (a) $3 \times 4 = 12$

(b) $5 \times 4 = 20$

(c) $7 \times 4 = 28$

3. (a) $4 \times 1 = 4$

$1 \times 4 = 4$

(b) $5 \times 4 = 20$

$4 \times 5 = 20$

(c) $3 \times 4 = 12$

$4 \times 3 = 12$

(d) $6 \times 4 = 24$

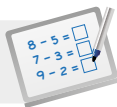
$4 \times 6 = 24$

4. 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

(a)

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

(b) Each successive multiple of 4 is 4 more than the previous multiple.

**Specific Learning Focus**

- Memorise the multiplication table of 3.
- Memorise the multiplication table of 4.

Suggested Duration

2 periods

Prior Learning

Revisit the concept of array briefly by saying that '12' or '15' can be rearranged into rows and columns of different combinations. Similarly, revise the multiplication tables of 2, 5 and 10 and conduct a quick verbal quiz in class where pupils are encouraged to say as many multiplication facts as possible correctly in one minute. Pupil(s) with the most number of correct answers in a minute wins.

Pre-emptive Pitfalls

Since pupils should have already memorised the multiplication tables of 2, 5 and 10 by first relating it to number patterns and skip counting in 2s, 5s and 10s, this lesson should not pose a challenge to most pupils.

Introduction

Introduce lessons 1 and 2 simultaneously and in continuation using similar tactics through C-P-A approach. Use real-life objects to make groups of 3 in Lesson 1 and groups of 4 in Lesson 2. Progress to standard models such as multilink cubes to make the concept concrete enough for pupils to grasp. They can then memorise the multiplication tables of 3 and 4.

Problem Solving

The commutative aspect of multiplication is best explained using arrays and real-life objects. Encourage skip counting in 3s and then in 4s using a hundred chart and use markers to colour the multiples of 3 and 4 while skip counting. Explain that the successive multiple will always be '3' or '4' more than the preceding multiple.

Activities

The online activity (Textbook 2 P97) will be fun for pupils. Pupils can be brought to the school computer lab or the 'Fun With Multiplication' activity can be given as an assignment where pupils' parents can be involved as well. Multiplication equation cards involving the multiplication tables of 3 and 4 (Activity Handbook 2 P36 – 37) can also be used to play a game in pairs in class.

Resources

- multilink cubes
- hundred chart (Activity Handbook 2 P7)
- markers
- multiplication cards (Activity Handbook 2 P36 – 37)

Mathematical Communication Support

Concept exploration and skill development can be done by asking pupils to use alternate strategy — skip counting or repeated addition — instead of multiplication, so that pupils can see how much more efficient multiplication is, in enabling us to derive the correct answer quickly. Ask pupils to draw four stickmen and ask them to find the total number of legs the four stickmen have altogether. Ask them to record it as a multiplication fact and not repeated addition. In addition, ask them to draw a four-legged animal and then draw a few of these animals to make multiplication facts of 4. Encourage pupils to verbally explain what they have drawn and then have some of them draw them on the whiteboard and write the multiplication fact.

LESSON 3


SOLVING WORD PROBLEMS

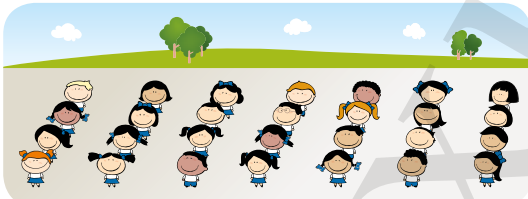
LEARNING OBJECTIVES

1. Solve 1-step word problems involving multiplication within the tables of 3 and 4.


SOLVING WORD PROBLEMS

LESSON 3

IN  FOCUS



How many pupils are there altogether?

LET'S LEARN 

1. There are 4 pupils in each group.
There are 7 groups.
How many pupils are there altogether?

How many pupils are there in each group?
How many groups are there?

$$4 \times 7 = 28$$

There are 28 pupils altogether.

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MULTIPLICATION TABLES OF 3 AND 4 98

Textbook 2 P98

IN FOCUS

Ask pupils for different ways to find the answer in the scenario. Lead pupils to observe that counting in fours is one of the possible ways.

LET'S LEARN

Guide pupils in solving the word problem by asking the following questions:

- How many pupils are there in each group?
- How many groups are there?

Get pupils to explain how they would form the number sentence and what the final answer is. They should observe that there are 7 groups of 4 pupils so the number sentence can be written as 7×4 .

2. There are 5 groups of children.
Each group has 3 children.
How many children are there altogether?

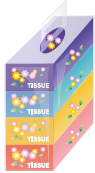
There are 5 groups of 3.

$$5 \times 3 = 15$$

There are 15 children altogether.



3. At a shop, boxes of tissue papers are sold in packets of 4.
How many boxes of tissue papers are there in 9 packets?



What does 'packets of 4' mean?

It means there are 4 boxes of tissue papers in each packet.



$$9 \times 4 = 36$$

There are 36 boxes of tissue papers in 9 packets.

Likewise, guide pupils in solving Let's Learn 2 and 3 by asking the following questions:

- How many groups are there?
- How many items are there in each group?

Demonstrate how the multiplication equation can be written for Let's Learn 2.

In Let's Learn 3, explain to pupils that the phrase 'packets of 4' meant that there are 4 boxes of tissue papers in each packet. Allow pupils to fill in the blanks independently and go through the answers as a class.

PRACTICE

Solve.

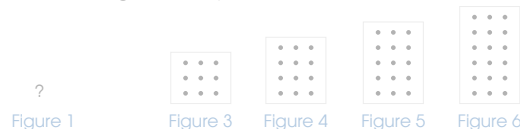
1. There are 7 stools.
Each stool has 3 legs.
How many legs are there altogether? 21
2. There are 6 shirts.
Each shirt has 4 buttons.
How many buttons are there altogether? 24
3. One flower has 4 petals.
How many petals do 8 flowers have? 32
4. At a shop, toy robots are sold in sets of 3.
How many toy robots are there in 9 sets? 27



Complete Workbook 2A, Worksheet 3 • Pages 125 – 127

MIND WORKOUT

There are 6 figures in a pattern.
The last four figures in the pattern are shown below.



How many dots will there be in the first figure? 3



Draw to help you find out.



PRACTICE



Work with pupils on the questions and selected examples from **Worksheet 3**.

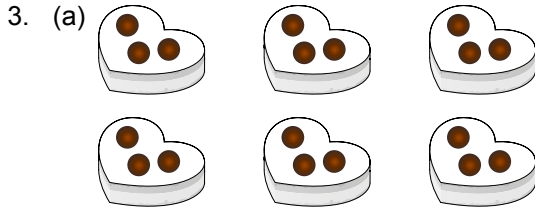
Ask questions such as 'How many groups are there?' and 'How many items are there in each group?' to guide pupils in solving the word problems. Get pupils to highlight the crucial information in each word problem.

Independent seatwork

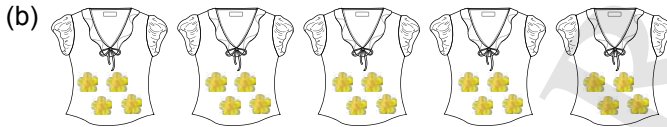
Assign pupils to complete Worksheet 3 (Workbook 2A P125 – 127).

1. $5 \times 3 = 15$
The aliens have 15 eyes altogether.

2. $7 \times 4 = 28$
There are 28 bananas in all.



- $6 \times 3 = 18$
Meiling uses 18 chocolate balls in all.

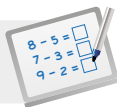


- $5 \times 4 = 20$
Mrs Gopal sews 20 flowers in all.

4. $7 \times 3 = 21$
Raju has 21 mangoes altogether.

5. $8 \times 4 = 32$
8 cars have 32 wheels altogether.

6. $4 \times 10 = 40$
Weiming bought 40 postcards in all.

**Specific Learning Focus**

- Solve 1-step word problems involving multiplication within the tables of 3 and 4.

Suggested Duration

4 periods

Prior Learning

At this stage, pupils should be well-versed in understanding a word problem, extracting important information and deciding the correct operation to be applied to derive the answer.

Pre-emptive Pitfalls

Since multiplication is repeated addition; some pupils might be confused as to whether to write an addition equation or a multiplication equation. It should be reinforced that if there is an equal number of items in each group, and the total number of items is to be determined, we use the multiplication operation.

Introduction

'Let's Learn' and 'Practice' (Textbook 2 P98 – 100) can be enacted with real-life objects to make the concept concrete. This strategy will enhance their abstract aspect of mathematics. The contextual understanding of the operation to apply and then identifying the multiplication table to be used, should be encouraged in a systematic manner. Encourage statements and ask them to write mathematical facts. At the end, encourage answers in a statement. In Let's Learn 3 (Textbook 2 P99), ask pupils 'What does packets of 4 mean?'. Encourage individual responses from pupils. Pupils can be asked to draw the subject of the word problem to help them visualise the multiplication fact. Give mixed word problems involving multiplication tables of 3 and 4 and some involving the multiplication tables of 2, 5 and 10 learnt earlier to help pupils recap what they have learnt.

Problem Solving

Using word problems and discussing the contextual link to the operation to be applied help enhance pupils' problem-solving skills. Give pupils a multiplication fact on the whiteboard and give them 5 minutes to write a multiplication story involving the multiplication fact. This backward method will develop their critical-thinking skills. Encourage drawings to show the number statements written in words and as mathematical facts.

Activities

The 'Mind Workout' (Textbook 2 P100) can be done as an activity using dot cards (Activity Handbook 2 38). Similarly, each word problem can be enacted using real-life objects or multilink cubes.

Resources

- multilink cubes
- dot cards
- real-life objects

Mathematical Communication Support

Encourage verbal class discussions before having pupils work independently. For example, in Question 3 of 'Practice' (Textbook 2 P100), ask them questions like: 'How many petals are there in each flower?', 'Which number will be repeated?', 'How many times will the number be repeated?', 'Which multiplication table should be used?' and 'Say the multiples in the multiplication table from the beginning and stop when you reach the correct multiplication fact.'. Repeat this verbal approach for each word problem.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout

Date: _____

Fill in the blanks with the correct numbers.

(a)

$$\triangle + \triangle = 8$$

$$\triangle = 4$$

$$\triangle + \triangle + \triangle + \triangle = 16$$

(b)

$$\star + \star + \star = 15$$

$$\star + \star + \star + \star + \star + \star + \star$$

$$= 35$$

What number does each
★ stand for?



128 Chapter 5

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Mind Workout

Teachers may go through (a) with pupils and allow them to solve (b) independently. In (a), ask the following questions to help them in solving the problem:

- Notice that 2 triangles = 8, how can you find the value of 1 triangle?
- If 1 triangle = 4, how do you find the value of 4 triangles?

Invite some pupils to present their answers at the end of the activity.

Workbook 2A P128

PRACTICE

Solve.

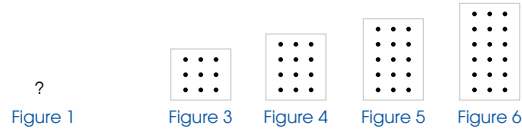
- There are 7 stools.
Each stool has 3 legs.
How many legs are there altogether? 21
- There are 6 shirts.
Each shirt has 4 buttons.
How many buttons are there altogether? 24
- One flower has 4 petals.
How many petals do 8 flowers have? 32
- At a shop, toy robots are sold in sets of 3.
How many toy robots are there in 9 sets? 27



Complete Workbook 2A, Worksheet 3 • Pages 125 - 127

MIND WORKOUT

There are 6 figures in a pattern.
The last four figures in the pattern are shown below.



How many dots will there be in the first figure? 3



Draw to help you find out.



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MULTIPLICATION TABLES OF 3 AND 4 100

Textbook 2 P100



MIND WORKOUT

Ask questions such as 'How many more dots does each figure have than the previous one?' to guide pupils in solving the question.

MATHS JOURNAL

Look at the chart.

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

- Skip count in twos and circle the numbers in red.
- Skip count in threes and circle the numbers in orange.
- Skip count in fours and circle the numbers in purple.
- Skip count in fives and circle the numbers in blue.
- Skip count in tens and circle the numbers in green.

Which numbers can be divided by both 2 and 5?
What do you notice about the numbers?



I know how to...

- multiply a number by 3.
- multiply a number by 4.
- solve word problems involving the multiplication tables of 3 and 4.

SELF-CHECK



101 CHAPTER 5

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Textbook 2 P101

MATHS JOURNAL

Remind pupils to follow the instructions and circle the numbers with the correct colours. Teacher can ask pupils to write down more observations.

SELF-CHECK



Before pupils proceed to do the self check, review the important concepts by asking for examples learnt for each objective. For instance, review the multiplication tables of 3 and 4 with pupils.

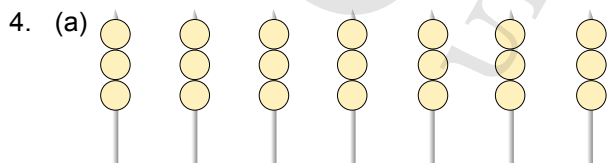
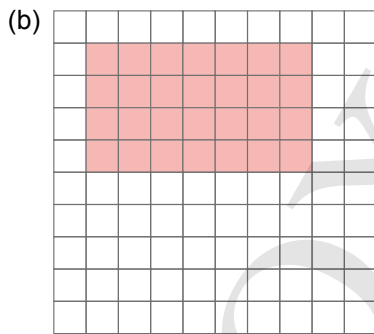
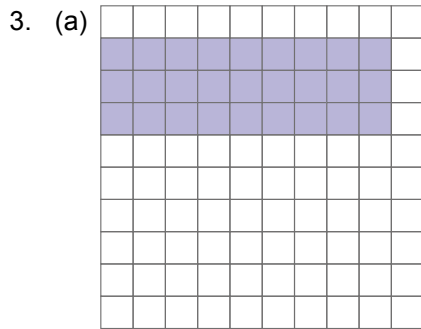
This self check can be done after pupils have completed **Review 5** (Workbook 2A P129 – 132) independently as consolidation of understanding for the chapter.

Answers Review 5 (Workbook 2A P129 – 132)

1. (a) $3 \times 3 = 9$
- (b) $4 \times 5 = 20$
- (c) $7 \times 2 = 14$

2.

$3 \times 4 = 12$	•	$4 \times 8 = 32$
$8 \times 4 = 32$	•	$3 \times 6 = 18$
$6 \times 3 = 18$	•	$4 \times 3 = 12$



$7 \times 3 = 21$
Tom has 21 fish balls altogether.



$4 \times 4 = 16$
Nora has 16 fish in all.

5. $2 \times 3 = 6$
The children have 6 stamps in all.

6. $3 \times 4 = 12$
3 cats have 12 legs altogether.

7. $9 \times 3 = 27$
There are 27 slices of cake in all.

Dividing by 3 and 4

CHAPTER

6

Dividing by 3 and 4 CHAPTER **6**

3 birds can be put on each stand.
How many stands does the magician need to put all the birds?

DIVIDING BY 3 AND 4 LESSON **1**

IN FOCUS

Each stand can hold 3 birds.
How many stands are needed?

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DIVIDING BY 3 AND 4 **102**

Textbook 2 P102

Related Resources

NSPM Textbook 2 (P91 – 101)
NSPM Workbook 2A (P133 – 144)

Materials

Division cards ($\div 2$, $\div 3$, $\div 4$, $\div 5$ and $\div 10$), drawing block, markers, multilink cubes, multiplication cards ($\times 2$, $\times 3$, $\times 4$, $\times 5$ and $\times 10$), magnetic buttons (optional)

Lesson

Lesson 1 Dividing by 3 and 4
Lesson 2 Multiplication and Division
Lesson 3 Solving Word Problems
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

In this chapter, pupils make connections between multiplication and division by writing families of multiplication and division facts. They are taught to do division by 3 and 4 with reference to the corresponding multiplication tables. Towards the end of the chapter, pupils will solve word problems involving division by 3 and 4.

LESSON

1

DIVIDING BY 3 AND 4

LEARNING OBJECTIVES

1. Divide within the multiplication tables of 3 and 4.


Dividing by 3 and 4

CHAPTER 6

3 birds can be put on each stand.
How many stands does the magician need to put all the birds?



DIVIDING BY 3 AND 4

IN  FOCUS

LESSON 1



Each stand can hold 3 birds.
How many stands are needed?

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DIVIDING BY 3 AND 4 102

Textbook 2 P102

IN FOCUS

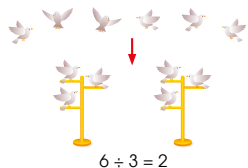
Guide pupils to the concept of division by asking the following questions:

- How many birds are there altogether?
- How many birds are there on each stand?

Lead them to write the division equation for the word problem.

LET'S LEARN

1. Put 6 birds in groups of 3.



2 stands are needed.

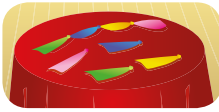
Divide 6 by 3 to find the number of stands needed.

$$2 \times 3 = 6$$

$$6 \div 3 = 2$$



2. There are 8 sashes.
4 sashes are tied together to make a long train.



$$8 \div 4 = 2$$

2 long trains can be made.

$$2 \times 4 = 8$$

$$8 \div 4 = 2$$



3. Each tricycle has 3 wheels.
There are 15 wheels altogether.



$$15 \div 3 = 5$$

There are 5 tricycles.

$$5 \times 3 = 15$$

$$15 \div 3 = 5$$



LET'S LEARN

Using magnetic buttons to represent the birds, move the buttons to show pupils how the birds can be distributed on the stands.

There is a total of 6 birds and 3 birds can be placed on one stand, therefore divide 6 by 3 to find the number of stands needed. It can be written as $6 \div 3 = 2$.

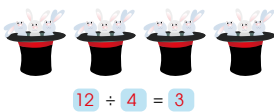
Get pupils to read the division equation and ask them if they can see the relationship between division and multiplication by looking at the numbers in the division equation.

Ask the following questions to guide pupils in solving Let's Learn 2 and 3:

- What is the total number of ___?
- How many ___ are there in each group?
- How many groups are there?

Lead pupils to write the division equation and remind them to use the multiplication tables of 3 and 4 to find the answer. Check if pupils know how division is related to multiplication in each question.

4. There are 12 rabbits.
They are put equally into 4 hats.



There are 3 rabbits in each hat.

$$3 \times 4 = 12$$

$$12 \div 4 = 3$$



ACTIVITY 1 TIME

Play in groups of 4.

- Put the cards face up on the table.
- Answer the first division fact. Cross out the answer on the chart.

What you need:



1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

- Take turns and repeat 2. Cross out your own answers only. The first player to cross out all the numbers wins!

ACTIVITY 2 TIME

- Go to <http://www.shinglee.com.sg/StudentResources/NSPM2>.
- Click on 'Fun With Division' and answer the questions.

How many points can you get?



Likewise, guide pupils in solving Let's Learn 4 with questions such as 'How many rabbits are there in total?' and 'How many hats are there?'

Allow pupils to write the number sentence and find the answer independently. Check if their answers are correct.

ACTIVITY 1 TIME

Each group is given a set of division cards ($\div 2$, $\div 3$, $\div 4$, $\div 5$ and $\div 10$). Demonstrate how the activity is carried out and give pupils 5 to 10 minutes to complete it.



1. Complete the division equations.

(a) Put 12 hearts in groups of 4.



$$12 \div 4 = 3$$

There are 3 groups.

(b) Put 9 strawberries equally on 3 slices of cake.



$$9 \div 3 = 3$$

There are 3 strawberries on each cake.

2. Solve.

Use the multiplication tables to help you.

(a) $16 \div 4 = 4$

Check: $4 \times 4 = 16$

(b) $18 \div 3 = 6$

Check: $6 \times 3 = 18$

(c) $3 \div 3 = 1$

Check: $1 \times 3 = 3$

(d) $32 \div 4 = 8$

Check: $8 \times 4 = 32$

(e) $28 \div 4 = 7$

Check: $7 \times 4 = 28$

(f) $27 \div 3 = 9$

Check: $9 \times 3 = 27$

Complete Workbook 2A, Worksheet 1 • Pages 133 – 136



Work with pupils on the questions and selected examples from **Worksheet 1**.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2A P133 – 136).

Answers Worksheet 1 (Workbook 2A P133 – 136)

- (a) $18 \div 3 = 6$
Weiming needs 6 boxes.

(b) $12 \div 4 = 3$
There are 3 groups of toy cars.

(c) $15 \div 3 = 5$
There are 5 teddy bears on each shelf.

(d) $24 \div 4 = 6$
There are 6 toy boats in each group.

- (a) 2, 2

(b) 2, 2

(c) 10, 10

(d) 5, 5

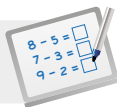
(e) 4, 4

(f) 10, 10

(g) 7, 7

(h) 8, 8

3.

**Specific Learning Focus**

- Divide within the multiplication tables of 3 and 4.

Suggested Duration

3 periods

Prior Learning

Pupils have already been introduced to the division operation formally. They should be able to write division facts using ‘÷’ symbol. They should also be well-versed with understanding division equations as: (i) Total number of items ÷ Number of items in each group = Number of groups, (ii) Total number of items ÷ Number of groups = Number of items in each group. Since they have learnt division facts of 2, 5 and 10 using their multiplication tables, this lesson is a continuation of Chapter 4, where division facts of 3 and 4 are introduced.

Pre-emptive Pitfalls

Since this is a progression of Chapter 4, most pupils will not face any problem as they will be in momentum. Ensure that in a division equation, the dividend needs to be divided either by the number of groups or number of items in each group.

Introduction

Real-life examples in Let’s Learn 1 to 4 (Textbook 2 P103 – 104) encourage pupils to visualise and comprehend the word problems. At this stage, pupils should be well-versed in using multiplication to solve the division equation. Question 2 of ‘Practice’ (Textbook 2 P105) is interesting as it helps pupils use their contextual understanding to solve division equations and use the inverse operation of division, which is multiplication, to check the division fact. Provide more questions involving division within the multiplication tables of 3 and 4.

Problem Solving

Assign each pupil with a number x (≤ 24) that is a multiple of 3 or 4 and ask them to roll a dice. They are to determine if the number obtained from rolling the dice can be a divisor of the division equation ‘ $x \div \square = 3$ or 4 ’. For example, if $x = 15$, and a pupil obtains ‘5’ from rolling the dice, the pupil should say that ‘5’ can be a divisor because $15 \div 5 = 3$. Any other number obtained from rolling the dice will not fit the criteria.

Activities

Get pupils to do the activity found on the website: <http://www.shinglee.com.sg/StudentResources/NSPM2>. Divide the class into groups and see which group gets the greatest number of points.

Resources

- multilink cubes
- dice
- hundred chart (Activity Handbook 2 P7)
- markers
- division cards (Activity Handbook 2 P29 – 31, 39 – 40)

Mathematical Communication Support

Ask pupils to create a story involving a division fact and ask them questions as they are creating it (e.g. for ‘ $12 \div 4 = 3$ ’, ask: ‘Which number in the equation has to be divided into equal groups?’; ‘Is 4 the number of groups or can it also be the number of items in each group?’; ‘What is the relationship between multiplication tables and division facts?’; ‘Why is the largest number always placed first in a division equation?’; ‘What does $12 \div 4$ and $12 \div 3$ have in common?’).

LESSON 2

MULTIPLICATION AND DIVISION

LEARNING OBJECTIVES

1. Relate multiplication and division by writing families of multiplication and division facts based on the multiplication tables of 3 and 4.

MULTIPLICATION AND DIVISION

IN FOCUS

Put 4 cherries on each cake.



Can we make a family of multiplication and division facts?

LET'S LEARN

Make a family of multiplication and division facts.



$$\begin{array}{l} 5 \times 4 = 20 \quad \text{---} \quad 20 \div 4 = 5 \\ 4 \times 5 = 20 \quad \text{---} \quad 20 \div 5 = 4 \end{array}$$

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DIVIDING BY 3 AND 4 106

Textbook 2 P106

IN FOCUS

Guide pupils in writing the multiplication and division facts by asking questions such as 'How many cakes are there?' and 'How many cherries are on each cake?'

LET'S LEARN


Use the information given in the picture to derive the multiplication and division facts. Check if pupils have written the multiplication and division equations correctly.

Give more examples as practice for pupils to write the families of facts. Alternatively, pupils can draw their own pictures and write the facts.



ACTIVITY TIME

Work in pairs.


- 1 Think of a number from 1 to 10. Multiply 3 by the number.
- 2 Use  to show how you multiply.
- 3 Write the related multiplication and division facts.

What you need:



Example

Multiply 3 by 5.



$$3 \times 5 = 15 \quad \text{---} \quad 15 \div 5 = 3$$

$$5 \times 3 = 15 \quad \text{---} \quad 15 \div 3 = 5$$

- 4 Repeat 1 to 3 to multiply 4.

Each pair of pupils is given some multilink cubes. Demonstrate the activity to the class and remind pupils to check their partners' answers.

PRACTICE

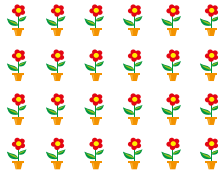


Work with pupils on the questions and selected examples from **Worksheet 2**.

PRACTICE



Make a family of multiplication and division facts.



$$6 \times 4 = 24 \quad \text{---} \quad 24 \div 4 = 6$$

$$4 \times 6 = 24 \quad \text{---} \quad 24 \div 6 = 4$$

Complete Workbook 2A, Worksheet 2 • Pages 137 – 138

Textbook 2 P107

Answers Worksheet 2 (Workbook 2A P137 – 138)

1. (a) $20 \div 4 = 5$
 $4 \times 5 = 20, 20 \div 5 = 4$
- (b) $18 \div 3 = 6$
 $3 \times 6 = 18, 18 \div 6 = 3$
- (c) $8 \times 3 = 24, 24 \div 3 = 8$
 $3 \times 8 = 24, 24 \div 8 = 3$
- (d) $9 \times 4 = 36, 36 \div 4 = 9$
 $4 \times 9 = 36, 36 \div 9 = 4$

SOLVING WORD PROBLEMS

LEARNING OBJECTIVES

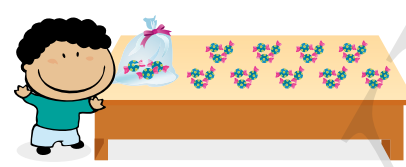
1. Solve 1-step word problems involving multiplication or division.

SOLVING WORD PROBLEMS

LESSON

3


IN FOCUS



How many sweets are there altogether?
How many packets of sweets can Ahmad pack?

LET'S LEARN

1. Multiply to find the total number of sweets.



There are 3 sweets in each group.
There are 10 groups.

$3 \times 10 = 30$

There are 30 sweets altogether.

$10 \times 3 = 30$

LET'S LEARN

To find the total number of sweets, guide pupils to understand that there are 10 groups of 3. Hence, the number sentence can be written as 10×3 . Use the multiplication table of 3 to find the total number of sweets.

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DIVIDING BY 3 AND 4

108

Textbook 2 P108

IN FOCUS

For the first part of the question, discuss the different ways to find the total number of sweets with the class. Lead pupils to count in threes by asking the following questions:

- How many sweets are there in each group?
- How many groups of sweets are there?
- Do we multiply or divide to find the total number of sweets?

For the second part of the question, start by asking the class how many sweets there are in each packet. Knowing (i) the total number of sweets and (ii) the number of sweets in each packet, check if pupils know how to find the number of packets of sweets and whether they should divide or multiply to find the answer.

LET'S LEARN

To find the total number of sweets, guide pupils to understand that there are 10 groups of 3. Hence, the number sentence can be written as 10×3 . Use the multiplication table of 3 to find the total number of sweets.

Divide to find the number of packets of sweets.



There are 30 sweets altogether.
Ahmad packs 3 sweets in each packet.

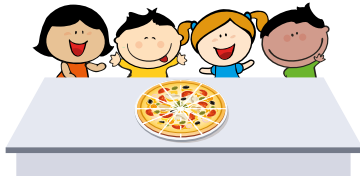
$$30 \div 3 = 10$$

Ahmad can pack 10 packets of sweets.

Divide 30 by 3.



2. There are 4 children.
They share 12 slices of pizza equally.
How many slices of pizza does each child get?



Should we multiply or divide?



$$12 \div 4 = 3$$

Each child gets 3 slices of pizza.

Division is used to find the number of packets of sweets.
The number of packets equals to $30 \div 3$.

In Let's Learn 2, guide pupils to solve the problem by asking:

- What information is given?
- Do we know how many slices of pizza there are in total?
- How many children are there?
- Should we divide or multiply to get the answer?

Remind pupils to use the multiplication table of 4 to find the answer.

3. Kate has 9 boxes.
She packs 4 tarts in each box.
How many tarts does Kate pack altogether?



$$9 \times 4 = 36$$

Kate packs 36 tarts altogether.

Should we multiply or divide?



Work in groups of 4.

- 1 Pick a card.
- 2 Write a word problem.
Draw a picture to show your word problem.

Example

$$2 \times 3$$

There are 2 stacks of books.
Each stack has 3 books.
How many books are there in all?



- 3 Repeat 1 and 2 to make three more word problems.
- 4 Show your word problems to the class.
Ask your classmates to solve them.

ACTIVITY TIME

What you need:



ACTIVITY TIME



In Let's Learn 3, use the following questions to help pupils in solving the problem:

- What information is given?
- Do we know how many boxes of tarts are there?
- How many tarts are there in a box?
- Should we divide or multiply to get the answer?

Remind pupils to use the multiplication table of 4 to find the answer.

Each group of pupils is given a set of multiplication cards and division cards. Demonstrate by writing an example to the class and encourage them to draw pictures in their word problems.

Allow pupils to share their word problems with the class and work out the answers to one another's word problems.



PRACTICE



Solve.

1. Farhan has to arrange 27 chairs in rows. Each row has 3 chairs. How many rows are there? **9**



2. Sam has 8 sheets of paper. He cuts each sheet into 4 rectangles. How many rectangles can he cut altogether? **32**



3. There are 3 postcards in one packet. How many postcards are there in 4 such packets? **12**



Complete Workbook 2A, Worksheet 3 • Pages 139 – 141



MIND WORKOUT

The number of cups of rice that is needed to fill a container is shown.



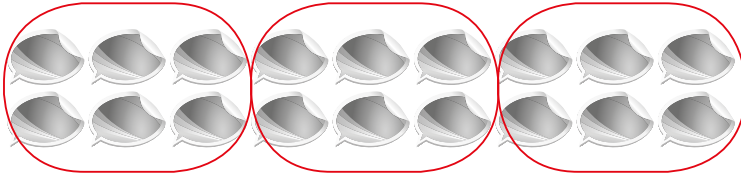
Mrs Lee has 32 cups of rice. How many such containers does she need to hold all her rice? **8**

Work with pupils on the questions and selected examples from **Worksheet 3**.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 2A P139 – 141).

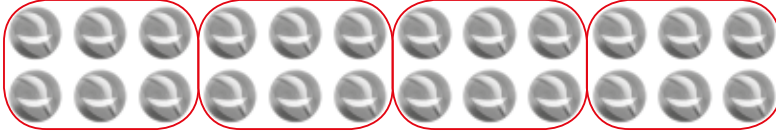
1. (a)



$$18 \div 3 = 6$$

Priya puts 6 stickers in each album.

(b)



$$24 \div 4 = 6$$

Ahmad gives each friend 6 marbles.

2. $5 \times 4 = 20$

Meiling has 20 potatoes altogether.

3. $36 \div 4 = 9$

There are 9 rows of pupils.

4. $28 \div 4 = 7$

Nora puts 7 roses in each vase.

5. $15 \div 3 = 5$

There are 5 prawns in each bowl of soup.

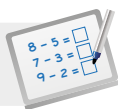
6. $7 \times 4 = 28$

Bala has 28 sweets.

7. $9 \times 3 = 27$

He can read 27 pages in 9 days.

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**Specific Learning Focus**

- Relate multiplication and division by writing families of multiplication and division facts based on the multiplication tables of 3 and 4.
- Solve 1-step word problems involving multiplication or division.

Suggested Duration

Lesson 2: 2 periods

Lesson 3: 4 periods

Prior Learning

Pupils should be able to relate multiplication and division facts as learnt in earlier lessons. They should be aware that multiplication and division are inverse operations to each other.

Pre-emptive Pitfalls

Since this concept of relating multiplication to division facts has been done earlier, pupils should not face challenges related to lessons 2 and 3.

Introduction

Since lessons 2 and 3 involve the concept of multiplication and division, the teacher needs to explain to pupils how to identify the operation and then write the mathematical fact. 'In Focus' (Textbook 2 P106) can be carried out as a real-life activity where pupils are asked to decorate the cake. Cakes can be replaced with pizza and cherries can be replaced with olives. Similarly, sandwiches and their fillings could be used for a hands-on activity in class where pupils could be asked to put 2 or 4 tomato slices in each sandwich. Get them to make their multiplication and division facts (e.g. 2 (tomato slices in each sandwich) \times 10 (number of sandwiches) = 20 (total number of tomato slices); 20 (total number of tomato slices) \div 2 (tomato slices in each sandwich) = 10 (number of sandwiches)). In Lesson 3, make sure pupils write the statements of the information given. Identify the question that needs to be answered. Translate the information into a mathematical equation and then finally, give the answer in a statement.

Problem Solving

The questions in Review 6 (Workbook 2A P143) can be done with concrete cards. It is important to match using logical reasoning and not by rote matching (i.e. they might identify the like numbers). 'Mind Workout' and 'Maths Journal' (Workbook 2A P142) could be used as independent exercises where pupils are encouraged to come up with their own solutions and stories. This will strengthen their critical-thinking skills. In 'Mind Workout' (Textbook 2 P111), the 32 cups of rice can be changed to 12 or 16 and the number of containers can be figured out through a hands-on activity.

Activities

In 'Activity Time' (Textbook 2 P107), multilink cubes are required, and an extension of the activity can be done, where a bigger or smaller dividend or divisor can be given. The teacher may challenge advanced learners to go beyond 40 as their dividend.

Resources

- multilink cubes
- multiplication cards (Activity Handbook 2 P25 – 27, 36 – 37)
- division cards (Activity Handbook 2 P29 – 31, 39 – 40)
- real-life objects (e.g. sandwiches, tomato slices, etc.)
- multiplication and division fact cards (Activity Handbook 2 P41 – 42)

Mathematical Communication Support

Discuss with the class the 'Maths Journal' (Textbook 2 P112). Ask pupils if they got the answer '16' and how they came up with the correct answer. Did they multiply or divide? It is important to discuss each word problem verbally in class before pupils work independently in their exercise books and workbooks. Pertinent questions like 'Do we know the number to be divided or is it being asked?' can be asked. If it is asked, we multiply and if it has to be determined, we divide.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout

Date: _____

Junhao has 12 triangular pieces of paper.



He puts 4 pieces together to form a square.



How many squares can Junhao form with all the triangular pieces of paper?

3 squares



Maths Journal

Look at the division fact.

$$36 \div 4$$

Write a division story.

Ahmad has 36 marbles.

He divides the marbles equally into 4 groups.

How many marbles are there in each group?

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Mind Workout

Pupils should try to attempt this problem independently and present their answers to the class. Their responses should include 'Each square is made up of 4 triangles' and 'There are 12 triangles altogether'.



Maths Journal

Get pupils to write the division story independently. For the weaker pupils, give an example of a division story and allow them to modify the example slightly.

Workbook 2A P142

Solve.

1. Farhan has to arrange 27 chairs in rows. Each row has 3 chairs. How many rows are there? 9



2. Sam has 8 sheets of paper. He cuts each sheet into 4 rectangles. How many rectangles can he cut altogether? 32



3. There are 3 postcards in one packet. How many postcards are there in 4 such 12 packets?



Complete Workbook 2A, Worksheet 3 • Pages 139–141



MIND WORKOUT

The number of cups of rice that is needed to fill a container is shown.



Mrs Lee has 32 cups of rice. How many such containers does she need to hold all her rice? 8

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Textbook 2 P111



MIND WORKOUT

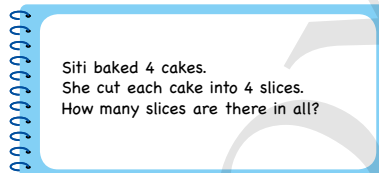
Pupils should try to attempt this problem independently. Otherwise, guide the weaker pupils with the following questions:

- Do we know the total number of cups of rice?
- Do we know how many cups of rice can fill one container?
- Should we divide or multiply to get the answer?

At the end of this activity, get some pupils to present their solutions to the class.

MATHS JOURNAL

Look at the word problem.



Weiming writes $4 \div 4 = 1$ and says that there is 1 slice in all.

Is Weiming correct?
Explain your answer.

I know how to...

- divide a number by 3.
- divide a number by 4.
- solve word problems involving division.

SELF-CHECK



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DIVIDING BY 3 AND 4

112

Textbook 2 P112

MATHS JOURNAL

Discuss this word problem with the class and allow pupils to answer independently. Lead pupils to understand that the answer is not reasonable as each cake is cut into 4 slices and ask questions such as 'Why do you think Weiming made the mistake?'

SELF-CHECK



Before pupils proceed to do the self check, review the important concepts by asking for examples learnt for each objective. For instance, conduct a class quiz to review the division of 3 and 4 with pupils.

This self check can be done after pupils have completed **Review 6** (Workbook 2A P143 – 144) independently as consolidation of understanding for the chapter.

Answers Review 6 (Workbook 2A P143 – 144)

1.

$3 \times 4 = 12$		$21 \div 3 = 7$
$8 \times 3 = 24$		$32 \div 4 = 8$
$5 \times 3 = 15$		$24 \div 4 = 6$
$8 \times 4 = 32$		$15 \div 3 = 5$
$7 \times 3 = 21$		$12 \div 4 = 3$
$6 \times 4 = 24$		$24 \div 3 = 8$

2. $30 \div 3 = 10$
There are 10 tops in each box.

3. $4 \times 4 = 16$
Mrs Lee needs 16 chocolate bars.

4. $36 \div 4 = 9$
Each girl has 9 stickers.

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Length CHAPTER 7

How long is my bed?

MEASURING LENGTH IN METRES LESSON 1

IN FOCUS

We have learnt that we can use different objects to measure length. Use 1 stick — as 1 unit.

The bed is about 5 units long. What other measurements can we use?

113 CHAPTER 7

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Textbook 2 P113

Related Resources

NSPM Textbook 2 (P113 – 133)
NSPM Workbook 2A (P145 – 172)

Materials

Centimetre ruler, measuring tape, metre ruler, paper clips (big), pencils, scissors, string

Lesson

Lesson 1 Measuring Length in Metres
Lesson 2 Measuring Length in Centimetres
Lesson 3 Comparing Lengths
Lesson 4 Solving Word Problems
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

In Grade 1, pupils have learnt the comparison and measurement of length using non-standard units such as paper clips. At this level, standard units of measurement such as **metre (m)** and **centimetre (cm)** are introduced. Pupils are taught to choose the appropriate unit of measurement, cm or m, to measure lengths with the use of real-world objects. In addition, pupils will have hands-on experience to measure length such as their own heights or class furniture using rulers and measuring tapes. Pupils are asked to make estimates before they measure the actual length to give them a sense of what they are measuring as well as the standard unit of measurement that they should use as bench mark. Word problems involving length in everyday context will aid pupils to understand its application in real life.

MEASURING LENGTH IN METRES

LEARNING OBJECTIVES


1. Estimate and measure length in metres.

Length

CHAPTER
7

IN FOCUS

How long is my bed?

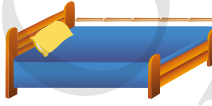


MEASURING LENGTH IN METRES

IN FOCUS

We have learnt that we can use different objects to measure length. Use 1 stick as 1 unit.

The bed is about 5 units long. What other measurements can we use?



LESSON
1

113

CHAPTER 7

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Textbook 2 P113

Use the chapter opener to discuss the following questions:

- Do you know how long your bed is?
- How can you find out?

Recall in Grade 1 that different objects can be used to measure length, hence the length of a bed can be measured with a stick. The bed is about 5 units long.

The length of the same bed can be measured by another object such as a badminton racket, etc. If we use a badminton racket to measure the bed, it is about 3 units long.

Allow pupils to think about how they would specify the length of a bed to a carpenter. Would the carpenter use a stick or a badminton racket to measure the length? Lead pupils to understand that there is a need for a 'common' unit of measurement. If everyone uses different objects to measure an item, the length of the item will be different and it can be confusing.

Alternatively, teacher can use paper clips or pencils to measure the picture of the bed over the visualiser.

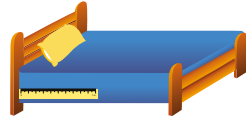
1.  1 metre

This is a metre tape. The **metre** is a unit of length. We write **m** for metre. The metre tape is 1 m long.

2. We can measure in metres. The bed is **about** 2 m long. We read **2 m** as **two metres**.



We usually measure long objects in metres.



3. We can measure the lengths of objects around us.



less than 1 m

desk



more than 1 m

teacher's table

The length of the desk is **shorter than** 1 m.

The length of the teacher's table is **longer than** 1 m.



The height of the cupboard is about 2 m.

Show 1 m using your arm span.



Show a metre ruler to pupils. Write down the word **metre** and the symbol **m** on the board while explaining the unit of measurement.

To illustrate the length of 1 metre, allow the tallest and the shortest pupils to stand in front of the class. Get the class to guess who is taller than a metre and who is shorter than a metre. Place the metre ruler in between the pupils to compare.

Using objects in the classroom, get pupils to guess if they are more than or less than 1 m long. Allow pupils to verify their answers by measuring the objects with the metre ruler. Ask them to conclude using the following statement:


The length of the _____ is shorter/longer than 1 metre.

Go through the examples and get pupils to read aloud the lengths of the objects.

ACTIVITY TIME



Work in groups of 2 to 4.

1 Measure your arm span with a . Is it longer or shorter than 1 m?

2 Look at the objects in the table below. Is it more than 1 m, about 1 m or less than 1 m?

Use the  to check your guess.

What you need:



Object	My guess	Check
Height of teacher's table	less than 1 m	less than 1 m
Width of classroom window		
Length of whiteboard		
Height of my chair		
Length of my waistline		
Length of my friend's arm span		

What is the length of my waistline?



What is the length of Weiming's arm span?



3 Tell your classmates about your group's answers.

Note: Pupils may need help with the use of a measuring tape.

This activity helps pupils to visualise how long a metre is by getting them to make estimations of various objects first and then verifying their answers with a measuring tape or metre ruler.



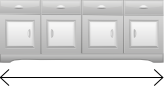

Compare and discuss the results by the end of the activity. Lead pupils to understand that the waistlines of the pupils can vary depending on the size of the person and the arm span of a pupil is **about** 1 metre long since most of them would have gotten similar answers.

Independent seatwork

Allow pupils to work in pairs on the questions from **Worksheet 1** (Workbook 2A P145 – 148) that involve measuring objects that are found in the classroom.

Encourage pupils to work with their parents or guardians at home to complete question 2 in Worksheet 1.

1. Answers may vary.

Object	Less than 1 m	More than 1 m	About 1 m	More than 2 m
 Height of my teacher's desk	✓			
 Height of a desk		✓		
 Length of a cupboard		✓		
 Length of a book	✓			

2. (a) tray, table, bench (Answers may vary.)

(b) bench, table, door (Answers may vary.)

3. Answers may vary.

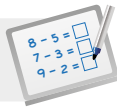
(a) 2

(b) 1

(c) 1

(d) 1

(e) 7

**Specific Learning Focus**

- Estimate and measure length in metres.

Suggested Duration

3 periods

Prior Learning

Pupils have learnt the concept of measurement in Grade 1, where standard units of measurement were not used but instead, hand span, arm span, stride, paper clips, stickers etc., were used.

Pre-emptive Pitfalls

In order for the formal introduction of a unit of measure in this lesson, pupils are required to understand and visualise how long one metre is. A lot of measurements by estimation can be done in class, such as estimating the length of the room and the diagonal length across the room. Pupils can use a measuring tape to measure the length in metres and the one who guesses the closest answer wins.

Introduction

The standard unit of measurement 'metre (m)' is introduced in this lesson. Bring a metre ruler to the classroom and let the pupils visually understand the length of a metre. Once they understand, they should be able to use the unit in the correct context. For example, a metre ruler cannot be used to measure the length of books, but can be used to measure the lengths, diagonal length and height of the classroom. Conduct a brainstorm session on the whiteboard and play 'I Spy' using objects that can be measured in metres. This can be a fun and boisterous activity.

Problem Solving

'Measure' is a concept where the usage of 'units' is formally introduced. How we measure the length and height of an object is important. In particular, it is important that the zero mark on the ruler is aligned to the start of the object. Similarly, when measuring the height of any object, emphasise to pupils that if the metre ruler is not perpendicular to the object and is tilted, the measurement will not be accurate. Visualisation and estimation skills will be developed in this lesson.

Activities

'Activity Time' (Textbook 2 P115) can be carried out by forming groups with mixed abilities. Ensure that when pupils use the measuring tape, it is properly held so that the measurement is accurate and the zero mark on the ruler is aligned to the start of the object.

Resources

- measuring tape
- metre ruler
- centimetre ruler
- real-life objects

Mathematical Communication Support

Get pupils to think of real-life situations where measurements in metre are required. Ask them if they would use paper clips to measure the length of long objects and explain why it would not be advisable.

MEASURING LENGTH IN CENTIMETRES

LEARNING OBJECTIVES


1. Estimate and measure length in centimetres.

MEASURING LENGTH IN CENTIMETRES

LESSON
2

IN FOCUS


The length of a metre tape is 1 metre or 1 m.



What is the length of the ruler above?

LET'S LEARN

1. 1 cm



This is a centimetre ruler.
The **centimetre** is a smaller unit of length.
We write **cm** for centimetre.

The centimetre ruler is 15 cm long.
The length of the space between two long markings is 1 cm.

When do we measure objects in centimetres? Why?

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LENGTH 116

IN FOCUS

Show a metre ruler and a 15-cm ruler to the class. Recall that metre ruler is used to measure the length of objects that are more than or less than 1 metre. Indicate to pupils that the 15-cm ruler is used to measure smaller units of length.

LET'S LEARN

Place a 15-cm ruler on the visualiser and get pupils to find out how long 1 centimetre is on their own rulers. The length of space between the 0 and 1-cm mark is **one centimetre**. Write down the word **centimetre** and the symbol **cm** on the board while explaining the unit of measurement.

Direct pupils to the length of space between the zero mark and 15-cm mark. Ask them how long the space is to find the length of the centimetre ruler.

2. How long is the pencil?



Zero mark

Place the pencil at the zero mark.
Look at the marking at the other end.



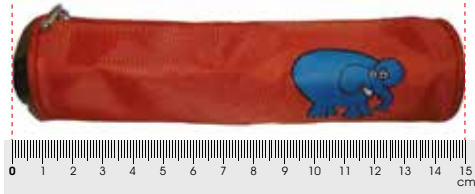
The length of the pencil is 12 cm.

3. How long is the paper clip?



The length of the paper clip is 5 cm.

4.

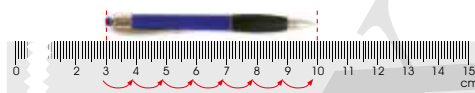


The length of the pencil case is 15 cm.

For Let's Learn 2, place a pencil at the zero mark of the ruler over the visualiser. Direct pupils to the marking at the opposite end of the pencil and ask them how long is the space from one end of the pencil to the other end. Point at the markings and count with pupils from 1 to 12. Remind pupils to include 'cm' when they report the measurement of the pencil.

Likewise, repeat the same procedure for the measurements of the paper clip and pencil case. Emphasise to pupils that the object should be placed at the zero mark.

5. How long is the pen?



The pen is not at the zero mark.
Count the number of units from 3 cm to 10 cm.



There are 7 units from 3 cm to 10 cm.
The length of the pen is 7 cm.

ACTIVITY TIME

Work in groups of 4.

- Look at the objects in the table. Guess the length of each object. Then measure them.

What you need:



Body part	Pupil A	Pupil B	Pupil C	Pupil D
Width of index finger	<input type="text"/> cm	<input type="text"/> cm	<input type="text"/> cm	<input type="text"/> cm
Length of hand	<input type="text"/> cm	<input type="text"/> cm	<input type="text"/> cm	<input type="text"/> cm
Length of foot	<input type="text"/> cm	<input type="text"/> cm	<input type="text"/> cm	<input type="text"/> cm
Length around head	<input type="text"/> cm	<input type="text"/> cm	<input type="text"/> cm	<input type="text"/> cm

- Compare. Who has the longest body parts?
- Tell your friends why you measure in centimetres.

For Let's Learn 5, place the pen at the 3-cm mark of the ruler and get pupils to guess the length of the pen. Indicate to pupils that the pencil is not placed at the zero mark. Guide them to see that the length of the pencil is equal to the number of markings between the 3-cm and 10-cm marking. Count the intervals with pupils and remind them to include 'cm' when they report the measurement of the pen.

Repeat the same procedure with another object such as a marker and place it on a different marking of the ruler.

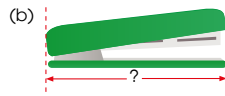
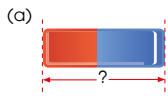
ACTIVITY TIME



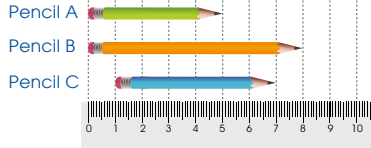
In this activity, pupils will estimate and measure the length of various body parts in cm. They will decide whether to use the measuring tape or the 15-cm ruler to measure each body part and explain why it is so.



1. Use a ruler to measure the lengths of these objects.



- 2.



- (a) Pencil A is 5 cm long.
 (b) Pencil B is 8 cm long.
 (c) Pencil C is 6 cm long.

3. Circle the correct answer.

(a) The length of the swimming pool is 50 cm or m.



(b) The length of my television is 60 cm or m.



Complete Workbook 2A, Worksheet 2 • Pages 149 – 152

Work with pupils on the questions and get them to verify their partners' answers. For question 3, reinforce to pupils that m is used for very long objects and cm is used for shorter objects.

For better understanding, go through selected examples from **Worksheet 2**. Allow pupils to work in pairs for question 5 in Worksheet 2 to measure objects in the classroom and check each other's answers.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2A P149 – 152).

Answers

Worksheet 2 (Workbook 2A P149 – 152)

1.



2. (a) 10

(b) 2

3. (a) 12

(b) 6

4. (a) 10

(b) 7

(c) 11

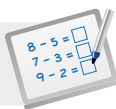
5. Answers may vary.

6. (a) cm

(b) m

(c) cm

(d) m

**Specific Learning Focus**

- Estimate and measure length in centimetres.

Suggested Duration

3 periods

Prior Learning

Pupils have been introduced to metres in Lesson 1. By now, they should be well versed with using a standard unit of measure.

Pre-emptive Pitfalls

Pupils might have difficulty in visualising or understanding the difference between 'cm' and 'm' initially. The teacher should explain that 100 cm make a metre, just like 100 cents make a dollar, and they should be able to understand that 'cm' is a smaller unit of measure. Also explain the benefit of using 'cm' when measuring shorter objects that are less than a metre long.

Introduction

In Textbook 2 P118, the pen is deliberately not placed at the zero mark, to test pupils' ability to measure by counting the number of intervals using the number line concept, in order to find the length of the pen. Reinforce that the starting line and ending line of the pen should be used to help count the number of intervals. Explain to pupils that when measuring the length of an object, they should follow these 3 steps:

1. Decide the appropriate unit of measurement ('m' or 'cm') and hence select the correct measurement tool (metre ruler, centimetre ruler, or measuring tape).
2. Align the ruler to the start of the object and count the intervals on the ruler.
3. Write the length with the correct unit of measurement.

Problem Solving

In this lesson, it is important that pupils have a lot of hands-on experience in measuring length in order for them to choose the appropriate unit of measurement. Reinforce the concept of vertical, horizontal and diagonal lengths. Without introducing the perpendicular terminology, explain that they have to be mindful of the positioning and alignment of the measuring tool to the object being measured.

Activities

This whole chapter requires independent and group work. In 'Activity Time' (Textbook 2 P118), encourage pupils to work in groups of 4 and collect objects. Then, choose the correct unit of measurement, measure the length of the object, and write down the answer.

Resources

- centimetre ruler
- real-life objects

Mathematical Communication Support

Introduce the term 'centimetre' and write it on the whiteboard. Break the word into 'centi' and 'metre' and explain that 100 cm make 1 m. The fact that 1 centimetre is $\frac{1}{100}$ th of a metre, should only be formally introduced in Grade 3.

LESSON

3


COMPARING LENGTHS

LEARNING OBJECTIVES

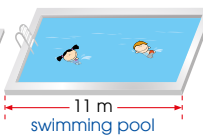
1. Compare and order lengths.
2. Measure straight lines and curves.

COMPARING LENGTHS


LESSON
3



3 m
sand pit



11 m
swimming pool



8 m
playground

Which is the longest?

LET'S LEARN

1. $11 - 3 = 8$
The swimming pool is 8 m **longer than** the sand pit.

$11 - 8 = 3$
The swimming pool is 3 m **longer than** the playground.

$8 - 3 = 5$
The sand pit is 5 m **shorter than** the playground.

The swimming pool is the **longest**.
The sand pit is the **shortest**.

swimming pool, playground, sand pit
longest \longrightarrow shortest

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LENGTH **120**

Textbook 2 P120

IN  FOCUS

Ask the class to answer these questions:

- What is the length of the sand pit?
- What is the length of the swimming pool?
- What is the length of the playground?
- Which is the longest?
- Which is the shortest?

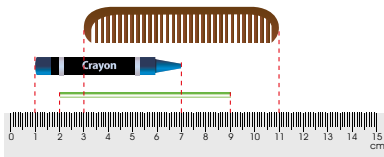
LET'S LEARN 

Guide pupils to compare lengths by asking the following questions:

- Compare the lengths of the swimming pool and the sand pit. Which is longer? How much longer? How do we find out?
- Compare the lengths of the swimming pool and the playground. Which is longer? How much longer? How do we find out?

Lead pupils to understand that subtraction is used to find the difference in length and the swimming pool is the longest. Then compare the sand pit with the playground and conclude that the sand pit is the shortest.

2. Compare the lengths of the objects.



The comb is 8 cm long.
The crayon is 6 cm long.
The straw is 7 cm long.

$$8 - 6 = 2$$

The comb is 2 cm longer than the crayon.

$$8 - 7 = 1$$

The comb is 1 cm longer than the straw.

The comb is the longest.
The crayon is the shortest.

comb, straw, crayon
longest → shortest

Why do we put the objects at the zero mark to compare?

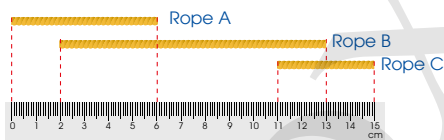


Highlight to pupils that the three objects are not placed at the zero mark. For ease of comparison, the three objects are aligned at the zero mark. Get pupils to read the lengths of the objects, compare the differences between them and order them according to length.

PRACTICE



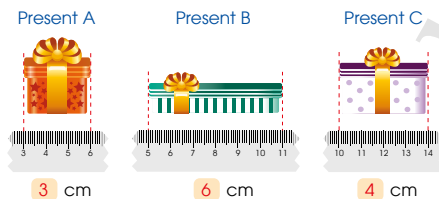
1. Compare the lengths of the ropes.



Rope B is the longest.

Rope C is the shortest.

2. Compare the lengths of the presents.



Arrange the presents in order of length.
Start with the longest.

Present B, Present C, Present A

PRACTICE



Work with pupils on the questions. For question 1, remind them to read the lengths of the three ropes from the scale on the ruler and ask them to explain how they arrived at their answers. This activity tests if pupils can make sense of the intervals between the markings on the centimetre ruler.

Independent seatwork

Assign pupils to complete Worksheet 3A independently (Workbook 2A P153 – 156).

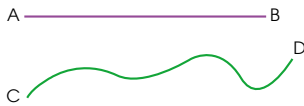
1. (a) teaspoon, tablespoon
(b) ladle, tablespoon
(c) teaspoon, ladle
(d) ladle
(e) teaspoon

2. (a) 4
(b) 7
(c) 5
(d) longer
(e) shorter
(f) matchstick, hairclip, glue stick

3. (a) giraffe
(b) 3
(c) 2
(d) giraffe, elephant, horse

4. (a) playground
(b) school
(c) library, 100

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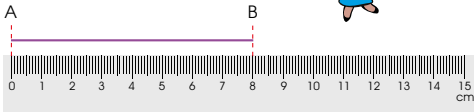


Which line is longer? AB or CD?

LET'S LEARN

1.

AB is a straight line.



The length of straight line AB is 8 cm.

Can we use a ruler to measure the length of CD?



Textbook 2 P123

Get pupils to describe the lines AB and CD. Possible responses are 'AB is straight and CD is crooked' and 'CD is longer than AB'.

Ask pupils how they can show CD is longer than AB and how they would measure the lengths of AB and CD.

LET'S LEARN

Get pupils to use their centimetre ruler to measure the length of AB. Allow a pupil to show the class how he/she would measure AB over the visualiser. Ask the class if the length of CD can be measured with a ruler.

2. We can use a string to measure the length of CD.

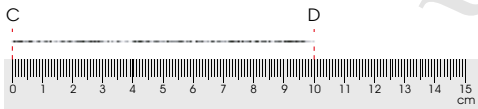
We can put a string along CD.



When we reach the end of CD, we cut the string. So, the string is as long as CD.



Straighten the string. Measure its length with a ruler.



The length of CD is 10 cm.

$$10 - 8 = 2$$

CD is 2 cm longer than AB.

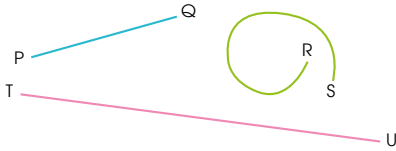
AB is 2 cm shorter than CD.

Textbook 2 P124

Give each pupil a piece of string. Assign them into pairs to discuss with their partners for 5 minutes on how they can use the piece of string to measure line CD. Get some pupils to present their answers and estimate the length of CD.

Demonstrate how to use the string and ruler to measure CD. Allow pupils to read the length of CD and compare the lengths of the two lines.

3. Measure and compare.



Line TU is the **longest** (longest/shortest).

Line RS is **5** cm longer than line PQ.

Line PQ is **7** cm shorter than line TU.

ACTIVITY **TIME**

Work in pairs.

1 Without looking at the markings on the , draw a straight line about 8 cm long.



2 Measure each other's line. Whose line is closer to 8 cm long?

3 Guess the length of each piece of string shown.



4 Use the and the to measure the lengths of the strings. Tell the length of each string using **about**.

Textbook 2 P125

Likewise, allow pupils to work in pairs to measure lines PQ, TU and RS. Get them to make comparison of the lengths to fill in the blanks in example 3.

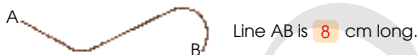
ACTIVITY **TIME**

This activity allows pupils to estimate and measure the lengths of straight lines and curves. Encourage pupils to use the word 'about' as the length of an object may not be a whole number.

PRACTICE

1. Use a ruler to draw each line.
(a) Draw a straight line AB that is 5 cm long.
(b) Draw a straight line CD that is 2 cm longer than line AB.

2. Use a string and a ruler.
(a) Measure the length of line AB.



(b) The same string is used to form line CD and line EF.



Line CD is **8** cm long. Line EF is **8** cm long.

What do you notice about the lines?
The lines are the **same** length.

3. Which string is longer?



String **A** is longer.
Why?

PRACTICE

Allow pupils to work in pairs to answer the practice questions. After each question, gather the class to verify their answers and discuss their mistakes.

Independent seatwork

Assign pupils to complete Worksheet 3B independently (Workbook 2A P157 – 158).

Textbook 2 P126

1. C, A, B

2. (a) 

(b) 

(c) 

3. (a) 10

(b) 11

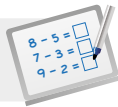
(c) 15

(d) 1

(e) longest

(f) shortest

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**Specific Learning Focus**

- Compare and order lengths.
- Measure straight lines and curves.

Suggested Duration

3 periods

Prior Learning

By now, pupils should be well-versed with the units of measurement ('m' and 'cm'). They should also be aware of the usage of 'cm' and 'm' depending on the length of the object. Alignment of the measuring tool to the zero mark or counting the intervals using the number line concept should also be mastered by now through hands-on experiences.

Pre-emptive Pitfalls

Pupils might get confused with the fractional values in millimetres within the centimetre intervals. Ask them to round off the values to the nearest value (e.g. if a length measures 3.8 cm, ask them to round up to 4 cm, or if a length measures 3.3 cm, ask them to round down to 3 cm).

Introduction

Use real-life measuring tools (e.g. ruler and measuring tape) and objects when going through 'Let's Learn' and 'Practice' (Textbook 2 P120 – 122). They can also read the questions in Workbook 2A (P125 – 127). The teacher can get pupils to work on an interesting exercise in Workbook 2A P156, where distance in metres is introduced informally. Ensure that pupils understand that in some cases, when very long distances are to be measured, a larger unit of measurement than metres has to be used (e.g. distance between two cities, planets, etc.).

Problem Solving

In Lesson 2, the measurement of vertical, horizontal and diagonal length was introduced. Crooked lines are introduced in this lesson, and these crooked lines then need to be straightened to get the correct measurement. Referring to 'In Focus' (Textbook 2 P123), explain to pupils that even though the length of the crooked line CD looks about the same as the length of the straight line AD, CD is actually longer than AD when CD is straightened. To explain this, the teacher may use real-life examples of 'queue', e.g. in the airport, a queue where travellers stand in a zigzag line is shorter than if they stand in a straight line. Practical demonstration can be done where 20 pupils can cover a certain 'length' and in a zigzag queue to explain how a shorter length is required. Explain, while comparing two lengths, that the operations of subtraction is employed.

Activities

'Activity Time' (Textbook 2 P125) can be extended by asking each pair to use a piece of string to measure the circumference of a ball. Ask pupils to mark out the end of the circumference of the ball on the string and then straighten out the string and align to a ruler to get the circumference in cm.

Resources

- real-life objects
- metre ruler
- centimetre ruler

Mathematical Communication Support

Using comparative terms like 'shorter', 'longer', 'almost', 'larger' and 'bigger' will be beneficial to pupils when comparing the length of objects.

SOLVING WORD PROBLEMS

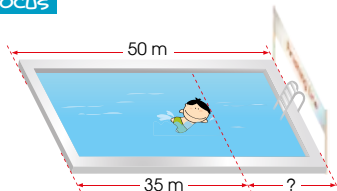
LEARNING OBJECTIVES

1. Solve word problems involving length (addition and subtraction).
2. Solve word problems involving length (multiplication and division).

SOLVING WORD PROBLEMS

LESSON
4

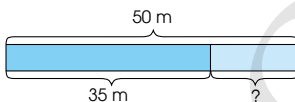
IN FOCUS



Weiming wants to swim 50 metres.
How far is he from the finishing line?

LET'S LEARN

1. Weiming wants to swim 50 metres.
He has swum 35 m.
How far is he from the finishing line?



$$50 - 35 = 15$$

Weiming is 15 m from the finishing line.

How far has Weiming swum?



Why do we subtract?



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Textbook 2 P127

IN FOCUS

Present the picture (shown on P127) without the story statements to the class. Allow them to work in pairs to come up with a number story for the picture. Invite some to present their stories to the class.

LET'S LEARN

Present the word problem to the class without the picture this time.

Example Weiming wants to swim 50 m.
He has swum 35 m.
How far is he from the finishing line?

Model the four steps to problem solving to help pupils in solving word problems:

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 do we have to find?

Step 2: Translate key elements into a diagram (model)

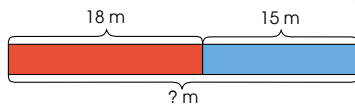
- Draw the model
- Label the known and unknown elements

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 Tan buys 18 m of red cloth and 15 m of blue cloth. What is the total length of cloth that she buys?



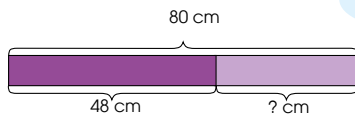
What equation can we write?



$$18 + 15 = 33$$

Mrs Tan buys 33 m of cloth altogether.

3. Siti has a ribbon that is 80 cm long. She cuts a piece that is 48 cm long to make a bow. What is the length of ribbon left?



Should we add or subtract?



$$80 - 48 = 32$$

The length of ribbon left is 32 cm.

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LENGTH 128

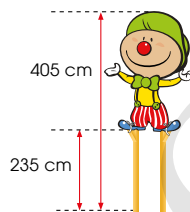
Textbook 2 P128

Likewise, apply the 4 steps in problem solving to Let's Learn 2 and 3. Guide pupils through the steps by asking questions such as 'What do we do first?' and 'What is the next step?'

Solve.

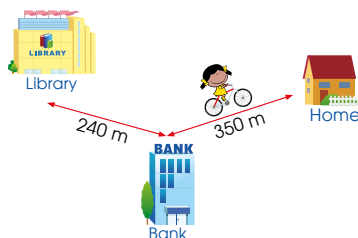
PRACTICE

1. A clown is standing on a pair of stilts that is 235 cm high. The height of the clown when he is standing on the stilts is 405 cm.



What is the height of the clown? 170 cm

2. Priya cycles home from the library. She passes by the bank.



How far does Priya cycle? 590 m

Complete Workbook 2A, Worksheet 4A • Pages 159 – 162

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Textbook 2 P129

PRACTICE

Allow pupils to work in pairs. It is not necessary for them to use model drawing since diagrams are provided. However, it may be good for teachers to draw models while going through the solutions with the class so that pupils can see the transition from pictorial diagrams to actual models.

For more practice, select questions from **Worksheet 4A** and work on them with pupils. Emphasise on the process of solving the word problems through the four steps. It is not necessary for pupils to draw models if diagram/picture is provided in the word problems. Get them to identify the unknown and use the correct operation to solve the problems.

Independent seatwork

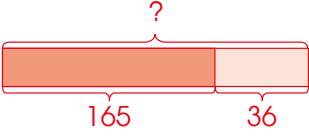
Assign pupils to complete Worksheet 4A (Workbook 2A P159 – 162).

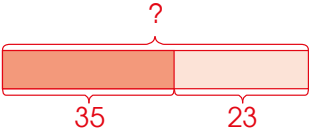
1. $3 + 4 = 7$
The length of the lorry is 7 m.

2. $150 - 48 = 102$ cm
The table is 102 cm longer than the chair.

3. $93 - 32 = 61$ cm
The height of the table is 61 cm.

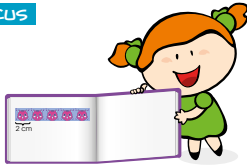
4. $250 + 360 = 610$ m
Farhan cycled 610 m.

5. 
 $165 + 36 = 201$ cm
She had 201 cm of ribbon at first.

6. 
 $35 + 23 = 58$ cm
The string was 58 cm long before it was cut.

7. $78 - 40 = 38$ cm
The plant grew 38 cm taller.

8. $50 - 22 = 28$ m
The turtle has run 28 m.



Kate sticks 5 stickers in a row.
What is the total length of the row of stickers?

LET'S LEARN



$$5 \times 2 = 10$$

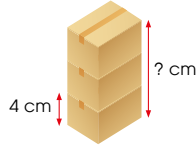
The row of stickers is 10 cm long.

What equation should we write?



2. Bala stacks 3 similar boxes.
The height of each box is 4 cm.
What is the total height of the stack of boxes?

$$3 \times 4 = 12$$



The total height of the stack of boxes is 12 cm.

Get pupils to discuss in their own words what they have understood about the word problem.

LET'S LEARN

The following examples involve multiplication and division. Allow pupils to identify the correct operation and write the number equation. Model the four steps to problem solving:

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 do we have to find?

Step 2: Translate key elements into a diagram (model)

- Draw the model
- Label the known and unknown elements

Step 3: Examine the model and write the number equation

- Lead pupils to see the **equal parts and whole** concept in the problem structure.
- How many equal parts? What is the length of one part? What is the whole part?
- Do we multiply or divide to find it?

Step 4: Answer the question

Likewise, apply the four steps in problem solving to the subsequent examples. Guide pupils through the steps by asking questions such as 'What do we do first?' and 'What is the next stage?'

PRACTICE



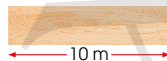
Assign the class to work in pairs and guide them to solve the word problems by using the four steps in problem solving. Draw diagrams to help pupils visualise and understand the word problems. At the end of the activity, get the class to discuss and verify their answers.

For more practice, select questions from **Worksheet 4B** and work on them with pupils.

3. A carpenter has a piece of wood that is 10 m long.
He cuts it into 5 pieces.
Each piece is of the same length.
How long is each piece of wood?

$$10 \div 5 = 2$$

Each piece of wood is 2 m long.



4. The carpenter has another piece of wood that is 8 m long.
He wants to cut it into pieces of equal length.
Each piece is 2 m long.
How many pieces of wood can he get?

$$8 \div 2 = 4$$

He can get 4 pieces of wood.

PRACTICE



Solve.

1. Meiling puts 5 toothpicks in one line.
Each toothpick is 5 cm long.
What is the length of the line of toothpicks? **25 cm**

2. Tom bent a wire that is 12 m long to form a square.
The square has 4 sides of equal length.
How long is each side? **3 m**



Independent seatwork

Assign pupils to complete Worksheet 4B (Workbook 2A P163 – 165).

- A rope is 2 m long.
What is the total length of 10 similar ropes? **20 m**
- A tailor needs 3 m of cloth to make one dress.
How many dresses can he make with 18 m of cloth? **6 m**

Complete Workbook 2A, Worksheet 4B • Pages 163 – 165

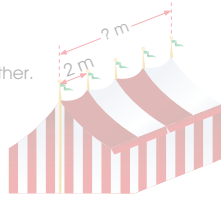


MIND WORKOUT

A tent is held up by 5 poles.
Each pole is 2 m apart from one another.

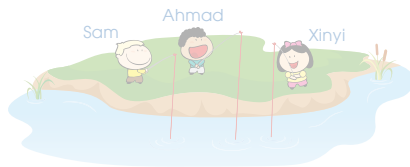
How long is the tent?

The tent is **8** m long.



MATHS JOURNAL

Ahmad has the longest fishing rod.
Xinyi's fishing rod is longer than Sam's fishing rod.
Who has the shortest fishing rod?



Tell your partner how you solve this problem.

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LENGTH 132

Textbook 2 P132

Answers Worksheet 4B (Workbook 2A P163 – 165)

- $18 \div 2 = 9$ cm
The length of each wooden block is 9 cm.
- $10 \times 6 = 60$ cm
The stack of books is 60 cm thick.
- $9 \times 4 = 36$
She needs 36 cm of tape to wrap 4 similar presents.
- $15 \div 5 = 3$
The length of each piece is 3 m.
- $8 \times 5 = 40$
The total length is 40 cm.
- $21 \div 3 = 7$
She can make 7 bed sheets.
- $40 \div 10 = 4$
The height of each storey is 4 m.
- $8 \times 4 = 32$
The length of the plank of wood was 32 cm.

**Specific Learning Focus**

- Solve word problems involving length (addition and subtraction).
- Solve word problems involving length (multiplication and division).

Suggested Duration

3 periods

Prior Learning

Pupils should know how to understand a word problem, extract important information, decide on the correct operation and derive the correct answer.

Pre-emptive Pitfalls

In this lesson, the four steps to problem solving are formally introduced to pupils. They might face difficulty initially but using the template (Activity Handbook 2 P43), they should be able to follow the steps easily.

Introduction

Use the 4-step approach to problem solving template to explain how to extract the important information, correctly organise the data, draw and label the model/diagram, and write the mathematical equation with the correct mathematical symbols.

Problem Solving

The use of real-life problems are important as pupils will be able to relate to them and pupils should find it easier to decide on the correct mode of operation (addition or subtraction). In Textbook 2 P130, pupils are required to use multiplication to solve the word problems. Some pupils might use repeated addition to solve. Remind them that although repeated addition will give the correct answer, it is better to use multiplication. Revisiting multiplication in the context of length through a spiral approach will strengthen their understanding of the concept.

Activities

The word problems can be enacted or the teacher can bring pupils to the playground or somewhere outside the classroom to create multiple real-life problems where pupils are required to solve (e.g. for 'Mind Workout' in Textbook 2 P132, if a tent cannot be pitched in the school playground, pillars or columns of the school auditorium can be used as the two ends of a tent with 5 school flag poles placed 2 m apart from one another).

Resources

- metre ruler
- centimetre ruler
- 4-step approach to problem solving template (Activity Handbook 2 P43)
- real-life objects

Mathematical Communication Support

To guide pupils in solving word problems, ask pupils questions such as 'What do you see in the picture? Which length looks longer? How do we measure? Which unit of length should we use? Which operation should we use to find the answer? How many sections or intervals of the ruler can you count? Do you need to align the start of the object to the zero mark on the ruler in order to measure its length?'. Assignments can be handed out to pupils where they present their word problem by drawing, colouring and writing their answers on chart papers. These can then be put up in the classroom for all to see and learn.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout

Date: _____

Siti, Kate and Priya each have a ribbon.

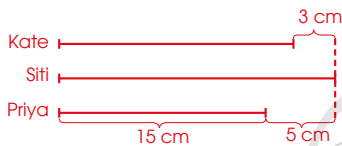
My ribbon is 5 cm longer than Priya's.

My ribbon is 3 cm shorter than Siti's.

My ribbon is 15 cm long.

Siti Kate Priya

Who has the longest ribbon?



Siti has the longest ribbon.

Draw to help you find out.



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Mind Workout

Guide pupils to draw lines representing the lengths of the ribbons by asking the following questions:

- Whose ribbon should be drawn first? (Priya)
- Who shall Priya compare with? (Siti)
- Who shall Kate compare with? (Siti)

Workbook 2A P166

- A rope is 2 m long.
What is the total length of 10 similar ropes? 20 m
- A tailor needs 3 m of cloth to make one dress.
How many dresses can he make with 18 m of cloth? 6 m

Complete Workbook 2A, Worksheet 4B • Pages 163 – 165

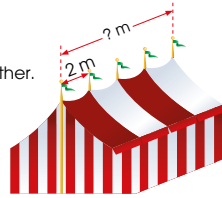


MIND WORKOUT

A tent is held up by 5 poles.
Each pole is 2 m apart from one another.

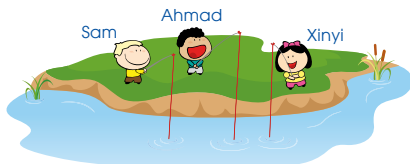
How long is the tent?

The tent is 8 m long.



MATHS JOURNAL

Ahmad has the longest fishing rod.
Xinyi's fishing rod is longer than Sam's fishing rod.
Who has the shortest fishing rod?



Tell your partner how you solve this problem.

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LENGTH 132

Textbook 2 P132



MIND WORKOUT

Ask the class to discuss how to find the length of the tent. One common error that pupils make is to assume the solution as: $5 \times 2 = 10$. For pupils who think that it is incorrect, get them to explain or identify the error.

Caution pupils to read the question carefully and consider the following points to solve this problem:

- What is the distance between two poles?
- How many sections are made with the five poles for the whole tent?

Answer: $4 \times 2 \text{ m} = 8 \text{ m}$

MATHS JOURNAL

Allow pupils to work out the answer independently and get some to present their solutions to the class. Guide them to understand Ahmad cannot be the answer as he has the longest fishing rod.

Lead pupils to realise that they need to compare between Sam and Xinyi to find the answer. Drawing of diagram is not necessary if pupils can deduce through reasoning that Sam's rod is the shortest. Otherwise, encourage the weaker pupils to draw lines for ease of comparison.

I know how to...

- measure length in metres (m).
- measure length in centimetres (cm).
- recognise when to use cm or m to measure lengths.
- compare and order lengths.
- measure and draw lines.
- solve word problems on length.

SELF-CHECK



SELF-CHECK



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

This self check can be done after pupils have completed **Review 7** (Workbook 2A P167 – 172) as consolidation of understanding for the chapter.

133 CHAPTER 7

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Textbook 2 P133

1. (a) 9
(b) 4
(c) 10
(d) 5
(e) chili

2. (a) 3 cm
(b) 121 cm
(c) 9 cm

3. (a) m
(b) cm
(c) m

4. (a) 11
(b) 8
(c) 14
(d) 3
(e) C, A, B

5. (a) 
(b) 
(c) 

6. $350 - 180 = 170$ cm
The length of ribbon left was 170 cm .

7. $127 + 36 = 163$ cm
The height of Raju's mother is 163 cm.

8. $10 \times 4 = 40$ m
He ran 40 m.

9. $30 \div 5 = 6$ cm
The length of each piece of string is 6 cm.

10. $9 \times 3 = 27$ m
The total height of the stack of boxes is 27 m.

Mass

CHAPTER 8

How do we measure the mass of things?

MEASURING MASS IN KILOGRAMS

IN FOCUS

1

We can buy these things by mass.
We can measure mass using a weighing scale.
What different types of weighing scales are there?
Talk to your classmates about it.

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MASS 134

Textbook 2 P134

Related Resources

NSPM Textbook 2 (P134 – 152)
NSPM Workbook 2A (P173 – 194)

Materials

Balance, bathroom scale, mass set (1 kg, 1 g), packets of rice/sugar in 1 kg/2 kg/5 kg, weighing scale, paper cup, pencil, coin, eraser, plastic bags, rubber bands, containers, scoop

Lesson

Lesson 1 Measuring Mass in Kilograms
Lesson 2 Measuring Mass in Grams
Lesson 3 Comparing Masses
Lesson 4 Solving Word Problems
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

In this chapter, the concept of mass is first introduced to Grade 2 pupils and they are taught the two standard units of measurement of mass. They are **kilogram (kg)** and **gram (g)**. Pupils will learn to choose the appropriate unit of measurement, kg or g, to measure mass with the use of objects in everyday life. In addition, pupils will have hands-on experience to measure mass using balance and weighing scales. Pupils are asked to make estimates before they measure the actual mass to give them a sense of what they are measuring as well as the standard unit of measurement that they should use as benchmark. Word problems involving mass in everyday context will aid pupils to understand its application in real life.

MEASURING MASS IN KILOGRAMS

LEARNING OBJECTIVES

1. Estimate and measure mass in kilograms.

Mass

CHAPTER 8

How do we measure the mass of things?

Tomatoes 1 kg for \$3
Potatoes 1 kg for \$3
Carrots 1 kg for \$3

Rice 5 kg
Rice 5 kg
Rice 10 kg

Flour 5 kg
Flour 10 kg
Flour 10 kg

MEASURING MASS
IN KILOGRAMS

IN FOCUS

LESSON 1

We can buy these things by mass.
We can measure mass using a weighing scale.
What different types of weighing scales are there?
Talk to your classmates about it.

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MASS 134

Textbook 2 P134

IN FOCUS

Use the chapter opener to discuss the following questions:

- What are some of the things that you can buy in this shop?
- How are they sold?
- The tomatoes are selling at 1 kg for \$3. What is 1 kg?
- How are the rice and sugar packed?

Emphasise to pupils that **1 kg, 2 kg, 5 kg and 10 kg are the masses of sugar, flour and rice.**

Introduce the use of weighing scales for measurement of mass by asking:

- How can we measure the mass of these things?
- Have you seen some of the weighing scales used when you go to the market with your parents? What are they for?
- How many types of weighing scales are there on P134?
- Has anyone seen them before and where have you seen it?

Highlight to pupils that **weighing scales are used to measure the mass of the items we buy.**

1.



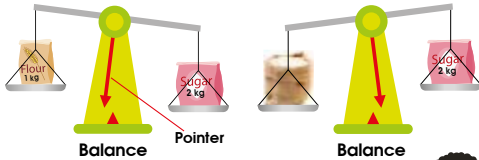
This is a one-kilogram mass.
The **kilogram** is a unit of mass.
We write **kg** for kilogram.

We can hold objects to feel how heavy they are.



We usually measure the mass of heavy objects in kilograms.

2.



How do we know which object is lighter?

The packet of flour is **lighter than** the packet of sugar.
The packet of sugar is lighter than the sack of rice.

Hold out a 1 kg mass and pass it around the class for pupils to feel how heavy it is. Write down the word **kilogram** and the symbol **kg** on the board while explaining the unit of mass.

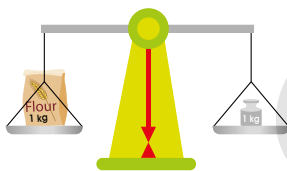
Next, do a class demonstration with 3 pupils by giving them a packet of 1 kg, 2 kg and 5 kg of rice respectively. Ask them to compare if the rice is heavier than the 1 kg mass and describe the packet of rice that they are holding.

Bring out a balance. Let pupils observe how the pointer on the balance moves when the 1 kg packet of flour and the 2 kg packet of sugar are placed on the pans. They should observe that the pointer is moving towards the lighter mass. Lead them to say **the 1 kg packet of flour is lighter than the 2 kg packet of sugar**.

Change the 1 kg packet of flour to a 5 kg packet of rice instead. Ask pupils to observe how the pointer moves. They should observe that the pointer is moving towards the lighter mass. Lead them to say **the 5 kg packet of rice is heavier than the 2 kg packet of sugar**.

The packet of sugar is **heavier than** the packet of flour.
The sack of rice is heavier than the packet of sugar.

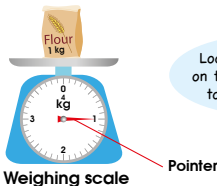
Which object is the heaviest?



The packet of flour is **as heavy as** a one-kilogram mass.

Try finding the heaviest object in your pencil case. You can use a balance to help you.

3.



The mass of the packet of flour is 1 kg.

Look at the pointer on the weighing scale to read the mass.

Repeat using a 1 kg mass and a 1 kg packet of flour. Let pupils observe how the pointer on the balance moves. They should observe that the pointer is in the centre (i.e. the two masses are equal). Lead them to say **the packet of flour is as heavy as the 1 kg mass**.

If time allows, repeat using different masses and lead pupils to observe that the pointer always moves towards the lighter mass.

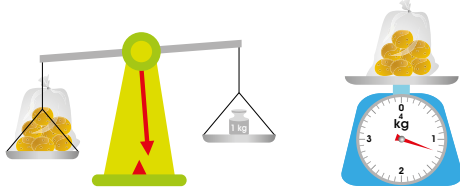
Bring out a weighing scale. Use various masses (1 kg, 2 kg and 5 kg) to show the movement of the pointer and its position on the scale. Guide pupils to read the markings on the scale.

4.



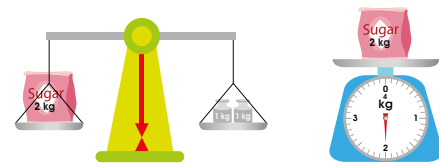
The bag of tomatoes is **lighter than** 1 kg.
The mass of the bag of tomatoes is **less than** 1 kg.

5.



The bag of potatoes is **heavier than** 1 kg.
The mass of the bag of potatoes is **more than** 1 kg.

6.



The mass of the packet of sugar is 2 kg.

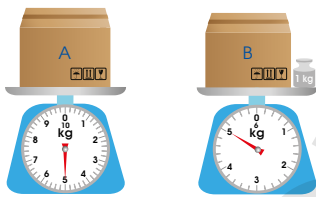
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Textbook 2 P137

Use suitable objects around the classroom such as books and pencil cases to weigh them. Get pupils to estimate the mass first before verifying them on the weighing scale. Encourage pupils to use terms such as **lighter than**, **less than**, **heavier than** and **more than** to describe and compare the masses.

7.



- (a) The mass of Box A is 5 kg.
 (b) $5 - 1 = 4$
 The mass of Box B is 4 kg.
 (c) Which is heavier? **Box A**

8. How heavy is Priya?



Priya's mass is 30 kg.

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MASS 138

Textbook 2 P138

Lead pupils to observe the different scales used in Let's Learn 7 compared to Let's Learn 6. Get them to practise reading the mass of the objects and explain how they arrived at their answers.

Bring out a bathroom scale for Let's Learn 8. Ask pupils if they have seen it around at home or in school, and how it is being used. Call out some pupils and get them to take turns to stand on the scale. Allow others to read the scale. Get them to use terms such as **lighter than**, **less than**, **heavier than** and **more than** to describe and compare their masses.

Highlight to pupils that the term 'weight' is commonly used to refer to mass in everyday situations.



ACTIVITY TIME

Work in groups of 4.

- Hold the 1 kg mass. Feel how heavy it is.
- Look for five objects in the classroom.
- Compare each object with the 1 kg mass in your hand.
- Guess if each object is heavier than, lighter than or about 1 kg.
- Use a weighing scale to check your guesses.

What you need:



Object	Guess (✓)			Check (✓)		
	Heavier than 1 kg	Lighter than 1 kg	About 1 kg	Heavier than 1 kg	Lighter than 1 kg	About 1 kg
Exercise book		✓			✓	



Which objects weigh about 1 kg?

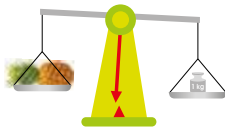
This activity allows pupils to have a feel of how heavy 1 kg is and of things around them that are heavier or lighter than 1 kg. If there are insufficient 1 kg masses, substitute them with a 1 kg packet of flour or sugar.

Teacher may need to guide pupils in reading the weighing scale and teach them to use the word **about** when the pointer is very close to a particular mark on the scale. For example, if the pointer is very close to the 1 kg mark, the object is about 1 kg.

PRACTICE



1. Which is the correct answer?



The pineapple is **heavier than** / **lighter than** 1 kg.

2. What is the mass of each item?

(a)



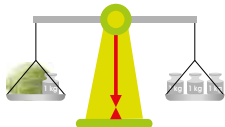
3 kg

(b)



5 kg

3. Find the mass of the cabbage.



$$3 - 1 = 2$$

The mass of the cabbage is 2 kg.

PRACTICE



Work with pupils on the questions and allow them to discuss their answers in pairs. For more practice, select questions from **Worksheet 1** and work on them with pupils.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2A P173 – 176).

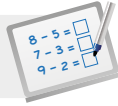
1. (a) less than
(b) as heavy as
(c) more than

2. (a) lighter than
(b) heavier than
(c) as heavy as

3. (a) 4
(b) 10
(c) 3
(d) 2
(e) 8
(f) 35

4. (a) 3
(b) 1
(c) 5

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**Specific Learning Focus**

- Estimate and measure mass in kilograms.

Suggested Duration

4 periods

Prior Learning

Pupils should be familiar with describing the mass of objects as 'heavy' or 'light'. Comparing the mass of objects using the terms 'heavier' or 'lighter' has been introduced to them in Grade 1. The concept of using standard units of measure of mass is introduced in this chapter. In this lesson, 'mass' will be introduced as a key term to refer to the weight of an object or how heavy an object is.

Pre-emptive Pitfalls

The standard units of length 'm' and 'cm' have been introduced in Chapter 7. If confusion between length and mass arises, it should be cleared. Explain to pupils that length is a measurement of the distance from one point to another and mass is the amount of matter in an object which best explains how heavy or light an object is. However, the differences between weight and mass should not be elaborated at this stage as the concept of gravity, which pupils are not expected to learn at this stage, comes into play.

Introduction

Bring different types of weighing scales to the classroom. These include a bathroom scale, a balance, and a weighing scale typically used in the kitchen. This helps pupils understand the use of each type of weighing scale. The balance is slightly different from the other types of weighing scales since it does not require reading the intervals and obtaining the exact mass of an object. It is important to explain how to interpret the position of the pointer and what it means when the level of both pans is the same. This will help pupils to understand the concept of comparing weight in the later grades. Ensure that pupils understand that the object on the pan that is at a lower level is heavier than the object on the pan that is at a higher level. In addition, pupils should understand that when the pointer is in the centre, it indicates that the masses of the objects on both pans are the same. In this lesson, the standard unit of 'kilogram' is introduced as the unit of measurement of the mass of heavy objects. They will then be taught on how to estimate the weight and then use the balance or weighing scale to determine the exact mass in kilograms. This chapter requires the hands-on experience of measuring the mass of real-life objects and stating the mass correctly with the unit of measurement 'kg'.

Problem Solving

Pupils should be able to distinguish the use of scales (e.g. the mass of a pupil would be measured on a bathroom scale but that of a book or a bag of flour would be measured on a weighing scale). Have a brainstorming session with the pupils and ask them to visualise a trip to the supermarket and list various items that are sold in kilograms. The reading of the intervals of a weighing scale should be explained in the same way as for the measurement of length. The pointer should be aligned at the zero mark at the start when no objects are placed on the pan. Emphasise to pupils that when it is stated that the mass of an object is 'about' 3 kg, for example, the mass of the object is not exactly at but close to 3 kg.

Activities

'Activity Time' (Textbook 2 P139) takes the concept of the lesson beyond reading and measuring the weight of an object. It allows pupils to gather objects by 'estimating' their weight to be around/about 1 kg. After this, they are to weigh the objects and tabulate the data obtained. This helps to develop their organisation and tabulation skills.

Resources

- weighing scale
- bathroom scale
- balance
- real-life objects

Mathematical Communication Support

Ask pertinent questions that strengthen pupils' concepts, such as 'If she/he is taller would that mean he/she would be heavier? Which type of weighing scale should we use to measure the mass of the object? Can you think of one object that is heavier or lighter than the other? Would 1 kg of cotton wool be lighter than 1 kg of flour?' Emphasise the usage of key terms in the context of mass, such as 'heavier', 'lighter', 'balance', 'pointer', 'zero', 'about', 'interval', etc.).

MEASURING MASS IN GRAMS

LEARNING OBJECTIVES

1. Estimate and measure mass in grams.

MEASURING MASS IN GRAMS

LESSON
2

IN FOCUS



These objects are light.
Do we use kilogram to measure the mass of these objects? Why?

LET'S LEARN

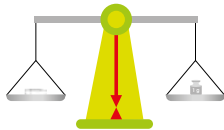
1. This is a one-gram mass.



We use a one-gram mass to measure the mass of lighter objects.

The **gram** is a smaller unit of mass.
We write **g** for gram.

2. Use a balance to measure the mass.



The paper clip has a mass of about 1 g.

Can you find other objects that have a mass of about 1 g?



IN FOCUS

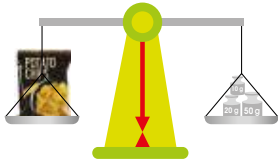
Place a paper clip, pencil, coin and an eraser on the visualiser. Discuss with pupils how they would describe the mass of these objects and compare them with the 1 kg mass from the previous lesson.

LET'S LEARN

For the lighter objects, another unit of mass, gram (g), is used. Write down the word **gram** and the symbol **g** on the board while explaining the unit of mass. Pass a 1 g mass around the class for pupils to have a feel of it.

With the use of a balance, demonstrate to pupils how to measure the mass of light objects.

3.



The packet of potato chips has a mass of about **80** g.

4.



The mango has a mass of **200** g.

The tin of milk powder has a mass of **450** g.



The fish has a mass of **700** g.



The bunch of bananas has a mass of **550** g.

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MASS 142

Textbook 2 P142

In Let's Learn 4, guide pupils to read the small markings on the various scales:

- The mango has a mass of 200 g as the pointer is pointing to the 200 mark.
- For the tin of milk powder, the pointer is between the 400 and 500 mark. There are 9 small markings between the 400 and 500 mark. Each marking represents 10 g. The pointer is at the 450 mark, therefore the mass of the tin of milk powder is 450 g.

Get pupils to find out the mass of the fish and the bunch of bananas, and explain how they read the scale to get their answers.

ACTIVITY TIME



Work in groups of 5.

- 1 Hold the . Would you measure the mass of the bag of rice in kg or g?
- 2 Make with the following masses. 20 g 50 g 100 g 250 g 500 g 750 g Use the weighing scale to measure the masses.
- 3 Write the mass of rice on each bag.
- 4 Look around the classroom. Guess which objects are as heavy as each of the bags of rice you have made.
- 5 Use the to check your guesses.

What you need:



In this activity, pupils get to estimate and weigh masses from 20 g to 750 g. There is a need for careful organisation and preparation of materials (e.g. plastic bags, rubber bands, container and scoop).

PRACTICE



1. What is the mass of each item?



(a) The mass of the carrots is **350** g.



(b) The mass of the mushrooms is **230** g.

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Textbook 2 P143

PRACTICE

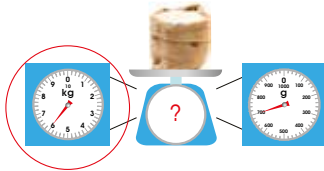


Work with pupils on the questions and get them to explain how they read the scales to obtain the answers.

2. Which scale should you use to find the following masses?
 (a) The mass of a box of tissues



- (b) The mass of a large sack of rice



3. The mass of the apple is 150g.
 What is the mass of the orange?



The mass of the orange is 250 g.

Complete Workbook 2A, Worksheet 2 • Pages 177 – 180

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MASS 144

Textbook 2 P144

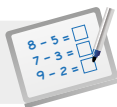
For more practice, select questions from **Worksheet 2** and work on them with pupils.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2A P177 – 180).

Answers Worksheet 2 (Workbook 2A P177 – 180)

- 10
 - 70
 - 650
 - 400
 - 350
 - 730
- $250 - 120 = 130$
 The mass of Box B is 130 g.
 - The mass of Box A is 100 g.
 $300 - 100 = 200$
 The mass of Box B is 200 g.
- g
 - kg
 - kg
 - g
 - kg
 - g

**Specific Learning Focus**

- Estimate and measure mass in grams.

Suggested Duration

3 periods

Prior Learning

In Chapter 7, pupils have been taught the difference between metres and centimetres. In this lesson, 'grams' is introduced. Since they have done an activity of estimating the mass of objects that weigh less than 1 kg, it will be easier to explain the concept of grams.

Pre-emptive Pitfalls

Gram with the symbol 'g' can be easily explained as a unit of measure of the mass of lighter objects. Show pupils objects around the classroom that weigh less than a kilogram and introduce grams to them. Pupils should not face any difficulty in grasping this concept.

Introduction

To read the mass in grams on a weighing scale, point out to pupils how many grams each interval on the weighing scale represents. Use a weighing scale in class to explain this. The questions in Workbook 2A (P177 – 180) can be done in class to address this concept.

Problem Solving

The mass represented by each interval on the scale should be explained well. If each interval represents 10 g, pupils should skip count in 10s to read the mass. The fact that 1 gram is $\frac{1}{1000}$ th of a kilogram cannot be formally introduced in this lesson, but it can be shown on the scale that 1000 g is equal to a kilogram.

Activities

'Activity Time' (Textbook 2 P143) is a fun activity where pupils will estimate the mass of each bag and then measure the mass using the weighing scale. They can label the bags of rice with the correct mass in grams. This will further strengthen their concept of estimation, organisation and tabulation.

Resources

- weighing scale
- balance
- real-life objects (e.g. paper clip, pencil, coin, eraser, rice, plastic bags, rubber bands, container, scoop, etc.)

Mathematical Communication Support

Key terms used in the earlier lessons should be emphasised again in this lesson for clarity of concept. The usage of correct units in readings should also be emphasised. Ask questions which lead pupils to differentiate between kilograms and grams: 'Would you find the mass of a sack of potatoes in grams or kilograms? Which weighing scale would you use to find the mass of the object? Give examples of objects with mass that can be expressed in kilograms. Give examples of objects with mass that can be expressed in grams. The symbols of kilograms and grams as 'kg' and 'g' should be emphasised, explaining that at the end of the numeric value of the mass, we write these symbols instead of the entire word.

COMPARING MASSES

LEARNING OBJECTIVES

1. Compare and order masses.

COMPARING MASSES

LESSON
3

IN  FOCUS



How can we tell which box is heavier?

LET'S LEARN 

1. We can use a weighing scale to measure the mass of each box.



The mass of Box A is 5 kg. The mass of Box B is 2 kg.

$$5 - 2 = 3$$

Box A is 3 kg **heavier than** Box B.

Box B is 3 kg **lighter than** Box A.

IN  FOCUS

Discuss the question in the given scenario.

LET'S LEARN 

Ask pupils to read the scales to find the mass of the boxes. After which, get them to compare the mass of Box A and Box B by asking the following questions:

- Which box is heavier?
- How much heavier?
- How do we find out?

Pupils should identify subtraction as the operation for this question.

2. Three similar jars are filled.



The mass of the jar of jelly beans is 320 g.
 The mass of the jar of marbles is 490 g.
 The mass of the jar of popcorn is 160 g.

$$490 - 320 = 170$$

The jar of marbles is 170 g heavier than the jar of jelly beans.

$$490 - 160 = 330$$

The jar of marbles is 330 g heavier than the jar of popcorn.

The jar of marbles is the **heaviest**.
 The jar of popcorn is the **lightest**.

Arrange the jars in order of mass.
 Start with the lightest.



Textbook 2 P146

In Let's Learn 2, get pupils to read the scales to find the mass of each jar. After which, guide them to compare the masses of the three jars by asking the following questions:

- Which is heavier? The jelly beans or the marbles?
- Which is heavier? The marbles or the popcorn?
- Which is heavier? The jelly beans or the popcorn?
- Which is the heaviest?
- Which is the lightest?

After which, help pupils to arrange the three jars in order of mass.

3. The mass of sweets is usually measured in grams.



- (a) Which sweet is the lightest? **Lollipop**
- (b) Which sweet is the heaviest? **Fruit Gums**
- (c) How much lighter is the packet of toffees than the packet of fruit gums? **70 g**
- (d) Arrange the sweets in order of mass.
 Start with the heaviest.

Fruit Gums , **Jelly Beans** , **Toffees** , **Lollipop**

ACTIVITY TIME

Work in groups of 4 to 5.

- 1 Take turns to use to measure your mass.

What you need:



Name	Mass
Meiling	21 kg

- 2 Arrange the pupils in your group in order of mass.
 Start with the heaviest.

Allow pupils to work in pairs to solve Let's Learn 3. Thereafter, discuss as a class and verify their answers.

ACTIVITY TIME



Ask pupils to make an estimate of their mass first before measuring with the bathroom scale. Guide pupils to read the scale by asking them to count the number of small markings between 0 kg and 10 kg or between 10 kg and 20 kg. Get them to figure what each small marking represents.

Textbook 2 P147



1.



- (a) The mass of the tomato is 120 g.
 (b) The mass of the carrot is 100 g.
 (c) The tomato is 20 g heavier than the carrot.

2. Compare the masses of the children.



- (a) Who is the heaviest?
 (b) Who is the lightest?
 (c) Farhan is 8 kg heavier than Bina.
 (d) Arrange the children in order of mass.
 Start with the lightest.

 , ,

Complete Workbook 2A, Worksheet 3 • Pages 181 – 182

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MASS 148

Textbook 2 P148



Work with pupils on the questions and selected examples from **Worksheet 3**.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 2A P181 – 182).

Answers Worksheet 3 (Workbook 2A P181 – 182)

1. 5, 2, 3

- (a) 3
 (b) fish
 (c) 5
 (d) fish, watermelon, potatoes

2. (a) 300

- (b) 250
 (c) 200
 (d) 50
 (e) butter
 (f) jar of cookies
 (g) bread


SOLVING WORD PROBLEMS

LEARNING OBJECTIVES


1. Solve word problems involving mass (addition and subtraction).
2. Solve word problems involving mass (multiplication and division).

LESSON
4

SOLVING WORD PROBLEMS



380 g



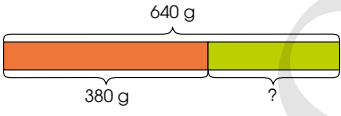
? g

The total mass of the bowl and the grapes is 640 g.
How do we find the mass of the grapes?


LET'S LEARN

1.

Draw a model to find out.



What is the total mass of the fruits?



$640 - 380 = 260$

The mass of the grapes is 260 g.

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Textbook 2 P149

IN FOCUS

Assign pupils to work in pairs and discuss the given word problem. Get them to list down the known and unknown elements in the question.

LET'S LEARN

Go through the word problem with the class. Model the four steps to problem solving to help pupils in answering the question:

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 do we have to find?

Step 2: Translate key elements into a diagram (model)

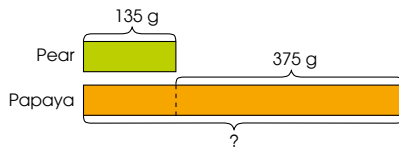
- Draw the model
- Label the known and unknown elements

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. The mass of a pear is 135 g.
A papaya is 375 g heavier than the pear.
What is the mass of the papaya?



Do we add or subtract?





$$135 + 375 = 510$$

The mass of the papaya is 510 g.

PRACTICE



Solve.

- The mass of a loaf of bread is 450 g.
A bun is 125 g lighter than the loaf of bread.
What is the mass of the bun? 325 g  
- The mass of Bag A is 2 kg.
Bag B is 3 kg heavier than Bag A.
What is the mass of Bag B? 5 kg
- The total mass of Junhao and Ahmad is 64 kg.
Junhao has a mass of 31 kg.
What is Ahmad's mass? 33 kg

Complete Workbook 2A, Worksheet 4A • Pages 183 – 186

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MASS 150

Textbook 2 P150

Apply the four steps in problem solving to Let's Learn 2 .
Guide pupils through the steps by asking questions such as 'What do we do first?' and 'What is the next stage?'

The problem structure in Let's Learn 2 is on comparison.
Use comparison model to guide pupils in deciding which operation to use.

Conclude by leading pupils to observe **the difference between the part-whole and comparison models** through the two examples.

PRACTICE



Guide pupils to understand the word problems and encourage them to draw models in helping them to visualise the problem structure. Ask pupils whether the models are part-whole or comparison models and how do they tell.

Allow pupils to work in pairs to solve the questions and selected examples from **Worksheet 4A** by using the four steps in problem solving. After which, discuss as a class and verify their answers.

Independent seatwork

Assign pupils to complete Worksheet 4A (Workbook 2A P183 – 186).

Answers Worksheet 4A (Workbook 2A P183 – 186)

- $28 - 7 = 21$
The mass of Weiming's sister is 21 kg.
- $65 + 88 = 153$ kg
He had 153 kg of sugar at first.
- $225 - 185 = 40$
The cucumber is 40 g heavier.
- $200 + 55 = 255$
The mass of the muffin is 255 g.
- $630 - 355 = 275$ kg
The mass of the other box is 275 kg.
- $128 + 105 = 233$ g
The total mass of the mango and the orange is 233 g.
- $600 - 417 = 183$
The mass of the empty box is 183 g.
- $89 + 157 = 246$ g
The mass of the grapefruit is 246 g.

How do we find the total mass of the 4 bags of rice?



3 kg 3 kg 3 kg 3 kg

LET'S LEARN

1. Mrs Ho bought 4 bags of rice.
Each bag has a mass of 3 kg.

$$4 \times 3 = 12$$

The total mass of the 4 bags of rice is 12 kg.

2. The total mass of 5 jars of honey is 40 kg.
Each jar has the same mass.
What is the mass of each jar of honey?

$$40 \div 5 = 8$$

The mass of each jar of honey is 8 kg.

Recall $5 \times 8 = 40$.
So, $40 \div 5 = 8$.



PRACTICE



Solve.

1. Kate has 9 coins. Each coin has a mass of 5 g.
What is the total mass of the coins? **45 g**
2. A shopkeeper has a few bags of oranges.
The mass of each bag of oranges is 5 kg.
The total mass of the bags of oranges is 35 kg.
How many bags of oranges does the shopkeeper have? **7**

Complete Workbook 2A, Worksheet 4B • Pages 187 – 188

Go through the given scenario with the class and get them to discuss in their own words what they have understood from the question.

LET'S LEARN

Let's Learn 1 and 2 involve multiplication and division. Allow pupils to identify the correct operation and write the number equation. Model the four steps to problem solving in Let's Learn 1:

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? (Do we know the mass of 1 bag? How many bags are there?)
 - What do we have to find? (What is the total mass of 4 bags?)

Step 2: Translate key elements into a diagram (model)

- Draw the model
- Label the known and unknown elements

Step 3: Examine the model and write the number equation

- Lead pupils to see the **equal parts and whole** concept in the problem structure.
- How many equal parts? What is the mass of one part? What is the total?
- Do we multiply or divide to find it?

Step 4: Answer the question

Apply the four steps in problem solving in Let's Learn 2. Guide pupils through the steps by asking questions such as 'What do we do first?' and 'What is the next step?' Lead pupils to observe that the operation in Step 3 is division and remind pupils to recall their multiplication facts to work out the answer.

PRACTICE



Guide them to understand the word problems and encourage them to draw diagrams in helping them to visualise the problem structure.

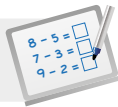
Allow pupils to work in pairs to solve the questions and selected examples from **Worksheet 4B** by using the four steps in problem solving. After which, discuss as a class and verify their answers.

Independent seatwork

Assign pupils to complete Worksheet 4B (Workbook 2A P187 – 188).

- $5 \times 7 = 35$
The total mass of the suitcases is 35 kg.
- $11 \times 2 = 22$
The total mass of all the ducks is 22 kg.
- $9 \div 3 = 3$
The mass of each watermelon is 3 kg.
- $45 \div 5 = 9$
The mass of each box of grapes is 9 kg.
- $24 \div 3 = 8$
There are 8 bags of flour.

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**Specific Learning Focus**

- Compare and order masses.
- Solve word problems involving mass (addition and subtraction).
- Solve word problems involving mass (multiplication and division).

Suggested Duration

Lesson 3: 2 periods

Lesson 4: 3 periods

Prior Learning

Pupils should be well-versed with comparing through hands-on activities in the earlier lessons. They should be familiar with comparing and ordering of numbers using 'less than' or 'more than'. In Lesson 4, word problems as learnt in earlier chapters are explored using the context of mass. The organisation and extracting of important information, deciding on the correct operation, and carrying out the operation have already been explained to pupils in earlier lessons.

Pre-emptive Pitfalls

Comparison of mass and solving word problems are both core concepts that have been done earlier in different topics. Making comparison of mass and solving word problems will further strengthen their concept of mass.

Introduction

Let's Learn 3 (Textbook 2 P146) involves comparison of masses by putting heavy and light objects in the same containers. It can be highlighted that for the mass of a jar of popcorns and a jar of marbles to be the same, there would be more popcorns in the jar than marbles in the other jar, as a popcorn weighs lighter than a marble. The teacher can engage pupils in fun games of weighing themselves in class and then arranging their weights in ascending or descending order on chart paper. This will further strengthen their concepts not just of 'kg' and 'g' but also of comparing and ordering masses. In Lesson 4, word problems involving the 4 operations (+, -, ×, ÷) are learnt and the 4-step approach to problem solving is to be emphasised using the template (Activity Handbook 2 P43). Another important aspect when solving word problems is the understanding of the four operations. The fact that addition and subtraction are inverse operations of each other, and multiplication and division are inverse operations of each other, should be revised while attempting each word problem.

Problem Solving

The part-part-whole concept or comparison can be clearly differentiated with the help of model drawing and labelling. Going through word problems during class discussions will help them choose the correct operation to solve the problems. Questions in 'Practice' (Textbook 2 P150) clearly demarcate the inverse operations of '+' and '-', and '×' and '÷'. In questions 1 and 2, the comparison of masses is involved and subtraction is done to get the correct answer. Similarly, discuss with pupils that if the total mass and the mass of one object or person are given, the mass of the other object or person can be found by subtraction.

Activities

'Activity Time' (Textbook 2 P147) and 'Maths Journal' (Textbook 2 P152) can be done at home as an assignment with the help of parents or guardians. Besides the weight of classmates, family members can be weighed and then have the pupils tabulate the weight of their family members as well.

Resources

- weighing scale
- real-life objects
- 4-step approach to problem solving template (Activity Handbook 2 P43)

Mathematical Communication Support

Workbook 2A (P189 – 194) can be discussed in class first before getting pupils to do independent work. Encourage individual responses when asking for the important information given in the question and the teacher can ask pupils to volunteer to draw the models on the whiteboard. The reason for the choice of operation can be discussed. Recall mathematical facts and equations when pupils decide on the operation. The key terms (e.g. 'more than', 'less than', 'total', 'equally distributed', 'part-part-whole', 'compare') can be put up on soft boards and the 4-step approach to problem solving can be written on chart paper and put up to assist instant recall.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW

4. The mass of 5 similar boxes of grapes is 45 kg.
What is the mass of each box of grapes?

$$45 \div 5 = 9$$

The mass of each box of grapes is 9 kg.

5. The total mass of a few bags of flour is 24 kg.
The mass of each bag of flour is 3 kg.
How many bags of flour are there?

$$24 \div 3 = 8$$

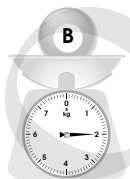
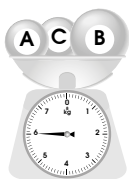
There are 8 bags of flour.



Mind Workout

Date: _____

Find the total mass of Ball A and Ball C.



The total mass of Ball A and Ball C is kg.

188 Chapter 8

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Mind Workout

Guide pupils to solve the problem by asking the following questions:

- What do we know from the two weighing scales?
- What do we have to find?
- How can we use what we have known to find the answer?

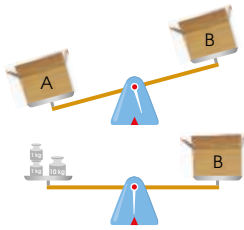
Pupils should be able to deduce the answer.

Workbook 2A P188



MIND WORKOUT

Look at the balances.
Which is the correct answer?
The mass of Box A is **more than**/
less than 12 kg.



MATHS JOURNAL

Weighing scales are used in many places.



Look around when you go shopping with your parents.
Take pictures of the weighing scales that you see.
Show your pictures to your classmates.
Tell them how each weighing scale is used.

I know how to...

- measure mass in kilograms (kg).
- measure mass in grams (g).
- compare and order masses.
- solve word problems on mass.

SELF-CHECK



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MASS 152

Textbook 2 P152



MIND WORKOUT

Allow pupils to work on the question independently and get some to present their answers at the end of the activity. They should first deduce that the mass of Box B is 12 kg from the diagram on the right. Then based on the diagram on the left, the pointer is pointing towards the lighter object. Hence, Box A is heavier than Box B and it is **more than** 12 kg.

MATHS JOURNAL

This can be a homework project whereby pupils can work with parents or guardians to relate Mathematics with everyday life.

If time permits, compile the pictures collected by pupils and do a powerpoint presentation for show and tell in class.

SELF-CHECK



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

This self check can be done after pupils have completed **Review 8** (Workbook 2A P189 – 194) as consolidation of understanding for the chapter.

Answers Review 8 (Workbook 2A P189 – 194)

1. (a) g
(b) kg
(c) kg
2. (a) more than
(b) less than
(c) as heavy as
3. (a) lighter than
(b) heavier than
(c) as heavy as
(d) heavier than
(e) lighter than
4. (a) 340
(b) 250
(c) 90
5. 180, 320, 140
6. (a) B
(b) C
(c) 68
(d) B, A, C
7. $9 \times 3 = 27$ kg
The total mass of milk powder that Mrs Kumar buys is 27 kg.
8. $30 \div 5 = 6$
There are 6 boxes of washing powder.
9. $450 - 100 = 350$
The mass of the pencil box is 350 g.
10. $32 - 8 = 24$
Siti's mass is 24 kg.

1.



$$3 \times 4 = 12$$

There are 3 groups of 4.

2. $4 \times 4 = 16$

4 boxes have 16

3. $15 \div 5 = 3$

There are 3 pies in each box.

4.

$$3 \times 4 \quad 3 \times 3 \quad 3 \times 9$$

5. $12 \div 3 = 4$

$$3 \times 4 = 12, 12 \div 4 = 3$$

6. $5 \times 3 = 15$

Sam has 15 stamps.

7. $10 \times 4 = 40$

40 balloons were given out at the party.

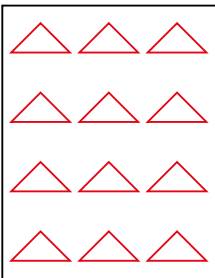
8. $18 \div 3 = 6$

6 full jugs of tea are needed to fill 18 cups.


9. $28 \div 4 = 7$

7 tables are needed for all the people.

10.



$$4 \times 3 = 12$$

1. (a) 15
(b) 55
(c) 300
(d) 40
2. (a) 6
(b) 12
3. (a) 7
(b) 
4. Swimming pool, 150 m
5. 10
6. (a) 260
(b) 190
(c) A, 70
7. D
8. $9 \times 3 = 27$
The length of the log was 27 m.
9. $273 - 185 = 88$
String B is 88 cm long.
10. $73 - 38 = 35$ kg
Bala's mass is 35 kg.

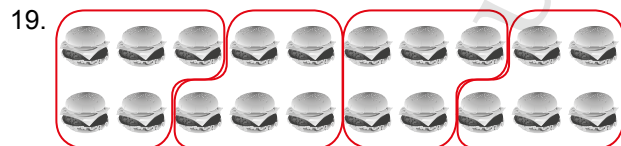
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Section A

1. (2)
2. (4)
3. (2)
4. (2)
5. (3)
6. (1)
7. (2)
8. (3)
9. (4)
10. (2)

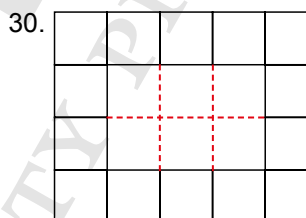
Section B

11. Three hundred and forty-five
12. 278
13. 44
14. $2 \times 4 = 8$
15. B, A
16. Kate, Xinyi, Raju
17. $7 \times 2 = 14$
He eats 14 slices of bread in 7 days.
18. $5 - 2 = 3$ m
The height of the papaya tree is 3 m.



$20 \div 5 = 4$
 $5 \times 4 = 20, 20 \div 4 = 5$

20. 712
21. 3
22. 12
23. A B
24. $5 \times 2 = 10$
25. $8 \times 5 = 40$ beads
26. 200
27. 320
28. $40 \div 10 = 4$
29. (a) 100
(b) 400



20

31. 37
32. 300
33. 55
34.
$$\begin{array}{r} 5 \overset{3}{4} \overset{1}{0} \\ - 1 2 \\ \hline 4 1 \\ \hline \end{array}$$

35. $4 \times 2 = 8$

36. $150 + 100 = 250$ cm
 $385 - 250 = 135$ cm

37. C

38. A, C

39. $410 - 125 = 285$ m

40. $258 - 129 = 129$ marbles

Section C

41. $30 + 5 = 35$
Junhao's mass is 35 kg.

42. $3 \times 3 = 9$
The first and fourth lampposts are 9 m apart.

43. $35 - 7 = 28$
The length of the second piece was 28 cm.

44. $18 \div 2 = 9$
He takes 9 days to finish reading the book.

45. $112 + 45 = 157$
The baker sold 157 tarts on Tuesday.

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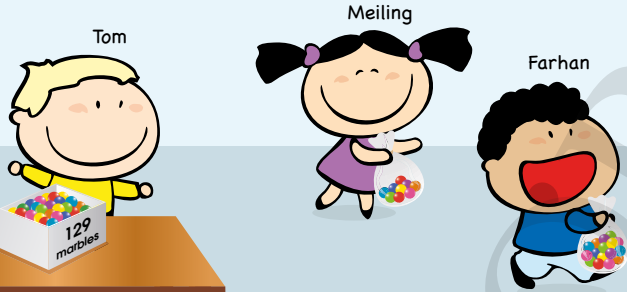
MORE WORD PROBLEMS

CHAPTER

9

More Word Problems CHAPTER **9**

How many marbles does Tom have left?
How do we find out?




Tom Meiling Farhan

2-PART WORD PROBLEMS LESSON **1**

IN FOCUS

I have 129 marbles.
I give 16 marbles to Farhan and
9 marbles to Meiling.



How do we find the number of marbles Tom gives away?
Should we add or subtract?

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Textbook 2 P153

Related Resources

NSPM Textbook 2 (P153 – 162)
NSPM Workbook 2B (P1 – 16)

Materials

Drawing block, markers

Lesson

Lesson 1 2-Part Word Problems
Lesson 2 2-Step Word Problems
Problem Solving, Maths Journal and
Pupil Review

INTRODUCTION

In this chapter, pupils will solve 2-part word problems and 2-step word problems. A 2-part word problem consists of 2 one-step problems to be solved one after another. Pupils will solve the first part of the word problem and use the answer to solve the second part. For a 2-step word problem, pupils have to first identify the hidden problem before they can solve the question. They will also revisit the part-whole and comparison models, which were taught in Semester 1 before moving on to solve 2-part and 2-step word problems.

LESSON

1

2-PART WORD PROBLEMS

LEARNING OBJECTIVES

1. Solve 2-part word problems.

More Word Problems

CHAPTER 9

How many marbles does Tom have left?
How do we find out?

Tom Meiling Farhan

129 marbles

2-PART WORD PROBLEMS LESSON 1

IN FOCUS

I have 129 marbles.
I give 16 marbles to Farhan and 9 marbles to Meiling.

How do we find the number of marbles Tom gives away?
Should we add or subtract?

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IN FOCUS

Use the chapter opener to discuss what information is needed to solve the problem. Elicit from pupils that they have to find out how many marbles were given to Farhan and Meiling before they can find out how many marbles Tom gives away.

The information needed is found in In Focus. Ask pupils how they can find the number of marbles Tom had left.

Textbook 2 P153

LET'S LEARN

1. Tom has 129 marbles.
He gives 16 marbles to Farhan and 9 marbles to Meiling.
(a) How many marbles does Tom give away altogether?
(b) How many marbles does Tom have left?

(a) $16 + 9 = 25$

Tom gives away 25 marbles altogether.

We add to find the number of marbles Tom gives away.

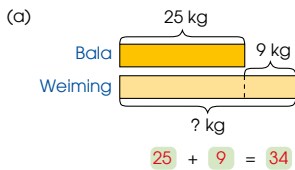
(b) $129 - 25 = 104$

Tom has 104 marbles left.

We subtract to find the number of marbles Tom has left.



2. Bala weighs 25 kg. Weiming weighs 9 kg more than Bala.
(a) What is Weiming's mass?
(b) What is the total mass of Bala and Weiming?



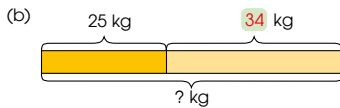
Weiming's mass is 34 kg.

Weiming weighs more than Bala. We add to find Weiming's mass.



Textbook 2 P154

Discuss why addition and subtraction are used to obtain the answers in (a) and (b) respectively.



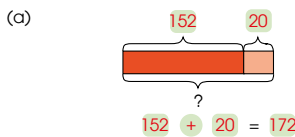
$25 + 34 = 59$

The total mass of Bala and Weiming is 59 kg.

Should we add or subtract to find their total mass?

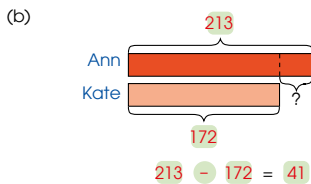


3. Kate has 152 stickers and Ann has 213 stickers.
Kate buys 20 more stickers.
(a) How many stickers does Kate have now?
(b) How many more stickers does Ann have than Kate now?



Kate has 172 stickers now.

Should we add or subtract?



Ann has 41 stickers more than Kate now.

How do you know when to add or subtract? Why?



Textbook 2 P155

For Let's Learn 2 and 3, refer to the models drawn and ask pupils if they should add or subtract to find the answers. Remind pupils to fill in the corresponding numbers on the models.



Solve.

- Xinyi baked 100 strawberry tarts and 100 pineapple tarts. She gave 127 tarts away.
 - How many tarts did Xinyi bake altogether? **200**
 - How many tarts did she have left? **73**
- Priya has 411 stamps. 295 of them are local stamps. The rest are foreign stamps.
 - How many foreign stamps does Priya have? **116**
 - How many more local stamps than foreign stamps does Priya have? **179**
- Mr Tan sold 261 textbooks. He sold 29 fewer textbooks than Mr Ali.
 - How many textbooks did Mr Ali sell? **290**
 - How many textbooks did Mr Tan and Mr Ali sell altogether? **551**



Complete Workbook 28, Worksheet 1 • Pages 1 – 6



Work with pupils on the word problems. Ask questions such as 'Should you add or subtract to find the answer?' and 'Why?' to guide them in answering the problems.

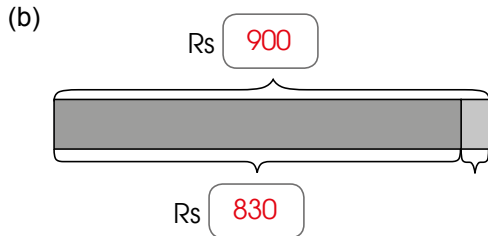
Independent seatwork

Assign pupils to complete Worksheet 1 independently (Workbook 2B P1 – 6).

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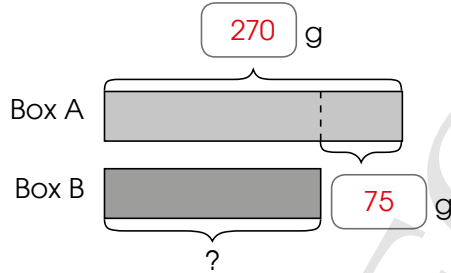
1. (a) $35 + 23 = 58$
Junhao has 58 red and blue marbles altogether.
(b) $58 + 42 = 100$
Junhao has 100 marbles altogether.

2. (a) $\text{Rs } 450 + \text{Rs } 380 = \text{Rs } 830$
Ann spent Rs 830 altogether.

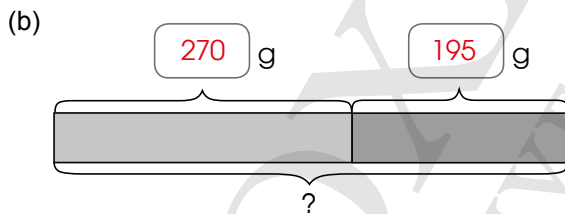


$\text{Rs } 900 - \text{Rs } 830 = \text{Rs } 70$
Ann had Rs 70 left.

3. (a)

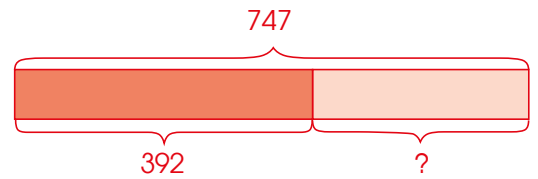


$270 - 75 = 195$
The mass of Box B is 195 g.



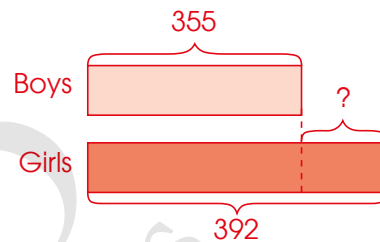
$270 + 195 = 465 \text{ g}$
The total mass of Box A and Box B is 465 g.

4. (a)



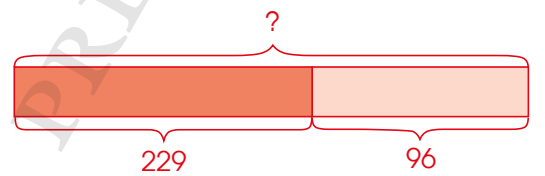
$747 - 392 = 355$
There are 355 boys.

- (b)



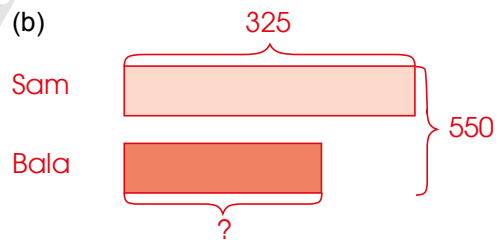
$392 - 355 = 37$
There are 37 more girls at the camp.

5. (a)



$96 + 229 = 325$
Sam had 325 stamps at first.

- (b)



$550 - 325 = 225$
Bala had 225 stamps.

6. (a) $150 + 280 = 430$
He cycled 430 m.
(b) $430 - 320 = 110$
His journey back home was 110 m shorter.

**Specific Learning Focus**

- Solve 2-part word problems.

Suggested Duration

6 periods

Prior Learning

Pupils should be well-versed with the 4-step approach to problem solving: (i) Understand the problem; (ii) Translate key elements into a diagram (model); (iii) Examine the model and write the number equation; and (iv) Check the answer.

Pre-emptive Pitfalls

This lesson consists of word problems that require two mathematical operations. The answer cannot be obtained in one step but requires two steps. To be able to solve such word problems, pupils must have good comprehension and organisational skills, good knowledge of mathematical facts, and be able to carry out the two steps correctly.

Introduction

The model drawing helps pupils organise their thoughts. The 2-part word problems are in real-world context and require the use of more than one mathematical operation. In some cases, the answer to the first part of the word problem could be used for the second part.

Problem Solving

This chapter develops pupils' critical-thinking skills and pupils are required to apply mathematical facts. Encourage them to recall mathematical facts and the 4-step approach to problem solving.

Activities

Enacting the word problem by role-playing and using real-life objects will help pupils understand the scenario described in the word problem.

Resources

- real-life objects
- picture cut-outs
- drawing board
- markers

Mathematical Communication Support

Encourage pupils to do silent reading of a word problem before starting a class discussion. Ask pupils for the important information given in the question and what needs to be found. Discuss the mathematical operation to be used. Recapitulate with pupils the key terms, mathematical equations, and symbols to solve the word problem.

2-STEP WORD PROBLEMS

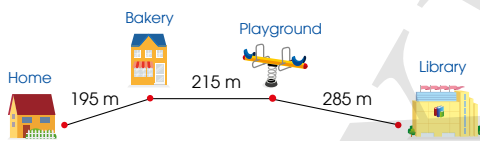
LEARNING OBJECTIVES

1. Solve 2-step word problems.

2-STEP WORD PROBLEMS

LESSON
2

IN  FOCUS



Ahmad walks past the bakery and playground on his way to the library.

How far is the library from his home?

How can we find out?



LET'S LEARN 

1. Ahmad walks from his home to the library. How far does Ahmad walk in total?

$$195 + 215 = 410$$

Ahmad's home is 410 m from the playground.

$$410 + 285 = 695$$

Ahmad walks a total of 695 m.

How far is Ahmad's home from the playground?



IN  FOCUS

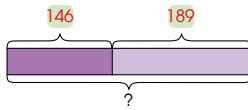
Discuss the scenario with pupils and ask how they can find out the total distance.

LET'S LEARN 

To find the total distance in Let's Learn 1, pupils can find the distance from Ahmad's home to the playground, then add this distance to the distance between the playground and the library.

Alternatively, pupils may add all three distances together.

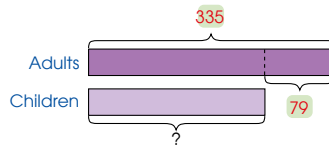
2. At a concert, there were 146 male adults and 189 female adults. There were 79 fewer children than adults. How many children were there at the concert?



$$146 + 189 = 335$$

There were 335 adults at the concert.

How many adults were there at the concert?



$$335 - 79 = 256$$

There were 256 children at the concert.

Textbook 2 P158

For Let's Learn 2 to 4, use Polya's four steps in problem solving:

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 do we have to find?

Step 2: Translate key elements into a diagram (model)

- Draw the model
- Label the known and unknown elements

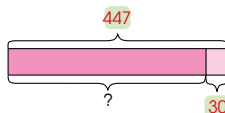
Step 3: Examine the model and write the number equation

- Lead pupils to see the **part-whole** or **comparison** concept in the problem structure.
- What do we need to find the unknown?
- **What do we have to find first? (The hidden problem)**
- Do we add or subtract to find it?

Step 4: Check the answer

Demonstrate to pupils how to check their answers (for reasonableness or for accuracy in computation).

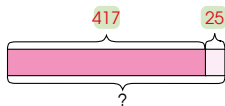
3. Siti had some stickers. She gave away 25 stickers and bought another 30 stickers. She had 447 stickers in the end. How many stickers did Siti have at first?



$$447 - 30 = 417$$

Siti had 417 stickers before buying another 30 stickers.

Did Siti have fewer or more stickers before buying another 30 stickers?



$$417 + 25 = 442$$

Siti had 442 stickers at first.

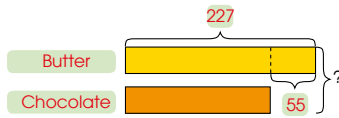
How many stickers did Siti have before giving away 25 stickers? How do we find out?



Textbook 2 P159

Model the four steps to problem solving and ask questions such as 'Should you add or subtract to find the answer?' and 'Why?' to guide pupils.

4. Xinyi baked 227 butter cookies. She baked 55 fewer chocolate cookies than butter cookies. How many cookies did Xinyi bake altogether?



$$227 - 55 = 172$$

Xinyi baked 172 chocolate cookies.

$$227 + 172 = 399$$

Xinyi baked 399 cookies altogether.

What should we find first?



Should we add or subtract to find the total number of cookies?

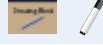


ACTIVITY TIME

Work in groups of 4.

- 1 Make two word problems on addition and subtraction.
- 2 Show your word problems to the class.
- 3 Get another group to solve the problem. Ask them how they solve each problem.
- 4 Check whether they solve your problems correctly.

What you need:



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MORE WORD PROBLEMS

160

Textbook 2 P160

Likewise, use Polya's four steps in problem solving and remind pupils to label and write down the corresponding numbers on the model.

ACTIVITY TIME



Each group is given a drawing block and a marker. Show a sample word problem before pupils create their own word problems. The weaker pupils may modify the values and contexts of the sample word problem while the more able pupils can create their original word problems.

Allow the groups to share their word problems with the class and work out the answers to one another's word problems.

Solve.

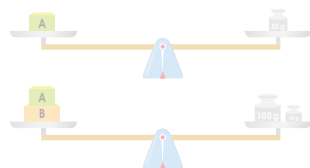
1. 538 children visited a funfair on the first day. 230 fewer children visited the funfair on the second day than on the first day. How many children visited the funfair on the two days altogether? 846
2. There are 141 women in a sports club. There are 52 more women than men in the club. How many people are there in the club altogether? 230
3. Look at the picture below.



What is the mass of the mango? 225

Complete Workbook 2B, Worksheet 2 • Pages 7 – 13

MIND WORKOUT



What is the mass of Box B? 60 g

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CHAPTER 9

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Textbook 2 P161

PRACTICE

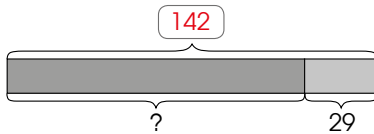


Work with pupils on the questions and selected examples from **Worksheet 2**. For each question, ask the pupils what kind of information they have been given and get them to highlight the important data. Check with them if they need to find out other information before obtaining the final answer.

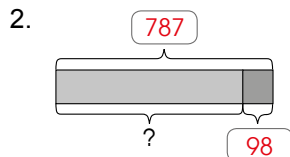
Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2B P7 – 13).

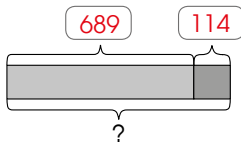
1. $128 + 14 = 142$
Ahmad has 142 stamps after receiving 14 stamps from his father.



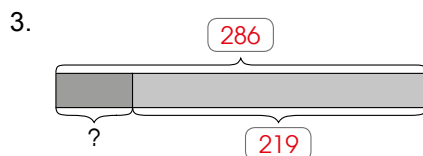
$142 - 29 = 113$
Ahmad has 113 stamps left.



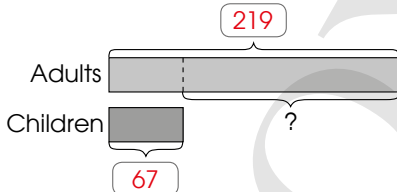
$787 - 98 = 689$
There were 689 people on the train after 98 people left.



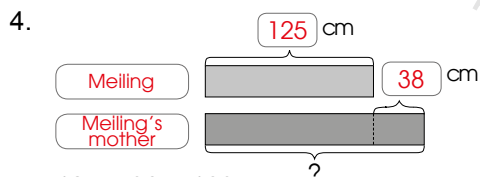
$689 + 114 = 803$
There were 803 people on the train then.



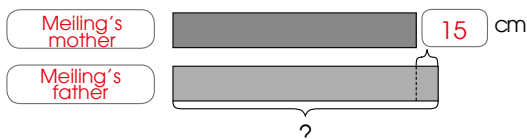
$286 - 219 = 67$
There were 67 children in the park.



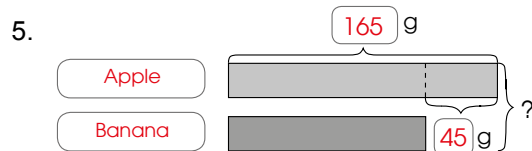
$219 - 67 = 152$
There were 152 more adults than children in the park.



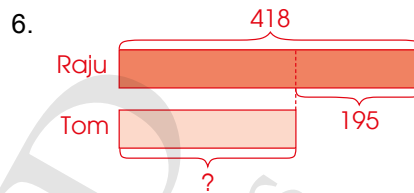
$125 + 38 = 163$ cm
Meiling's mother is 163 cm tall.



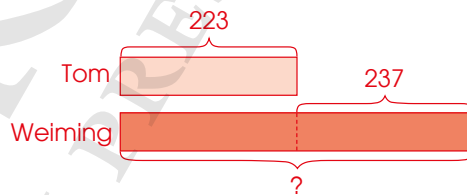
$163 + 15 = 178$ cm
Meiling's father is 178 cm tall.



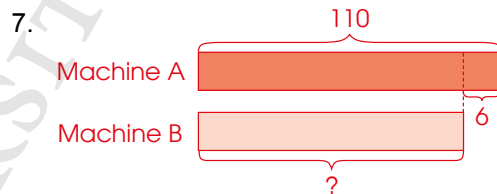
$165 - 45 = 120$
The mass of the banana is 120 g.
 $165 + 120 = 285$
The total mass of the apple and the banana is 285 g.



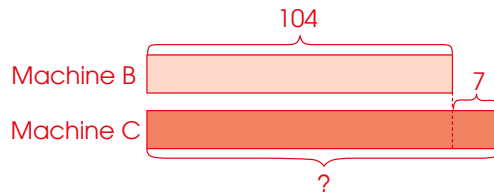
$418 - 195 = 223$
Tom has 223 marbles.



$223 + 237 = 460$
Weiming has 460 marbles.



$110 - 6 = 104$
Machine B makes 104 toys.



$104 + 7 = 111$
Machine C makes 111 toys.

**Specific Learning Focus**

- Solve 2-step word problems.

Suggested Duration

6 periods

Prior Learning

In Lesson 1, pupils have been exposed to 2-part word problems. They should understand that solving word problems can involve more than one mathematical operation.

Pre-emptive Pitfalls

This lesson involves a higher-tier word problem skill. Reinforce the 4-step approach to problem solving and recapitulate how to choose the correct mathematical operations. If pupils are still unfamiliar with the steps, they will face difficulty in this lesson.

Introduction

In Let's Learn 2 (Textbook 2 P158), a higher level of understanding is required. To find the total number of adults, addition is done. Pupils can be encouraged to write the mathematical equation. Explain to pupils that the addition in the first step requires regrouping. In the second step, subtraction is required to find the number of children as there are 79 fewer children than adults. The keyword 'fewer' should be emphasised in this question and guide pupils to see the relation of 'fewer' to subtraction.

Problem Solving

Mass, length, comparison and part-part-whole concept should be re-visited through this chapter. The methods of grouping and regrouping in addition and subtraction are also revisited. In this chapter, pupils are also required to draw and label bar models, which enhances their analytical skills. 'Maths Journal' (Textbook 2 P162) can be done as a class presentation where pupils can first discuss in their groups and then present their questions to the class for their classmates to solve.

Activities

Role-play and the use of real-life objects will help pupils visualise word problems better. 'Activity Time' (Textbook 2 P160) can be made fun by awarding points to the group with the most number of correct answers.

Resources

- drawing blocks
- markers
- real-life objects

Mathematical Communication Support

Encourage the use of the 4-step approach to problem solving template (Activity Handbook 2 P43) to solve a word problem. Discuss in class and encourage individual responses while pupils fill up the template and then have them independently work out the operation (3rd stage) of the word problem.

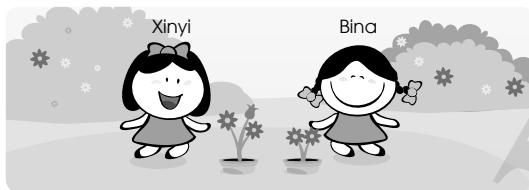
PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout

Date: _____

Xinyi and Bina are growing plants.



Bina's plant grew 18 cm in the first month.
Xinyi's plant grew 5 cm taller than Bina's plant in the first month.
In the second month, the height of Xinyi's plant was 30 cm.
How much did Xinyi's plant grow in the second month?

In the first month,

$$18 + 5 = 23$$

Xinyi's plant grew 23 cm in the first month.

In the second month,

$$30 - 23 = 7$$

Xinyi's plant grew cm in the second month.

14 Chapter 9

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Mind Workout

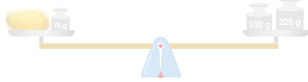
Go through the word problem with pupils. Allow them to solve the problem independently and get some to present their answers.

Workbook 2B P14

PRACTICE

Solve.

- 538 children visited a funfair on the first day. 230 fewer children visited the funfair on the second day than on the first day. How many children visited the funfair on the two days altogether? **846**
- There are 141 women in a sports club. There are 52 more women than men in the club. How many people are there in the club altogether? **230**
- Look at the picture below.

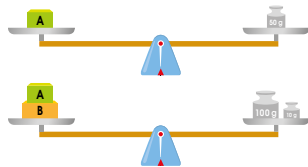


What is the mass of the mango? **225**

Complete Workbook 2B, Worksheet 2 • Pages 7 – 13



MIND WORKOUT



What is the mass of Box B? **60 g**

Textbook 2 P161

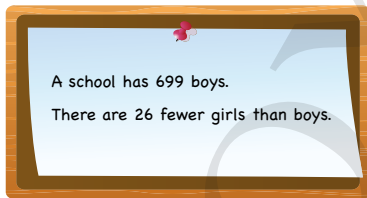


MIND WORKOUT

Ask pupils what kind of information they have and what else they need before proceeding to find the mass of Box B.

MATHS JOURNAL

Look at the sentences below.



Write two questions that you can ask with the information given.

Draw models and answer the questions.



I know how to...

- solve 2-part word problems.
- solve 2-step word problems.

SELF-CHECK



Textbook 2 P162

MATHS JOURNAL

Pupils can work in groups to discuss the possible questions that can be asked. Various groups can present the questions that they have come up with to the class.

SELF-CHECK



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

This self check can be done after pupils have completed **Review 9** (Workbook 2B P15 – 16) independently.

1. (a) $114 + 57 = 171$
Mrs Gopal sold 171 pairs of shoes.
(b) $114 + 171 = 285$
They sold 285 pairs of shoes altogether.

2. $239 + 246 = 485$
The total mass of the red and blue marbles is 485 g.
 $500 - 485 = 15$
The mass of the empty box is 15 g.

3. $350 - 190 = 160$
 $160 - 70 = 90$
Siti gave 90 beads away.

4. $287 - 49 = 238$
Sam has run 238 m.
 $400 - 238 = 162$
Sam is 162 m from the finishing line.

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DOLLARS, CENTS AND RUPEES

CHAPTER 10

Dollars, Cents and Rupees CHAPTER 10

How much money does each child have?

Sam Farhan Kate

COUNTING DOLLARS AND CENTS LESSON 1

RECAP

1. Sam has 1 fifty-cent coin, 2 twenty-cent coins and 1 five-cent coin.

Count to tell the amount of money.

Sam has 95¢. 50¢, 70¢, 90¢, 95¢

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Textbook 2 P163

Related Resources

NSPM Textbook 2 (P163 – 186)
NSPM Workbook 2B (P17 – 44)

Materials

Blank cards, drawing block, markers, mini whiteboard, newspapers, play money

Lesson

Lesson 1 Counting Dollars and Cents
Lesson 2 Changing Dollars and Cents
Lesson 3 Comparing Amounts of Money
Lesson 4 Solving Word Problems
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

Continuing the spiral approach, this chapter revisits the concepts that are taught in Grade 1 on counting the amount of money in cents up to \$1 and in dollars up to \$100. This chapter will now extend the counting of the amount of money to dollars and cents, reading and writing money in decimal notation, comparing two or three amounts of money, converting an amount of money in decimal notation to cents only and vice versa, and solving word problems. The dot is introduced as a separator between the dollars and cents. Strategy to compare the amount of money systematically by comparing the dollars first before comparing the cents will be incorporated into the lessons. Model drawing to help pupils to understand and plan their solutions is used to solve the word problems.

LESSON

1

COUNTING DOLLARS AND CENTS

LEARNING OBJECTIVES

1. Count the amount of money in a given set of notes and coins.
2. Read and write money in decimal notation.

Dollars, Cents and Rupees CHAPTER 10

How much money does each child have?

Sam Farhan Kate

COUNTING DOLLARS AND CENTS LESSON 1

RECAP

1. Sam has 1 fifty-cent coin, 2 twenty-cent coins and 1 five-cent coin.

Count to tell the amount of money.

Sam has 95¢. 50¢, 70¢, 90¢, 95¢

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RECAP

Use the chapter opener to review concepts taught in Grade 1. Pupils to focus on Sam first and identify the different denominations of coins that he has. Ask pupils to calculate the amount of money Sam has by counting the coins one by one until all the coins have been counted.

Textbook 2 P163

2. Farhan has 1 fifty-dollar note, 1 five-dollar note and 2 two-dollar notes.



Farhan has \$59.

IN FOCUS

Kate has 1 two-dollar note and 1 fifty-cent coin.



How much does Kate have?

LET'S LEARN

1. Kate has 1 two-dollar note and 1 fifty-cent coin.



We read it as **two dollars and fifty cents**.
We write it as **\$2.50**.

\$2 50¢
two dollars fifty cents

The dot separates the dollars and the cents.



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DOLLARS, CENTS AND RUPEES

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Textbook 2 P164

LET'S LEARN

In Let's Learn 2, repeat the steps for Farhan.

IN FOCUS

Use the chapter opener to focus on Kate. Ask the following questions to help pupils to count the amount of money in dollars and cents:

- What do you notice about the money that Kate have?
- How many dollars does Kate have?
- How many cents does Kate have?
- How much does Kate have altogether?

Model the reading of the amount of money that Kate has: Kate has **two dollars and fifty cents**.

LET'S LEARN

Get pupils to identify the dollars first followed by the cents. Ask the questions in the following sequence to help pupils to count the amount of money in dollars and cents:

- How many dollars are there?
- How many cents are there?
- How much does Kate have?

Emphasise on the reading of the amount of money in words before moving to the numerical representation. Stress on the word 'and' in the reading to indicate that there are two units involved, namely dollars and cents. Guide pupils in writing the dot to separate dollars from cents in the numerical representation in Let's Learn 1.

2. Bina has 2 fifty-dollar notes and 1 five-dollar note.



\$105 is the same as \$105.00.

We read it as one hundred and five dollars.
We write it as **\$105** or **\$105.00**.



3. Weiming has 1 fifty-cent coin, 1 ten-cent coin and 1 five-cent coin.



50¢, 60¢, 65¢

We read it as sixty-five cents.
We write it as **65¢** or **\$0.65**.



4. A shop sells pencils, notebooks, files, calculators and bags. How much does each item cost?



A pencil costs 20 cents.
We write it as \$0.20.



A notebook costs 2 dollars.
We write it as \$ 2.00.

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CHAPTER 10

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Textbook 2 P165

In Let's Learn 2 and 3, the amount of money is in dollars only and cents only respectively. Direct the attention of the pupils to the writing of two zeroes after the dot in Let's Learn 2 as the amount of money is in dollars only and one zero before the dot in Let's Learn 3 as the amount of money is in cents only.

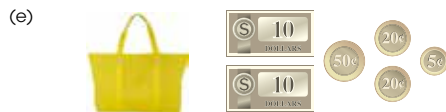
In Let's Learn 4, there are amounts of money in dollars and cents. Get pupils to identify the dollars first and then the cents. Remind pupils to separate dollars from cents with the use of the dot in the numerical representation.



A file costs 5 dollars and 30 cents.
We write it as \$ 5.30.



A calculator costs 17 dollars and 90 cents.
We write it as \$ 17.90.



A bag costs 20 dollars and 95 cents.
We write it as \$ 20.95.

In Let's Learn 4, there are amounts of money in dollars and cents. Get pupils to identify the dollars first and then the cents. Remind pupils to separate dollars from cents with the use of the dot in the numerical representation.

Work in groups of 4.

- 1 Read a supermarket advertisement from a newspaper.

Example

SUPERMARKET	
<p>Fresh milk</p> <p>\$5.50</p>	<p>Biscuits</p> <p>\$3.70</p>
<p>Ice cream</p> <p>\$11</p>	<p>Apple juice</p> <p>\$4.25</p>

ACTIVITY TIME

What you need:



The fresh milk costs \$5.50.



- 2 Choose an object shown in the advertisement.
- 3 Read the cost of the object.
Then write the cost in dollars and cents on the .
Use to show the cost of the object.
- 4 Ask your classmates to look at the amount of money and identify which object you chose.
- 5 Take turns and repeat 2 to 4.

ACTIVITY TIME

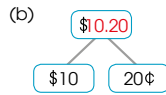
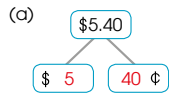


Assign pupils to work in groups of 4. Each group to be given a mini whiteboard, play money and a piece of newspaper advertisement.

This activity provides hands-on practice in dealing with money in dollars and cents and writing amounts of money in decimal notation.



1. Show the correct amount.



2. Match.

3. What is the amount of money?

(a) $\$2.60$
2 dollars 60 cents

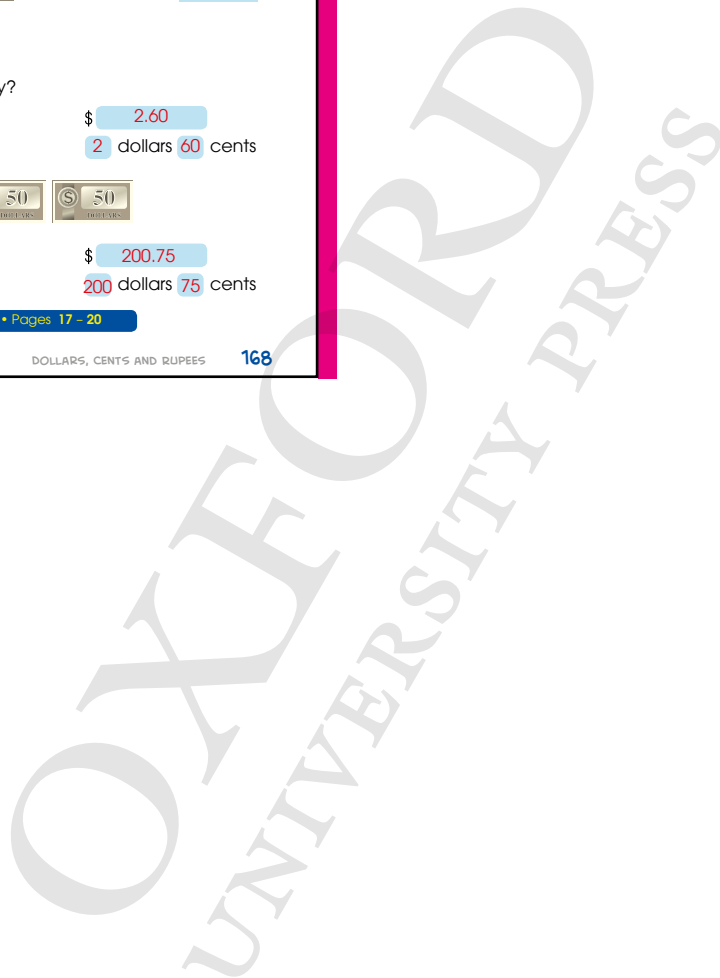
(b) $\$200.75$
200 dollars 75 cents

Complete Workbook 28, Worksheet 1 • Pages 17 – 20

Work with pupils on the questions and selected examples from **Worksheet 1**.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2B P17 – 20).



1. (a) \$10, 30¢
- (b) \$11, 75¢
- (c) \$15, 15¢
- (d) \$39, 0¢
- (e) \$53, 20¢
- (f) \$95, 55¢

2.

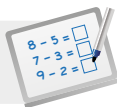
Box 1: 2 DOLLARS, 50¢, 20¢ → \$0.95

Box 2: 50¢, 20¢, 20¢, 5¢ → \$15.30

Box 3: 10 DOLLARS, 20¢, 5 DOLLARS, 5¢, 5¢ → \$2.70

Box 4: 5 DOLLARS, 50¢, 2 DOLLARS, 20¢, 10¢ → \$7.80

3. (a) 50, \$0.50
- (b) 90, \$0.90
- (c) 2, 70, \$2.70
- (d) 9, \$9.00
- (e) 10, 5, \$10.05
- (f) 26, \$26.00

**Specific Learning Focus**

- Count the amount of money in a given set of notes and coins.
- Read and write money in decimal notation.

Suggested Duration

3 periods

Prior Learning

Pupils have learnt to count money to \$100 or Rs 100.

Pre-emptive Pitfalls

Decimal notation and decimal numbers are not formally introduced in Grade 2. However, to write money in dollars and cents, the use of a dot as a decimal point to separate dollars from cents, is introduced. Pupils may find this concept difficult to understand so to help pupils, it can be simplified and explained as a representation for money.

Introduction

100 cents make a dollar just like 100 cm make a metre. These facts can be correlated if pupils do not find it too challenging. If they face difficulty in grasping this concept, simplify it by saying that the dot acts as a separator of dollars (whole number) and cents (parts of a whole). Introduce the '\$' symbol and the dot while they read the decimal notation representing money. In Let's Learn 2 (Textbook 2 P165), one hundred and five dollars is written as \$105 and \$105.00, explaining that the two place values after the dot represent the cents. Since 100¢ represent a whole (\$1), values less than 100¢ are written after the dot in the decimal notation. Therefore, in Let's Learn 3 (Textbook 2 P165), 65¢ is written as \$0.65, which represents a value of less than a dollar. In Let's Learn 4(c), (d) and (e) (Textbook 2 P166), have pupils express the amount in dollars and cents and the decimal notation with the dot.

Problem Solving

In this lesson, the concept of expressing money in parts and whole is consolidated. In the decimal notation, the dollars before the dot constitute the whole and the cents constitute the parts. Any value less than 100¢ is represented after the dot. 100 cents make \$1. The questions in 'Practice' (Textbook 2 P168) test the pupils' ability to recognise dollar notes and cents and add up the amount to find the total amount.

Activities

'Activity Time' (Textbook 2 P167) can be done in mixed-ability groups. The play money can be shuffled and distributed to the pupils to play the game. Put up magazine or newspaper advertisements on the board for all to see. They can go to the supermarket to look for items that they can buy with the amount of money given. The teacher can also distribute flyers given out at the supermarket to each group. Get pupils to write the amount of money and state the objects that they are able to buy with that amount. The teacher can have pupils calculate the remaining amount of money they would have left after buying that item.

Resources

- mini whiteboard
- play money (Activity Handbook 2 P44)
- newspaper or magazine advertisements
- markers

Mathematical Communication Support

It is important to recapitulate and discuss in class the concepts of adding, part-part-whole, and dollar/cent parity. Quizzes can be given to test pupils' understanding of all the concepts taught in the lesson.

CHANGING DOLLARS AND CENTS

LEARNING OBJECTIVES

1. Convert an amount of money in decimal notation to cents only and vice versa.

CHANGING DOLLARS AND CENTS

LESSON
2

RECAP



10 ten-cent coins make \$1.

How many fifty-cent coins make \$1?



IN FOCUS



Junhao can pay for the pen with a \$1 coin.



Are there other ways to pay for the pen?

RECAP

Review that 10 ten-cent coins make \$1 leading to the conversion of 100 cents = \$1 by using play money and skip counting.

IN FOCUS

Ask pupils if there are other ways to make \$1 to pay for the pen. Pupils can be given play money to explore the different combinations.

LET'S LEARN

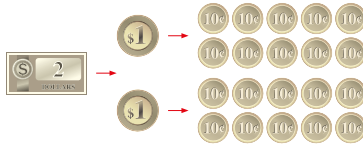
1. We can change **dollars** to **cents**.



10 ten-cent coins make \$1.

$\$1.00 = 100\text{¢}$

10¢, 20¢, 30¢, 40¢, 50¢, 60¢, 70¢, 80¢, 90¢, 100¢



20 ten-cent coins make \$2.

$\$2.00 = 200\text{¢}$

How many ten-cent coins make \$10?

2. Look at the amount of money.



We write it as 2 dollars and 15 cents, or \$2.15.

$\$2.00 = 200\text{¢}$ $\$0.15 = 15\text{¢}$

$\$2.15 = 215\text{¢}$

Textbook 2 P170

In Let's Learn 1, use play money to reinforce the conversion of dollars to cents by extending from \$1 = 100 cents to \$2 = 200 cents.

In Let's Learn 2, 15 cents will be added to \$2.00 to convert both dollars and cents to cents only.

3. We can also change **cents** to **dollars**.

Look at the coins.



$100\text{¢} = \$1.00$ $85\text{¢} = \$0.85$

$185\text{¢} = \$1.85$

185¢ is 100¢ and 85¢.

4. What is the cost of each item?

Item	Amount of money	Cost
Biscuits		\$3.50 or 350¢
Rice		\$7.05 or 705¢

We can write amounts of money in different ways.

The packet of biscuits costs \$3.50.
The packet of biscuits costs 3 dollars and 50 cents.

$\$3.50 = 350\text{¢}$






The packet of rice costs \$7.05.
The packet of rice costs 7 dollars and 5 cents.

Textbook 2 P171

In Let's Learn 3, use the fact 100 cents = \$1 to convert 185 cents to dollars and cents.

Let's Learn 4 will consolidate both types of conversion.

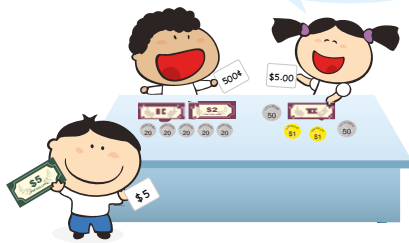
Work in groups of 3 to 4.

- 1 Take some . Write the amount in dollars on one .
- 2 Show the  to your group members.
- 3 Ask your group members to write the amount in different ways on the .
- 4 Ask your group members to show the amount of money you have written using .

What you need:
  

I can use 2 two-dollar notes and 5 twenty-cent coins to make \$5.

I can use 1 two-dollar note, 2 one-dollar coins and 2 fifty-cent coins to make \$5.



- 5 Take turns and repeat 1 to 4.

Textbook 2 P172

Assign pupils to work in groups of 3 or 4. Each group to be given blank cards, markers and play money.

This activity allows pupils to further explore the conversion of money through hands-on practice.

PRACTICE 

1. Write in cents.
 - (a) \$9.00 = ¢
 - (b) \$0.60 = ¢
 - (c) \$4.70 = ¢
 - (d) \$7.05 = ¢

2. Write in dollars.
 - (a) 800¢ = \$
 - (b) 80¢ = \$
 - (c) 540¢ = \$
 - (d) 305¢ = \$

3. Which item did each child buy?



- (a) Siti paid \$5.50 for the .
- (b) Weiming paid 250¢ for the .

Complete Workbook 2B, Worksheet 2 • Pages 21 – 24

Textbook 2 P173

PRACTICE 

Work with pupils on the questions and selected examples from **Worksheet 2**.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2B P21 – 24).

1. (a) 30
(b) 75
(c) 165
(d) 305
(e) 800
(f) 955

2. (a) 0.55
(b) 0.60
(c) 1.60
(d) 4.00
(e) 5.50
(f) 6.05
(g) 9.85
(h) 10.00

3. (a) 15
(b) 80
(c) 1000
(d) 320
(e) 705
(f) 895

4. (a) 0.05
(b) 0.95
(c) 4.00
(d) 1.70
(e) 6.35
(f) 8.90

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**Specific Learning Focus**

- Convert an amount of money in decimal notation to cents only and vice versa.

Suggested Duration

3 periods

Prior Learning

Pupils are already aware of dollars and cents. Different amounts of money in various combinations or denominations of coins and dollar notes are dealt with in this lesson, and pupils are required to know that 100 cents (parts) make up 1 dollar (whole).

Pre-emptive Pitfalls

In this lesson, pupils learn to recognise the denominations of coins and dollar notes, and come up with different combinations of coins and dollar notes that make a certain amount. This can be challenging for most pupils.

Introduction

In converting an amount of money in decimal notation to cents only and vice versa (e.g. expressing \$2.15 as 215 cents), pupils get to understand the part-part-whole concept in money. Let's Learn 3 (Textbook 2 P171) shows how different denominations of coins and dollar notes can add up to the correct amount, as well as how the amount can be expressed in decimal notation and in cents. The concept of number bonds should be revisited through a spiral approach. It is important to explain to pupils that \$3.50, for example, can be made up of multiple combinations and coins and dollar notes (e.g. seven 50¢-coins, three \$1-notes and one 50¢-coin).

Problem Solving

Since the partitioning of numbers greater than 100 and the part-part-whole concept are visited in this lesson using money, the teacher should carry out various activities in class using paper money, where the teacher writes an amount on the whiteboard and get pupils to use different ways of denote the amount. This will strengthen their understanding of the concepts of conversion of dollars to cents, and conversion of cents to dollars.

Activities

'Activity Time' (Textbook 2 P172) tests pupils' ability to come up with different ways of expressing the same amount. Encourage peer learning by having pupils motivate and help their peers who have difficulty doing the activity.

Resources

- blank cards (Activity Handbook 2 P34)
- markers
- play money (Activity Handbook 2 P44)

Mathematical Communication Support

In 'Practice' (Textbook 2 P173), questions 1 and 2 can be discussed in class before the pupils start working independently. In question 1(d), discuss how \$7.05 differs from \$7.50, where the place value concept should be emphasised to help them see the difference between 0.05 and 0.50. Although decimals have not yet been formally introduced at this stage, in question 2(d), explain to pupils that since 100 cents make 1 dollar, \$0.05 (= 5¢) and \$0.50 (= 50¢) are parts of \$1 (= 100¢). 305 and 350 cents will therefore be written as \$3.05 and \$3.50.

COMPARING AMOUNTS OF MONEY

LEARNING OBJECTIVES

1. Compare two or three amounts of money.

COMPARING AMOUNTS OF MONEY

LESSON
3

IN FOCUS

I have \$2.80.

I have \$5.30.

Raju

Ann

Who has more money?

LET'S LEARN

1.

Raju	Ann
\$2.80	\$5.30

\$5.30 is **more than** \$ 2.80.

Ann has **more** money than Raju.

Compare the dollars first.

5 dollars is **more than** 2 dollars.

Does Raju have **less** money than Ann?

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DOLLARS, CENTS AND RUPEES

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IN FOCUS

Pupils to look at the amount of money that Raju and Ann have. Ask questions such as 'Who has more money?' and 'How do you know?'.

LET'S LEARN

Guide pupils to compare the dollars first. Help pupils to understand that regardless of the amount of money in cents, it will not be greater than \$1 as 99 cents is the greatest (which is less than \$1). Review the fact 100 cents = \$1.

Ask the following questions to scaffold the pupils' learning:

- How many dollars does Raju have?
- How many dollars does Ann have?
- Who has more dollars?

Textbook 2 P174

2.



Which item costs less?

Shampoo
\$10.10

Soap
\$10.20

Compare the dollars.
Both are 10 dollars.
They are the same.

What should I compare next?



Since the dollars are the same,
I compare the cents.
10 cents is less than 20 cents.



\$10.10 is **less than** \$ **10.20**.

The shampoo costs **less** than the soap.

Does the soap cost **more** than the shampoo?



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CHAPTER 10

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Textbook 2 P175

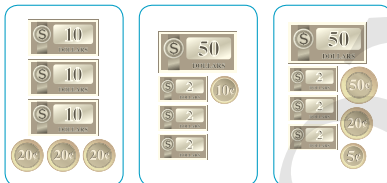
In Let's Learn 2, both items have the same amount of money in dollars. Get pupils to compare the cents next.

Likewise, ask the following questions to scaffold the pupils' learning:

- How many cents are there?
- Which is greater?

3. Tom has \$30.60. Priya has \$56.10 and Xinyi has \$56.75.
Who has the most money?
Who has the least money?

Compare the dollars first.



Tom
\$30.60

Priya
\$56.10

Xinyi
\$56.75

\$30.60 is the **smallest** amount of money.

Compare **Priya** and **Xinyi**.
\$56.10 and \$56.75.

Priya and Xinyi
have \$56 each.
What should we
compare next?

75 ¢ is more than 10 ¢.

\$56.75 is the **greatest** amount of money.

Arrange the amounts of money in order.
Start with the greatest amount.

\$56.75, \$56.10, \$30.60
greatest → smallest

Xinyi has the **most** money.
Tom has the **least** money.

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DOLLARS, CENTS AND RUPEES

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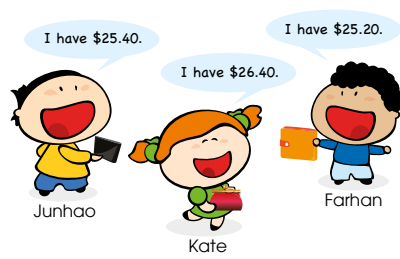
The transitive principle can be used to compare the amount of money that Tom, Priya and Xinyi have in Let's Learn 3.

First, compare Tom and Priya. Priya has more money than Tom. Next, compare Priya and Xinyi. Xinyi has more money than Priya. Therefore, Xinyi has the most amount of money, followed by Priya, then Tom.

Textbook 2 P176



Compare.



- (a) Who has more money, Junhao or Kate?
- (b) Who has more money, Kate or Farhan?
- (c) Who has less money, Junhao or Farhan?
- (d) Who has the most money?
- (e) Who has the least money?
- (f) Arrange the amounts of money in order.
Start with the smallest amount.

Farhan, Junhao, Kate

Complete Workbook 2B, Worksheet 3 • Pages 25 – 32



Work with pupils on the questions and selected examples from **Worksheet 3**.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 2B P25 – 32).

1. (a)



(b)



(c)



2. (a)



(b)



(c)



3. (a) less
 (b) less
 (c) more

4. (a) 3.75, 3.85, B
 (b) 15.50, 15.65, D

5. (a)

\$5.00

(b)

\$19.05

(c)

\$5.55

6. (a)

\$0.15

(b)

\$1.00

(c)

\$10.05

7. (a) Ann

(b) Nora

(c) Nora

(d) Ann

(e) Bala

(f) Ann, Nora, Bala

8. (a) soft drink

(b) sweets

(c) sweets

(d) sweets

(e) soft drink, ice cream, sweets

9. 10.85, 9.45, 9.85

(a) A

(b) B

(c) A, C, B

SOLVING WORD PROBLEMS


LEARNING OBJECTIVES

1. Solving word problems involving money in dollars only or cents only.

LESSON
4

SOLVING WORD PROBLEMS

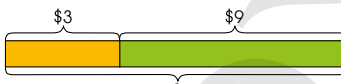
IN FOCUS



What is the total cost of the sandwich and the toy?

LET'S LEARN

1. Ahmad buys a sandwich for \$3. He also buys a toy for \$9. How much does Ahmad pay in all?



$\$3 + \$9 = \$12$

Ahmad pays \$12 in all.

How can we check our answer?

$\$12 - \$9 = \$3$
 $\$12 - \$3 = \$9$
 Our answer is right!

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DOLLARS, CENTS AND RUPEES 178

Textbook 2 P178

IN FOCUS

Ask the following questions to test the understanding of the pupils:

- How much is the sandwich?
- How much is the toy?
- How do you find the total cost of the two items?

LET'S LEARN

Use Polya's problem solving framework to guide the pupils in Let's Learn 1:

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 do we have to find?

Step 2: Translate key elements into a diagram (model)

- Draw the model
- Label the known and unknown elements

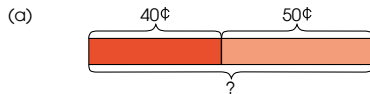
Step 3: Examine the model and write the number equation

- Lead pupils to see the **part-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

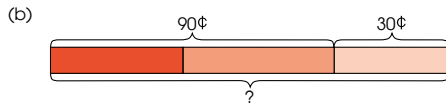
- Check if the answer is reasonable.

2. Meiling saves 40¢ on Monday. She saves 50¢ on Tuesday. She saves 30¢ on Wednesday.
- (a) How much does Meiling save on Monday and Tuesday?
- (b) How much does Meiling save on the three days?



$$40¢ + 50¢ = 90¢$$

Meiling saves 90¢ on Monday and Tuesday.



$$90¢ + 30¢ = 120¢$$

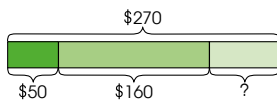
Meiling saves \$1.20 on the three days.

120¢ = \$1.20



Apply Polya's four steps in problem solving to Let's Learn 2. Review the fact 100 cents = \$1 and convert 120 cents to dollars and cents.

3. Bala has \$270. He buys a cake which costs \$50. He buys a pair of shoes which costs \$160. How much money does he have left?



$$\$50 + \$160 = \$210$$

Bala spends \$210 altogether.

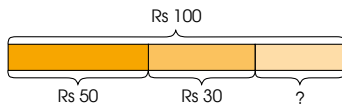
$$\$270 - \$210 = \$60$$

Bala has \$60 left.

First, we should find how much money Bala spends altogether.



4. Nora buys a pair of scissors for Rs 50. She buys a ruler for Rs 30. She gives the cashier Rs 100. How much change does Nora get?



$$\text{Rs } 50 + \text{Rs } 30 = \text{Rs } 80$$

Nora spends Rs 80 in all.

$$\text{Rs } 100 - \text{Rs } 80 = \text{Rs } 20$$

Nora gets Rs 20 change.

What should we find first?

'Change' is the amount of money Nora gets back.



In Let's Learn 3 and 4, pupils can first find out the total amount of money that is spent.

Highlight to pupils that the word 'change' in Let's Learn 4 refers to the amount of money that is returned by the cashier.

Work in groups of 4.

- 1 Choose one pupil to be the shopkeeper.
- 2 Look at the objects.




ACTIVITY  TIME

What you need:



SUPERMARKET

 Easel \$17	 Building blocks \$29	 Sports shoes \$48
 Teddy bear \$13	 Train set \$35	

- 3 Choose two objects.
- 4 Use  to show the cost of each object.
- 5 Add and tell how much the two objects cost altogether.
- 6 Use  or  to pay for the objects.
Get change from the shopkeeper.
- 7 Ask your group members to check your answers.
- 8 Repeat 1 to 7.

Divide the class into groups of 4 and each group to be given a set of play money.

This hands-on activity allows pupils to solve problems related to money in a simulated real life context.

Solve.

1. A snack costs 65¢.
A sweet costs 15¢ less than the snack.
How much does the sweet cost? **50¢**
2. Mr Lim bought a fan for \$127.
He also bought a digital camera that costs \$422 more than the fan.
(a) What was the cost of the digital camera? **\$549**
(b) How much did Mr Lim spend altogether? **\$676**
3. A pair of slippers costs Rs 663.
It costs Rs 43 more than a book.
(a) How much does the book cost? **Rs 620**
(b) How much do the pair of slippers and book cost altogether? **Rs 1283**
4. Tom bought a bar of chocolate for \$4.
He also bought a packet of milk for \$2.
He gave the cashier \$10.
How much change did he get? **\$4**
5. Bina saved Rs 490.
She saved Rs 315 more than Ahmad.
How much did Bina and Ahmad save altogether? **Rs 665**

 Complete Workbook 2B, Worksheet 4A • Pages 33 – 38

Work with pupils on the questions and selected examples from **Worksheet 4A**.

Independent seatwork

Assign pupils to complete Worksheet 4A (Workbook 2B P33 – 38).

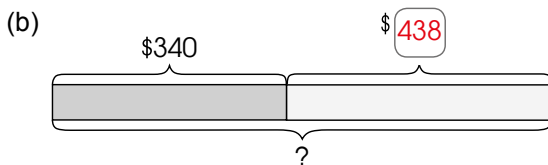
1. $\$12 + \$7 = \$19$
Mr Tan pays \$19 altogether.

2. $\$47 + \$34 = \$81$
She has \$81 altogether.

3. $55\text{¢} - 25\text{¢} = 30\text{¢}$
The pencil costs 30¢.

4. $\$100 - \$46 = \$54$
He had \$54 left.

5. (a) $\$340 + \$98 = \$438$
The bag cost \$438.



$\$340 + \$438 = \$778$
Mrs Ali spent \$778 altogether.

6. (a) $\$1 + \$5 = \$6$
He spends \$6 altogether.

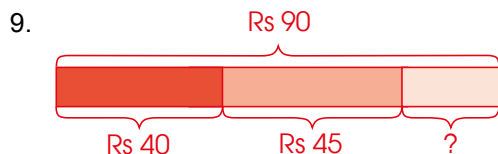
(b) $\$10 - \$6 = \$4$
He has \$4 left.

7. (a) $\$208 - \$59 = \$149$
Xinyi has \$149.

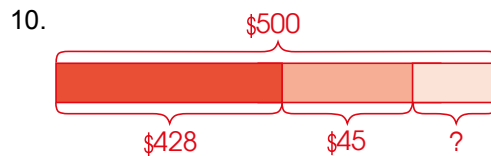
(b) $\$208 + \$149 = \$357$
Ahmad and Xinyi have \$357 altogether.

8. $\text{Rs } 255 + \text{Rs } 366 = \text{Rs } 621$
Farhan and Bina have Rs 621 altogether.

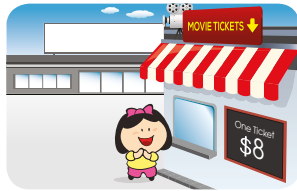
$\text{Rs } 621 + \text{Rs } 83 = \text{Rs } 704$
The children have Rs 704 altogether.



$\text{Rs } 40 + \text{Rs } 45 = \text{Rs } 85$
Bala spent Rs 85 on the drink and biscuits.
 $\text{Rs } 90 - \text{Rs } 85 = \text{Rs } 5$
Bala had Rs 5 left.



$\$428 + \$45 = \$473$
She spent \$473.
 $\$500 - \$473 = \$27$
She got \$27 change.



Xinyi buys movie tickets for 5 people.
How much does she pay?

LET'S LEARN

1. One movie ticket costs \$8.
How much does Xinyi pay for 5 movie tickets?

$$\$8 \times 5 = \$40$$

Xinyi pays \$40 for 5 movie tickets.

2. Nora bought some pens for \$14.
Each pen costs \$2.
How many pens did she buy?

$$14 \div 2 = 7$$

She bought 7 pens.

$$7 \times 2 = 14$$

$$14 \div 2 = 7$$



Help pupils to understand the context by asking the following questions:

- Where is this place?
- Have you been to a cinema to watch a movie?
- What is the price of one ticket?
- How much will 5 tickets cost?
- How do you know?

LET'S LEARN

Use Polya's four steps in problem solving to guide pupils in Let's Learn 1:

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 do we have to find?

Step 2: Translate key elements into a diagram (model)

- Draw the model
- Label the known and unknown elements

Step 3: Examine the model and write the number equation

- Lead pupils to see the **equal parts and whole** concept in the problem structure.
- What do we need to find the unknown? Part or whole?
- Do we multiply or divide to find it?

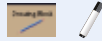
Step 4: Answer the question

Apply Polya's four steps in problem solving to Let's Learn 2. Remind pupils to recall their multiplication facts to work out the answer.

Work in groups of 4.

ACTIVITY  TIME


What you need:



1 Look at the advertisement.

SUPERMARKET			
 <p>Chicken \$8</p>	 <p>Peanuts \$3</p>	 <p>Cake \$9</p>	 <p>Hand wash \$10</p>
 <p>Salmon \$14</p>	 <p>Orange juice \$4</p>	 <p>Detergent \$20</p>	 <p>Scallops \$48</p>

2 Make three different word problems.

Write them on the .

Example

Mrs Lim has \$30.
She buys a packet of peanuts for \$3.
She buys a cake for \$9.
How much money does she have left?

3 Ask your classmates to solve your word problems.

4 Check your classmates' answers.

Pupils have to plan the solutions after writing out the word problems. Emphasise on using Polya's four steps in problem solving to plan the solutions.

PRACTICE 

Solve.

- Raju buys 5 packets of biscuits. Each packet of biscuits costs \$4. How much does Raju pay altogether? **\$20**
- Ann buys some watermelons with \$18. Each watermelon costs \$6. How many watermelons does she buy? **3**
- Kate saves Rs 8 every day. How much money will Kate save after three days? **Rs 24**
- 2 cola candies cost Rs 3. How many cola candies can Weiming buy with Rs 15? **10**

Complete Workbook 2B, Worksheet 4B • Pages 39 – 40

 **MIND WORKOUT**

Meiling wants to use coins       to make up the amounts shown.

Help Meiling to find the least number of coins she needs to make up each amount.

Example

\$4.65



We can use  to help us answer this question.

Meiling needs 7 coins to make up \$4.65.



Work with pupils on the questions and selected examples from **Worksheet 4B**.

Independent seatwork

Assign pupils to complete Worksheet 4B (Workbook 2B P39 – 40).

1.

\$2	\$2	\$2	\$2	\$2
-----	-----	-----	-----	-----

$\$2 \times 5 = \10

She saves \$10 in 5 days.

2.

\$5	\$5	\$5	\$5	\$5	\$5	\$5	\$5	\$5	\$5	\$5
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

$\$5 \times 10 = \50

Tom's father pays \$50 for 10 such books.

3.

Rs 10	Rs 10	Rs 10	Rs 10	Rs 10	Rs 10	Rs 10	Rs 10
-------	-------	-------	-------	-------	-------	-------	-------

2 sweets

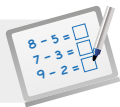
$8 \times 2 = 16$

She can buy 16 sweets.

4. $\text{Rs } 70 \div 10 = \text{Rs } 7$
Sam saved Rs 7 each day.

5. $\text{Rs } 20 \div \text{Rs } 5 = 4$
Ahmad can buy 4 cakes.

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Specific Learning Focus

- Compare two or three amounts of money.
- Solving word problems involving money in dollars only or cents only.

Suggested Duration

Lesson 3: 2 periods

Lesson 4: 4 periods

Prior Learning

At this stage, pupils should be well-versed with the concepts of dollars and cents, as well as the conversion between dollars and cents. In Lesson 3, pupils learn to compare and order amounts of money. This is a re-visit of the ordering and comparing of numbers, which was learnt in Grade 1. Similarly, the word problems in Lesson 4 cover a combination of all the concepts of money learnt earlier, in a real-world context.

Pre-emptive Pitfalls

When comparing and ordering amounts of money, just like the approach used when comparing and ordering whole numbers, pupils have to compare the dollars first, and if the dollars are the same, then they have to compare the cents. Some pupils might find this challenging as they now have to compare dollars and cents instead of whole numbers.

Introduction

Apply the same strategy of comparing and ordering numbers, to compare and order amounts of money in Lesson 3. In 'Practice' (Textbook 2 P175 – 176), questions 2 and 3 require pupils to compare the dollars first and if they are the same, compare the cents. Once the comparison is done, get them to arrange the amounts in ascending or descending order. Emphasise to pupils that to find how much more or less an amount is compared to the other, we subtract the smaller amount from the greater amount to find the difference.

Problem Solving

In Lesson 4, pupils' problem-solving and critical-thinking skills are enhanced. In Lesson 4, pupils are required to solve word problems in real-life context involving money, using one or more of the four mathematical operations (addition, subtraction, multiplication and division). The 4-step approach to problem solving template (Activity Handbook 2 P43) should be used whenever a lesson on word problems is done. In Let's Learn 1 (Textbook 2 P183), emphasise to pupils that multiplication is the best and fastest way to obtaining the answer, rather than repeated addition, which takes up more time. The contextual and conceptual application of mathematical operations are revisited and applied in lessons 3 and 4.

Activities

'Activity Time' (Textbook 2 P184) can be enacted by role-playing, where pupils are assigned different roles such as shopkeepers and customers. This activity can be used as an evaluative assessment.

Resources

- newspaper clippings
- drawing blocks
- markers
- play money (Activity Handbook 2 P44)
- real-life objects

Mathematical Communication Support

'Mind Workout' (Textbook 2 P185) requires pupils to think critically. Conduct a class discussion and put up the coins on the whiteboard. Get individual responses and encourage multiple answers from pupils. 'Maths Journal' (Textbook 2 P186) can be done with various combinations of coins and dollar notes. Games can be played where the one with the most number of correct answer wins.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW

4. Sam saved Rs 70 in 10 days.
He saved the same amount of money every day.
How much money did Sam save each day?

$$35 \div 7 = 5$$

Each file costs \$5.

5. A cake costs Rs 5.
How many cakes can Ahmad buy with Rs 20?

$$20 \div 5 = 4$$

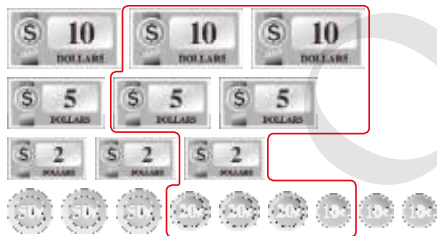
Ahmad can buy 4 cakes.



Mind Workout

Date: _____

Tom has 5 notes and 4 coins.
He has a total of \$32.70.
Circle to show the number of each note and each coin he has.



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Mind Workout

This activity seeks to inculcate the habit of exploring alternative solutions in problem solving as there can be more than one way to solve a problem. Pupils will be trained to be systematic in listing their solutions instead of using inefficient methods such as wild guessing or trial and error.

Workbook 2B P40

PRACTICE

Solve.

- Raju buys 5 packets of biscuits. Each packet of biscuits costs \$4. How much does Raju pay altogether? **\$20**
- Ann buys some watermelons with \$18. Each watermelon costs \$6. How many watermelons does she buy? **3**
- Kate saves Rs 8 every day. How much money will Kate save after three days? **Rs 24**
- 2 cola candies cost Rs 3. How many cola candies can Weiming buy with Rs 15? **10**

Complete Workbook 2B, Worksheet 4B • Pages 39 – 40



MIND WORKOUT

Meiling wants to use coins to make up the amounts shown.

Help Meiling to find the least number of coins she needs to make up each amount.

Example

\$4.65



We can use to help us answer this question.

Meiling needs 7 coins to make up \$4.65.



Textbook 2 P185



MIND WORKOUT

Assign the class to work in pairs and provide play money for the pupils. Allow them to use the coins to make up the required amount of money in the first attempt. Challenge them to use fewer coins in the subsequent attempts for the same amount of money. Ask pupils to observe if there is a method to select the least number of coins.

MATHS JOURNAL

- Meiling needs **2** coins to make up \$1.20.
- Meiling needs **3** coins to make up \$2.50.
- Meiling needs **6** coins to make up \$3.75.

Compare your answers with your classmates.

To find the least number of coins, should we start counting 50¢ or 5¢ first?



MATHS JOURNAL



How much money is there?

There is \$ **31.95**.

Show two ways that you can count to find the total amount of money.

I know how to...

- count the amount of money.
- read and write the amount of money in different ways.
- change dollars to cents. change cents to dollars.
- compare amounts of money.
- solve word problems on money.

SELF-CHECK



Textbook 2 P186

SELF-CHECK



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

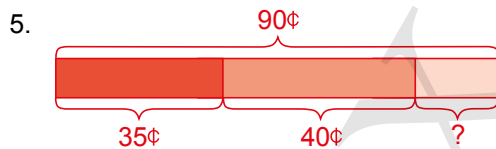
Pupils to complete **Review 10** (Workbook 2B P41 – 44) as consolidation of understanding for the chapter.

1. (a) 0.55
 (b) 62.70
 (c) 71.45

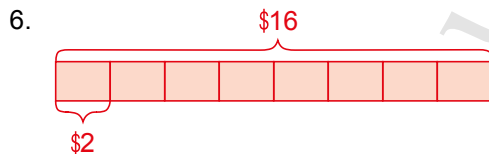
2. (a) 15
 (b) 460
 (c) 605
 (d) 700
 (e) 0.50
 (f) 1.05
 (g) 2.30
 (h) 9.00

3. (a) A
 (b) A
 (c) C, B, A

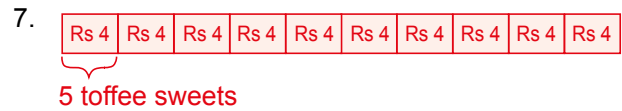
4. (a) Xinyi
 (b) Siti
 (c) Xinyi
 (d) Xinyi
 (e) Siti
 (f) Xinyi, Raju, Siti



$35¢ + 40¢ = 75¢$
 She spends 75¢.
 $90¢ - 75¢ = 15¢$
 She gets 15¢ change.



$16 \div 2 = 8$
 He needs to save for 8 days.



5 toffee sweets

$10 \times 5 = 50$
 She bought 50 toffee sweets.

TWO-DIMENSIONAL SHAPES

CHAPTER

11

Two-Dimensional Shapes CHAPTER **11**

Which objects have shapes with straight lines?



STRAIGHT LINES AND CURVES LESSON **1**

IN FOCUS



ruler disc

Close your eyes and feel the sides of each object. What can you feel?

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Textbook 2 P187

Related Resources

NSPM Textbook 2 (P187 – 207)
NSPM Workbook 2B (P45 – 70)

Materials

2D cut-outs (square, rectangle, triangle, circle, semicircle and quarter circle), A4 papers, CD, dot grid papers, square grid papers, drawing block, glue, markers, pencil, scissors

Lesson

- Lesson 1 Straight Lines and Curves
- Lesson 2 Semicircles and Quarter Circles
- Lesson 3 Making Figures from Shapes
- Lesson 4 Copying Figures
- Lesson 5 Symmetrical Figures
- Lesson 6 Making Patterns

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

In Grade 1, pupils have learnt to recognise, name and describe the 4 basic 2D shapes (rectangle, square, circle and triangle) from real objects and pictures. In addition, pupils are taught to sort and classify these shapes as well as complete patterns with them according to attributes of size, shape and colour. In Grade 2, they continue to visualise, describe and compare shapes using 2D cut-outs, which they can also use to make new composite figures. Straight lines and curves are introduced to describe semicircles and quarter circles according to their properties. Spatial visualisation skills are developed as pupils learn to copy figures on dot grids and square grids by following the position, orientation and composition of the figure. While making and completing geometric patterns, pupils have to consider an additional attribute i.e., orientation.

STRAIGHT LINES AND CURVES

LEARNING OBJECTIVES

1. Identify straight lines and curves in 2D figures.

Two-Dimensional Shapes

CHAPTER 11

Which objects have shapes with straight lines?

STRAIGHT LINES AND CURVES

IN FOCUS

ruler disc

Close your eyes and feel the sides of each object. What can you feel?

187 CHAPTER 11

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Textbook 2 P187



Use the chapter opener to recall the 4 basic shapes. Real objects can be brought to class and get pupils to name and describe them. For example:

A triangle has 3 sides and 3 corners.

A circle has no side and no corners.

Get pupils to close their eyes and feel the sides of their 15-cm ruler. Lead them to describe **the sides of the ruler are straight**. Likewise, give each pupil a disc and get them to feel the edge. Ask them to compare the difference between the side of the ruler and the edge of the disc. Lead them to describe **the edge of the disc is not straight**.

LET'S LEARN

1. Draw with the ruler and a pencil.



These are **straight lines**.

2. Draw with the disc and a pencil.

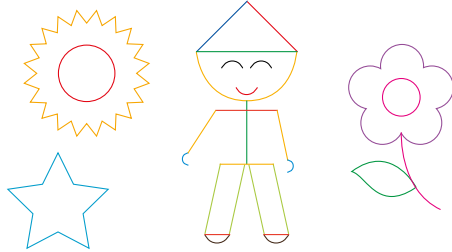


These are **curves**.

What other curves can you draw using a pencil only?



3. Which shape has curves only?
Which shape has straight lines only?
Which shapes have both curves and straight lines?



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TWO-DIMENSIONAL SHAPES

188

Textbook 2 P188

LET'S LEARN

Demonstrate to the class how to draw a straight line using a ruler and pencil and get the pupils to repeat the same procedure. Ask them to draw 3 more straight lines in different orientations and label them as **straight lines**.

Likewise, demonstrate to the class how to draw a curve with a circular disc and get them to repeat the same procedure. Suggest to pupils that they can draw a curve freehand like some letters in the alphabet. For example:

Letter S



Pupils will need to identify which shape has straight lines only, curves only or both in Let's Learn 3.

PRACTICE



Look at the word below.

I S L A M A B A D

- (a) Which alphabets have straight lines only?
- (b) Which alphabets have curves only?
- (c) Which alphabets have both straight lines and curves?

Complete Workbook 2B, Worksheet 1 • Pages 45 – 46

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Textbook 2 P189

PRACTICE



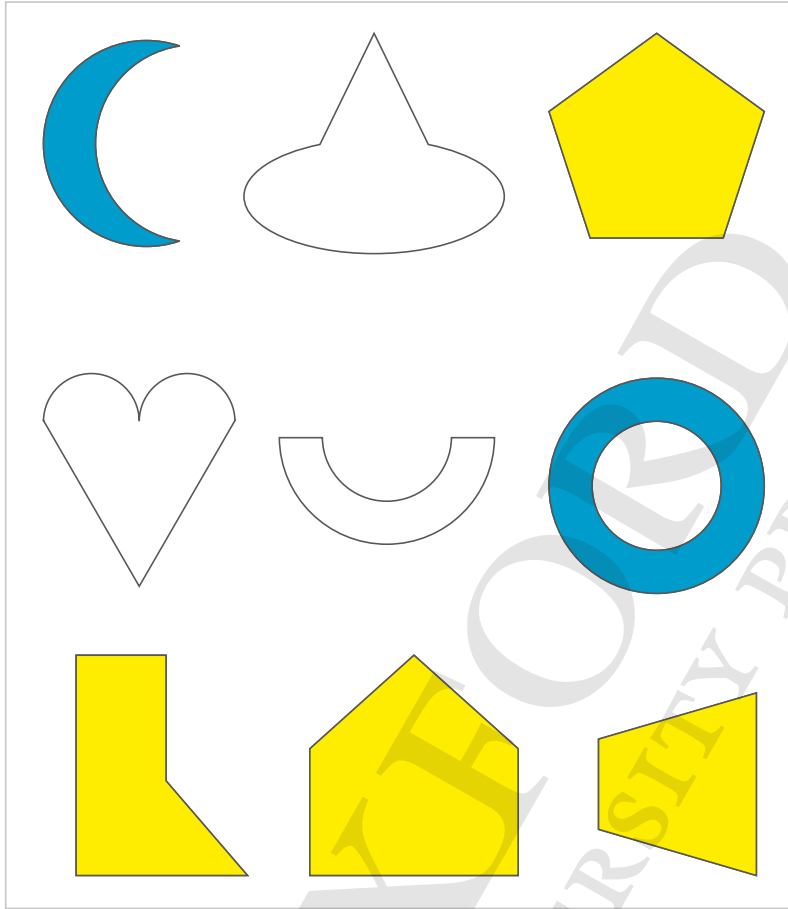
Work with pupils on the questions and selected examples from **Worksheet 1**.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2B P45 – 46).

- 1. (a) D
- (b) A
- (c) B, C

2.



Activity Identifying letters with straight lines only, curves only or both.

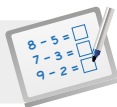
Materials Drawing block, markers

Procedure

1. Assign pupils to work in groups of 4.
2. Provide each group with a piece of drawing paper.
3. Ask pupils to identify which of the letters in the alphabet have straight lines only, curves only and both.
4. Get them to write these letters into the 3 columns on the drawing paper as shown below.

Only straight lines	Only curves	Both

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**Specific Learning Focus**

- Identify straight lines and curves in 2D figures.

Suggested Duration

2 periods

Prior Learning

Pupils should be well-versed with identifying 2D shapes (rectangles, squares, triangles, and circles) in real-life objects. They should also be able to recognise and complete patterns involving 2D shapes according to size, colour and shape. In this lesson, pupils are required to build on this concept to make composite shapes and identify straight lines and curves.

Pre-emptive Pitfalls

The concept involved in this lesson should be easy for pupils to comprehend and it harnesses the pupils' observation skills.

Introduction

Introduce the topic on curves and straight lines to pupils, and teach them how to identify and differentiate between curves and straight lines by bringing in real-life objects. Strengthen their cognitive skills by asking them to feel the straight corners of a table, ruler, book, etc., and the curved corners of a pencil, scissors, ball, disc, etc. The teacher can go through the steps of constructing straight lines and curves on the whiteboard using a ruler to help pupils learn to draw neat straight lines and curves.

Problem Solving

While revisiting the 2D shapes, distribute the 2D shape cut-outs (Activity Handbook 2 45) to pupils and make them trace the shapes with their fingers and write the following properties:

- A rectangle has 2 pairs of equal straight lines.
- A square has 4 equal straight lines.
- A triangle has 3 straight lines.
- A circle has no straight lines but has curves.

Activities

'Practice' (Textbook 2 P189) can be done as an activity. The teacher can bring to the class large cardboard cut-outs of the alphabets shown in the question, for pupils to identify the curves and straight lines on the alphabets.

Resources

- 2D shape cut-outs (Activity Handbook 2 P45)
- real-life objects
- cardboard cut-outs of alphabets (Textbook 2 P189)

Mathematical Communication Support

In this lesson, pupils' skills in drawing straight lines and curves are developed. Pupils will be introduced to draw straight lines and curves which leads to geometrical constructions which will be learnt later. The teacher should verbally go through the steps of construction. For example, in the first step, place a ruler straight on a piece of paper; and in the second step, place the tip of a pencil at the start of the ruler and draw a straight line.

SEMICIRCLES AND QUARTER CIRCLES

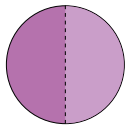
LEARNING OBJECTIVES

1. Explore the relationship between circle, semicircle and quarter circle.

SEMICIRCLES AND QUARTER CIRCLES

LESSON
2

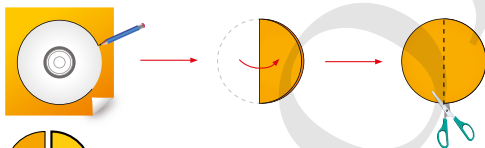
IN FOCUS



The circle is divided into 2 equal parts.
What is the shape of each part?

LET'S LEARN

1. Trace and cut out a circle.
Cut the circle into 2 equal parts.



Each half circle is called a **semicircle**.
A semicircle has 1 straight line and 1 curve.

How many semicircles
make one whole circle?



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TWO-DIMENSIONAL SHAPES

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IN FOCUS

Show a paper circle to pupils. Fold into halves and open up. Explain to pupils that the circle is divided into 2 equal parts. Ask them to name the shape of one part.

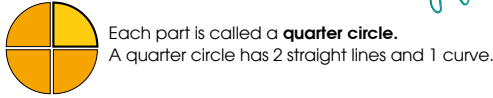
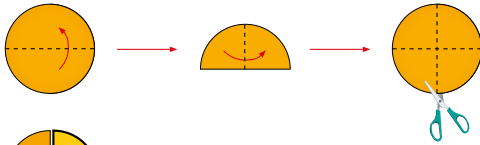
LET'S LEARN

Get pupils to trace and cut out circles using CD if paper circles are not available. Ask pupils to fold and cut the circle into 2 equal parts. Guide the pupils to identify that the half circle is a **semicircle** and describe its features:

A semicircle has 1 straight line and 1 curve.

2. Trace and cut out another circle.

Cut the circle into 4 equal parts.



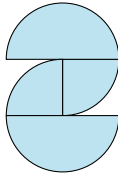
Each part is called a **quarter circle**.
A quarter circle has 2 straight lines and 1 curve.

ACTIVITY TIME

Work in pairs.

- 1 Trace and cut out 4
- 2 Cut 2 circles into .
How many do you get?
- 3 Cut the other 2 circles into .
How many do you get?
- 4 Use the and to make your own figure.
- 5 Get your partner to talk about the shapes you have used to make your figure.

What you need:



Ask pupils to recall how to fold a circle into 4 equal parts from the lesson on fraction. Invite responses before demonstrating to the pupils. Fold and cut another piece of paper circle into 4 equal parts. Guide the pupils to identify that each part is a **quarter circle** and describe its features:

A quarter circle has 2 straight lines and 1 curve.

ACTIVITY TIME



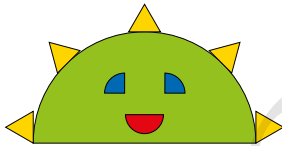
This activity allows pupils to develop their creativity and spatial visualisation as they manipulate the semicircles and quarter circles to form a figure of their choice.

PRACTICE



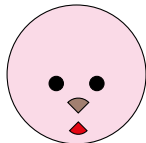
Tick to show the shapes that are used to make each figure.

(a)



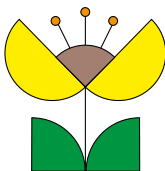
- 0 circle
- 2 semicircle
- 2 quarter circle

(b)



- 3 circle
- 0 semicircle
- 2 quarter circle

(c)



- 3 circle
- 2 semicircle
- 3 quarter circle

PRACTICE

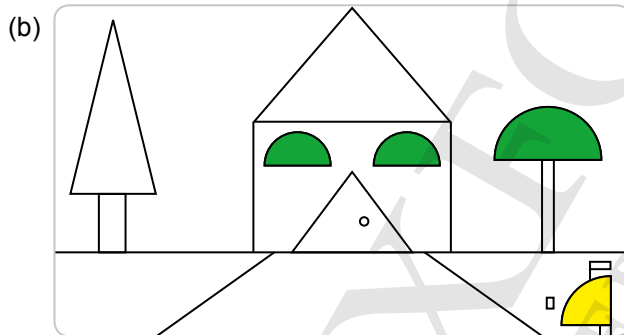
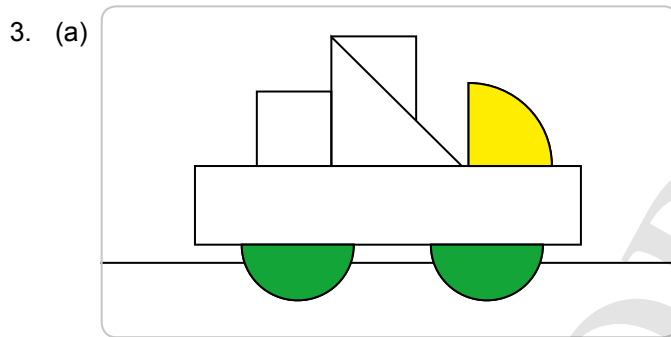
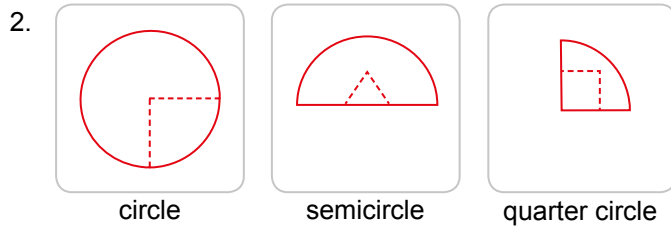
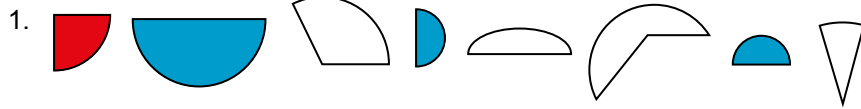


Work with pupils on the questions and ask them what each figure looks like. Get them to identify the number of basic shapes in each figure.

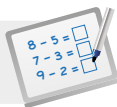
For better understanding, select questions from **Worksheet 2** and work on them with pupils. Allow them to attempt question 2 in class and provide them with scissors and glue to cut and form the shapes.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2B P47 – 50).



4. (a) quarter circle
 (b) semicircle
 (c) semicircle
 quarter circle

**Specific Learning Focus**

- Explore the relationship between circle, semicircle and quarter circle.

Suggested Duration

2 periods

Prior Learning

Pupils have been introduced to halves and quarters in the chapter on fractions in Grade 1. In this chapter, pupils will learn to divide a circle into 2 or 4 equal parts and name each part.

Pre-emptive Pitfalls

This should be a relatively simple lesson that can be learnt through hands-on activities, so pupils should not face any difficulty.

Introduction

Semicircles and quarters of a circle can be introduced through a hands-on activity (Textbook 2 P190 – 191). Real-life objects like cakes, pizzas or any other circular objects can be folded into halves and quarters to explain semicircles and quarters. Explain and enunciate through cut-outs that 2 semicircles make a whole circle and 4 quarter circles make a full/whole circle.

Problem Solving

In 'Practice' (Textbook 2 P192), the question challenges pupils to identify quarter circles and semicircles that make up the composite shapes which are in unusual forms. This question enhances their observational skills. They can also be encouraged to create their own shapes.

Activities

Cut-outs of semicircle and quarter circle can be used by teachers or distributed to pupils to create different shapes and figures.

Resources

- circle, semicircle and quarter circle cut-outs (Activity Handbook 2 P46)
- scissors
- CD
- paper
- glue
- real-life objects with straight lines or curves

Mathematical Communication Support

The teacher can ask pupils to describe the shape they have created using the cut-outs. For example, if the figure in Question (c) in 'Practice' (Textbook 2 P192) was created by a group of 4 pupils, they could explain the following to the class:

- (i) The figure that our group has created is a flower.
- (ii) The petals are made up of two semicircles.
- (iii) The centre (stigma) is made up of a quarter circle and the anthers are made up of 3 circles.
- (iv) The stalk of the flower is a straight line.
- (v) The base of the flower is made up of two quarters.

MAKING FIGURES FROM SHAPES


LEARNING OBJECTIVES


1. Recognise the shapes used to form a figure.
2. Form different figures with shapes.


LESSON
3


MAKING FIGURES FROM SHAPES

RECAP



square


rectangle

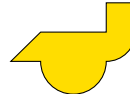

triangle


circle

Can you remember these shapes?



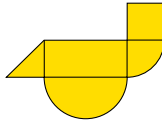
IN FOCUS



Do you know what shapes are used to make this figure?






LET'S LEARN


1. We can draw lines on the figure to show the shapes used.



Can you name the shapes used?

These shapes are used to make the figure shown.



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RECAP

Ask pupils to close their eyes and imagine the four basic shapes (i.e., square, rectangle, triangle and circle) in their heads. Then, show them the shapes.

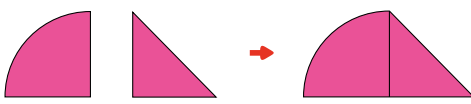
IN FOCUS

Get pupils to discuss with their partners on the shapes that are used to make the figure. Invite responses from the class and write their answers on the board.

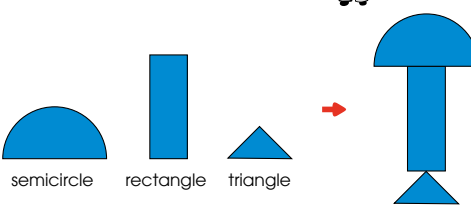
LET'S LEARN

Use the earlier responses to help pupils to visualise the shapes that form the figure and allow them to suggest how to divide the figure. Mark out the shapes on the visualiser and lead pupils to understand that straight lines can be drawn to divide the figure into its constituent shapes.

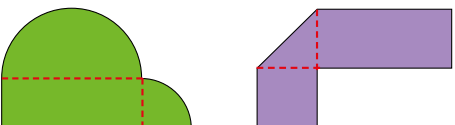
For a more concrete learning experience, prepare the cut-outs of the shapes for manipulation on the visualiser. Use these cut-outs and join them to form the original figure.

2. 
quarter circle triangle

We can use the basic shapes to make different figures.

3. 
semicircle rectangle triangle

4. Look at the figures below.



Draw dotted lines in the figures to show the shapes.
Use shape cut-outs to make these figures.

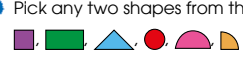
OXFORD UNIVERSITY PRESS TWO-DIMENSIONAL SHAPES 194

Textbook 2 P194

For Let's Learn 2 and 3, invite pupils up to the front to form the composite figures using the cut-outs.

Allow pupils to work in groups for Let's Learn 4 and provide them with the necessary cut-outs to form the figure. Invite some pupils to draw dotted lines to divide the figures over the visualiser.

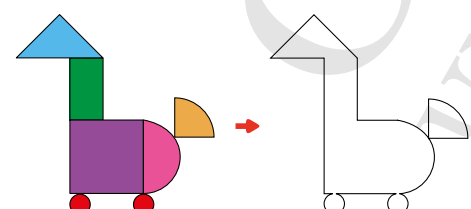
Work in groups of 3 to 4.

1 Pick any two shapes from the 
How are they different?
How are they similar?

2 Use the shapes to form a figure.

3 Trace the outline of the figure on a sheet of paper.

Example



4 Show your classmates the outline.
What shapes do they see?

5 Ask them to form the same figure.

Draw lines in the outline to help you see the shapes in the figure.

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Textbook 2 P195

ACTIVITY TIME 

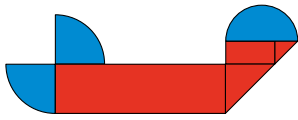
This activity allows pupils to develop their creativity and spatial visualisation as they form composite figures of their choice.

Compile the outlines from all the groups and make into a puzzle book for display in the Mathematics corner. Pupils can work on their friends' outlines during their free time.

PRACTICE

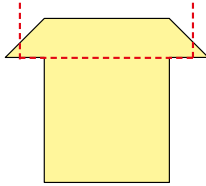


1. Tick to show the shapes that are used to make the figure.



- square
- rectangle
- triangle
- circle
- semicircle
- quarter circle

2. Use dotted lines to show the shapes that make the figure. What shapes can you find?



Complete Workbook 2B, Worksheet 3 • Pages 51 – 54

PRACTICE

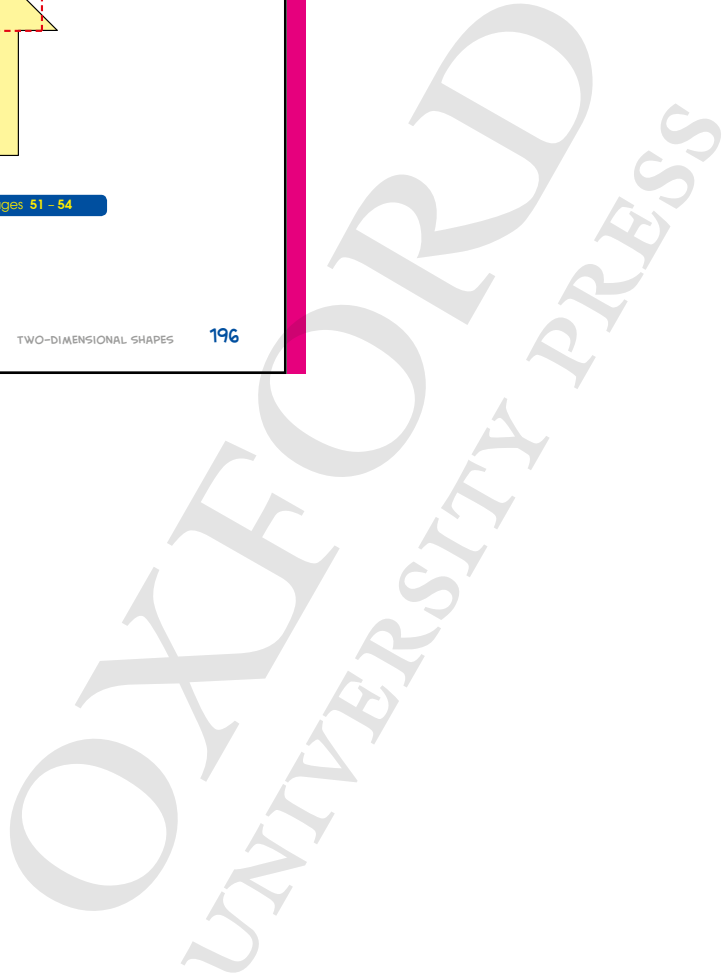


Work with pupils on the practice questions.

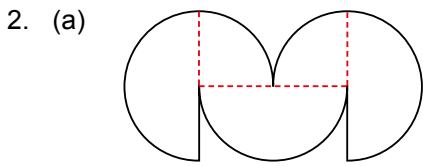
For better understanding, attempt question 3 from **Worksheet 3** with pupils in class. Provide pupils with scissors and allow them to work in pairs to help each other.

Independent seatwork

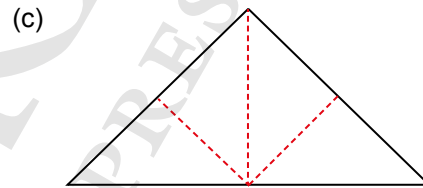
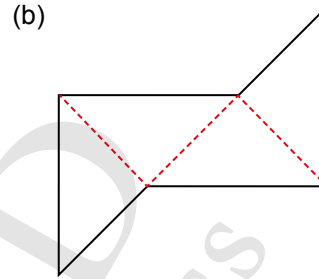
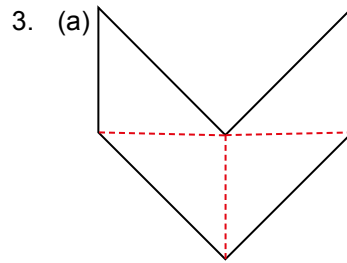
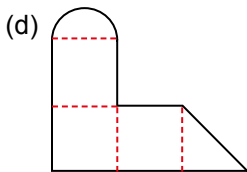
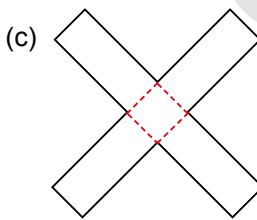
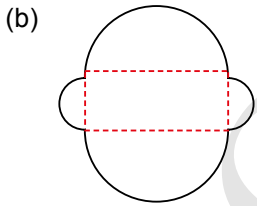
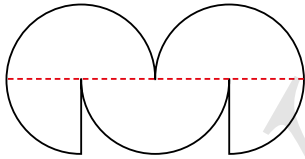
Assign pupils to complete Worksheet 3 (Workbook 2B P51 – 54).

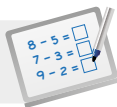


1. (a) triangle circle
 square semicircle
rectangle quarter circle
- (b) triangle circle
 square semicircle
rectangle quarter circle



Alternative solution:



**Specific Learning Focus**

- Recognise the shapes used to form a figure.
- Form different figures with shapes.

Suggested Duration

3 periods

Prior Learning

Pupils should be familiar with the different 2D shapes and their properties. They should know that rectangles, squares and triangles have straight lines while circles have curves.

Pre-emptive Pitfalls

This is a fun chapter where pupils will use shape cut-outs to form composite figures. Have pupils identify the 2D shapes that form the composite figure by drawing dotted lines inside the figure. This might be quite challenging for some pupils. Guide pupils by reminding them of the shapes that have straight lines and the shapes that have curves.

Introduction

This chapter introduces pupils to composite figures. Observational skills are enhanced by making dotted lines and cutting out the 2D shapes used to create the composite figures. This lesson is extremely critical as it lays the foundation for finding the area of the cross section of composite figures, which will be learnt in later grades. It might be a complex exercise for pupils to recognise the shapes used to form a figure. This chapter requires visualisation. Pupils should be encouraged to close their eyes and visualise the different 2D shapes used to form a composite figure. Have them feel the sides and observe the curves and straight lines. Lead them to see that the curve could be a part of a quarter circle, semicircle or circle, while the straight line could be a part of a rectangle, square or triangle. For Let's Learn 1 to 4 (Textbook 2 P193 – 194), provide pupils with shape cut-outs for them to use to form composite figures. In Let's Learn 4, explain to them that drawing dotted lines enables them to divide the composite figure into the 2D shapes that it is made up of.

Problem Solving

In 'Practice' (Textbook 2 P196), question 1 encourage pupils to identify the 2D shapes by visualisation. The list of shapes on the righthand side of the question helps pupils to identify the shapes that are used to make the composite figure. Ticking the correct boxes also strengthens their tabulation and data organisation skills. As such, in the later stage, they should be able to easily identify, classify and then apply the formula of area to find the total area of a figure.

Activities

For this lesson, various 2D shape cut-outs in different coloured papers can be distributed to the pupils to carry out hands-on activities. In 'Activity Time' (Textbook 2 P195), the class can be divided into mixed-ability groups or simply asked to make their own groups of 4. This activity can be conducted as a game where one group member thinks of a composite figure and asks the rest of the group to form that figure by giving them step-by-step instructions. For example, the group member can say: (i) use a triangle to represent the head of an animal, (ii) use a rectangle in the vertical orientation to represent its neck, (iii) use a square to represent its stomach, (iv) place a semicircle on each of the two sides of the square, (v) use a quarter circle to represent its tail, and (vi) use two circles to represent its legs.

Resources

- 2D shape cut-outs (Activity Handbook 2 P47)

Mathematical Communication Support

Encourage pupils to visualise and then classify or identify the 2D shapes. Put up a big composite figure on the soft board and ask the pupils where the dotted lines should be drawn to divide the composite figure into 2D shapes. The teacher can have pupils use the shape cut-outs to form different composite figures and then go to the pupils' tables to look at the figures that they have formed and have them explain how many 2D shapes make up the figure.

COPYING FIGURES

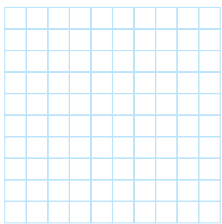
LEARNING OBJECTIVES

1. Copy figures onto square grids and square dot grids.

COPYING FIGURES

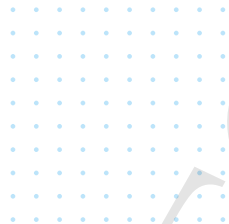
LESSON
4

IN FOCUS



square grid

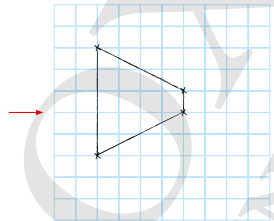
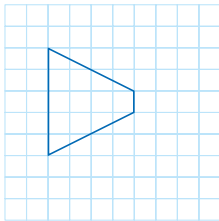
How can we use these to copy figures?



dot grid

LET'S LEARN

1. Copy the figure using square grid paper. Mark out the corners of the figure. Draw lines to join the corners.



197

CHAPTER 11

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IN FOCUS

Provide pupils with square grid and dot grid papers. Show the template of each grid on the visualiser and ask pupils if they can see the squares on both types of grid.

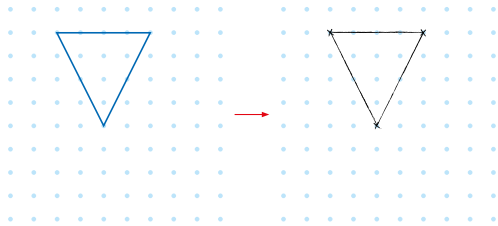
LET'S LEARN

Demonstrate the method of copying figures on the square grid to pupils over the visualiser. Draw the pupils' attention to the composition of the figure, the outlines as bounded by straight lines, the position as well as the orientation of lines (i.e., horizontal, vertical or slanted) with respect to the lines on the square grid.

First, mark out the corners of the figure. Next, copy them on the given blank grid and note their positions by counting the unit squares. Draw lines to join the corners to get the figure.


Textbook 2 P197

2. Copy the figure using dot grid paper. Mark out the corners of the figure. Draw lines to join the dots.

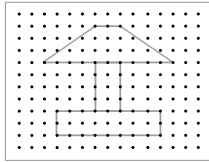


ACTIVITY  **TIME**

Work in pairs.

- 1 Make a figure on a dot grid. You can do this with a computer or on a .

What you need:



- 2 Get your partner to copy the figure using .
- 3 Take turns and repeat 1 and 2.

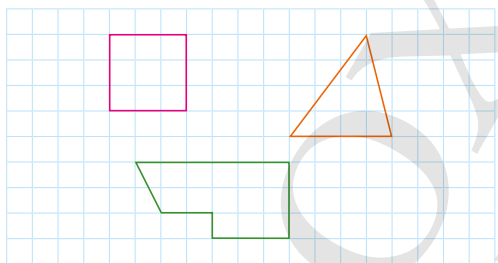
Repeat the procedure of figure copying on dot grid paper.

ACTIVITY  **TIME**

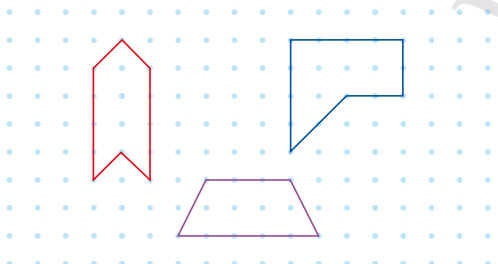
Allow pupils to work in pairs. If geoboards are available, get one pupil in the pair to make a figure on the geoboard and let the partner copy it onto the dot grid. To save time, pupils can draw or make their figures first and then exchange with each other to copy.

PRACTICE 

1. Copy these figures onto a piece of square grid paper.



2. Copy these figures onto a piece of dot grid paper.



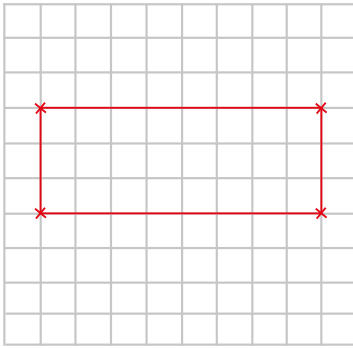
PRACTICE 

Allow pupils to practise the questions with one figure at a time. Help them to organise the spacing of their drawings so that there is sufficient space for all three figures to fit on a sheet of grid paper. Pay attention to pupils who may be weaker in visualisation or have poor psychomotor skills as required of this task.

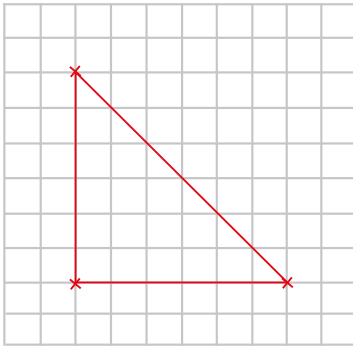
Independent seatwork

Assign pupils to complete Worksheet 4 independently (Workbook 2B P55 – 58).

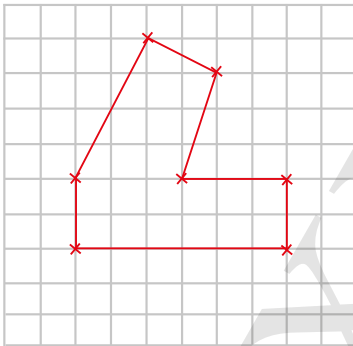
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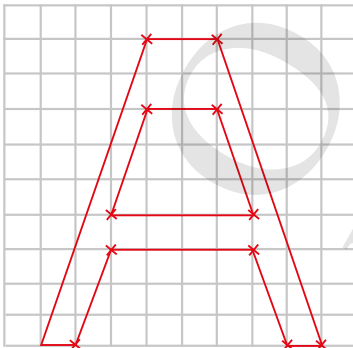
(b)



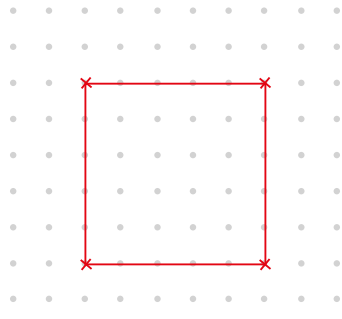
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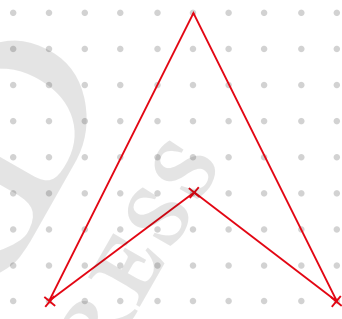
(d)



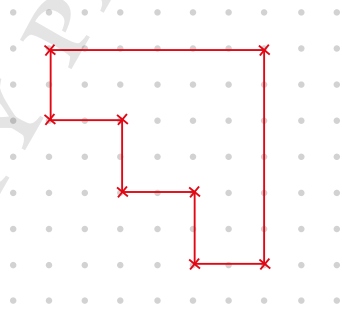
2. (a)



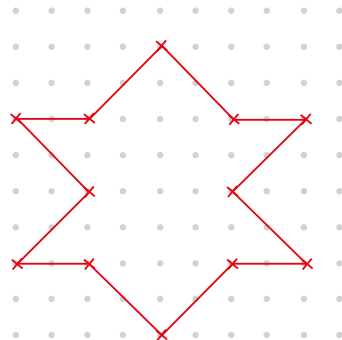
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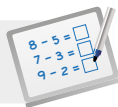


(c)



(d)



**Specific Learning Focus**

- Copy figures onto square grids and square dot grids.

Suggested Duration

2 periods

Prior Learning

Pupils have learnt how to draw straight lines and curves using rulers and discs.

Pre-emptive Pitfalls

In this lesson, pupils will be required to accurately copy figures onto square grids and square dot grids using a ruler. This might be a bit challenging for some pupils as this is a new skill that they are being introduced to. This skill is necessary in order to build the foundation for geometrical constructions at a later stage.

Introduction

Distribute square grids and square dot grids to pupils for them to copy figures (Activity Handbook 2 P48). Practice questions can be given to pupils in the form of worksheets or written on the whiteboard. Encourage pupils to count the squares or dots on the square grids or square dot grids to copy the figure. The teacher can ask pupils to copy similar shapes like the ones in Textbook 2 P199 on square grids and square dot grids for more practice.

Problem Solving

This is the lesson that forms the basis of geometrical constructions to be learnt in the later grades. The teacher should emphasise to pupils that the length of each side of the shape can be determined by counting the squares or dots on the square grids or square dot grids. The shapes found in this lesson consist of straight lines in different orientations (vertical, horizontal and slanted). Explain to pupils that a slanted line is drawn obliquely from one point or dot to the other across the dots or squares.

Activities

In 'Activity Time' (Textbook 2 P198), the teacher may distribute geoboards to pupils if available. If geoboards are not available, one partner can think of a figure and draw it out on a square grid or square dot grid, and then get the other partner to copy the figure. Get them to exchange roles.

Resources

- square grid papers
- dot grid papers
- markers
- rulers
- figures on Dot Grid (Activity Handbook 2 P48)

Mathematical Communication Support

Give pupils lots of questions to practise. The questions in Workbook 2B P55 – 58 enable pupils to build up the foundation in geometrical drawing. The teacher can give attention to individual pupils who lack psychomotor skills to help them. Have class discussions before giving pupils questions to solve. Encourage individual responses by asking pupils how many vertical, horizontal and slant lines they see in the figure to be copied or how many dots make up each line. Encourage visual perception by asking them what shapes they see in the composite figure. Encourage them to identify the 2D shapes that make the composite figure before copying the figure.

SYMMETRICAL FIGURES

LESSON

5

LEARNING OBJECTIVES

1. Identify symmetrical figures and draw the lines of symmetry.

SYMMETRICAL FIGURES



LESSON
5

IN FOCUS


What do you notice about these pictures?



LET'S LEARN

1.  A line cuts the shape into two equal halves. This line is called the **line of symmetry**. It forms a mirror image.
2.  This shape has a line of symmetry which is vertical.

When the shape is folded along its line of symmetry, one side matches the other side.

Such figures are called **symmetrical figures**.
3.  The letter B has a line of symmetry which is horizontal.

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TWO-DIMENSIONAL SHAPES 200


Textbook 2 P200


IN FOCUS

Get pupils to describe and explain verbally (mathematical communication and reasoning) what they notice about the heart shape and butterfly. Direct pupils to use phrases like 'sides meet', 'mirror image' etc. Provide more examples of each of the following categories – shape, letter and picture, with different lines of symmetry (horizontal, vertical or diagonal). Introduce the terms 'symmetrical figure', 'line of symmetry' and 'symmetrical'.

LET'S LEARN

Provide pupils with paper cut-outs of the figures shown in Let's Learn 1 to 4. Teacher will demonstrate the folding action of one of the cut-outs. Next, instruct pupils to fold along the dotted line and ask them what the dotted line is called.

4.  This shape has 4 lines of symmetry.





A symmetrical figure can have more than one line of symmetry. 

5. These are not symmetrical figures. Why?



ACTIVITY TIME 

Work in pairs.

- 1 Think of a shape with 1 line of symmetry and draw it on . What you need: 
- 2 Talk about the line of symmetry with your classmates.
- 3 Think of a shape with no line of symmetry and draw it on .
- 4 Tell your classmate why there is no line of symmetry.
- 5 Think of a shape with more than 1 line of symmetry and draw it on .
- 6 Discuss how many lines of symmetry there are with your classmates.

Repeat the same process for Let's Learn 4 and 5. In Let's Learn 4, encourage pupils to explore other line(s) of symmetry by folding horizontally, vertically and diagonally. Give pupils time to manipulate the given cut-outs. Emphasise to pupils that a symmetrical figure can have more than one line of symmetry. In Let's Learn 5, select pupils to provide verbal reasoning for each figure.

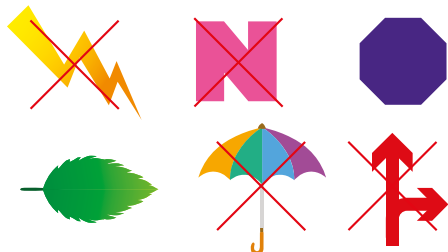
ACTIVITY TIME 

Get pupils to work in pairs. Ask pupils to think of a shape with 1 line of symmetry and draw the shape on the drawing block. Get them to draw the line of symmetry on the shape. Repeat the same process for a shape with no line of symmetry and a shape with more than 1 line of symmetry. Allow pupils to present their work and reasoning.

1. Circle the figures that have one or more lines of symmetry. Draw the lines of symmetry.



2. Cross out the figures that are not symmetrical.













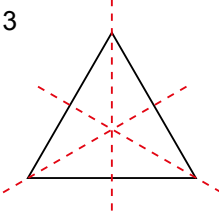
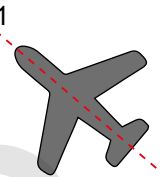
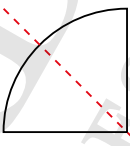
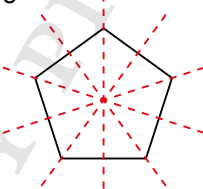
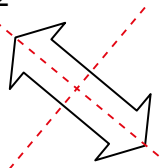
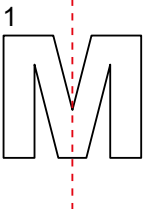
PRACTICE 

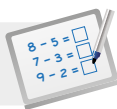
Work with pupils on the practice questions. Provide cut-outs of figures if pupils are unable to visualise the line of symmetry. For Question 1, encourage pupils to explore more than one line of symmetry. For Question 2, start a class discussion by asking pupils what they can change to make the umbrella a symmetrical figure. Also, discuss why the letter N is not a symmetrical figure.

Independent seatwork

Assign pupils to complete Worksheet 5 (Workbook 2B P59 – 60).

1. (a) 
- (b) 
- (c) 
- (d) 
- (e) 
- (f) 
- (g) 
- (h) 
- (i) 
- (j) 

2. (a) 3 
- (b) 1 
- (c) 1 
- (d) 5 
- (e) 2 
- (f) 1 

**Specific Learning Focus**

- Identify symmetrical figures and draw the lines of symmetry.

Suggested Duration

2 periods

Prior Learning

Pupils have prior knowledge of vertical, horizontal and slanted lines. They have cut circles into semicircles and quarter circles before.

Pre-emptive Pitfalls

This should be a relatively easy lesson for pupils and they should be encouraged to learn with the help of shape cut-outs in order to understand symmetry easily.

Introduction

Quite a few key terms are introduced in this lesson. For example, 'line of symmetry' is the line that cuts the shape into two equal halves, and 'mirror images' are images that are exactly the same. To further explain the meaning of mirror images, the teacher may explain to pupils that when we look in the mirror or place a shape cut-out in front of the mirror, the exact person or shape is seen on the mirror. This concept forms the basis of geometrical transformation and congruency which will be learnt at a later stage. Explain that in order to create two equal halves or mirror images, vertical, horizontal or slanted lines can be used. Use real-life objects to explain that not all shapes can be divided into two equal halves or mirror images. Let them know that shapes that can be divided into two equal halves are called 'symmetrical figures'. Emphasise that a shape can have more than one line of symmetry. Draw shapes like squares, rectangles and equilateral triangles on the whiteboard to show examples of such shapes.

Problem Solving

Use the cut-outs of alphabets in class and ask pupils to use a ruler to draw lines of symmetry on the cut-outs to identify which alphabets are symmetrical. For example, 'Z' and 'N' do not have any line of symmetry, while 'M' and 'W' have one vertical line of symmetry each. 'C' and 'B' have one horizontal line of symmetry each, while 'X' and 'H' have more than one line of symmetry each. Encourage pupils to make a list of symmetrical figures.

Activities

The activity in 'Activity Time' (Textbook 2 P201) can be done collectively or in pairs. The teacher can give pupils a cue, for example, 'draw a figure with one line of symmetry' or 'a figure with 1 horizontal line of symmetry'. Other similar cues can be called out for pupils to draw the shapes on their mini whiteboards and then get them to raise their whiteboards in the air once done.

Resources

- cut-outs of alphabets
- markers
- drawing blocks
- real-life objects

Mathematical Communication Support

Have class discussions and ask pupils if the shapes in Textbook 2 P202 and Workbook 2B P59 – 60 are symmetrical or non-symmetrical. Ask pupils why they are able to visualise that the 'lightning bolt' cannot be divided into two equal halves. To help pupils recognise if the shape is symmetrical or not, prompt pupils by asking 'Do you think we can draw a line to create mirror images?'. Ask pupils questions that will guide their visual perception and hence derive the correct answer.

LEARNING OBJECTIVES

1. Make and complete patterns with cut-outs of 2D shapes using one or two of the following attributes: shape, size, orientation and colour.

MAKING PATTERNS

IN FOCUS

What shape comes next in the pattern?

LESSON

6

LET'S LEARN

1.

The next shape is .

This is a pattern using different **shapes**.

Look at the next few patterns.
What comes next?

LET'S LEARN

2.

The next shape is .

This is a pattern using shapes of different **sizes**.

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Textbook 2 P203

IN FOCUS

Help the pupils to understand that the pattern is a repetition of shapes by asking the following questions:

- Is this a pattern?
- Why do you say it is a pattern?

LET'S LEARN

In Let's Learn 1, guide pupils to see the repeated pattern of the three shapes (semicircle, triangle and rectangle) by asking the following questions:

- What do you see in this pattern?
- What about the colour?
- Did you see different shapes?

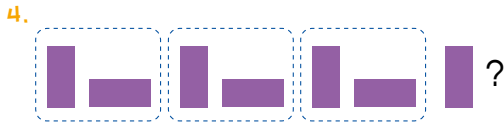
Lead pupils to read the pattern aloud 'semicircle, triangle, rectangle, semicircle, triangle, rectangle, semicircle, triangle, rectangle, semicircle' and ask them what comes next. Once pupils can identify this repeated pattern, it will help them to guess what comes next.

In Let's Learn 2, guide pupils to identify the repeated pattern by looking for things that do not change and things that change such as shape, size, colour, orientation or any other attribute. Lead pupils to see it is a pattern of using shapes of different sizes.



The next shape is .

This is a pattern using shapes of different **colours**.



The next shape is .

This is a pattern using shapes in different **orientations**.

What is the pattern?



What pattern do you see?



This is a pattern using different shapes and sizes.

Repeat the procedure Let's Learn 3 to 5. Ask pupils to read aloud the repeated patterns of one or more shapes. Guide them to identify things that do not change and things that change in the repeated pattern. Get them to articulate the attribute of the pattern. Once pupils can identify the repeated pattern, it can help them to guess what comes next easily.

Work in groups of 3 to 4.

- 1 Think of a pattern.
- 2 Describe the shapes in the pattern. Ask your group members to name them.

What you need:



I am thinking of a pattern with two shapes. One shape is round. The other shape has three sides.

There is a circle in the pattern.

There is a triangle in the pattern.



- 3 Trace and colour the on the to show your pattern.
- 4 Talk about the pattern with your group members.
- 5 Take turns and repeat 1 to 4.

PRACTICE

What is the missing shape in each pattern below?

- (a)
- (b)
- (c)
- (d)

ACTIVITY TIME

This group activity enables pupils to articulate the patterns that they have made using appropriate terms such as a *repeated pattern of a group of one or more shapes*. At the end of the activity, allow each group to present their pattern to the class and let the rest guess what comes next in the pattern.

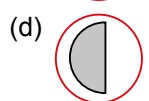
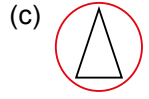
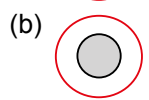
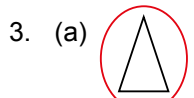
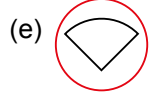
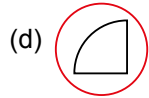
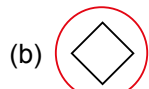
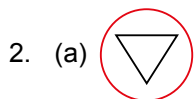
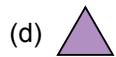
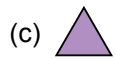
PRACTICE

Emphasise the attribute to pupils and allow them to articulate the pattern aloud. Guide them to identify the repeated pattern in order to guess what comes next.

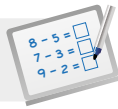
For better understanding, select and work with pupils on the questions from **Worksheet 6**.

Independent seatwork

Assign pupils to complete Worksheet 6 (Workbook 2B P61 – 63).



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**Specific Learning Focus**

- Make and complete patterns with cut-outs of 2D shapes using one or two of the following attributes: shape, size, orientation and colour.

Suggested Duration

3 periods

Prior Learning

Pupils should have a clear understanding of how to identify number and shape patterns learnt in earlier grades. They are required to identify the attribute(s) of the pattern and thus complete the pattern.

Pre-emptive Pitfalls

Pupils need to apply their visualisation and observation skills in this lesson. Identification of the pattern in one or two of the attributes might be quite challenging for some pupils. Give individual attention to pupils who have difficulties and guide them by asking pertinent questions which would lead them to identify the pattern.

Introduction

Go through 'Let's Learn' (Textbook 2 P203 – 204) collectively in class before getting pupils to work independently to complete the patterns. Guide them to predict the pattern by asking them '(i) What 2D shapes can you identify? (ii) Which attribute remains the same in the pattern (e.g. colour, shape)? (iii) Which attribute changes in the pattern? (iv) What uniform recurrence or repeated pattern can you see?'. Once they are guided in this thought process, they should be able to complete the pattern. Encourage them to work on assignments independently by discussing and then get them to do the questions in Workbook 2B (P61 – 63) as an evaluative task.

Problem Solving

This lesson emphasises the identification of the similarities and differences in a pattern, as well as the repeated pattern. Pupils are encouraged to observe and identify the attribute of each shape in the pattern, thereby identifying the repeated pattern in order to complete the pattern. 'Mind Workout' (Textbook 2 P206) strengthens pupils' spatial visualisation skills. In question (b) of 'Practice' (Textbook 2 P205), pupils are required to identify the orientation of the rectangles to recognise the pattern. Give individual attention to pupils to guide them to identify the repeated pattern and hence complete the pattern.

Activities

'Activity Time' (Textbook 2 P205) is a fun activity where pupils learn and play. The mathematical communication aspect of this activity can be emphasised by the teacher, who can encourage pupils to articulate patterns they have made and have the rest of the group complete the pattern.

Resources

- 2D shape cut-outs (Activity Handbook 2 P47)
- drawing block
- markers
- glue

Mathematical Communication Support

'Maths Journal' (Textbook 2 P206) encourages pupils to articulate the attributes of the shapes. Ask them to write a letter to a friend to explain to him or her what have been learnt. The letters written by pupils can be put on the classroom softboard for all to read. This will enhance their mathematical language and creativity using the visualisation and spatial knowledge of shapes.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout

Date: _____

Circle the shape that comes next.

(a)

(b)

(c)

(d)



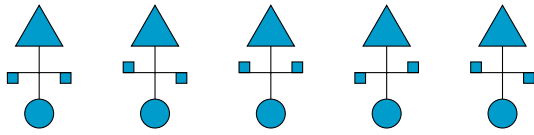
Mind Workout

Guide pupils to look at the overall pattern to identify the attribute (i.e., the thing(s) that has or have changed in the pattern). Allow pupils to read the pattern aloud, identify the repeated pattern and guess what comes next in the pattern.



MIND WORKOUT

Look at the figures below.



What shapes are used to form each figure?
Circle the two figures that are exactly the same.

MATHS JOURNAL

Write a letter to tell your friend what you have learnt.

Make a figure using semicircles and quarter circles.
You may use the shapes tool on your computer to help you create the figure.

Dear _____,

Today I learnt about semicircles and quarter circles.

A semicircle _____

A quarter circle _____

This is a figure I made using the shapes.

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TWO-DIMENSIONAL SHAPES 206

Textbook 2 P206



MIND WORKOUT

Pupils will need to use their spatial visualisation skills to observe the similarities (shapes) and differences (orientations) among the five figures to pick out the pair of similar figures.

MATHS JOURNAL

The journal task allows pupils to reflect and communicate their understanding in the form of a letter to their friends. Ask pupils to copy the format of the letter onto their journal book and fill in the blanks. Get them to paste figures made from semicircle and quarter circle cut-outs onto the letter.

I know how to...

SELF-CHECK

- name and describe squares, rectangles, triangles, circles, semicircles and quarter circles.
- form different figures with shapes.
- tell the shapes that make up a figure.
- copy figures on square grid and dot grid paper.
- identify symmetrical figures.
- identify a line of symmetry of a figure.
- make and complete patterns.
- tell how patterns are formed from shapes.

SELF-CHECK



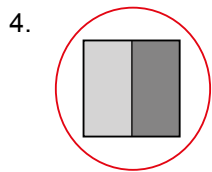
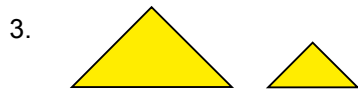
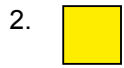
This self check can be done after pupils have completed **Review 11** (Workbook 2B P65 – 70) as consolidation of understanding for the chapter.

207 CHAPTER 11

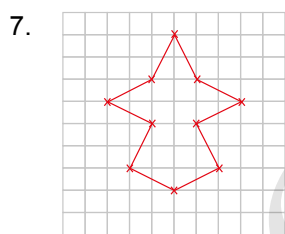
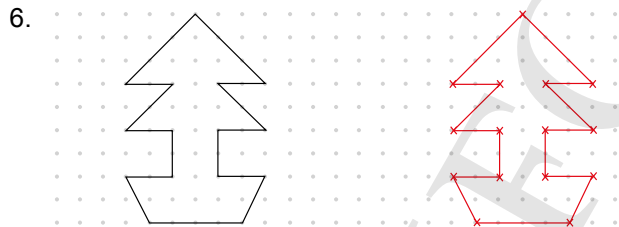
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Textbook 2 P207

1. (a) True
(b) False



5. (a) A
(b) B
(c) B



8. (a) ✗
(b) ✗
(c) ✓
(d) ✗
(e) ✗
(f) ✓

9. (a) ✗
(b) ✗
(c) ✓
(d) ✗
(e) ✗
(f) ✓

THREE-DIMENSIONAL SHAPES

CHAPTER 12



Related Resources

NSPM Textbook 2 (P208 – 221)
NSPM Workbook 2B (P71 – 84)

Materials

3-D Mini GeoSolids (cone, cube, cuboid, cylinder, pyramid and sphere), bag, blindfold

Lesson

- Lesson 1 Recognising Three-Dimensional Shapes
 - Lesson 2 Grouping Three-Dimensional Shapes
 - Lesson 3 Forming Three-Dimensional Figures
 - Lesson 4 Making Patterns
- Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

In this second chapter on geometry, pupils are given the opportunity to feel three-dimensional (3D) models or real objects of the basic shapes to recognise flat faces and curved surfaces. They can name basic 3D shapes such as sphere, cuboid, cube, cylinder, cone and pyramid, and describe their features i.e., having flat faces or curved surfaces. Pupils will sort and classify 3D shapes, as well as complete patterns with these shapes according to attributes such as size, shape, colour and orientation. Spatial visualisation skills are developed in the process when pupils form figures from the basic 3D shapes as well as break these composite figures into its constituent basic shapes.

RECOGNISING THREE-DIMENSIONAL SHAPES

LEARNING OBJECTIVES

1. Recognise flat faces and curved surfaces.
2. Name and describe sphere, cuboid, cube, cylinder and cone.

Three-Dimensional Shapes

What is the shape of each object?



CHAPTER

12

RECOGNISING THREE-DIMENSIONAL SHAPES

LESSON 1

IN FOCUS



Move your hand over these objects. Are the surfaces flat or curved?

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Textbook 2 P208



Using the chapter opener, ask pupils if they have seen these five shapes at home or outside. Get pupils to name the objects in the picture (ball, hat, Rubik's cube, tissue box, a roll of biscuits, four-sided die, etc.).

Prepare sets of these six shapes (either with real objects or 3D models of the shapes). Assign the class into groups of 4 to 5 pupils and give each group a set of these shapes. Allow them to feel the objects and discuss the following questions:

- Are these surfaces flat or curved?
- Which of them has no flat faces at all?
- Which have all flat faces?
- Which have both flat faces and curved surfaces?

LET'S LEARN

1.



A ball is shaped like a **sphere**.
The surface of a sphere is **curved**.

A sphere has no flat faces. It can roll.

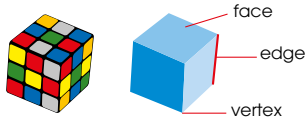


2.



A tissue box is shaped like a **cuboid**.
A cuboid has flat faces.
The flat faces are squares or rectangles.

3.



The object is shaped like a **cube**.
A cube has flat faces.
The flat faces are squares.

A cuboid and a cube both have 6 flat faces. How are they different?



4.



The object is shaped like a **cylinder**.
A cylinder has flat faces and a curved surface.
The flat faces are circles.

A cylinder has 2 flat faces.



Use both the 3D models and real objects for the teaching of shapes. In Let's Learn 1, show a ball and the 3D model of a sphere to the pupils. Ask the following questions:

- Are the shapes of these two objects the same?
- Is the surface flat or curved?
- Why can it roll? (Demonstrate to pupils by rolling the objects on the floor)

Lead pupils to understand a ball is shaped like a **sphere** and a **sphere has no flat faces so it can roll**.

Likewise, introduce Let's Learn 2 using a tissue box and the 3D model of a cuboid. Emphasise on the following features of a cuboid:

- Number of faces
- Corners
- Edges

Introduce the shape of a cube in a similar way as the cuboid. Allow pupils to work in pairs to analyse the similarities and differences between a cuboid and a cube. Lead them to see that **a cube is a special cuboid because all the 6 faces are squares**.

Use the 3D models and real objects to introduce a cylinder and a cone. Ask pupils to state the similarities and differences between these two shapes. They should observe the two shapes have both flat faces and curved surfaces.

Work with pupils by rolling the 3D shapes and compare with how a sphere rolls. Lead them to see that only shapes with curved surfaces can roll but in different ways:

- A sphere has no flat faces so it can roll in different directions.
- A cylinder can roll along the curved surface in one direction.
- A cone rolls on its curved surface about one fixed point.

Introduce the shape of a pyramid using the 3D models and real object. Pupils should observe that a pyramid has flat faces only. Introduce the two types of pyramid – rectangular pyramid and triangular pyramid. Lead them to see that the name of the pyramid follows the shape of its base.

5.

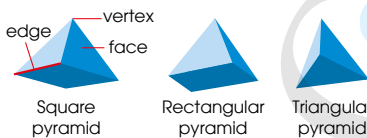


The object is shaped like a **cone**.
A cone has a flat face and a curved surface.
The flat face is a circle.

Which objects can roll?



6.



A **pyramid** has flat faces.
The base is a shape with straight edges.
The sides are triangles that meet at the top.

A pyramid is named after the shape of its base.



ACTIVITY TIME



This activity enables pupils to develop a deeper understanding of 3D shapes. The tactile experience allows pupils to analyse the features of these shapes in terms of their similarities and differences, and their relationships with one another. Allow pupils to work in pairs to discuss the shapes using the geometric terms that they have learnt.

Work in pairs.

- 1 Put the in the bag.
- 2 Cover your eyes with a . Pick a solid from the .
- 3 Feel the solid and describe it to your partner. Guess the shape and check your answer.
- 4 Take turns and repeat 2 to 3.
- 5 Look at the solids that your partner picked. How are they similar? How are they different?

What you need:

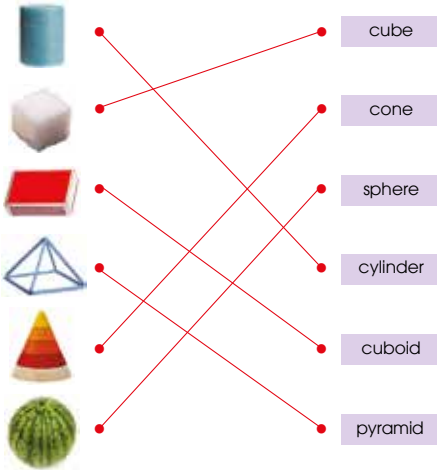




1. Which object has both flat faces and curved surfaces?



2. Match the objects and the shapes.



Textbook 2 P211

Work with pupils on the questions and selected examples from **Worksheet 1**.

3. Complete the table.





Object	Name of object	Number of edges	Number of faces	Number of vertex/vertices
	cube	10	6	8
	cylinder	2	3	0
	sphere	0	1	0
	cone	1	2	1
	pyramid	6	4	4
	cuboid	12	6	8

Complete Workbook 2B, Worksheet 1 • Pages 71 – 74

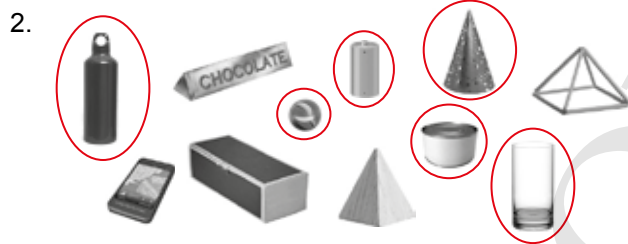
Textbook 2 P212

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2B P71 – 74).

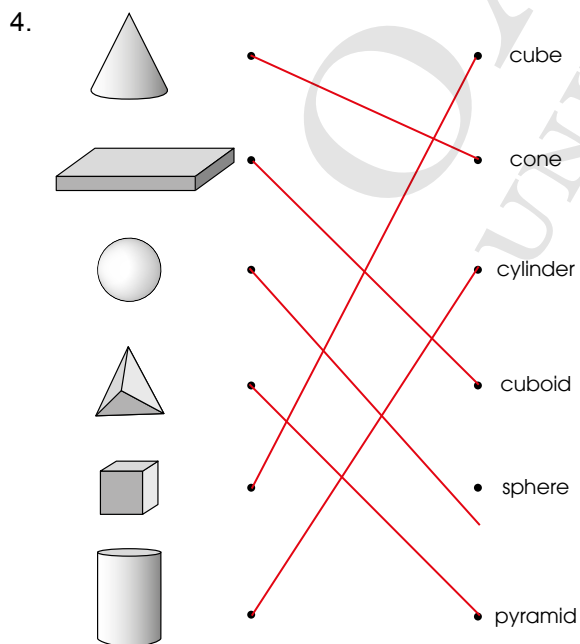
1.	Object	Flat faces	Curved surfaces
			✓
		✓	
		✓	✓
		✓	

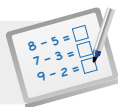
5.	C	A	T	F	G	H	K	L
	O	S	P	H	E	R	E	X
	N	C	B	O	M	D	S	W
	E	M	N	U	E	R	H	O
	T	C	U	B	O	I	D	J
	P	Y	R	A	M	I	D	Q
	C	Y	L	I	N	D	E	R
	A	B	C	U	B	E	G	H



curved

3. (a) sphere
 (b) cube
 (c) cone
 (d) cuboid



**Specific Learning Focus**

- Recognise flat faces and curved surfaces.
- Name and describe sphere, cuboid, cube, cylinder and cone.

Suggested Duration

2 periods

Prior Learning

In this chapter, pupils are formally introduced to the 3D shapes. In Grade 1, they have been formally introduced to names of 2D shapes only.

Pre-emptive Pitfalls

3D shapes, as the name suggests, are three-dimensional, where not only do the shapes have length and height, they also have depth. This can be quite challenging for some pupils to comprehend. To help pupils comprehend, a 2D shape can be best explained as a shape that does not contain any space or material, but when it has a third dimension, space is formed within it.

Introduction

Two concepts need to be reinforced when introducing 3D shapes:

- (i) A 3D shape has three dimensions and has space within it.
- (ii) A 3D shape can have a flat or curved surface, or both flat and curved surfaces.

Problem Solving

Pupils need to have a clear understanding of key terms like 'edge', 'face' and 'vertex' of a 3D shape. In 'Practice' (Textbook 2 P212), encourage pupils to feel the shapes and fill in the table. Show pupils real-life objects or 3D shapes made by nets (Activity Handbook 2 P49 – 51) and have them identify the edge, face and vertex of these objects.

Activities

In 'Activity Time' (Textbook 2 P210), get pupils to collect real-life objects in a bag, group pupils in pairs and encourage one pupil of each pair to describe the shape using key terms like 'vertex', 'edge' and 'face' so that the partner can identify the shape.

Resources

- nets of 3D shapes (Activity Handbook 2 P49 – 51)
- real-life objects

Mathematical Communication Support

Encourage description of objects using key terms. Use the shape word cards (Activity Handbook 2 P52) to encourage pupils to identify real-life objects in the classroom that are in those shapes. The cards can also be used to help pupils memorise the names and spellings of 3D shapes.

GROUPING THREE-DIMENSIONAL SHAPES

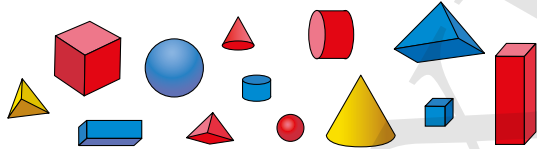
LEARNING OBJECTIVES

1. Sort and classify 3D shapes according to attributes.

GROUPING THREE-DIMENSIONAL SHAPES

LESSON
2

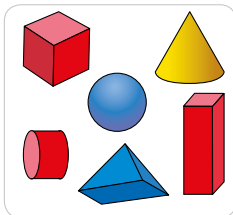
IN FOCUS



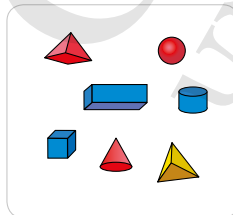
These are three-dimensional shapes. Match them with real objects. How can we group the solids?

LET'S LEARN

1. We can group the solids by size.



Big



Small

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IN FOCUS

Ask the class to identify the various shapes. Guide pupils to sort and classify these shapes with the following questions:

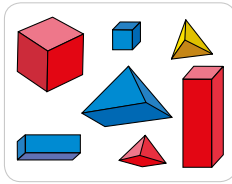
- What is the name of this shape?
- For objects with similar shapes, what is the difference between them? (big and small; red and blue colour)
- How many 3D solids are there altogether?
- How can we group these solids?

LET'S LEARN

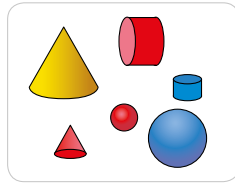
Note: Let's Learn to be done after Activity Time so that teaching in this segment can be conducted based on the pupils' exploration in grouping.

For groups who sorted according to size, allow one group to come forward and present their groupings to the class.

2. We can group the solids by the type of faces they have.

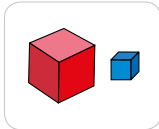


All flat faces
Cannot roll

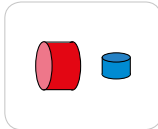


Has curved surfaces
Can roll

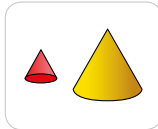
3. We can group the solids by shape.



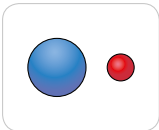
Cubes



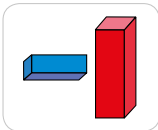
Cylinders



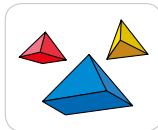
Cones



Spheres



Cuboids



Pyramids

How else can we group the solids?



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THREE-DIMENSIONAL SHAPES

214

Textbook 2 P214

Allow another group who sorted by the types of faces to come forward and present their groupings to the class. Ask pupils what is the common attribute in each group and the difference between the two groups. For example:

All have flat faces in one group whereas all have curved surfaces in the other group.

In one group, all cannot roll whereas in the other group, all can roll.

Ask for other methods of grouping from the class. Pupils may group according to colours. Some may even group the spheres in one set (no flat faces) and the rest in the other set (one or more flat faces). For those with incorrect groupings, ask the class what are the mistakes in the groupings.

ACTIVITY TIME



Work in groups of 4.

- 1 Look at the Take turns to group them.
- 2 Tell your classmates how you group them.

ACTIVITY TIME

What you need:

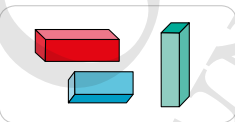
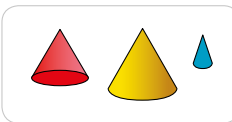


PRACTICE

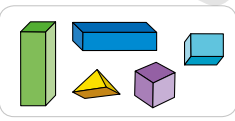
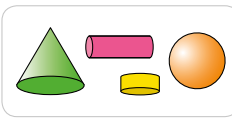


How are the shapes grouped?

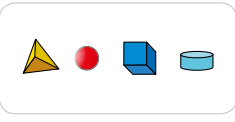
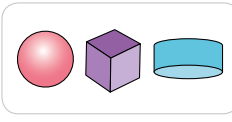
(a)



(b)



(c)



PRACTICE



Note: Activity Time to be done before Let's Learn to allow pupils to sort and classify the objects according to the similarities and differences that they observe.

Ask pupils to sort and classify the solids (In Focus, P213) into two groups. Guide them to discuss and explain how they grouped the solids by asking the following questions:

- What is similar about the solids in each group?
- What is the difference between the two groups?

Work with pupils on the questions and allow them to articulate the attributes for the groupings.

For better understanding, select questions from **Worksheet 2** and work on them with pupils. Question 2 can be set as homework with parent or guardian.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2B P75 – 76).

215

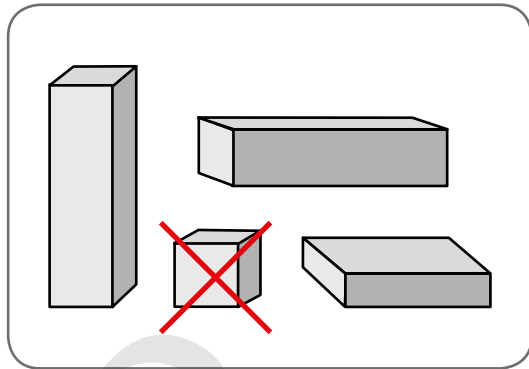
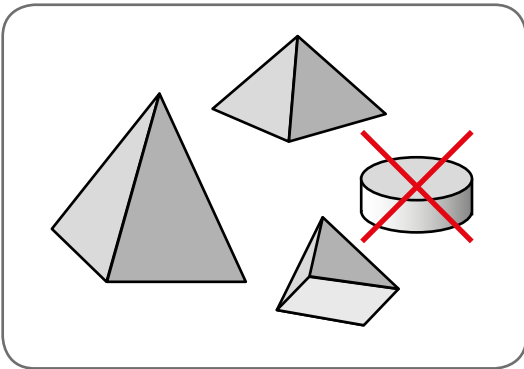
CHAPTER 12

Complete Workbook 2B, Worksheet 2 • Pages 75 – 76

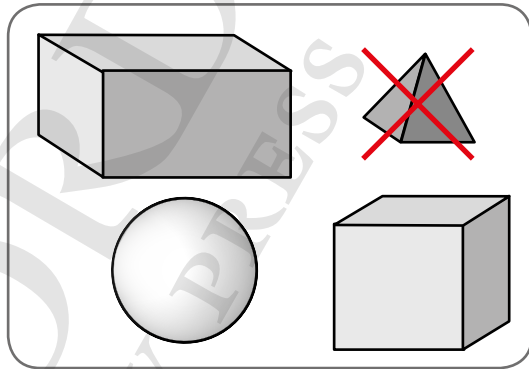
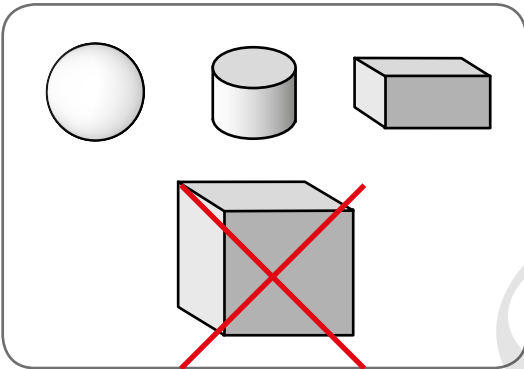
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Textbook 2 P215

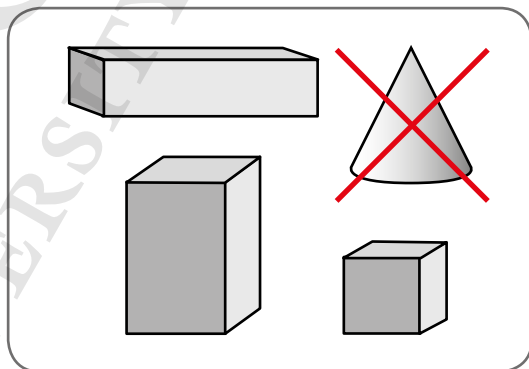
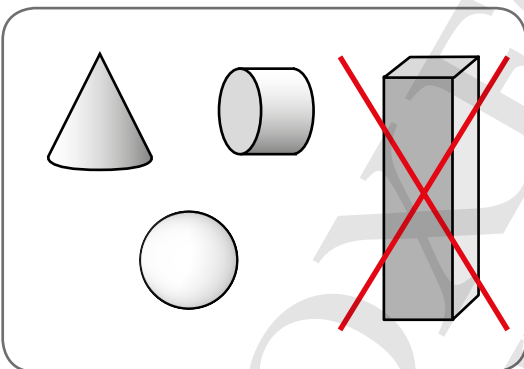
1. (a)



(b)



(c)



FORMING THREE-DIMENSIONAL FIGURES

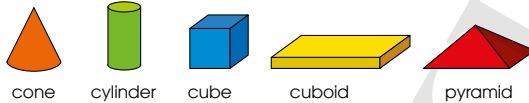
LEARNING OBJECTIVES

1. Form different figures with shapes.

FORMING THREE-DIMENSIONAL FIGURES

LESSON
3

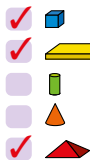
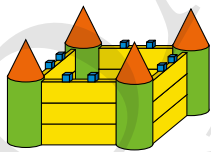
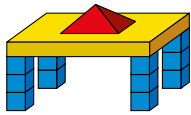
IN  FOCUS



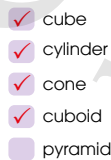
How can we use the solids to form different figures?

LET'S LEARN 

Use solids to form the figures.
Which solids are used in each figure?



The figure is made up of a cuboid, a pyramid and cubes.



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THREE-DIMENSIONAL SHAPES 216

IN  FOCUS

Ask pupils to close their eyes and imagine in their heads the four basic shapes: cone, cylinder, cube, cuboid and pyramid. After which, show them the 3D models of these shapes.

LET'S LEARN 

For a concrete learning experience, use the 3D models to form two figures. Otherwise, get pupils to identify and name the basic shapes that are used to form the figures on P216.

Allow pupils to describe what the figures look like to them: a table, a hall, a castle, rockets, etc. (appropriate to the pupils' imagination).

Textbook 2 P216



Work in pairs.

- Use the to form two different figures.

Example



What you need:



- Ask your classmates to guess what you have formed.
- Get your classmates to tell which solids you use to form each figure.

PRACTICE



Which solids are used to form each figure?

(a)

- cube
- cuboid
- cylinder
- cone
- pyramid

(b)

- cube
- cuboid
- cone
- cylinder
- pyramid

Complete Workbook 2B, Worksheet 3 • Pages 77 – 78

Textbook 2 P217

This activity develops pupils' creativity and spatial visualisation skills as they form 3D composite figures of their choice. Allow them to name their figures. Photographs of pupils' creations can be taken and used as display for the class notice board.

PRACTICE



Work with pupils on the practice questions.

Independent seatwork

Assign pupils to complete Worksheet 3 independently (Workbook 2B P77 – 78).

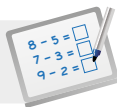
Answers Worksheet 3 (Workbook 2B P77 – 78)

1.	Figure A	Figure B

2. (a)

(b)

- cubes
- cuboids
- cones
- cylinders

**Specific Learning Focus**

- Form different figures with shapes.

Suggested Duration

2 periods

Prior Learning

Pupils have been introduced to forming composite figures made up of 2D shapes. They have also learnt to break up a composite figure into 2D shapes.

Pre-emptive Pitfalls

Reinforce the identification of 3D shapes using key attributes to lead pupils to form 3D composite figures in this lesson. Any misconceptions or poor knowledge of this should be addressed and rectified in this lesson.

Introduction

This lesson enables the strengthening of pupils' imagination and creativity. Distribute 3D Mini GeoSolids to pupils and have them make a composite 3D figure using their creativity. 'Let's Learn' and 'Practice' (Textbook 2 P216 – 217), and questions in Workbook 2B P77 – 78, not only help pupils make their own 3D composite figures, but also encourage them to tabulate and identify the 3D objects that make up the composite figure.

Problem Solving

This lesson enables pupils to develop their spatial, visual and observational skills. Relating the figure made to the attributes of shapes will develop their critical reasoning skills. For example, if they want to make a 3D composite figure that resembles the parapet and tower of a castle, they can use cuboids and cones. Also, sorting the number of 3D shapes used to make the figure is a good exercise in data tabulation and identification of the properties of 3D shapes.

Activities

Using 3D Mini GeoSolids, pupils can have a fun time making their own 3D composite figures. Bonus points can be awarded to pupils for maximum utilisation of the GeoSolids. Pupils can also be encouraged to bring real-life 3D objects to make their own figures. These figures can be displayed in the classroom for the other schoolmates to look at and appreciate.

Resources

- 3D Mini GeoSolids
- nets of 3D shapes (Activity Handbook 2 P49 – 51)
- real-life 3D objects

Mathematical Communication Support

Ask pupils questions like: 'What different shapes do you see in this figure? Do they have curved or flat surfaces? What real-life object do you think this figure is representing? Can you make more of such figures?' Pupils can even play a game where they describe a 3D composite figure representing a real-life object and the rest of the class can guess what real-life object the figure is representing.

MAKING PATTERNS

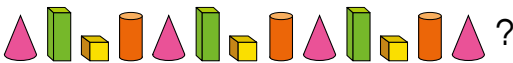
LEARNING OBJECTIVES

1. Make and complete patterns with 3D shapes.

MAKING PATTERNS

LESSON
4

IN FOCUS



What comes next in the pattern? How do you know?

LET'S LEARN

1.



The next shape is .

The pattern is 'cone, cuboid, cube, cylinder'.
This is a pattern using different shapes.

What other patterns can you make?



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THREE-DIMENSIONAL SHAPES

218

IN FOCUS

Help pupils to understand that the pattern is a repetition of shapes by asking the following questions:

- Is this a pattern?
- Why do you say it is a pattern?
- What is the repeated pattern that you see?

LET'S LEARN

In Let's Learn 1, guide pupils to see the repeated pattern of four different shapes (cone, cuboid, cube and cylinder) by asking the following questions:

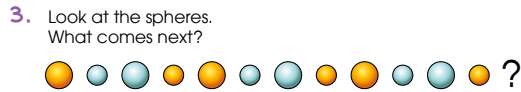
- What do you see in this pattern?
- Did you see different shapes?
- How many different shapes are there?
- What about the colour?

Lead pupils to read the pattern aloud 'cone, cuboid, cube and cylinder, cone, cuboid, cube and cylinder, cone, cuboid, cube and cylinder, cone' and ask them what comes next. Once they can identify the repeated pattern, it helps them to guess what comes next easily.



The next shape is .

The pattern is
 {small cylinder, big cuboid, big cylinder, small pyramid};
 This is a pattern using different shapes and sizes.



What pattern can you see?

Work in pairs.

- 1 Look at the .
How are they different?
- 2 Make two patterns.
- 3 Show your patterns to your classmates.
- 4 Ask your classmates.
What comes next in the pattern? How do you know?

What you need:

ACTIVITY TIME

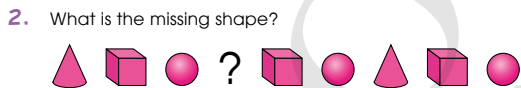
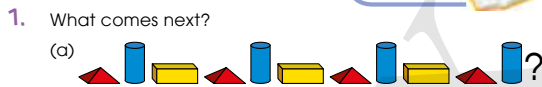
Textbook 2 P219

In Let's Learn 2, guide pupils to identify the repeated pattern by looking for things that do not change and things that change (i.e., shape and size). Ask them to articulate the attribute of the pattern and read aloud the repeated pattern of one or more shapes.

Repeat the procedure for Let's Learn 3. Pupils should identify colour and size as the attributes of the pattern. Get them to read the repeated pattern aloud 'big orange, small blue, big blue and small orange'. Once pupils can identify the repeated pattern, it can help them to guess what comes next in the pattern.

ACTIVITY TIME

This activity enables pupils to articulate the patterns that they have created using appropriate words such as *a repeated pattern of a group of one or more shapes*. At the end of the activity, allow each pair to present the pattern that they have created and let the rest guess what comes next in the pattern.



Complete Workbook 2B, Worksheet 4 • Pages 79 – 80

MIND WORKOUT



How many small cubes are used to make the bigger cube?

Use to help you count the number of small cubes used.



Textbook 2 P220

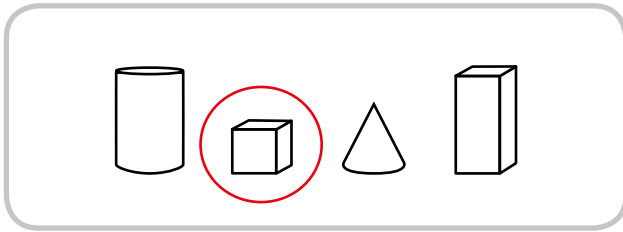
PRACTICE

Emphasise the attributes to the pupils and allow them to articulate the patterns aloud. Guide them to identify the repeated pattern in order to guess what comes next.

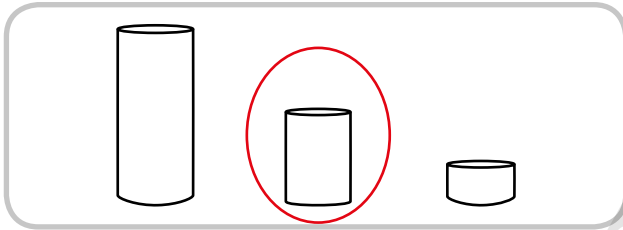
Independent seatwork

Assign pupils to complete Worksheet 4 independently (Workbook 2B P79 – 80).

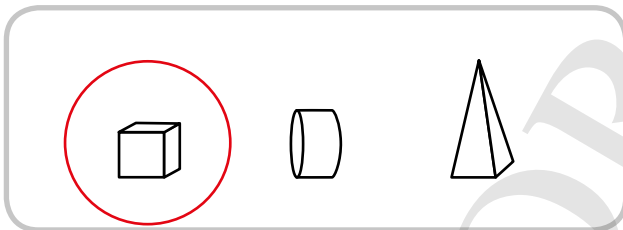
1. (a)



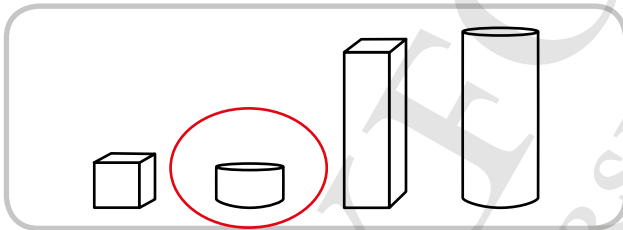
(b)

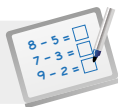


(c)



(d)



**Specific Learning Focus**

- Sort and classify 3D shapes according to attributes.
- Make and complete patterns with 3D shapes.

Suggested Duration

Lesson 2: 2 periods

Lesson 4: 2 periods

Prior Learning

The ordering of numbers and shapes has been learnt in Grade 1 and in Chapter 11. In this lesson, the attributes of 3D shapes come into play while grouping and making a pattern.

Pre-emptive Pitfalls

Making or completing patterns with 3D shapes, involving patterns in attributes like shape, size, colour or orientation, can be made fun. Ask pupils questions about the shape's faces, size, colour and orientation, and encourage them to identify the shape and identify the pattern.

Introduction

In 'Let's Learn' (Textbook 2 P213 – 214), activity-based exercises where 3D Mini GeoSolids can be provided and used to make various patterns. Lead pupils to see that the shapes can be grouped by: (i) size, (ii) type of surfaces (curved/flat), (iii) type of 3D shape, (iv) colour, and (v) orientation. Get them to work in pairs, where one partner makes a pattern and the other partner completes the patterns. Have them exchange roles. Get them to describe their patterns using key mathematical terms like 'faces', 'edges', 'size' and 'orientation'.

Problem Solving

Since this chapter requires a more visual and concrete skill, it allows pupils to analyse and observe properties of 3D shapes. Emphasise the similarities and differences in the attributes of the shapes. 'Mind Workout' (Textbook 2 P220) is a good activity to sharpen pupils' visual and problem-solving skills. This activity can be extended by asking pupils to count the number of faces of the small cubes that can be seen and the number of faces that are hidden.

Activities

'In Focus' (Textbook 2 P213) can be used as an introductory activity. If GeoSolids are not available, use the nets of 3D shapes (Activity Handbook 2 P49 – 51) to make 3D shapes using coloured A4-sized papers.

Resources

- nets of 3D shapes (Activity Handbook 2 P49 – 51)
- coloured papers
- 3D Mini GeoSolids
- real-life 3D objects (e.g. cartons, boxes)

Mathematical Communication Support

This chapter forms an important foundation to spatial mathematics. Have pupils verbalise the similarities and differences of the attributes of 3D shapes in the shape patterns. In Lesson 2, pupils group objects according to attribute(s) and in Lesson 4, pupils are required to recognise the pattern by identifying the key attributes and hence complete the pattern.

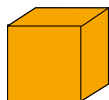
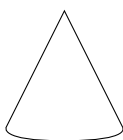
PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout

Date: _____

Look at the solids below.



Choose any two solids and compare.
How are they different?
How are they similar?

Colour the two solids that are completely different.
How are they different?

Sphere	Cube
Has curved surface	No curved face
No flat face	Has 6 flat faces
No corner	Has 8 corners

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Three-Dimensional Shapes 81



Mind Workout

This task requires pupils to analyse and compare the attributes of the shapes. It develops their communication skills as they describe the similarities and differences using the geometric language they have learnt.

The answers are open-ended with respect to the shapes they choose as well as the attributes that they consider.

Workbook 2B P81



Maths Journal

Date: _____

Use the drawing tools on your computer to draw solids. Print and cut out the solids.

Paste your solids in the correct space below.

Solids with flat faces

Solids without flat faces

82 Chapter 12

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Workbook 2B P82



Maths Journal

This task can be integrated with pupils' IT lessons where the facility of computers and printers is available. Guide pupils on the use of the drawing tool (Shapes) in Microsoft Word.

1. What comes next?



2. What is the missing shape?



Complete Workbook 2B, Worksheet 4 • Pages 79–80



MIND WORKOUT



How many small cubes are used to make the bigger cube?

Use to help you count the number of small cubes used.



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THREE-DIMENSIONAL SHAPES 220

Textbook 2 P220



MIND WORKOUT


This task requires spatial visualisation skills. Many pupils may not be able to visualise the cubes that are hidden in this oblique diagram at this level though some would be able to. Nevertheless, ask them to make a guess and explain how they arrived at their answers.

Next, give small cubes to pupils to form the bigger cube and allow them to count the number of cubes used. It may be surprising for some pupils to find out how their guesses differ from the actual answer.

MATHS JOURNAL

Look at the objects around you.



Can you match the shapes of these objects with any of the ? Describe the shape of each object.



The drink packet has flat faces and cannot roll.

I know how to...

SELF-CHECK 

- recognise flat faces and curved surfaces.
- name and describe spheres, cuboids, cubes, cylinders, cones and pyramids.
- group the shapes in different ways.
- form figures with shapes. make patterns with shapes.

221 CHAPTER 12

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Textbook 2 P221

MATHS JOURNAL

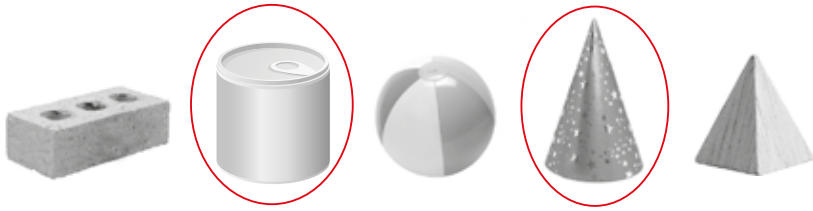
Encourage pupils to obtain pictures of real objects and paste them on their Maths journal book. Get them to write three short sentences about each object. For example:

*It is a cuboid.
It has 6 flat faces.
It cannot roll.*

This self check can be done after pupils have completed **Review 12** (Workbook 2B P83 – 84) as consolidation of understanding for the chapter.

SELF-CHECK 

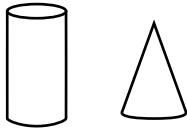
1.



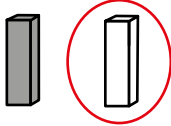
2. square

3. cylinder cone pyramid sphere

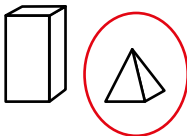
4. (a)



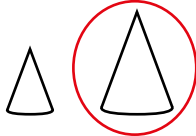
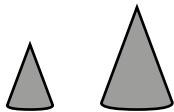
(b)



(c)



(d)



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1.

2. (a) 25
 (b) 305
 (c) 600
 (d) 0.50
 (e) 2.70
 (f) 8.00

3. (a) more
 (b) less
 (c) less
 (d) more

4. 12.05, 14.85, 12.35
 (a) B
 (b) A
 (c) B, C, A

5. \$15.35, \$15.80, \$16.30

6.

$130 + 15 = 145$
 Nora is 145 cm tall.
 $130 + 145 = 275$
 Their total height is 275 cm.

7.

$500 - 200 = 300$
 A bag of apples weighs 300 g.
 $500 + 300 = 800$
 The total mass of the two bags of fruits is 800 g.

8.

$3 \times 5 = 15$
 The total mass of rice bought is 15 kg.

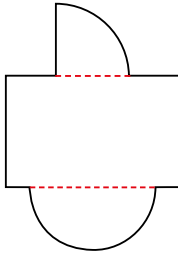
9. (a) $\$95 - \$25 = \$70$
 Weiming has \$70.

- (b) $\$95 + \$70 = \$165$
 They have \$165 altogether.

10.

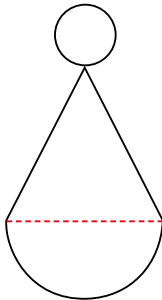
$\$399 + \$140 = \$539$
 Mr Ali spends \$539 on Tuesday.
 $\$399 + \$539 = \$938$
 Mr Ali spends \$938 on both days.

1. (a)



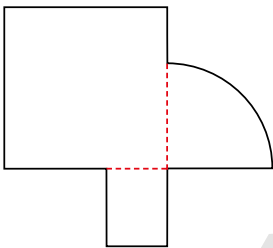
Quarter circle
Rectangle
Semicircle

(b)



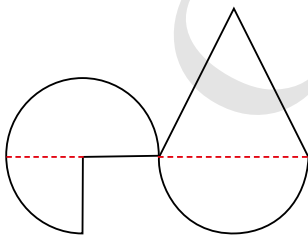
Circle
Triangle
Semicircle

(c)



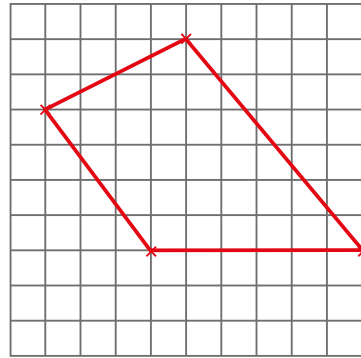
Square
Rectangle
Quarter circle

(d)

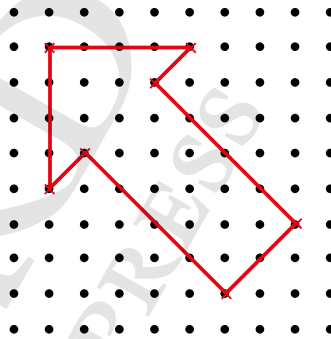


Semicircle
Quarter circle
Triangle

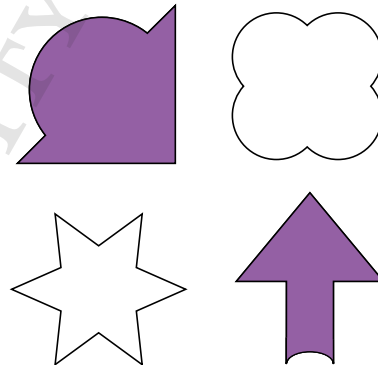
2.



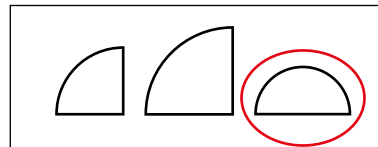
3.

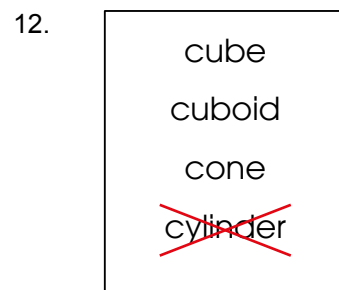
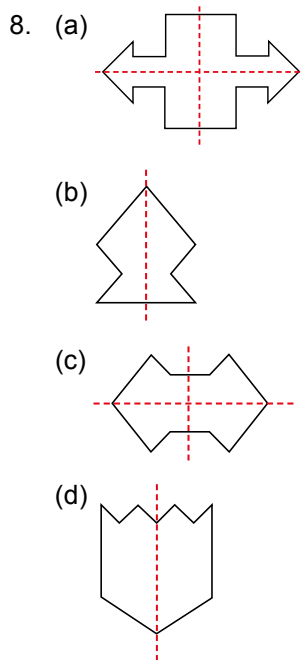
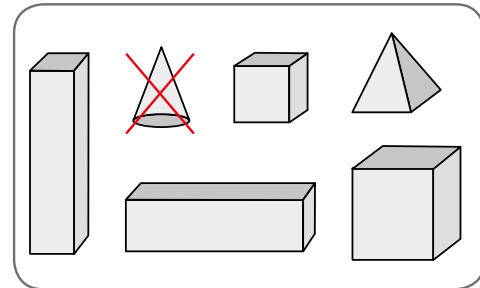
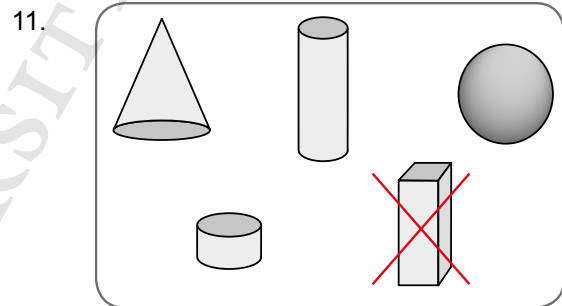
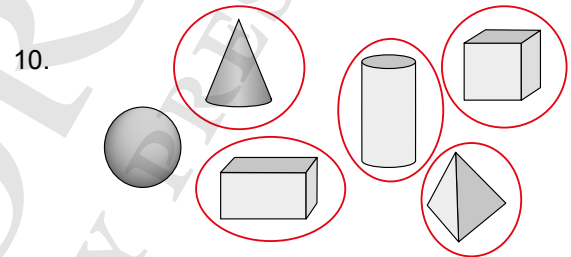
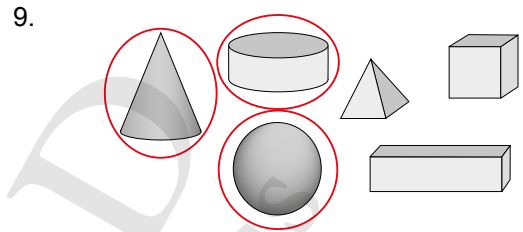
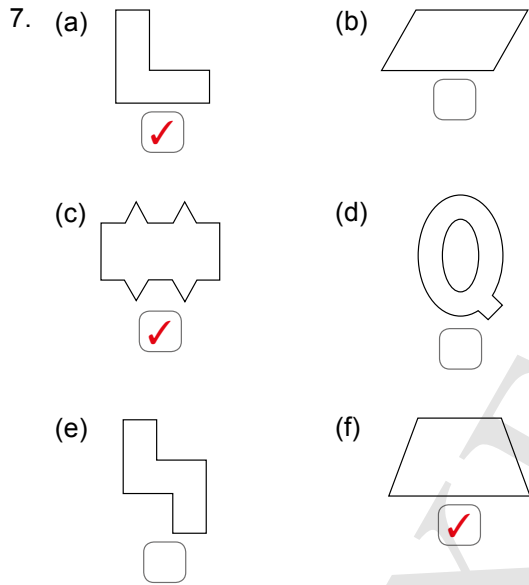
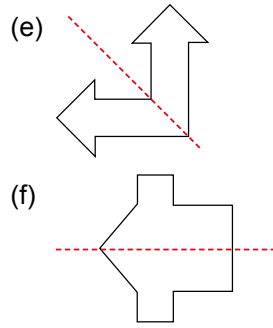
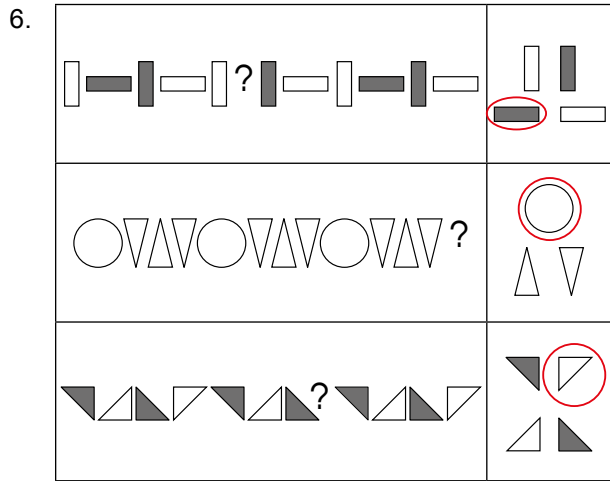


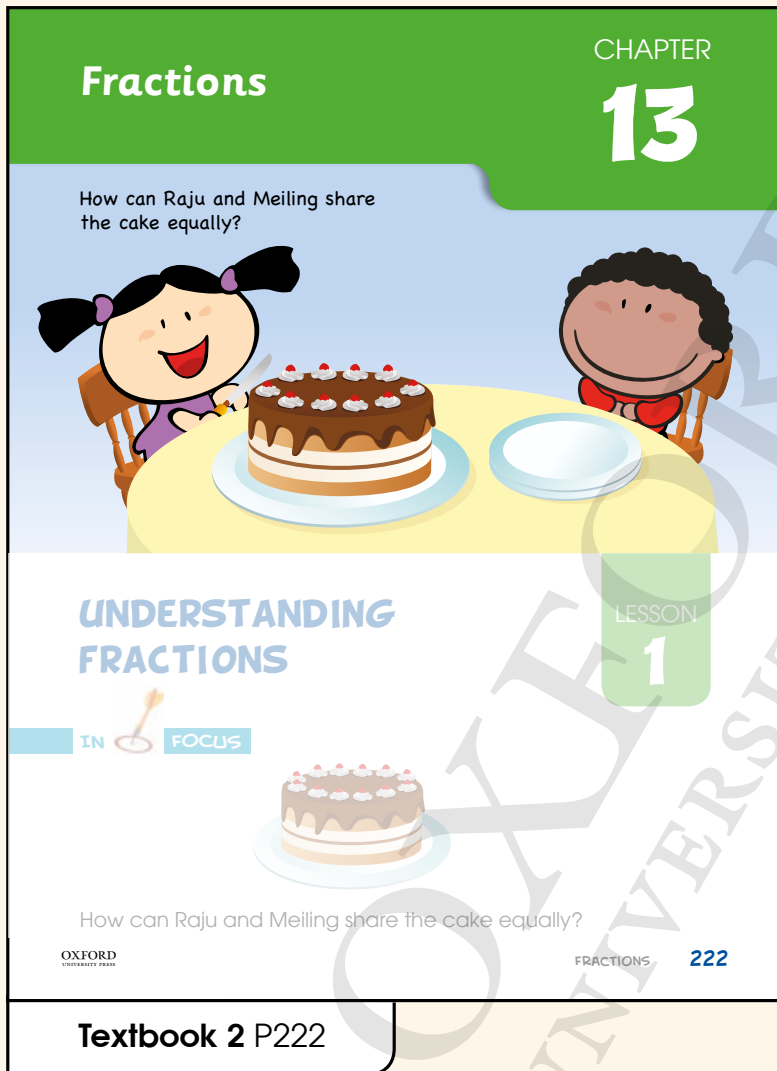
4.



5.







Related Resources

NSPM Textbook 2 (P222 – 246)
NSPM Workbook 2B (P99 – 118)

Materials

A4 papers, fraction cards, fraction discs, mahjong paper, markers, pencils

Lesson

- Lesson 1 Understanding Fractions
- Lesson 2 More Fractions
- Lesson 3 Comparing and Ordering Fractions
- Lesson 4 Adding and Subtracting Like Fractions

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

Pupils are introduced to fractions for the first time in this chapter. At this level, they are only taught fraction as part of a whole. The concepts of equal parts and comparing to the same whole are the key ideas in this chapter. Manipulatives of various shapes will be used to aid in the understanding of these important concepts. Pupils are taught to read fractions as the number of parts out of the total number of parts in one whole. Following the CPA approach, the concrete representation of fractions (using manipulatives) is translated into pictorial representation, whereby pupils are asked to shade on the pictorial diagrams to reflect their understanding of fractions. This will in turn lead to the abstract representation of fraction with a numerator and a denominator. Controlled comparisons are made using unit fractions or like fractions. Addition and subtraction of like fractions using the CPA approach with denominators not exceeding 12 will be discussed.

LESSON

1

UNDERSTANDING FRACTIONS


LEARNING OBJECTIVES

1. Fraction as part of a whole.
2. Notation and representations of fractions.

Fractions


CHAPTER 13


How can Raju and Meiling share the cake equally?



UNDERSTANDING FRACTIONS

LESSON 1

IN  FOCUS



How can Raju and Meiling share the cake equally?

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FRACTIONS 222

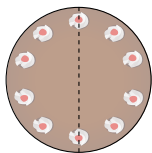
IN  FOCUS

Ask the class how they celebrate their birthdays or if they have seen others celebrating their birthdays. Get pupils to talk about how they would share the birthday cake. Discuss how Raju and Meiling can share the cake equally on P222.

Textbook 2 P222

LET'S LEARN 

1.



Cut the cake into 2 equal parts.

Each part of the cake is **half** of the whole cake. Each part is 1 out of 2 equal parts.

We write it as $\frac{1}{2}$.

2. Fold a square piece of paper into 2 equal parts.



Unfold and shade 1 part.



1 out of 2 equal parts of the square is shaded.

$\frac{1}{2}$ of the square is shaded.

One half of the square is shaded.

Are there other ways to fold the paper into halves?



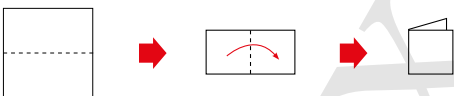
Cut the cake into 2 equal parts and point to the dotted line on the cake to indicate the cut. Guide pupils to understand each part is half of the whole cake by asking the following questions:

- How many equal parts are there?
- Can you point to the 2 equal parts?

Indicate to pupils that each part is 1 out of 2 equal parts and write the notation $\frac{1}{2}$.

For Let's Learn 2, get pupils to fold a square piece of paper into half and write out the notation $\frac{1}{2}$.

3. Fold another square piece of paper into 4 equal parts.



Unfold and shade 1 part.



1 out of 4 equal parts of the square is shaded.

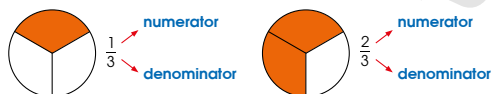
$\frac{1}{4}$ of the square is shaded.

One quarter of the square is shaded.

Are there other ways to fold the paper into quarters?



4.



The **numerator** shows the number of equal parts that is shaded.

The **denominator** shows the total number of equal parts in a whole.

Likewise, get pupils to fold another square piece of paper into 4 equal parts and write out the notation $\frac{1}{4}$.

Ask pupils if there are other ways to fold the paper into quarters apart from the method shown on the textbook.

Introduce the 2 new terms **numerator** and **denominator** in Let's Learn 4 to pupils. Guide pupils to understand that numerator is written on top of a fraction and denominator is written at the bottom of a fraction.

5. What fraction of the waffle is eaten?



There are 4 equal parts.
3 parts are eaten.
 $\frac{3}{4}$ of the waffle is eaten.

We read $\frac{3}{4}$ as three quarters.
 $\frac{3}{4}$ is 3 out of 4 equal parts.

Where do you see fractions around you?

6. What fraction of each circle is shaded?



$\frac{1}{5}$
1 fifth

1 out of 5 equal parts of the circle is shaded.

$\frac{1}{5}$ of the circle is shaded.



$\frac{2}{5} = \frac{1}{5} + \frac{1}{5}$
2 fifths

2 out of 5 equal parts of the circle are shaded.

$\frac{2}{5}$ of the circle is shaded.



$\frac{3}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$
3 fifths

3 out of 5 equal parts of the circle are shaded.

$\frac{3}{5}$ of the circle is shaded.

Let's Learn 5 shows a non-unit fraction. Emphasise to pupils to read the fraction $\frac{3}{4}$ as **3 out of 4 equal parts**.

In Let's Learn 6, guide pupils to understand that there is a total of 5 equal parts. When 1 part out of 5 equal parts is shaded, the fraction is written as $\frac{1}{5}$. Lead pupils to read $\frac{1}{5}$ as one fifth.

Emphasise on the use of '___ out of ___ equal parts' to reinforce the concept of fraction reading for subsequent fractions.

7. Some unit fractions are shown below.


Fraction	Picture	Read
$\frac{1}{2}$		one half 1 out of 2 equal parts
$\frac{1}{3}$		one third 1 out of 3 equal parts
$\frac{1}{4}$		one quarter 1 out of 4 equal parts
$\frac{1}{5}$		one fifth 1 out of 5 equal parts
$\frac{1}{6}$		one sixth 1 out of 6 equal parts
$\frac{1}{7}$		one seventh 1 out of 7 equal parts
$\frac{1}{8}$		one eighth 1 out of 8 equal parts
$\frac{1}{9}$		one ninth 1 out of 9 equal parts
$\frac{1}{10}$		one tenth 1 out of 10 equal parts
$\frac{1}{11}$		one eleventh 1 out of 11 equal parts
$\frac{1}{12}$		one twelfth 1 out of 12 equal parts

Let's Learn 7 shows a list of unit fractions in notation and pictorial form, together with how they should be read in words. Lead pupils to read the fractions aloud.



ACTIVITY TIME

Work in pairs.

- 1 Think of some examples of fractions in your every day life. Use  to show the fractions.


What you need:

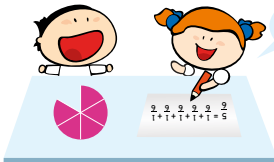


Example

A pizza can be cut into 6 equal parts.



- 2 Ask your partner to make a fraction from the . Read the fraction aloud.



5 slices of pizza is 5 sixths of the pizza.

$$\frac{5}{6} = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$$

- 3 Take turns and repeat 1 and 2 with other fractions.

Textbook 2 P227

Provide examples for pupils if they are unable to suggest any example of fractions (e.g. biscuits, bread, plasticine, chocolate, whiteboard, wheel of a bicycle, etc.).

PRACTICE



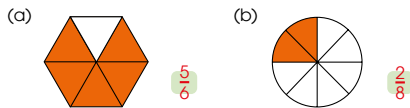
1. Which are cut into equal parts?



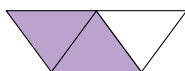
2. Which pictures show $\frac{1}{2}$ of the shape shaded?



3. What fraction of each shape is shaded?



4. What fraction of the shape is shaded?



Complete Workbook 2B, Worksheet 1 • Pages 99 – 104

Textbook 2 P228

PRACTICE

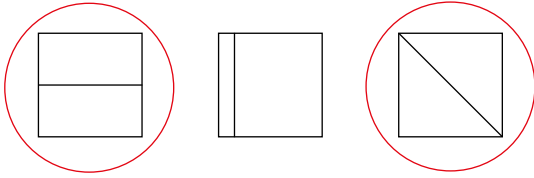


Work with pupils on the questions and selected examples from **Worksheet 1**.

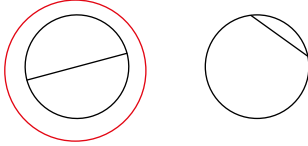
Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2B P99 – 104).

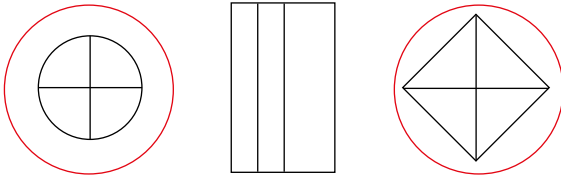
1. (a)



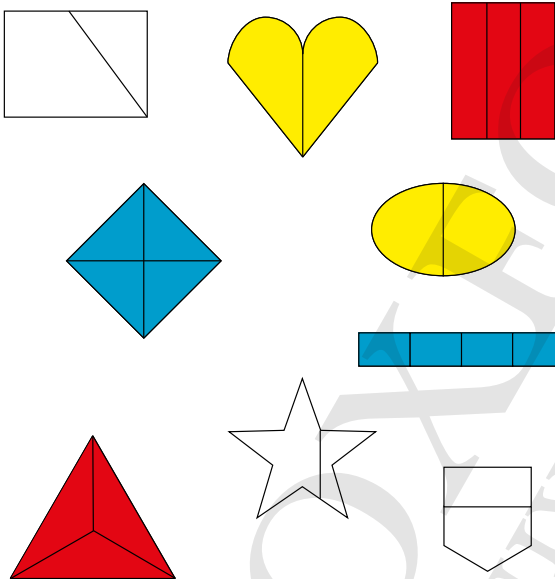
(b)



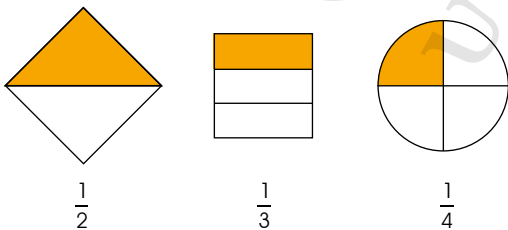
2.



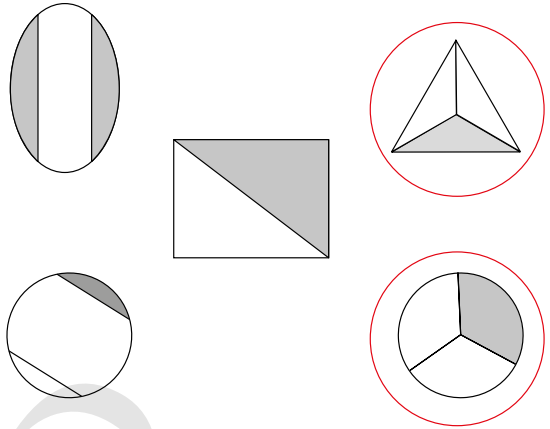
3.



4.



5.



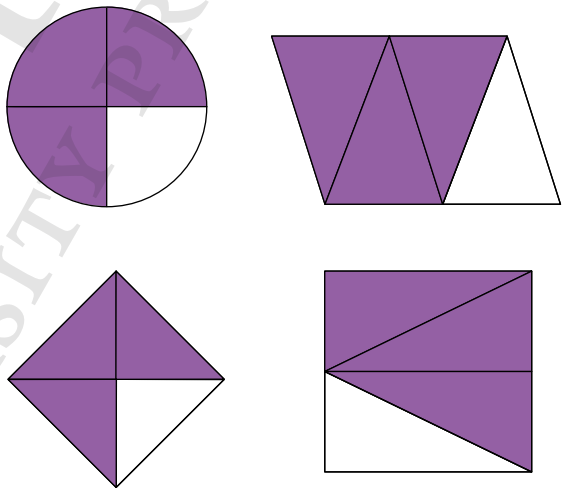
6. (a) 1, 3

(b) 2, 4

(c) 2, 4

(d) 2, 2

7.

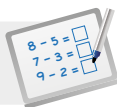


8. (a) $\frac{3}{8}$

(b) $\frac{2}{6}$

(c) $\frac{2}{10}$

(d) $\frac{3}{10}$

**Specific Learning Focus**

- Fraction as part of a whole.
- Notation and representations of fractions.

Suggested Duration

5 periods

Prior Learning

Pupils should know that a fraction is part of a whole. Recapitulate that 2 equal halves or 4 equal quarters make a whole.

Pre-emptive Pitfalls

Fractions are formally introduced in this chapter. A common misconception is that a fraction of a whole must be circular. Emphasise that any figure, which does not have to be circular, when divided into equal parts, makes fractions of a whole.

Introduction

Fractions are formally introduced in this lesson using concrete materials. Engage pupils in pictorial visuals by getting them to colour the parts of a whole to represent the fraction, leading to the abstract part of fractions. It is important to explain that for any shape divided into equal parts, these equal parts are fractions of a whole. In Let's Learn 2 and 3 (Textbook 2 P223 – 224), a square is folded into halves and then quarters. Let's Learn 4 (Textbook 2 P224) formally introduces numerator as the number of equal parts and the denominator as the total number of equal parts in a whole. Explain to pupils that in fraction notation, the numerator is written above the fraction bar and the denominator is written below the fraction bar, and a fraction $\frac{n}{d}$ is read as n out of d parts. Encourage class discussion while going through the table in Textbook 2 P226.

Problem Solving

Two important concepts to emphasise are that a fraction is a part of a whole, and that a whole can be divided into as many equal parts as possible. In Grade 2, a maximum of 12 equal parts (denominator 12) is introduced. Get pupils to shade the number of equal parts in the shape and write the fraction represented by it. Emphasise that the whole shape can be any shape and size as long as the parts that the whole shape is divided into are equal (refer to Textbook 2 P228).

Activities

Fraction cards (Activity Handbook 2 P61 – 66) can be used in a class activity that can be done on the whiteboard. 'Activity Time' (Textbook 2 P227) can be carried out. Encourage pupils to think of real-life objects that can be divided into the number of equal parts as represented by the denominator of the fraction on the fraction card.

Resources

- fraction cards (Activity Handbook 2 P61 – 66)
- fraction discs (Activity Handbook 2 P54)
- pencils
- A4 papers
- real-life objects (e.g. the wheel of a toy car can be divided into equal parts by using masking tape to mark the parts)
- worksheet (Activity Handbook 2 P53)

Mathematical Communication Support

Encourage pupils to read the fractions out loud (e.g. $\frac{2}{11}$ is 2 out of 11 equal parts). Emphasise that the numerator is written above the fraction bar and the denominator is written below the fraction bar.

LEARNING OBJECTIVES

1. Make one whole.
2. Notation for writing a fraction in one whole.

MORE FRACTIONS

LESSON


2


IN FOCUS



Siti and Junhao order 2 pizzas of the same size.
Siti eats 3 equal pieces of her pizza.
Junhao eats 4 equal pieces of his pizza.
They eat the same amount of pizza. Is it possible?

LET'S LEARN

1.  The pizza is divided into 3 equal parts.
1 whole = $\frac{3}{3}$

 The pizza is divided into 4 equal parts.
1 whole = $\frac{4}{4}$

We read $\frac{3}{3}$ as 3 thirds
and $\frac{4}{4}$ as 4 quarters.



What do you notice about the fractions that make up 1 whole?

229 CHAPTER 13

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IN FOCUS

Allow pupils to discuss the following questions in small groups before going through the answers in Let's Learn:

- What do you know about the size of the 2 pizzas?
- How many equal pieces of the pizza does Siti eat?
- How many equal pieces of the pizza does Junhao eat?
- Do they eat the same amount of pizza? Why?

LET'S LEARN

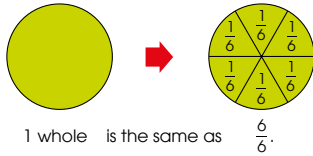
Using the same illustration from In Focus, show pupils the same pizza that can be cut into 3 or 4 equal parts is of the same size, i.e. one whole.

Illustrate one whole pizza to pupils by showing sequentially $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$, together with the notations.

Likewise, repeat for $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$ and $\frac{4}{4}$. Ask pupils what they notice about the fractions that make one whole.

Textbook 2 P229

2. The figure is divided into 6 equal parts.



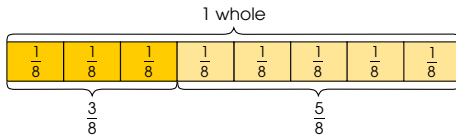
We read $\frac{6}{6}$ as 6 sixths.



1 whole = $\frac{6}{6}$

6 sixths make 1 whole.

3. How many eighths make 1 whole?



Think of other ways to use eighths to make 1 whole.

1 whole = $\frac{8}{8}$
 $\frac{3}{8}$ and $\frac{5}{8}$ make 1 whole.



$\frac{2}{8}$ and $\frac{6}{8}$ make 1 whole.
 $\frac{1}{8}$ and $\frac{7}{8}$ also make 1 whole.



Textbook 2 P230

Repeat the sequential showing of fractions together with the notations for Let's Learn 2.

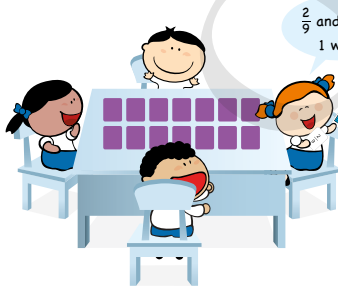
In Let's Learn 3, show the part-part whole model that makes one whole. Use the part-part whole model to illustrate $\frac{3}{8}$ and $\frac{5}{8}$, as well as $\frac{2}{8}$ and $\frac{6}{8}$, make one whole. Allow pupils to use models to explore other combinations that make one whole.

ACTIVITY 23 TIME

Play in groups of 4.

- Put each face down on the table.
- Turn over 2 cards.
If the fractions on the 2 cards make 1 whole, keep them. If they do not make 1 whole, turn the cards over.

What you need:



$\frac{2}{9}$ and $\frac{7}{9}$ make 1 whole!


- Take turns and repeat 2.
- After 10 rounds, the player with the most number of cards wins!


Get pupils to check on one another's cards to ensure that they have matched the cards correctly. Alternatively, walk around to check on the pupils.


Textbook 2 P231



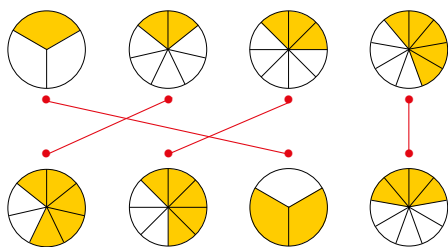
1. What are the missing fractions?

(a)  $\frac{2}{3}$ and $\frac{1}{3}$ make 1 whole.

(b)  $\frac{1}{4}$ and $\frac{3}{4}$ make 1 whole.

(c)  $\frac{3}{5}$ and $\frac{2}{5}$ make 1 whole.

2. Match the fractions to make 1 whole.



Complete Workbook 2B, Worksheet 2 • Pages 105 – 106

Textbook 2 P232



Work with pupils on the questions and selected examples from **Worksheet 2**.


Independent seatwork

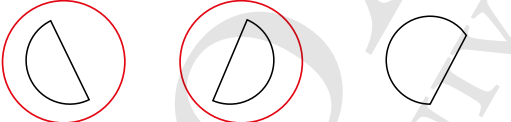
Assign pupils to complete Worksheet 2 (Workbook 2B P105 – 106).

Answers


Worksheet 2 (Workbook 2B P105 – 106)

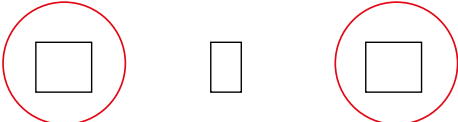
1. (a)


1 whole




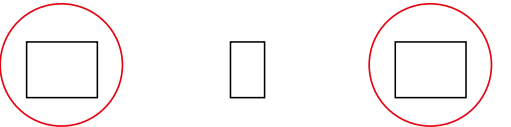
(c)


1 whole



(b)


1 whole

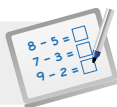


2. (a) $\frac{3}{4}$

(b) $\frac{2}{3}$

(c) $\frac{3}{5}$

(d) $\frac{5}{12}$



Specific Learning Focus

- Make one whole.
- Notation for writing a fraction in one whole.

Suggested Duration

5 periods

Prior Learning

This lesson is in continuation of lesson 1, where pupils first learnt to write and understand fraction notations.

Pre-emptive Pitfalls

In this lesson, the concept of a whole is explained using multiple strategies. Explain to pupils that when finding two fractions that make a whole, the numerators of both fractions must add up to the denominator. As this involves a higher-level concept, pictorial and visual representations are necessary.

Introduction

Discuss the question posed in 'In Focus' (Textbook 2 P229) with the pupils by explaining that if Siti's pizza was cut into 6 equal parts while Junhao's pizza was cut into 8 equal parts, it was possible that they ate 3 and 4 pieces respectively. However, this does not lead to the concept of equivalence but the fact that a whole can be cut into multiple equal parts, so go through 'Let's Learn' and 'Practice' to explain this concept of equivalence (e.g. $\frac{1}{8}$ and $\frac{7}{8}$ make $\frac{8}{8}$, where $\frac{8}{8}$ is a whole). The part-part-whole concept can be used here. Bar modelling is another helpful way of explaining how equal parts make a whole.

Problem Solving

If the denominators of fractions are not the same, the numerators cannot be compared simply as the number of equal parts represented by each fraction do not add up to a whole. Get pupils to make bar models to relate the fractions to the part-part-whole concept. They can start by dividing the bar into 2 to 12 equal parts and then think of different ways to make a whole.

Activities

Carry out the activity in 'Activity Time' (Textbook 2 P231). This activity is similar to 'SNAP'. Let pupils play this game in groups of 4 and make sure there are enough cards photocopied for the pupils.

Resources

- worksheet (Activity Handbook 2 P53)
- fraction discs (Activity Handbook 2 P54)
- fractions of shapes
- bar models for fractions (Activity Handbook 2 P55 – 59)
- fraction cards (Activity Handbook 2 P61 – 66)

Mathematical Communication Support

Ask and encourage pupils to come up with different pairs of fractions to make a whole. Draw a polygon on the whiteboard and encourage pupils to divide the polygon into equal parts in different ways. Write all the combinations on the whiteboard beside the polygon. Point out that each time a whole is made, the denominators of the fractions are the same and the numerators add up to the denominator (e.g. $\frac{3}{11} + \frac{8}{11} = \frac{11}{11} = 1$).

COMPARING AND ORDERING FRACTIONS

LEARNING OBJECTIVES

1. Compare 2 or 3 unit fractions with denominators not exceeding 12.
2. Compare 2 or 3 like fractions with denominators not exceeding 12.

COMPARING AND ORDERING FRACTIONS

LESSON
3

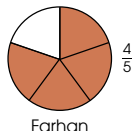
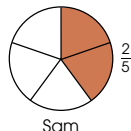
IN FOCUS



Sam and Farhan each has a cake of the same size.
Sam eats 2 out of 5 equal parts of the cake.
Farhan eats 4 out of 5 equal parts of the cake.
Who eats more?

LET'S LEARN

1.



$\frac{4}{5}$ is greater than $\frac{2}{5}$.

Farhan eats more than Sam.

IN FOCUS

Emphasise to pupils that both cakes are of the same size. Allow pupils to discuss the following questions in small groups:

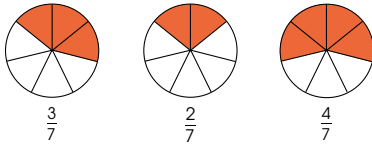
- How many equal parts are there in each cake?
- How many parts of the cake does Sam eat?
- How many parts of the cake does Farhan eat?
- Who eats more? Why?

Get some pupils to share their answers with the class.

LET'S LEARN

Fraction discs can be used to illustrate the comparison of the fractions in the given examples. Let's Learn 1 shows the comparison of 2 like fractions.

2. Arrange the fractions in order.
Start with the greatest.



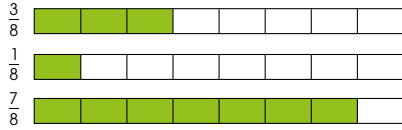
$\frac{4}{7}$ is the greatest.

$\frac{2}{7}$ is the smallest.

$$\frac{4}{7} > \frac{3}{7} > \frac{2}{7}$$

greatest \longrightarrow smallest

3. Arrange the fractions in order.
Start with the smallest.



$\frac{7}{8}$ is the greatest.

$\frac{1}{8}$ is the smallest.

$$\frac{1}{8} < \frac{3}{8} < \frac{7}{8}$$

smallest \longrightarrow greatest

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FRACTIONS 234

Textbook 2 P234

Let's Learn 2 and 3 show the comparison of 3 like fractions.

Prompt pupils to observe the numerators in like fractions to determine which fraction is greater (i.e., the greater the numerator, the larger the fraction). Teacher may use fraction discs to illustrate the comparison of fractions.

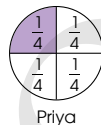
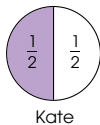
In addition, remind pupils to take note of the arrangement of fractions (whether to start with the greatest or the smallest fraction).

4. Kate and Priya have cakes of the same size.

Kate ate $\frac{1}{2}$ of her cake.

Priya ate $\frac{1}{4}$ of her cake.

Who ate more?



What do you notice
about the denominators
and numerators of
the two fractions?



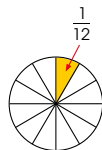
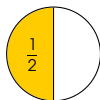
$\frac{1}{2}$ is greater than $\frac{1}{4}$.

Kate ate more than Priya.

5. Compare $\frac{1}{2}$ and $\frac{1}{12}$.

Which is smaller?

Which is greater?



$\frac{1}{12}$ is smaller than $\frac{1}{2}$.

$\frac{1}{2}$ is greater than $\frac{1}{12}$.

235 CHAPTER 13

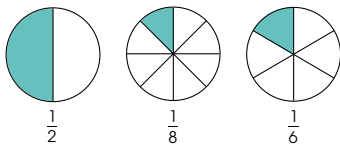
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Let's Learn 4 and 5 show the comparison of two unit fractions. Similarly, teacher may use fractions discs to illustrate the comparison of fractions.

Prompt pupils to observe the denominators in unit fractions to determine which fraction is greater (i.e., the smaller the denominator, the greater the fraction).

Textbook 2 P235

6. Arrange the fractions in order.
Start with the smallest.



$\frac{1}{2}$ is the greatest.

$\frac{1}{8}$ is the smallest.

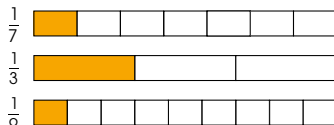
$$\frac{1}{8} < \frac{1}{6} < \frac{1}{2}$$

smallest \longrightarrow greatest

Look at the denominators and numerators in the greatest and the smallest fractions. What do you notice?



7. Arrange the fractions in order.
Start with the greatest.



$\frac{1}{3}$ is the greatest.

$\frac{1}{9}$ is the smallest.

$$\frac{1}{3} > \frac{1}{7} > \frac{1}{9}$$

greatest \longrightarrow smallest

How do you know which fraction is the greatest?



What do you notice about its numerator and denominator?

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FRACTIONS 236

Textbook 2 P236

Let's Learn 6 and 7 show the comparison of three unit fractions. Pupils may use fraction discs to help them in understanding the comparison of fractions.

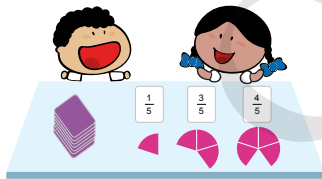
Prompt pupils to observe the denominators in unit fractions to determine which fraction is greater and remind them to take note of the arrangement of fractions.

ACTIVITY TIME

Play in pairs.

- Shuffle the cards.
- Pick three cards showing fractions with the same denominator.
- Use fraction discs to show the fractions.
Then, arrange the cards from the smallest to the greatest.

What you need:



- Take turns and repeat 1 to 3.
- Repeat the activity using fractions with numerator of one.

Does the greatest fraction have the greatest denominator?



ACTIVITY TIME

- Go to <http://www.shinglee.com.sg/StudentResources/NSPM2>.
- Click on 'Fractions'.
- Compare and order the fractions.

237 CHAPTER 13

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Textbook 2 P237

ACTIVITY TIME



Provide pupils with manipulatives to verify their answers and encourage them to verbalise their reasoning on the order that they have decided.

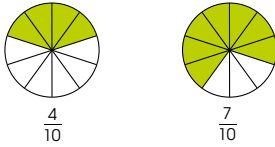
Conclude the activity by recapitulating the following observations:

- For like fractions: The larger fraction is the one with the greater numerator.
- For unit fractions: The larger fraction is the one with the smaller denominator.



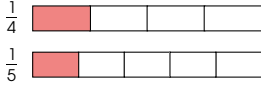
1. Compare.

(a)



$\frac{7}{10}$ is greater than $\frac{4}{10}$.

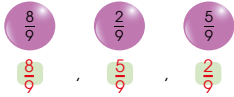
(b)



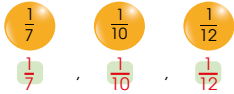
$\frac{1}{5}$ is smaller than $\frac{1}{4}$.

2. Arrange the fractions in order.
Start with the greatest.

(a)



(b)



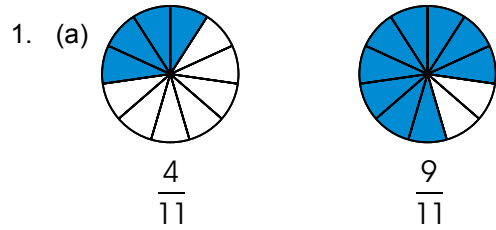
Complete Workbook 2B, Worksheet 3 • Pages 107 – 110



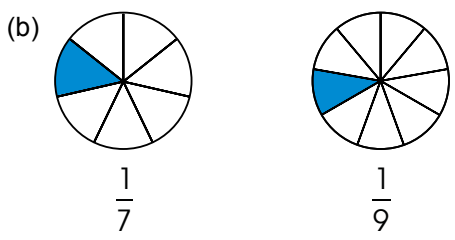
Work with pupils on the questions and selected examples from **Worksheet 3**.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 2B P107 – 110).



$\frac{9}{11}$ is greater than $\frac{4}{11}$.
 $\frac{4}{11}$ is smaller than $\frac{9}{11}$.

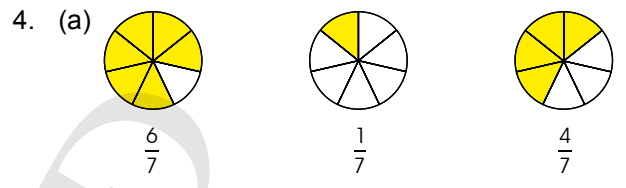


$\frac{1}{7}$ is greater than $\frac{1}{9}$.
 $\frac{1}{9}$ is smaller than $\frac{1}{7}$.

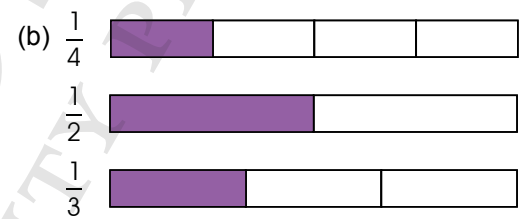
2. (a) $\frac{2}{8}$ $\frac{5}{8}$
 (b) $\frac{9}{10}$ $\frac{3}{10}$
 (c) $\frac{5}{12}$ $\frac{7}{12}$
 (d) $\frac{1}{6}$ $\frac{1}{5}$
 (e) $\frac{1}{7}$ $\frac{1}{11}$
 (f) $\frac{1}{9}$ $\frac{1}{2}$

3. (a) $\frac{3}{7}$ $\frac{6}{7}$
 (b) $\frac{7}{11}$ $\frac{9}{11}$
 (c) $\frac{10}{12}$ $\frac{8}{12}$

- (d) $\frac{1}{8}$ $\frac{1}{9}$
 (e) $\frac{1}{10}$ $\frac{1}{3}$
 (f) $\frac{1}{4}$ $\frac{1}{5}$



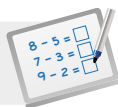
$\frac{6}{7}$ is the greatest.
 $\frac{1}{7}$ is the smallest.
 $\frac{6}{7}, \frac{4}{7}, \frac{1}{7}$



$\frac{1}{2}$ is the greatest.
 $\frac{1}{4}$ is the smallest.
 $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$

5. (a) $\frac{9}{10}, \frac{7}{10}, \frac{4}{10}$
 (b) $\frac{1}{4}, \frac{1}{9}, \frac{1}{11}$

6. (a) $\frac{2}{8}, \frac{3}{8}, \frac{7}{8}$
 (b) $\frac{1}{12}, \frac{1}{7}, \frac{1}{5}$



Specific Learning Focus

- Compare 2 or 3 unit fractions with denominators not exceeding 12.
- Compare 2 or 3 like fractions with denominators not exceeding 12.

Suggested Duration

4 periods

Prior Learning

This lesson is a progression to the concept of fractions. Fraction notations and equal parts making a whole were explained in previous lessons. In this lesson, pupils will learn to understand the value of each fraction and hence compare and order the fractions in ascending or descending order.

Pre-emptive Pitfalls

Pupils should understand how to compare and order numbers by comparing their place values. They have learnt to start comparing the largest place value first and compare the place values from left to right of the number. However, in fractions, it is to be emphasised that all the denominators must be the same before comparison and ordering can be done. This is a conceptual point whereby the pupils need to understand that only if each whole is divided into the same number of equal parts, then the fractions can be compared. In Let's Learn 1 to 3 (Textbook 2 P233 – 234), fractions with the same denominator are dealt with. Then, in Let's Learn 4 to 7 (Textbook 2 P235 – 236), the level of difficulty is increased as we progress to fractions with different denominators.

Introduction

When comparing unit fractions, the smaller the denominator, the greater the fraction. In Let's Learn 7 (Textbook 2 P236), since the denominator '3' is the smallest of all three denominators, $\frac{1}{3}$ is the greatest and since the denominator '9' is the greatest of all three denominators, $\frac{1}{9}$ is the smallest. Emphasise the fact that the larger denominator signifies that the same whole is cut into more equal parts, which means each equal part is smaller. Hence relating pictorial representation to number, the unit fraction with a greater denominator is smaller.

Problem Solving

Pupils should order and compare fractions by first expressing the fractions using diagrams. Fraction discs come in handy while explaining fractions. Recapitulate the facts: (i) In like fractions (same denominator), the greater the numerator, the greater the fraction; and (ii) In unit fractions (numerator is 1), the smaller the denominator, the greater the fraction.

Activities

Use manipulatives to explain the numeric value of fractions. Fraction discs (Activity Handbook 2 P54) are used in 'Activity Time' (Textbook 2 P237). Encourage pupils to verbalise to their parents the comparison between two fractions represented by the fraction discs (e.g. $\frac{1}{3}$ is greater than $\frac{1}{4}$).

Resources

- real-life objects (e.g. pizzas, cakes, chocolate bars, etc.)
- fraction discs (Activity Handbook 2 P54)
- fraction cards (Activity Handbook 2 P61 – 66)

Mathematical Communication Support

Encourage class discussion and ask pupils individually for the mathematical reasoning for their comparison and ordering:

- Why did you place the unit fraction with a smaller denominator first when arranging in descending order?
- If the denominators of fractions are the same, how do you compare the fractions?
- If there are 3 or more fractions, will you apply the same concept of ordering?

Revisit the use of symbols '>', '<' in ordering fractions (e.g. $\frac{1}{3} > \frac{1}{4} > \frac{1}{6}$).

ADDING AND SUBTRACTING LIKE FRACTIONS

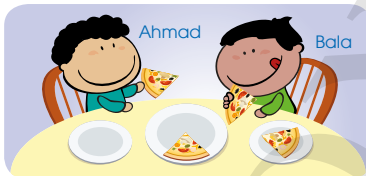
LEARNING OBJECTIVES

1. Add like fractions within one whole with denominators not exceeding 12.
2. Subtract like fractions within one whole with denominators not exceeding 12.

ADDING AND SUBTRACTING LIKE FRACTIONS

LESSON
4

IN FOCUS

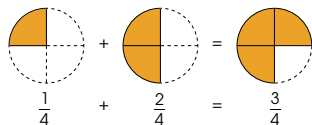


A pizza is cut into 4 slices of equal size.
What fraction of the pizza do Ahmad and Bala eat altogether?

LET'S LEARN

1. Ahmad ate $\frac{1}{4}$ of a pizza.

Bala ate $\frac{2}{4}$ of the pizza.



Add $\frac{1}{4}$ and $\frac{2}{4}$.
1 quarter + 2 quarters
= 3 quarters

Ahmad and Bala ate $\frac{3}{4}$ of the pizza altogether.



IN FOCUS

Allow pupils to discuss the following questions in small groups:

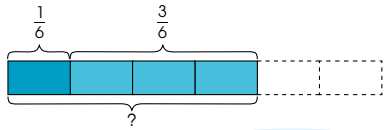
- How many slice(s) of the pizza does Ahmad eat?
- How many slice(s) of the pizza does Bala eat?
- What fraction of the pizza does Ahmad eat?
- What fraction of the pizza does Bala eat?
- What fraction of the pizza do Ahmad and Bala eat altogether?

LET'S LEARN

Use the fraction disc with the part-part whole model to present the solution. Guide pupils in understanding the addition of fractions by saying 'Add $\frac{1}{4}$ and $\frac{2}{4}$ to give $\frac{3}{4}$,

while writing the equation, $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$ on the board.

2. Add $\frac{1}{6}$ and $\frac{3}{6}$.

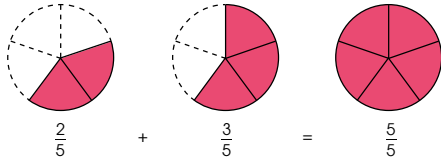


$$\frac{1}{6} + \frac{3}{6} = \frac{4}{6}$$


1 sixth + 3 sixths = 4 sixths



3. Add $\frac{2}{5}$ and $\frac{3}{5}$.



2 fifths + 3 fifths = 5 fifths
5 fifths = 1 whole

Use  to help you add fractions.



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FRACTIONS 240

Textbook 2 P240

For Let's Learn 2, guide pupils by saying 'Add $\frac{1}{6}$ and $\frac{3}{6}$ to give $\frac{4}{6}$ ', while writing the equation, $\frac{1}{6} + \frac{3}{6} = \frac{4}{6}$ on the board.

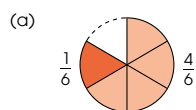
Likewise, repeat the procedure for Let's Learn 3.

Highlight to pupils that $\frac{5}{5} = 1$ whole. Use the fraction discs to present the solutions if necessary.

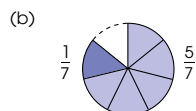
PRACTICE



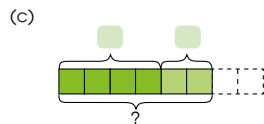
Add.



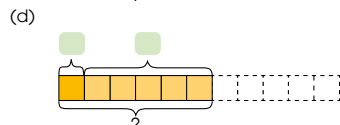
$$\frac{1}{6} + \frac{4}{6} = \square$$



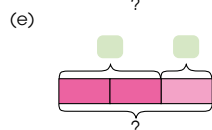
$$\frac{1}{7} + \frac{5}{7} = \square$$



$$\frac{4}{8} + \frac{2}{8} = \square$$



$$\frac{1}{11} + \frac{5}{11} = \square$$



$$\frac{2}{3} + \frac{1}{3} = \square$$

Complete Workbook 2B, Worksheet 4A • Pages 111 – 112

241

CHAPTER 13

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Textbook 2 P241

PRACTICE



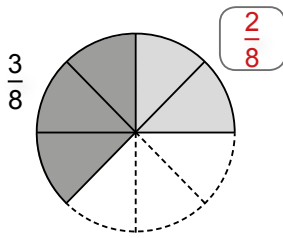
Work with pupils on the questions and selected examples from **Worksheet 4A**.

Independent seatwork

Assign pupils to complete Worksheet 4A (Workbook 2B P111 – 112).

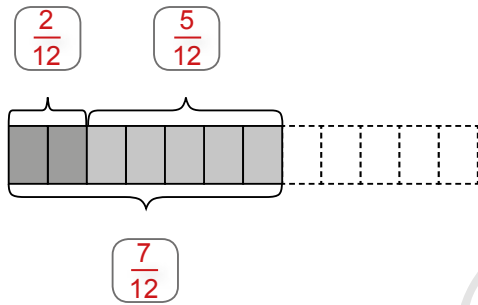
1. (a) $\frac{4}{6}$

(b)



$$\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$$

(c)



$$\frac{2}{12} + \frac{5}{12} = \frac{7}{12}$$

2. (a) $\frac{4}{5}$

(b) $\frac{4}{7}$

(c) $\frac{7}{10}$

(d) $\frac{11}{11}$

(e) $\frac{5}{10}$

(f) $\frac{8}{12}$

(g) $\frac{5}{6}$

(h) $\frac{5}{8}$

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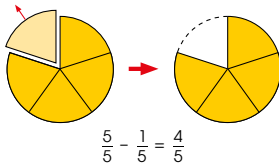


What fraction of the pizza is left?

LET'S LEARN

- There is $\frac{5}{5}$ of a pizza on the table.
Tom eats $\frac{1}{5}$ of the pizza.

Subtract $\frac{1}{5}$ from $\frac{5}{5}$.



$$\frac{5}{5} - \frac{1}{5} = \frac{4}{5}$$

$\frac{4}{5}$ of the pizza is left.

5 fifths - 1 fifth = 4 fifths



Textbook 2 P242

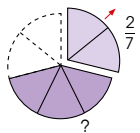
Assign pupils into groups to discuss the following questions:

- How many slices of pizza are there in one whole?
- How many slice(s) of pizza is/are eaten?
- How many slice(s) of pizza is/are left?
- What fraction of the pizza is left?

LET'S LEARN

Use the fraction disc with the part-part whole model to present the solution. Guide pupils in understanding the subtraction of fractions by saying 'Subtract $\frac{1}{5}$ from $\frac{5}{5}$ to get $\frac{4}{5}$ ', while writing the equation, $\frac{5}{5} - \frac{1}{5} = \frac{4}{5}$ on the board.

- Subtract $\frac{2}{7}$ from $\frac{5}{7}$.

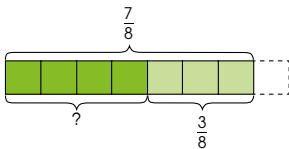


$$\frac{5}{7} - \frac{2}{7} = \frac{3}{7}$$

5 sevenths - 2 sevenths = 3 sevenths



- Subtract $\frac{3}{8}$ from $\frac{7}{8}$.



$$\frac{7}{8} - \frac{3}{8} = \frac{4}{8}$$

7 eighths - 3 eighths = 4 eighths

1 whole is the same as 8 eighths.



Textbook 2 P243


For Let's Learn 2, guide pupils by saying 'Subtract

$\frac{2}{7}$ from $\frac{5}{7}$ to get $\frac{3}{7}$ ', while writing the equation,

$\frac{5}{7} - \frac{2}{7} = \frac{3}{7}$ on the board.

Likewise, repeat the procedure for Let's Learn 3. Use the manipulatives to present the solutions if necessary.

Work in groups of 4.

- Use fractions to make an addition story and a subtraction story.
- Write the stories on the .


What you need:




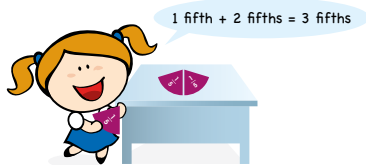
Write the correct addition and subtraction equations.

Example

Nora eats $\frac{1}{5}$ of a cake.
Ann eats $\frac{2}{5}$ of the cake.
 $\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$
They eat $\frac{3}{5}$ of the cake altogether.



- Show your group's stories to the class.
Use  to show how you add or subtract.

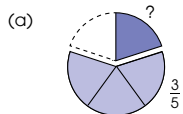


Textbook 2 P244

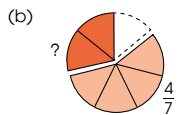
Reinforce the part-part whole model to pupils. Emphasise on the language used (i.e., add ___ to ___ or subtract ___ from ___). Check on the accuracy of the equations written with the pictorial representation. Display the stories on the class notice board.

PRACTICE 

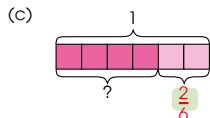
Subtract.



$$\frac{4}{5} - \frac{3}{5} = \frac{1}{5}$$



$$\frac{6}{7} - \frac{4}{7} = \frac{2}{7}$$



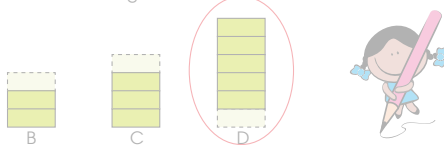
$$1 - \frac{2}{6} = \frac{6}{6} - \frac{2}{6} = \frac{4}{6}$$

Complete Workbook 2B, Worksheet 4B • Pages 113 – 114

 MIND WORKOUT

Part A is $\frac{1}{6}$ of a figure. 

Which of the following makes 1 whole with Part A?



Textbook 2 P245

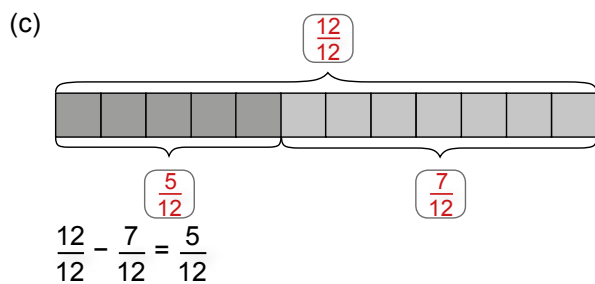
PRACTICE 

Work with pupils on the questions and selected examples from **Worksheet 4B**.

Independent seatwork

Assign pupils to complete Worksheet 4B (Workbook 2B P113 – 114).

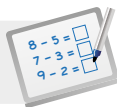
1. (a) $\frac{2}{4}$
 (b) $\frac{6}{7} - \frac{2}{7} = \frac{4}{7}$



2. (a) $\frac{2}{8}$
 (b) $\frac{1}{5}$
 (c) $\frac{5}{11}$
 (d) $\frac{3}{12}$
 (e) $\frac{3}{4}$
 (f) $\frac{4}{7}$

3. (a) $\frac{7}{8}$
 (b) $\frac{6}{6}$
 (c) $\frac{10}{12}$
 (d) $\frac{6}{9}$
 (e) $\frac{6}{10}$
 (f) $\frac{10}{10}$
 (g) $\frac{4}{8}$
 (h) $\frac{3}{12}$
 (i) $\frac{1}{7}$
 (j) $\frac{4}{9}$
 (k) $\frac{6}{8}$
 (l) $\frac{9}{11}$

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Specific Learning Focus

- Add like fractions within one whole with denominators not exceeding 12.
- Subtract like fractions within one whole with denominators not exceeding 12.

Suggested Duration

5 periods

Prior Learning

Pupils should be able to represent and understand the value of fractions. They should be able to compare like and unit fractions and arrange them in ascending and descending order.

Pre-emptive Pitfalls

Since pupils should already be clear that the numerator is the number of equal parts and the denominator is the total number of equal parts in a whole, and that a fraction represents the number of equal parts of a whole, this lesson should be less challenging for pupils.

Introduction

Addition and subtraction of fractions is introduced in this lesson. Since it is an introduction to applying mathematical operations in fractions, only like fractions are dealt with. Emphasis of part-part-whole concept and using fraction discs will help teachers to explain this lesson. In addition of like fractions, the numerators are added while the denominators remain the same. In an addition like $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$, verbalise this equation by saying 'one fourth and two fourths add up to three fourths'. In an addition of fractions making a whole like $\frac{1}{4} + \frac{3}{4} = 1$, verbalise this equation by saying 'one fourth and three fourths make a whole'.

Problem Solving

Understanding the pictorial representations helps pupils understand the addition and subtraction of fractions clearly. Once the pictorial understanding is achieved, the equations and symbols need to be reinforced (e.g. $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$). Get pupils to verbalise the equations. In a subtraction equation like $\frac{5}{7} - \frac{2}{7} = \frac{3}{7}$, the verbalisation would be 'five sevenths minus two sevenths equals to three sevenths'.

Activities

In 'Activity Time' (Textbook 2 P244), once the addition story and subtraction story have been written, the group members can then enact the stories using fraction discs.

Resources

- fraction discs
- markers

Mathematical Communication Support

Encourage class discussion and verbalise the equations. The addition and subtraction of fractions can be checked by pictorial representations (fraction discs and bar models). Ask pupils relevant questions for a better understanding of the equation and operation:

- How many parts has the whole been divided into?
- Will this number be the numerator or denominator?
- How many parts are being added? Are they equal parts?
- After subtracting or adding, how many parts of the fraction are there left or in total?
- Why would you subtract or take away?
- Why would you add or find the sum?
- Can you make your own word problems using the given equation?

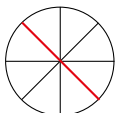
PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



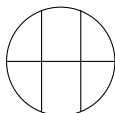
Mind Workout

Date: _____

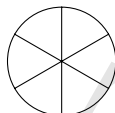
Mrs Lim asked her pupils to divide a circle into 6 equal parts. The figures drawn by 3 pupils are shown.



Kate



Junhao



Farhan

- (a) Whose drawing is correct?

Farhan

What fraction of the circle is one part?

$$\left(\frac{1}{6}\right)$$

- (b) Kate can draw one more line to divide the circle into 8 equal parts.

Help Kate draw the line in her figure above.

What fraction of the circle is one part?

$$\left(\frac{1}{8}\right)$$



Mind Workout

In part (a), pupils will have to focus on the concept of equal parts in fraction.

In part (b), spatial visualisation skills will be required to identify the position of the additional line to make all the parts equal.



Maths Journal

Date: _____

Nora says that $\frac{2}{5} + \frac{1}{5} = \frac{3}{10}$.

Is Nora correct?

Draw a diagram in the space below to show whether Nora is correct.

Nora is incorrect.

Workbook 2B P116



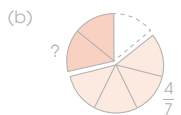
Maths Journal

This journal presents a common error made by pupils in the addition of like fractions. It will highlight why the answer $\frac{3}{10}$ does not make sense as it is less than $\frac{3}{5}$, the correct answer. Pupils can be guided to see that the equation should be changed to $\frac{2}{10} + \frac{1}{10}$ to get $\frac{3}{10}$.

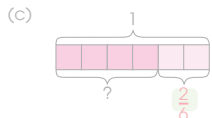
Subtract.



$$\frac{4}{5} - \frac{3}{5} = \frac{1}{5}$$



$$\frac{6}{7} - \frac{4}{7} = \frac{2}{7}$$



$$1 - \frac{2}{6} = \frac{6}{6} - \frac{2}{6} = \frac{4}{6}$$

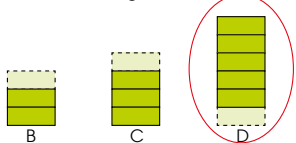
Complete Workbook 2B, Worksheet 4B • Pages 113 – 114



MIND WORKOUT

Part A is $\frac{1}{6}$ of a figure. **A**

Which of the following makes 1 whole with Part A?



Textbook 2 P245



MIND WORKOUT

Allow pupils to work in pairs and let them place Part A on each of the three options. Then ask them to consider the following questions:

- What fraction of Figure B is Part A?
- What fraction of Figure C is Part A?
- What fraction of Figure D is Part A?
- What is the difference?

Recapitulate the concept of $\frac{1}{6}$ with manipulatives if necessary.

MATHS JOURNAL

Add or subtract.

(a) $\frac{2}{7} + \frac{3}{7} = \frac{5}{7}$

(b) $\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$

(c) $\frac{6}{9} - \frac{2}{9} = \frac{4}{9}$

(d) $\frac{7}{8} - \frac{1}{8} = \frac{6}{8}$

How do the numerators and the denominators change when you add or subtract?

You may use fraction discs to help you add or subtract.



I know how to...

SELF-CHECK

- name and write a fraction.
- name fractions that make one whole.
- identify equivalent fractions.
- compare and order fractions.
- add fractions. subtract fractions.

MATHS JOURNAL

Pupils need to look out for the patterns in the questions, observing the change in the numerators and denominators when they add or subtract the fractions. They can use the fraction discs to help them observe the change. Encourage pupils to discuss their observations with their partners.

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

SELF-CHECK



Pupils to complete **Review 13** (Workbook 2B P117 – 118) as consolidation of understanding for the chapter.

1. (a)

$\frac{1}{4}$			
$\frac{1}{5}$			
$\frac{1}{3}$			

$\frac{1}{5}, \frac{1}{4}, \frac{1}{3}$

(b)

$\frac{2}{8}$			
$\frac{7}{8}$			
$\frac{5}{8}$			

$\frac{2}{8}, \frac{5}{8}, \frac{7}{8}$

2. (a) $\frac{2}{6}$

(b) $\frac{4}{6}$

3. (a) $\frac{7}{7}$

(b) $\frac{4}{8}$

(c) $\frac{11}{12}$


(d) $\frac{2}{5}$

(e) $\frac{6}{8}$

(f) $\frac{3}{10}$

Time
CHAPTER
14


Can you help Kate tell the time on the clock?



TELLING AND WRITING TIME TO 5 MINUTES

LESSON
1

IN FOCUS



What do you notice about the two hands of the clock?
What is the time shown?

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CHAPTER 14
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Textbook 2 P247

Related Resources

NSPM Textbook 2 (P247 – 258)
NSPM Workbook 2B (P119 – 134)

Materials

12-h demonstration geared clock

Lesson

Lesson 1 Telling and Writing Time to 5 Minutes
Lesson 2 Using a.m. and p.m.
Lesson 3 Telling Time After
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

In Grade 1, pupils are taught that a clock face has 12 numbers on it and the long hand is the minute hand while the shorter hand is the hour hand. They also learnt to read time to the hour and half-hour. At Grade 2, pupils will progress to learn skip counting in fives to tell time to 5 minutes, the use of a.m. and p.m., and duration of one hour and half hour. Abbreviations for hours and minutes are introduced to teach pupils to write time. Geared clocks are used to help pupils to observe the movement of the hour hand and the minute hand so that they can identify and draw the time on the clock face accurately. Pupils will be given the opportunity to understand time using events in their lives as well as experience the concept of duration. The concept of time can be incorporated into the daily lessons with the class to help pupils to understand the application of time in real life.

LESSON

1

TELLING AND WRITING TIME TO 5 MINUTES

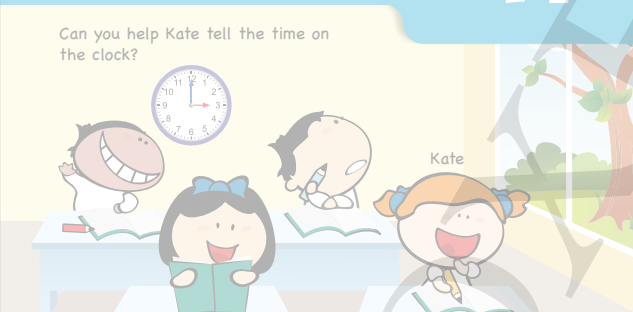
LEARNING OBJECTIVES

1. Telling time to 5 minutes.
2. Writing time to 5 minutes.

Time


CHAPTER 14


Can you help Kate tell the time on the clock?



TELLING AND WRITING TIME TO 5 MINUTES

LESSON 1

IN  FOCUS



What do you notice about the two hands of the clock?
What is the time shown?

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IN FOCUS

Ask the pupils what they notice about the clock by asking the following questions:

- Where is the minute hand pointing at?
- Where is the hour hand pointing at?
- What is the time on the clock?
- What are the pupils doing at this time?

Textbook 2 P247

LET'S LEARN

1.



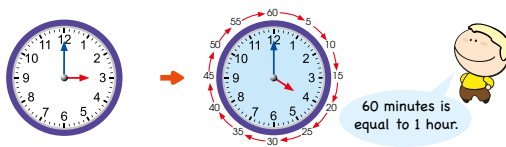
3 o'clock
After 5 **minutes**, the minute hand moves from 12 to 1.
We write the time as **3.05**.
We read 3.05 as three o' five.

2.



After 30 minutes, the minute hand moves from 12 to 6.
The time shown is 3.30.
It is **30** minutes after 3 o'clock.

3.



The minute hand makes a complete round in 60 minutes.
The hour hand moves from 3 to 4.
1 hour after 3 o'clock is 4 o'clock.

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TIME 248

Textbook 2 P248

Using a geared clock, show the movement of the minute hand by moving it from 12 to 1 and tell pupils that 5 minutes have passed. Read the time 'three o' five' to the class and write down 3.05 on the board.

Continue to move the minute hand and skip count in fives. For Let's Learn 2, stop the minute hand at 6 and tell the class that 30 minutes have passed. Read the time 'three thirty' to the class and write down 3.30 on the board. Get pupils to notice the position of the minute hand and hour hand for the given time.

For Let's Learn 3, move the minute hand to complete one round and stop at 12. Tell the class that 60 minutes = 1 hour. Read the time and write it on the board. Reverse the time to 3.00 and ask pupils to observe the simultaneous movements of the minute hand and hour hand.

4. Draw the minute hand to show 4.15.



At 4.15, the minute hand is pointing to 3.
The hour hand is between 4 and 5.

5. Draw the hour hand to show 7.45.



7.45 is nearer to 8.00.
So, we draw the hour hand nearer to 8.
The hour hand is between 7 and 8.

Work in pairs.

- 1 Make sure is pointing to 12. What is the time now?
- 2 Take turns to move from one number to the next. Count aloud in fives. For example, say '5 minutes' when points to 1.
- 3 Keep counting in fives until points to 12 again. What is the time now?
- 4 Tell your partner where the is when the shows:
(a) 5 minutes (b) 30 minutes (c) 55 minutes

What you need:
 minute hand
 hour hand

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Textbook 2 P249

For Let's Learn 4, point the minute hand to 12 and ask pupils to skip count in fives. The minute hand should stop at 3, indicating 15 minutes have passed. Ask pupils to take note that the hour hand is now between 4 and 5.

For Let's Learn 5, tell pupils to note the time 7.45 is nearer to 8.00 so the hour hand has to be nearer to 8 than 7.

ACTIVITY TIME



Allow pupils to work in pairs and provide them with geared clocks. Get them to start with the minute hand pointing at 12 and the hour hand pointing at 4. Take turns to complete the activity.



1. Count in fives to tell the time.

(a)



The time shown is **3.35**.

It is **35** minutes after **3** o'clock.

(b)



The time shown is **5.50**.

It is **50** minutes after **5** o'clock.

2. Read the time.
Show the missing hour hand.

(a) 10.15



(b) 3.50



3. Read the time.
Show the missing minute hand.

(a) 7.45



(b) 2.20



Complete Workbook 2B, Worksheet 1 • Pages 119 – 122

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TIME 250



Work with pupils on the questions and selected examples from **Worksheet 1**.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2B P119 – 122).

- 1. (a) 11.30, 30, 11
- (b) 7.15, 15, 7
- (c) 5.40, 40, 5
- (d) 4.20, 20, 4
- (e) 12.05, 5, 12

2. (a)



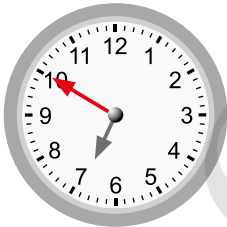
(b)



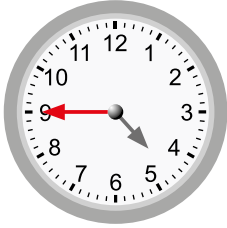
(c)



3. (a)

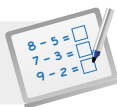


(b)



(c)





Specific Learning Focus

- Telling time to 5 minutes.
- Writing time to 5 minutes.

Suggested Duration

4 periods

Prior Learning

In Grade 1, pupils have been introduced to telling time to the half hour and to the hour. They should be familiar with the minute hand and hour hand, and that the minute hand pointing to digit '6' on the clock represents half hour and when this happens, the hour hand points exactly in between two consecutive digits on the clock.

Pre-emptive Pitfalls

Explain to pupils that there are 60 minutes in an hour. This can be quite challenging for pupils to comprehend. The teacher can relate this to money where 100 cents make a dollar. In this case, 60 minutes make an hour.

Introduction

Explain to pupils the following concepts in this lesson:

- An hour equals to 60 minutes.
- There are 12 digits on an analogue clock. Each digit represents 5 minutes. This can be tabulated as such:

digit on analogue clock	number of minutes it represents	digit on analogue clock	number of minutes it represents
1	5	7	35
2	10	8	40
3	15	9	45
4	20	10	50
5	25	11	55
6	30	12	60

Verbalising the time is equally important (e.g. say 'if the minute hand is pointing at 4 and the hour hand is pointing at 6, the time will be written as 6.20 or 20 minutes after 6'). Point out to the pupils that the minute hand moves every minute while the hour hand also moves bit by bit from one digit to the next consecutive digit within an hour.

Problem Solving

The teacher can explain how to tell time to 5 minutes by relating it to skip counting in fives. Enunciate that there are 60 minutes in an hour, so for example, 60 minutes after the time 5.00, the time is written as 6:00 and not 5:60. Explain that the next hour has reached, so the digit representing hours changed by 1 from '5' to '6'.

Activities

The 'Snap' game or just peer playing using the 12-h demonstration geared clock can be fun. The teacher can write down a time on the board and have pupils work in pairs to show the time on the clock and raise the clock in the air once done.

Resources

- 12-h demonstration geared clock

Mathematical Communication Support

Emphasise that the interval between two consecutive minute marks on the analogue clock represents 5 minutes. Encourage classroom participation by asking pupils the following questions:

- Where is the minute hand pointing? How many minutes does it represent?
- Why do we skip count in fives when telling time in minutes?
- Why is the hour hand positioned between two consecutive numbers?
- What do you generally do at the time shown on the clock?
- How many complete rounds does the minute hand move in 180 minutes?
- If the minute hand moves a quarter of a turn, how minutes have passed?

LESSON 2

USING a.m. AND p.m.

LEARNING OBJECTIVES

1. Write time using a.m. or p.m.
2. Indicate a.m. or p.m. given some events.

USING a.m. AND p.m.

LESSON 2

IN FOCUS



Junhao asked Bina where she was at 8.00. Bina said that she was in school and also at home at 8.00.

Was Bina telling the truth?

LET'S LEARN

1.



Bina was in class at eight in the morning.

We write the time as **8.00 a.m.**

We use **a.m.** to tell the time from 12 midnight to just before 12 noon.



Bina was at home at eight at night.

We write the time as **8.00 p.m.**

We use **p.m.** to tell the time from 12 noon to just before 12 midnight.

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Textbook 2 P251

IN FOCUS

Ask pupils about what they do in the morning, afternoon, evening and at night. Get them to state the time when they wake up in the morning and the time when they sleep. Lead pupils to the context and ask them the following questions:

- What do you notice about the time 8 o'clock?
- Is Bina telling the truth?
- How do we tell the difference between the two 8 o'clock in a day?

LET'S LEARN

First, guide pupils to understand the use of a.m. and p.m.

- The use of **a.m.** refers to morning and it is used to tell the time from 12 midnight to just before 12 noon.
- The use of **p.m.** can refer to afternoon, evening or at night, and it is used to tell the time from 12 noon to just before 12 midnight.

Next, go through the 2 scenarios to illustrate the use of a.m. or p.m. for the events. In the first part of Let's Learn 1, **a.m.** is used to write the time as Bina was in class **in the morning** whereas **p.m.** is used to write the time in the second part of Let's Learn 1 as Bina was at home **at night**.

2.



Sam brushes his teeth at 8.15 in the morning.
We write the time as **8.15 a.m.**

3.



Nora reads a book at 1.00 in the afternoon.
We write the time as **1.00 p.m.**

4.



Xinyi watches television at 6.20 in the evening.
We write the time as **6.20 p.m.**

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TIME 252

Textbook 2 P252

Guide pupils to understand the time is 8.15 in Let's Learn 2 as the minute hand is pointing to 3 and the hour hand is between 8 and 9. As Sam brushes his teeth in the morning, the time should be written as **8.15 a.m.**

In Let's Learn 3, the time is 1.00 as the minute hand is pointing to 12 and the hour hand is pointing at 1. As Nora is reading a book in the afternoon, the time should be written as **1.00 p.m.**

The time is 6.20 in Let's Learn 4 as the minute hand is pointing to 4 and the hour hand is between 6 and 7. As Xinyi watches television in the evening, the time should be written as **6.20 p.m.**

ACTIVITY TIME

Work in pairs.

1 Use to show different times.
Ask your partner what time is shown.

What you need:

2 Think of an activity that you do at each time.

Time	Activity
7.00 a.m.	Brush my teeth

3 Show your table to your classmates.

4 Tell your classmates what you do at each time.

Use words such as morning, afternoon or night to talk about the activities.

I brush my teeth at 7.00 in the morning.



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Textbook 2 P253

ACTIVITY TIME



Allow pupils to work in pairs and provide them with geared clocks. Take turns to complete the table and remind pupils to use words such as morning, afternoon or night to describe time.



Tell the time using **a.m.** or **p.m.**

(a)



9.20 a.m.

(b)



9.15 p.m.

(c)



8.10 p.m.

(d)



8.05 a.m.

Complete Workbook 2B, Worksheet 2 • Pages 123 – 126

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TIME

254

Textbook 2 P254



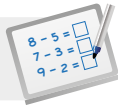
Work with pupils on the questions and selected examples from **Worksheet 2**.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2B P123 – 126).

Answers Worksheet 2 (Workbook 2B P123 – 126)

- a.m.
 - p.m.
 - p.m.
 - a.m.
- 10.45 a.m.
 - 2.20 p.m.
 - 5.10 p.m.
 - 7.35 p.m.

**Specific Learning Focus**

- Write time using a.m. or p.m.
- Indicate a.m. or p.m. given some events.

Suggested Duration

2 periods

Prior Learning

Pupils should be able to tell time on an analogue clock. The a.m. and p.m. concepts are explained in this lesson.

Pre-emptive Pitfalls

Explain to the pupils that there are 24 hours in a day, and within these 24 hours, the time in the first set of 12 hours is written with 'a.m.' while the time in the second set of 12 hours is written with 'p.m.'. 'a.m.' is used to tell the time from 12 midnight to just before 12 noon, while 'p.m.' is used to tell the time from 12 noon to just before 12 midnight. This can be quite challenging for pupils to understand. 'In Focus' (Textbook 2 P251) poses a thought-provoking question as it asks about Bina's whereabouts at 8.00 which could be either morning or night.

Introduction

Reinforce when 'a.m.' and 'p.m.' are used respectively. Morning, afternoon, evening and night are key words to decide if the time should be written using 'a.m.' or 'p.m.'. Similarly, the logical sequence of daily events helps us to identify the time of the day. For example, the time that one has breakfast is written using 'a.m.' since we have breakfast in the morning, while the time that one has dinner is written using 'p.m.' since we have dinner at night.

Problem Solving

Reinforce that when writing time, the digit representing hours is written first, followed by the digit representing minutes, and lastly 'a.m.' or 'p.m.' is written depending on the time of the day. Explain that using 'a.m.' or 'p.m.' when writing time defines the time of the day better.

Activities

A fun game can be played, where each pair can take turns to fill in the table (Activity Handbook 2 P68).

Resources

- 12-h demonstration geared clock
- markers
- mini boards
- time of activities table (Activity Handbook 2 P68)

Mathematical Communication Support

During class discussion, point out the sequential events of a day – e.g. the sun rises in the morning ('a.m.') and sets in the evening ('p.m.'). Brainstorm with pupils the daily events that occur in the 'a.m.' time and those that occur in the 'p.m.' time. Have the pupils record these events in a two-columns table.

TELLING TIME AFTER

LEARNING OBJECTIVES

1. Tell the time one hour later.
2. Tell the time half an hour later.
3. Write min for minute(s).
4. Write hr for hour(s).

TELLING TIME AFTER

LESSON

3

IN FOCUS



Farhan went to the library to read at 1.00 p.m.
After 1 hour, he went to the canteen for lunch.

What time did Farhan go to the canteen?

LET'S LEARN

1.



2.00 p.m. is 1 hr after 1.00 p.m.
Farhan went to the canteen at 2.00 p.m.
The minute hand makes a complete round in 60 minutes.

We write 'hr' for hour.



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IN FOCUS

Ask the following questions to check on pupils' understanding:

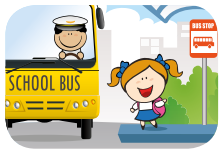
- Where did Farhan go at 1.00 p.m.?
- How long did he stay at the library?
- Where did he go after he left the library?
- When did he go to the canteen?

LET'S LEARN

Using a geared clock, show the time for 1.00. Move the hour hand to one hour later and read the time. Tell pupils that 1 hour can be written as 1 hr. State that the minute hand has completed 1 round which is equivalent to 60 minutes when the hour hand moves from 1 to 2. Remind pupils that **60 min = 1 hr**.

Textbook 2 P255

2.



Ann reached the bus stop at 8.00 a.m.
She boarded the bus at 8.30 a.m.
8.30 a.m. is half an hour after 8.00 a.m.

We write 'min' for minutes.

$\frac{1}{2}$ hr is the same as 30 min.



Ann waited $\frac{1}{2}$ hr or 30 min for the bus.

3.



Meiling wakes up 1 hour after 7.00 a.m.
Meiling wakes up at 8.00 a.m.

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TIME 256

Textbook 2 P256

Use Let's Learn 2 to practice telling the time half an hour later. Remind pupils to skip count in fives to show that **half an hour = 30 min**. Tell pupils to write 'min' for minutes.

Let's Learn 3 is similar to Let's Learn 1 except the time is in the morning. Remind pupils that a.m. is used to refer to morning and get them to fill the blank in the textbook and verify their answers.

ACTIVITY  TIME

Work in groups of 3 to 4.

1 Look at the class timetable.

Time	Activity
7.30 a.m.	Assembly
8.00 a.m.	Mathematics
8.30 a.m.	P.E. lesson
9.30 a.m.	Recess
10.00 a.m.	English test
11.00 a.m.	Computer lab lesson
12 noon	Children's Day celebration
1.00 p.m.	Go home

Which activities last about 1 hour?
Which activities last about half an hour?

2 Name some other activities in school that last for about 1 hour or half an hour.

PRACTICE 



What is 1 hr after 10.00 a.m.?



Priya started playing the piano at 10.00 a.m.
She played for 1 hour.

Priya stopped playing the piano at 11.00 a.m.

Complete Workbook 2B, Worksheet 3 • Pages 127 – 130

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CHAPTER 14

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Textbook 2 P257

ACTIVITY  TIME

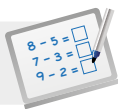
Allow pupils to work in small groups and get them to discuss the questions in the activity. Take turns to suggest the answers in question 2 and remind pupils to use a.m. or p.m. to describe the start time of their activities.

PRACTICE 

Work with pupils on the question and selected examples from **Worksheet 3**.

Independent seatwork

Assign pupils to complete Worksheet 3 (Workbook 2B P127 – 130).

**Specific Learning Focus**

- Tell the time one hour later.
- Tell the time half an hour later.
- Write min for minute(s).
- Write hr for hour(s).

Suggested Duration

4 periods

Prior Learning

Pupils should be well-versed in telling time to 5 minutes, half hour, and in a.m. and p.m. In this lesson, pupils progress to add the time elapsed to the starting time to find the ending time.

Pre-emptive Pitfalls

In this lesson, pupils are required to add the time elapsed to the starting time to find the ending time. If explained well with real-life events and geared clock, this concept can be made clear to the pupils within one or two classes.

Introduction

To find the ending time after the elapsed time, the addition operation is required. The teacher can use a geared clock to show how the hour hand and minute hand move to the ending time. For example, If it is 8.00 a.m. or 8 o'clock and Ann takes half an hour to reach school, we say that Ann will reach school at 8.30 a.m. or 30 minutes after 8. This can be represented on the clock or get pupils to draw on their worksheet.

Problem Solving

This lesson provides pupils with a lot of opportunities to relate time to real-life experiences and encourages them to organise their routine. The teacher can give an example of a real-life situation involving time: 'Ann has to reach Bina's house for a birthday party at 6.00 p.m. Bina's house is an hour away from her own house. What time should Ann leave house in order to reach Bina's house on time?'. Other similar real-life examples can be asked so that pupils are engaged in mental strategies and concepts involving time.

Activities

'Activity Time' (Textbook 2 P257) incorporates the class timetable and questions posed in this activity can be asked as formative assessment. The groups can be graded collectively.


Resources

- 12-h demonstration geared clock


Mathematical Communication Support

Pupils should find this chapter on time very relatable as they relate time to their daily routine and therefore this chapter can be made interesting by asking questions based on their specific timings and routines in their daily lives. Pupils tend to enjoy learning this chapter as they find themselves being able to relate to it. Time management, routine, estimated arrival time or time duration, and above all, punctuality, are emphasised throughout this chapter.

1. (a)




30 minutes
later




9.00 a.m. 9.30 a.m.

(b)




1 hour
later




5.00 p.m. 6.00 p.m.

2. (a)




is 1 hr after




1.00 12.00

(b)



is 30 min after



6.30 6.00

(c)



is half an hour after



2.30 2.00

3. (a)




half an hour
later




7.30 a.m.

(b)



1hr
later



9.00 p.m.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW



Mind Workout

Date: _____

Look at the clock.



There is something wrong with the hour hand on the clock.

Draw the correct way to show the time.
Then write the time.



7.05

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Time 131



Mind Workout

Encourage pupils to attempt the question on their own before using the geared clocks to check their answers.

Workbook 2B P131



Maths Journal

Date: _____

Write down the activities you do at home.

Time	Activity
7.00 p.m.	Dinner

My dinner lasts for about half an hour.



Which activities last for about half an hour?

Which activities last for about 1 hour?

Workbook 2B P132



Maths Journal

This journal allows pupils to understand different people may take different amount of time to complete the same task. Allow pupils to share why they take an hour on a particular activity while others take half an hour on the same task.

The use of the word 'about' focuses on the estimation of time. It is important in our daily lives as some events involve time management. Share on the important implications of time management with the class.



MIND WORKOUT

Kate arrived at a party at 2.00 p.m.



Junhao arrived 1 hour after Kate.



Meiling arrived 1 hour after Junhao.



Farhan arrived half an hour after Meiling.

The party started at 4.00 p.m. Who was late?

Use to help you.



MATHS JOURNAL

What can you do in half an hour?

I can read pages of a storybook.

I can complete questions in my workbook.

I can run rounds around the school field.

What can you do in 1 hour?



I know how to...

- tell time to 5 minutes.
- draw hands on the clock faces to show time.
- tell time using a.m. or p.m.
- write the time in hour (hr) and minutes (min).
- tell how long 1 hour or half an hour is.

SELF-CHECK

Textbook 2 P258



MIND WORKOUT

Allow pupils to work in groups and let them guess the arrival time for Junhao, Meiling and Farhan before finding the actual answers. Pupils can use the geared clocks to help them to find the answers if they are unsure. At the end of the activity, remind pupils on the importance of punctuality.

MATHS JOURNAL

Encourage pupils to guess the answers before they attempt on the activities so that they will have a better idea of how long the duration of 30 minutes is. In addition, get pupils to identify activities that require 1 h.

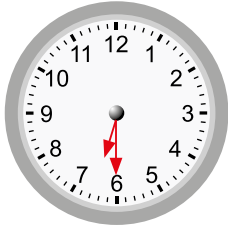
Before pupils proceed to do the self check, review the important concepts by asking for examples learnt for each objective.

Pupils to complete **Review 14** (Workbook 2B P133 – 134) as consolidation of understanding for the chapter.

SELF-CHECK

1. (a) 4.50
(b) 9.35

2. (a)



(b)



3. (a) 9.55 p.m.
(b) 7.10 a.m.
(c) 2.25 p.m.

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Volume CHAPTER **15**

How much liquid can each container hold?



MEASURING VOLUME IN LITRES LESSON 1

IN FOCUS



Mrs Tan bought these from the supermarket.
How much liquid is there in each container?

259 CHAPTER 15 OXFORD UNIVERSITY PRESS

Textbook 2 P259

Related Resources

NSPM Textbook 2 (P259 – 268)
NSPM Workbook 2B (P135 – 144)

Materials

1-litre beaker/bottle, containers of various shapes and sizes to hold liquids, newspaper clippings, sand or beans

Lesson

Lesson 1 Measuring Volume in Litres
Lesson 2 Solving Word Problems
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

In Grade 1, pupils have learnt to compare volumes of liquid. At this level, pupils will learn to measure and compare volume in litres. At the end of the chapter, word problems involving volume in everyday context will help pupils to understand its application in real life.

MEASURING VOLUME IN LITRES

LEARNING OBJECTIVES

1. Use 1-litre containers to measure the volumes of water in different containers.
2. Estimate and measure volumes in litres (ℓ).

Volume

CHAPTER 15

How much liquid can each container hold?

MEASURING VOLUME IN LITRES

LESSON 1

IN  FOCUS

Mrs Tan bought these from the supermarket.
How much liquid is there in each container?

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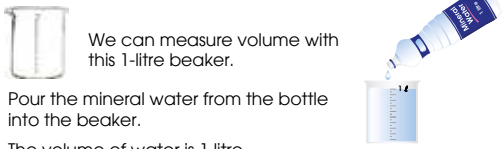
IN  FOCUS

If possible, show pupils the actual items in the picture (P259). Ask pupils if they remember what measurement they can use when buying rice, sugar and flour from the supermarket.

Lead pupils to understand that those items are measured by mass and the unit used is kilograms (kg) and gram (g). For items such as water, juices, cooking oil and washing detergent, another unit of measurement is used.

Textbook 2 P259

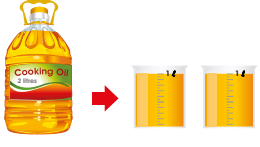
LET'S LEARN

- 


We can measure volume with this 1-litre beaker.

Pour the mineral water from the bottle into the beaker.


The volume of water is 1 litre.

The **litre** is a unit of volume. We write **ℓ** for litre.
- 

The volume of cooking oil is more than 1 ℓ.

The volume of cooking oil is ℓ.
- 

Pour some juice into a glass.

The glass contains less than 1 ℓ of juice.
- 

Is the volume of water in the jug more or less than 1 ℓ?

Use the 1-litre beaker to measure.

The jug contains than 1 ℓ of water.

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Textbook 2 P260

LET'S LEARN

Using a 1-litre beaker, show that the markings on the beaker measure volumes of liquids. Place a 1-litre bottle of mineral water beside the beaker and ask the class if the water in the bottle can fill up the 1-litre beaker. Pour the water into the beaker and ask pupils to observe the water level.



Reiterate to pupils that the volume of water is 1 litre and the unit for volume is **litre**. Show that **ℓ** is written for litre.

For practical reason whereby the use of cooking oil and detergent in large quantities cannot be demonstrated to pupils, use the illustrations in P260 to explain the examples.


Let's Learn 2 shows the volume that is more than 1 litre whereas Let's Learn 3 and 4 illustrate volumes that are less than 1 litre.

ACTIVITY TIME


Work in groups of 4.

- Fill the  and  with water.

Here are some examples of containers.


- Guess the volume of water in each container.

Is the volume **more than**, **less than** or **about** 1 ℓ?

If you guess more than 1 ℓ, what do you think is the actual volume?
- Use  to measure and check your guess.

Count the number of bottles used to fill the containers.
- Complete the table.

What you need:



Container	My guess (more than, less than or about 1 ℓ)	Measured volume

less

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CHAPTER 15

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Textbook 2 P261

ACTIVITY TIME



In this activity, pupils get to estimate and measure volumes in litres using containers that are used in everyday life.

Note: Careful organisation and preparation of materials are necessary for smooth implementation of the activity. Sand and beans can be used in place of water for practical reason.

1. Compare using **more** or **less**.

(a)



The volume of tea in the cup is **less** than 1 l.

(b)



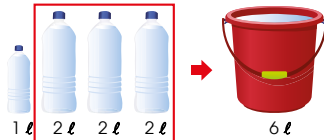
The pot contains **more** than 1 l of coffee.

2. Pour all the washing liquid into 1-litre beakers.



The volume of washing liquid is **5** l.

3. Which bottles will you use to fill up the pail completely?



Complete Workbook 2B, Worksheet 1 • Pages 135 – 138

Textbook 2 P262

Work with pupils on the questions and ask them to explain how they read the scales to obtain the answers.

For better understanding, select questions from **Worksheet 1** and work on them with pupils.

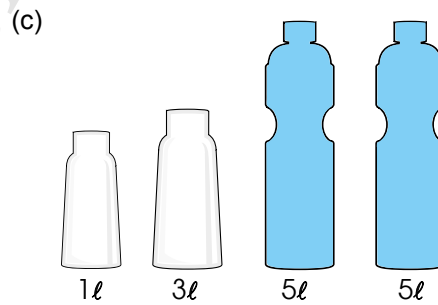
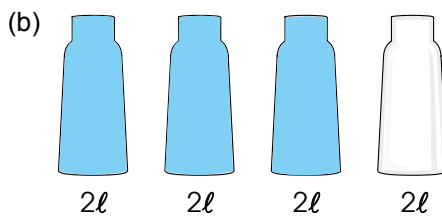
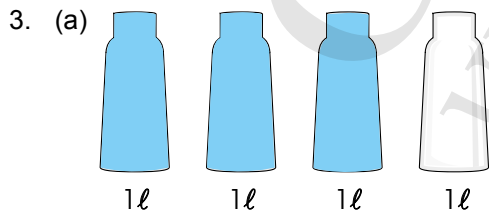
Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2B P135 – 138).

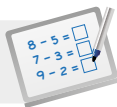
Answers Worksheet 1 (Workbook 2B P135 – 138)

1. (a) less
(b) more

2. (a) 3l
(b) 4l
(c) 15l



4. (a) C
(b) 3
(c) 5

**Specific Learning Focus**

- Use 1-litre containers to measure the volumes of water in different containers.
- Estimate and measure volumes in litres (l).

Suggested Duration

4 periods

Prior Learning

Pupils have been introduced to the concept of volume informally in Grade 1. Recapitulate that volume is the amount of space contained within an object or 3D shape.

Pre-emptive Pitfalls

Pupils have to be very clear of the units for different types of measurements. Masses are measured in units such as kilograms and grams, while volumes are measured in units such as litres and millilitres.

Introduction

This chapter should be taught by relating the concept of volume to real-life situations. Explain to pupils that the volume of a liquid is a measurement of the amount of liquid and have pupils associate this with real-life situations like shopping at the supermarket, consuming liquids like juices and water, watering plants, etc. 'In Focus' (Textbook 2 P259) encourages pupils to think of real-life situations involving volume. The unit for volume, litre, is introduced in this lesson. To help pupils understand litre, get them to measure the volumes of liquids using a beaker and find out if the volume is more or less than a litre. In 'Practice' (Textbook 2 P262), questions 2 and 3 require higher-order thinking where the addition of volume is required to find the total volume.

Problem Solving

Apart from the introduction and understanding of units of measurements (e.g. time – minutes and hours, length – metres and kilometres, mass – kilograms and grams, volume – litres), pupils will be required to compare and order volumes, and use addition and subtraction to find volumes. Scale reading of volume using beakers should be explained in this lesson so that pupils are able to get the correct reading of volume.

Activities

'Activity Time' (Textbook 2 P261) requires planning and careful implementation. Water can be used and pupils can be encouraged to bring containers to class to make the activity fun and engaging. The concept of estimation is also used in this activity and will form a good basis for estimation and rounding off to be learnt in the later grades.

Resources

- containers
- beakers
- liquids (e.g. water, juice, cooking oil)
- table of estimated and measured volume (Activity Handbook 2 P69)

Mathematical Communication Support

This lesson is very relatable to real life. Pupils can engage their parents or guardians to do activities together (Maths Journal P268). Ask questions like 'If the containers are of different sizes or in different shapes, can they hold the same amount of liquid? Would a taller container or cup hold more liquid? Do you think the liquid in the bucket can fill up four bottles or more?' Shorter questions can encourage pupils to contextualise their learning to real-life applications, thereby making mathematics less abstract.

SOLVING WORD PROBLEMS

LEARNING OBJECTIVES

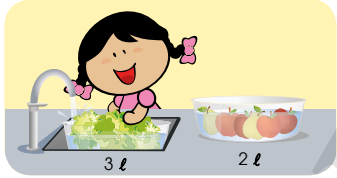
1. Solve word problems involving volumes (addition and subtraction).
2. Solve word problems involving volumes (multiplication and division).

SOLVING WORD PROBLEMS

LESSON

2

IN FOCUS



Nora washed her vegetables and fruits.
How much water did she use altogether?

LET'S LEARN

1. Nora used 3 l of water to wash vegetables. She used 2 l of water to wash fruits. How much water did she use altogether?
 $3 + 2 = 5$
Nora used 5 l of water altogether.

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Textbook 2 P263

IN FOCUS

Show the picture on the visualiser and ask pupils to make up a number story involving the volumes of water in this picture.

LET'S LEARN

Go through Let's Learn 1 with the class. For most pupils, they will recognise this word problem involves addition. Model the four steps to problem solving to help pupils in solving the word problem:

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 do we have to find?

Step 2: Translate key elements into a diagram (model)

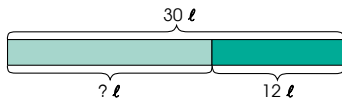
- Draw the model
- Label the known and unknown elements

Step 3: Examine the model and write the number equation

- Lead pupils to see the **part-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 Ali had 30 ℓ of petrol at the beginning. After driving for three days, he had 12 ℓ of petrol left. How much petrol did he use?



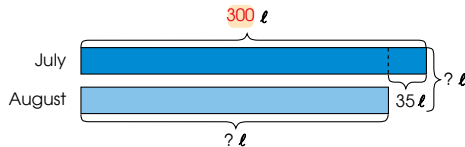
You can draw a model to help you.



$$30 - 12 = 18$$

Mr Ali used 18 ℓ of petrol.

3. Meiling's family used 300 ℓ of water in July. They used 35 ℓ less water in August than in July. How many litres of water did they use in July and August altogether?



$$300 - 35 = 265$$

They used 265 ℓ of water in August.

$$300 + 265 = 565$$

They used 565 ℓ of water in July and August altogether.

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VOLUME 264

Textbook 2 P264

Apply the four steps in problem solving to Let's Learn 2 and 3. Encourage pupils to use model drawing as a visual aid.

PRACTICE



Solve.

1. There is 45 ℓ of water in a fish tank. The fish tank has a crack and 18 ℓ of water leaks out. How much water is left in the fish tank? 27 ℓ



2. Mr Lim's petrol tank can contain 50 ℓ of petrol. He has 12 ℓ of petrol in the tank. How many more litres of petrol does he need to completely fill the tank? 38 ℓ
3. Container A has 25 ℓ of cooking oil. Container B has 9 ℓ more cooking oil than that in Container A.
(a) What is the volume of cooking oil in Container B? 34 ℓ
(b) How much cooking oil is there altogether? 59 ℓ
4. Mr Ali makes some lemonade for sale. He mixes 4 ℓ of lemon juice, 5 ℓ of sugar syrup and 17 ℓ of water. How many litres of lemonade does he make? 26 ℓ

Complete Workbook 2B, Worksheet 2A • Pages 139 – 140

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Textbook 2 P265

PRACTICE



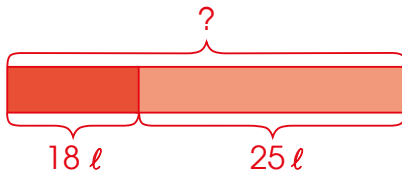
Guide pupils in understanding the problems and encourage them to draw models. Ask them whether the models are part-whole or comparison models and why they choose the particular model. Allow pupils to work in pairs and use the four steps in problem solving to answer the questions.

For more practice, select questions from **Worksheet 2A** and work on them with pupils.

Independent seatwork

Assign pupils to complete **Worksheet 2A** (Workbook 2B P139 – 140).

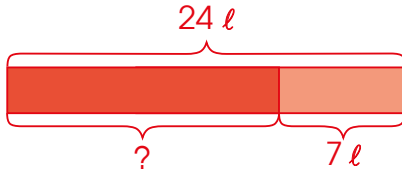
1.



$$18 + 25 = 43$$

He has 43 l of juice altogether.

2.



$$24 - 7 = 17$$

17 l of water was left in the tank.

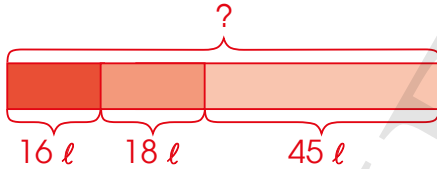
3. (a) $12 - 5 = 7$

He used 7 l of water on Wednesday.

(b) $12 + 7 = 19$

The total volume of water he used on the two days was 19 l.

4.

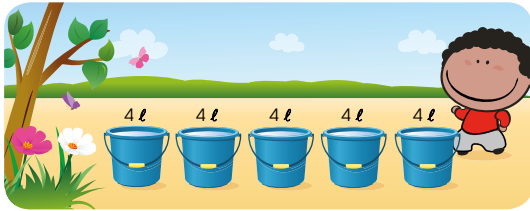


$$16 + 18 = 34$$

The children drank 34 l of orange juice and grape juice.

$$34 + 45 = 79$$

The children drank 79 l of juice altogether.



How much water did Raju use to water the plants?

LET'S LEARN

1. Raju used 5 pails of water to water the plants. Each pail contained 4 l of water. How much water did he use?

$$5 \times 4 = 20$$

Raju used 20 l of water.

Read each problem.
Do we multiply or divide?



2. Xinyi pours 10 l of apple juice equally into 5 bottles. How many litres of apple juice does each bottle contain?

$$10 \div 5 = 2$$

Each bottle contains 2 l of apple juice.

Ask pupils to work in pairs to make up a multiplication story for this picture. Invite 1 or 2 pairs to share their stories.

LET'S LEARN

The examples shown involve multiplication and division. The goal is for pupils to identify the correct operation for each question and write its equation. Model the four steps to problem solving:

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 do we have to find?

Step 2: Translate key elements into a diagram (model)

- Draw the model (to help pupils to visualise the word problem)
- Label the known and unknown elements

Step 3: Examine the model and write the number equation

- Lead pupils to see the **equal parts and whole** concept in the problem structure.
- How many equal parts? What is the volume of each part? What is the total volume?
- Do we multiply or divide to find it?

Step 4: Answer the question



Solve.

1. Bina's mother bought 8 bottles of liquid soap. Each bottle contains 2 ℓ of liquid soap. How many litres of liquid soap did she buy?



2. Weiming prepares 12 ℓ of fruit punch for his birthday party. He pours the fruit punch equally into 3 bottles. How much fruit punch is there in each bottle? 4 ℓ

Complete Workbook 2B, Worksheet 2B • Pages 141 – 142



MIND WORKOUT

Tom needs to fill an empty pail with 7 ℓ of water.



1 ℓ



2 ℓ



How can he use the containers to fill the pail?



Guide pupils in understanding the problems and encourage them to draw models, especially for pupils who are weaker in word problems. Allow pupils to work in pairs and use the four steps in problem solving to answer the questions.

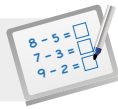
For more practice, select questions from **Worksheet 2B** and work on them with pupils.

Independent seatwork

Assign pupils to complete Worksheet 2B (Workbook 2B P141 – 142).

Answers Worksheet 2B (Workbook 2B P141 – 142)

1. $9 \times 2 = 18$
Ahmad bought 18 ℓ of orange juice.
2. $12 \div 4 = 3$
There was 3 ℓ of soya bean milk in each container.
3. $8 \times 5 = 40$
He sold 40 ℓ of cooking oil altogether.
4. $20 \div 2 = 10$
She used 10 bottles.

**Specific Learning Focus**

- Solve word problems involving volumes (addition and subtraction).
- Solve word problems involving volumes (multiplication and division).

Suggested Duration

3 periods

Prior Learning

Pupils should have a clear understanding of the measurement of volume in litres. They should also be able to estimate volume, read the scales of a beaker and use addition to find the volumes of liquids.

Pre-emptive Pitfalls

This is a relatively easy concept, which can be explained through engaging hands-on activities.

Introduction

'In Focus' (Textbook 2 P263) can be done in class if convenient, such that pupils can be engaged in coming up with the total volume, in litres, of the water used. Explain and revisit the 4-step approach to problem solving.

Problem Solving

Critical-thinking skill is enhanced by having pupils apply what they have learnt in Lesson 1 to real-life word problems, which are to be taught in this lesson. When solving word problems, encourage pupils to understand the information given and decide the strategy to solve (e.g. bar modelling). Then, get them to identify whether the models are part-whole or comparison models. Lastly, get them to decide on the operation to use (+, -, × or ÷). Encourage pair work and get pupils to work on the questions in their workbooks in class.

Activities

All the word problems can be enacted or engaged in class with containers and liquids.

Resources

- real-life objects (container, beaker, liquid)
- mathematical story card (Activity Handbook 2 P70)
- 4-step approach to problem solving template (Activity Handbook 2 P43)

Mathematical Communication Support

Introduce the word problems to the pupils by writing them on the board. Ask for individual responses in steps: '(i) What are the key elements in the word problem? (ii) What is the question asking for? (iii) Which concept is employed? (iv) How do we draw a part-whole or comparison bar model? (v) What operation should be used?'. Then, solve the word problem together on the board.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW

4. Kate poured 20 ℓ of oil equally into some bottles.
Each bottle contained 2 ℓ of oil.
How many bottles did she use?

$$20 \div 2 = 10$$

She used 10 bottles.



Mind Workout

Date: _____

A shop sells oil in three different bottles.



1ℓ



2ℓ



5ℓ

There
is more
than one
answer.



Mrs Lim wants to buy 9 ℓ of oil.

How many bottles of each size can she buy?



Mind Workout

Ask pupils to read the question carefully. Emphasise on the phrase 'bottles of each size' and ask them what it meant.

Possible answers:

$$1(5)+1(2)+2(1)$$

$$1(5)+2(2)$$

$$1(5)+4(1)$$

$$4(2)+1(1)$$

$$3(2)+3(1)$$

$$2(2)+5(1)$$

$$1(2)+7(1)$$

$$9(1)$$

PRACTICE

Solve.

1. Bina's mother bought 8 bottles of liquid soap. Each bottle contains 2 ℓ of liquid soap. How many litres of liquid soap did she buy?



2. Weiming prepares 12 ℓ of fruit punch for his birthday party. He pours the fruit punch equally into 3 bottles. How much fruit punch is there in each bottle? 4 ℓ

Complete Workbook 2B, Worksheet 2B • Pages 141 – 142



MIND WORKOUT

Tom needs to fill an empty pail with 7 ℓ of water.



1 ℓ



2 ℓ



How can he use the containers to fill the pail?

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Textbook 2 P267



MIND WORKOUT

Lead pupils to see that there can be more than one correct answer. Allow pupils to work in pairs to list out all the possible answers and compete within the class for the pair with the most correct answers.

Possible answers:

$$7(1)$$

$$5(1)+1(2)$$

$$3(1)+2(2)$$

$$1(1) +3(2)$$

MATHS JOURNAL

Find and cut out pictures of containers in newspapers or magazines.



Can each container hold more than, less than or about 1 litre of water?

I know how to...

- compare volumes.
- measure volume in litres (ℓ).
- solve word problems on volume.

SELF-CHECK



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VOLUME 268

Textbook 2 P268

MATHS JOURNAL

This activity can be a homework project whereby pupils can work with their parents or guardians to relate Mathematics with their everyday life. Get pupils to make a scrapbook of their cuttings for display or show and tell in class.

This self-check can be done after pupils have completed **Review 15** (Workbook 2B P143 – 144) as consolidation of understanding for the chapter.

SELF-CHECK



1. 1, 4, 6
 - (a) 3
 - (b) 5
 - (c) X, Y, Z

2. $6 \times 3 = 18$

She bought 18 ℓ of water altogether.

3. $20 \div 2 = 10$

Each of them gets 10 ℓ of fruit punch.

4. (a) $472 - 395 = 77$

Barrel A contains 77 ℓ more oil than Barrel B.

(b) $472 + 395 = 867$

There is 867 ℓ of oil in both barrels.

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PICTURE GRAPHS AND TALLY CHARTS

CHAPTER 16

Picture Graphs and Tally Charts CHAPTER 16

How many animals of each type does Farhan see in the zoo?

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Textbook 2 P269

Related Resources

NSPM Textbook 2 (P269 – 280)
NSPM Workbook 2B (P145 – 152)

Materials

Drawing block, markers, newspaper clippings

Lesson

Lesson 1 Reading Picture Graphs with Scales
Lesson 2 Reading Tally Charts
Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

At Grade 1, pupils learnt to read and interpret picture graphs without the use of scales. In this chapter, they will be taught to use scales in reading and interpreting picture graphs. Skip counting is used as a strategy to help pupils to count in groups of 2, 3, 4, 5 and 10 within the multiplication tables learnt in the earlier chapters. Real-life data can be utilised to construct meaningful picture graphs. Picture graphs, including horizontal and vertical picture graphs will be discussed to emphasise that the information remains the same despite the different presentation styles. Pupils will also learn to read tally charts.

LESSON

1

READING PICTURE GRAPHS WITH SCALES

LEARNING OBJECTIVES

1. Read and interpret picture graphs with scales.
2. Read and interpret horizontal and vertical picture graphs.
3. Solve 1-step word problems using picture graphs.

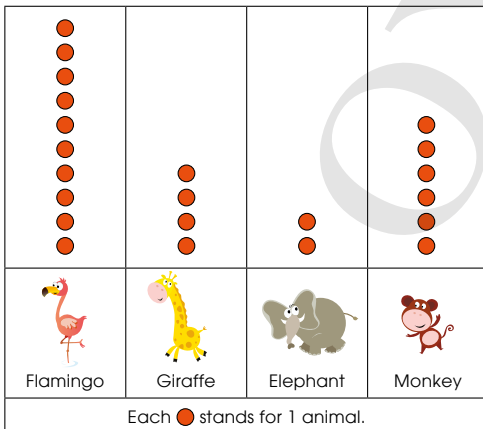
READING PICTURE GRAPHS WITH SCALES

LESSON
1

IN FOCUS

The picture graph shows the number of each type of animal in the zoo.

Animals in the Zoo



Farhan says there are 10 flamingos in the zoo.
Is he correct?

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PICTURE GRAPHS AND TALLY CHARTS 270

IN FOCUS

Ask the class if they have been to the zoo. Get pupils to share their experiences in groups.

Name the animals in the picture (P270) especially the flamingos and count the number of each animal. Teacher to highlight the title and what it means as well as the scale. Check that the symbol represents the number of each animal correctly.

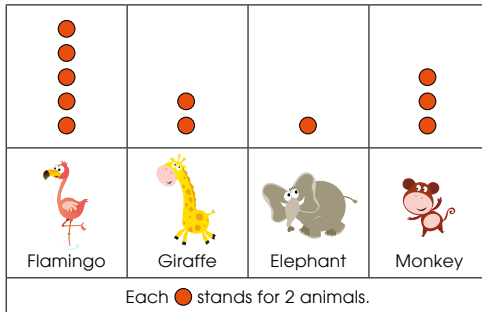
Allow pupils to discuss the following question:

- Is this a better and clearer representation of the number of animals in the zoo? Why?

Textbook 2 P270

1. We can also use one ● to stand for 2 animals.

Animals in the Zoo



Most of the animals in the zoo are flamingos.
We can also tell the number of each type of animal.

- (a) How many flamingos are there?

$$5 \times 2 = 10$$

There are 10 flamingos.

How are the two graphs different?



Lead pupils to understand what a scale represents, starting from 1 : 1. Move on to 1 : 2 and then 1 : 3. Explain the meaning of the title and get pupils to read the scale. Highlight to pupils that the scale is different from what they have learnt in Grade 1. Count the number of animals indicated in the example by using the skip counting strategy.

- (b) How many monkeys are there?

1 ● stands for 2 animals.

$$3 \times 2 = 6$$

There are 6 monkeys.



- (c) How many **more** flamingos than giraffes are there?

Method 1:

There are 5 ● for flamingos.

There are 2 ● for giraffes.

There are 10 flamingos and 4 giraffes.

$$10 - 4 = 6$$

There are 6 more flamingos than giraffes.



Method 2:

There are 3 more ● for flamingos than for giraffes.

$$3 \times 2 = 6$$

There are 6 more flamingos than giraffes.

Note that there are two methods to calculate the difference in (c).

Method 1:

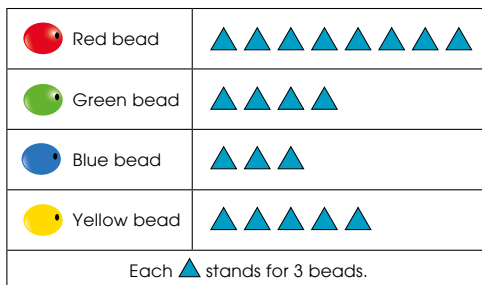
Calculate the number of flamingos and giraffes respectively before finding the difference in the number of animals.

Method 2:

Find the difference in the number of ●. Pupils can find the difference in the number of animals by using the scale 1 : 2.

2. The picture graph shows the number of beads of each colour on a bracelet.

Beads on a Bracelet



We can use the information shown on the picture graph to answer the questions below.

- (a) There are 24 red beads.
 (b) There are 12 green beads.
 (c) There are 9 blue beads.
 (d) There are 15 yellow beads.
 (e) There are 3 more green beads than blue beads.
 (f) There are 21 green and blue beads on the bracelet altogether.



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Textbook 2 P273

Teacher to highlight the title and its meaning. Explain to pupils what the scale 1 : 3 represents and ask them to use the information shown on the picture graph to answer the questions. Remind pupils to use the skip counting strategy to count the number of beads in (a) to (d). Pupils can use either method 1 or 2 on P272 to answer (e) and (f).

Work in groups of 4.

1. Make a list of different places you like to visit. Some examples are shown.



Mausoleum of Quaid



Faisal Mosque

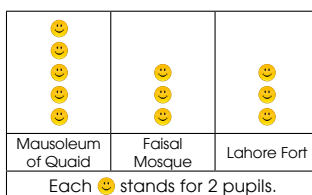


Lahore Fort

2. Ask your classmates to look at your list and choose their favourite place.
 3. Count the number of pupils who choose each place.
 4. Make a picture graph.
 5. Look at other picture graphs. Ask your classmates questions. "How many pupils does each symbol stand for?"

Example

Favourite place pupils like to visit



What symbols do you use?

Why do we use symbols?



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PICTURE GRAPHS AND TALLY CHARTS

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Textbook 2 P274

ACTIVITY TIME



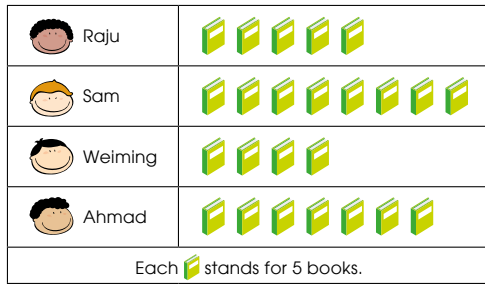
Teacher may want to emphasise on the words 'you like to visit' so that pupils who may not have visited any place of interest can join in the discussion. Highlight to pupils the need to have a scale in a graph and the challenge of having an appropriate scale when the number of objects represented is greater.

Software for graphs e.g. Graph club can be used to create the picture graph.



The picture graph shows the number of books each boy read in one year.

Books We Read



Use the picture graph to answer the questions.

- (a) How many books did Ahmad read? **35**
- (b) How many fewer books did Raju read than Sam? **15**
- (c) How many more books did Sam read than Weiming? **20**
- (d) How many books did Raju and Weiming read altogether? **45**

Complete Workbook 2B, Worksheet 1 • Pages 145 – 147



Work with pupils on the questions and selected examples from **Worksheet 1**.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2B P145 – 147).

Answers

Worksheet 1 (Workbook 2B P145 – 147)

- (a) Raju
(b) 2
(c) 16
- (a) 12
(b) Meiling, Bina
(c) 32
(d) 5
- (a) Bala
(b) 100
(c) 300

LESSON

2

READING TALLY CHARTS

LEARNING OBJECTIVES

1. Read and interpret tally charts.
2. Solve 1-step word problems using tally charts.





READING TALLY CHARTS

LESSON
2

IN FOCUS

The tally chart shows the number of each type of snack in a bakery.

Snack in a Bakery

Snack	Tally Marks
 Cupcake	///
 Sandwich	### /
 Doughnut	### ##
 Cake	### ///

How can we use the chart to tell the number of each snack?

LET'S LEARN

1. (a) How many sandwiches are there?



$5 + 1 = 6$
There are 6 sandwiches.

Each '/' is a tally mark.
Each '###' is a group of 5 tally marks.



IN FOCUS

Use the tally chart on P276 to introduce tally chart to pupils. Ask pupils to discuss what they observe about the tally chart and describe how a tally chart differs from a picture graph.

Refer to the tally chart on P276 and allow pupils to discuss the following questions:

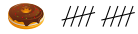
- What does each tally mark represent?
- How many of each type of snack are there?

LET'S LEARN

Go through what a tally chart is. Highlight that in a tally chart, the symbol we use, which looks like a stick, is called a tally mark. Emphasise to pupils that each '/' is a tally mark and we use one tally mark for each sandwich. Lead pupils to see that the fifth tally mark cuts across the four tally marks and faces a different direction, and it looks like a rope that bundles up the four tally marks. Guide pupils to see that to find the total number of tally marks, we add a group of 5 tally marks and 1 tally mark to get 6.

Textbook 2 P276

(b) How many doughnuts are there?



$$5 + 5 = 10$$

There are 10 doughnuts.

(c) How many fewer cupcakes than cakes are there?



There are 3 cupcakes and 8 cakes.

$$8 - 3 = 5$$

There are 5 fewer cupcakes than cakes.



2. The tally chart shows the number of cookies eaten by each child.

Child	Tally Marks
Bala	### ## /
Kate	### //
Raju	### ////
Melling	////

(a) Bala ate 11 cookies.

(b) Kate ate 7 cookies.

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CHAPTER 16

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Textbook 2 P277

(c) Raju ate 9 cookies.

(d) Melling ate 4 cookies.

(e) Raju ate 2 cookies more than Kate.

(f) The children ate 31 cookies altogether.

PRACTICE



The tally chart shows the number of glasses of water each girl drinks in one day.

Girl	Tally Marks
Ann	### //
Bina	### /
Nora	### ##
Xinyi	////

Use the tally chart to answer the questions.

(a) How many glasses of water did Nora drink? 10

(b) How many more glasses of water did Ann drink than Xinyi? 3

(c) How many fewer glasses of water did Xinyi drink than Bina? 2

(d) How many glasses of water did Bina and Nora drink altogether? 16

Complete Workbook 2B, Worksheet 2 • Pages 148 – 149

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PICTURE GRAPHS AND TALLY CHARTS

278

Textbook 2 P278

In Let's Learn 1 (b), remind pupils to use the skip counting strategy to count the total number of tally marks, i.e. count in fives. In Let's Learn 1(c), lead pupils to see that the difference between the number of cupcakes and the number of cakes can be determined by counting the difference in the number of tally marks.

In Let's Learn 2, get pupils to answer the questions based on the tally chart.

PRACTICE



Work with pupils on the question and selected examples from **Worksheet 2**.

Independent seatwork

Assign pupils to complete Worksheet 2 (Workbook 2B P148 – 149).

1. (a) 15
(b) 12
(c) 6
(d) 9
(e) 24
2. Hopscotch: 3
Hide-and-seek: 16
Basketball: 25
Football: 12

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Specific Learning Focus

- Read and interpret picture graphs with scales.
- Read and interpret horizontal and vertical picture graphs.
- Solve 1-step word problems using picture graphs.

Suggested Duration

Lesson 1: 4 periods
Lesson 2: 2 periods

Prior Learning

Pupils have learnt to interpret picture graphs and extract important information by reading the question. They should understand that graphs are ways to obtain information and compare data easily. With the use of picture graphs, comparison of data can be done easily.

Pre-emptive Pitfalls

In Lesson 1, the concept of scale in picture graphs is introduced. Then, in Lesson 2, tally marks and tally charts are introduced. Using tally marks to represent and obtain data should be easy for pupils to understand. However, interpreting picture graphs with scales could be challenging for some pupils. It would be easier if they relate the interpretation of picture graphs with scales to skip counting.

Introduction

In this lesson, the concept of picture graph learnt in Grade 1 is revisited. The picture graph in 'In Focus' (Textbook 2 P270) should be easy to read as the scale is 1 : 1. In 'Let's Learn' and 'Practice' (Textbook 2 P271 – 275), the level of difficulty increases as the scale progresses to 1 : 2, 1 : 3 and 1 : 5. The questions in Workbook 2B P145 – 147 can be done for further practice. The teacher can come up with a picture graph using a 1 : 10 scale and draw on the board. The data for the picture graph can be related to a real-life situation (e.g. the number of books read by each of the four boys). Explain to pupils that for large data, it is easier to use a scale to represent the data on a picture graph. Prompt their thinking by asking them: 'Would you want to draw 40 pictures to represent 40 books? Would it be easier if 1 picture represents 10 books and we draw 4 pictures to represent 40 books?'. Recapitulate the skip counting strategy and multiplication tables. If the scale of a picture graph is 1 : 3, when interpreting the picture graph, lead them to skip count in 3s (3, 6, 9, 12, ...) or use multiplication ($3 \times 4 = 12$). In Lesson 2, the use of tally marks is introduced as an alternative way to write numbers. Pupils should find the use of tally charts fun and easier to read and interpret as the group of 5 tally marks guides the skip counting in 5s.

Problem Solving

Reading and interpreting graphs, and then drawing picture graphs and tally charts, are the concepts to be learnt in this lesson. To read graphs, it is essential that pupils are well-versed with multiplying and skip counting. To answer the questions that involve comparison or sum, based on the data given in a picture graph, pupils have to decide which operation to use. This is a revisit of the approach to solving a word problem. When making their own picture graphs (Textbook 2 P274), pupils will have to study the range of data and come up with a suitable scale.

Activities

Places to visit, favourite sports, cars, and pets are few examples that can be used to make picture graphs and tally charts. In 'Activity Time' (Textbook 2 P274), encourage pupils to choose an appropriate scale by first looking at the data obtained. Most of the time, 1 : 2 or 1 : 4 scales are suitable. Encourage group activities where pupils make their own picture graphs and tally charts on a drawing block and then display them in class.

Resources

- drawing block
- markers
- newspaper clippings
- worksheet (Activity Handbook 2 P71)

Mathematical Communication Support

Encourage class discussions and make picture graphs and tally charts on the board. The teacher can ask pupils for the genres of books they like to read and record the results in a picture graph and tally chart. Ask pupils to suggest a suitable scale for the picture graph. After making the picture graph and tally chart, ask pupils questions that require comparison and finding the total. This lesson can be made fun as pupils enjoy having a lot of interactions with one another about each other's interests.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW

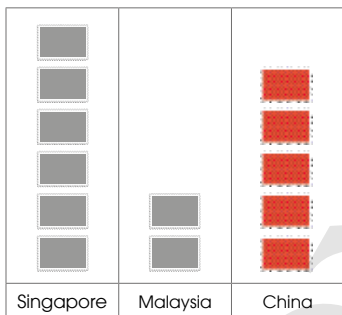



Mind Workout

Date: _____

Tom collects stamps from different countries.
He wants to draw a picture graph to show the number of stamps he has.

My Stamp Collection



Tom has 30 Singapore stamps.
Each  stands for stamps.

Tom has 25 China stamps.
Draw to complete the picture graph.

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Mind Workout

Pupils can use the division concept to find the scale.

Workbook 2B P150

 **MIND WORKOUT**

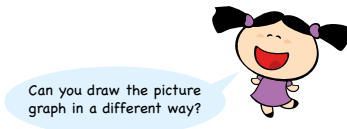
The picture chart shows the cost of each type of pen.

Prices of Pens

Pen A	★ ★
Pen B	★ ★ ★ ★ ★
Pen C	★ ★ ★

Pen B costs Rs 100 more than Pen C.
Pen A costs Rs 50 less than Pen C.

- (a) Each ★ stands for Rs 50.
- (b) Pen A costs Rs 100.
- (c) Pen B costs Rs 250.
- (d) Pen C costs Rs 150.
- (e) The pens cost Rs 500 altogether.



Textbook 2 P279

 **MIND WORKOUT**

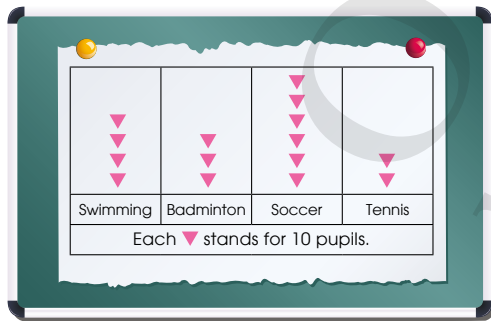
Get pupils to identify the scale used and encourage them to discuss how they arrive at their answer.

 **MATHS JOURNAL**

Look for picture graphs in newspapers or magazines.

Show them to your classmates.

Tell your classmates what is shown in each picture graph.



I know how to...

- read information from picture graphs and tally charts.
- make picture graphs.
- use picture graphs and tally charts to solve problems.

SELF-CHECK 

Textbook 2 P280

 **MATHS JOURNAL**

Teacher may want to prepare some picture graphs from the newspapers, magazines or the Internet for pupils who are not able to find any.

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

SELF-CHECK 

Pupils to complete **Review 16** (Workbook 2B P151 – 152) as consolidation of understanding for the chapter.

1. (a) 4
(b) 12
(c) 8
2. (a) 3
(b) 12
(c) 3
(d) 6
(e) 9

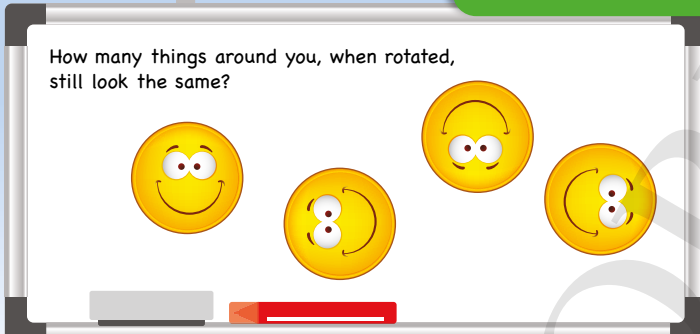
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ROTATION


CHAPTER 17


Rotation CHAPTER 17

How many things around you, when rotated, still look the same?



ROTATION

IN  FOCUS



What do you notice about the shapes?

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Textbook 2 P281

Related Resources

NSPM Textbook 2 (P281 –284)

NSPM Workbook 2B (P153 – 156)

Materials

Sticker , shape cut-outs

Lesson

Lesson 1 Rotation

Problem Solving, Maths Journal and Pupil Review

INTRODUCTION

Pupils are introduced to rotation for the first time in this chapter. In this chapter, pupils revisit the concept of movement of objects in the clockwise and anticlockwise directions that were taught in Grade 1. Pupils are required to understand the concept of rotation and draw the shape after a rotation in either direction.

LESSON

1

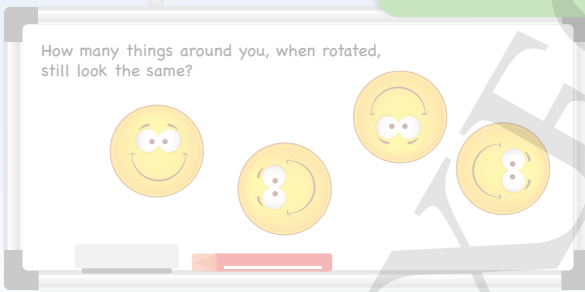
ROTATION


LEARNING OBJECTIVES


1. Understand what rotation means.
2. Draw the shape after a rotation in the clockwise or anticlockwise direction.

Rotation CHAPTER 17

How many things around you, when rotated, still look the same?



ROTATION IN  FOCUS LESSON 1



What do you notice about the shapes?


281 CHAPTER 17 OXFORD UNIVERSITY PRESS

Textbook 2 P281

Ask the class to look at the things around them. Get pupils to talk about the things that can rotate and still look the same. Discuss how each of the four faces on P281 look after each rotation.

LET'S LEARN

- Turning an object about a point in a circle is called **rotation**.

Take a sticker . Make a quarter rotation in the clockwise direction.



we get:

- Make another quarter rotation in the clockwise direction.



we get:

This becomes half a rotation.

- Make two more quarter rotations in the clockwise direction.





we get:

This becomes a whole rotation.

Textbook 2 P282

Lead pupils to understand that when an object is rotated, it means it is turned about a point in a circle.

Provide pupils with a sticker  and get them to rotate it by a quarter in the clockwise direction. Recap with pupils which direction is clockwise and anticlockwise respectively. Get them to continue rotating the sticker by a quarter in the clockwise direction until a whole turn is made. In Let's Learn 3, guide pupils to see that after a whole rotation, the sticker looks exactly the same as it looks before the rotation.

- Take a sticker . Make three quarter rotations in the anticlockwise direction.




we get:

PRACTICE

Complete the given shapes by drawing the quarter rotations 4 times until they become a whole turn.

-
-
-

Textbook 2 P283

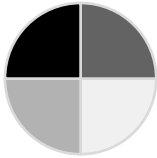
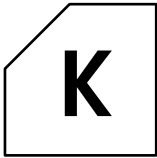
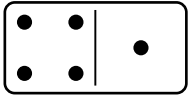
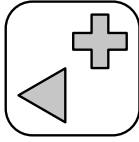
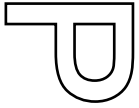
In Let's Learn 4, get pupils to take the sticker  and make three quarter rotations in the anticlockwise direction. Encourage them to show one another the sticker after the rotations and compare if they got the same result.

PRACTICE

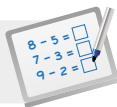
Provide shape cut-outs for pupils to work with to help them answer the questions. Lead them to see that after 4 quarter rotations in the clockwise or anticlockwise direction, the shape will be exactly the same as the starting shape.

Independent seatwork

Assign pupils to complete Worksheet 1 (Workbook 2B P153).



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**Specific Learning Focus**

- Understand what rotation means.
- Draw the shape after a rotation in the clockwise or anticlockwise direction.

Suggested Duration

2 periods

Prior Learning

Spatial, movement and orientation concepts are new to the pupils. In Grade 1, they have been introduced to movements in the clockwise and anticlockwise directions, as well as whole, quarter, half and three quarters of a turn. This chapter is a continuation of those concepts, and rotation is formally introduced.

Pre-emptive Pitfalls

Some pupils may face difficulty in figuring out the orientation of a figure or object. The teacher should face the same direction when explaining the direction of movement to avoid confusion.

Introduction

The terms 'rotation' and 'about' are introduced in this chapter. Explain to pupils the concept of a whole as a complete rotation using concrete materials. In 'Let's Learn' (Textbook 2 P282), distribute smiley stickers to pupils and instruct them to rotate the sticker in a specified direction and paste it on their exercise books. Relate clockwise rotation to the movement of the clock hands and anticlockwise rotation to the movement of the steering wheel of a vehicle.

Problem Solving

'Mind Workout' and 'Maths Journal' (Textbook 2 P284) can be conducted as hands-on activities which give pupils a clear understanding of spatial and directional mathematics.

Activities

Play 'Simon Says' and play music in the background while asking pupils to make whole, quarter, half and three quarters of a turn in clockwise and anticlockwise directions.

Resources

- strips of smiley faces (Activity Handbook 2 P33)

Mathematical Communication Support

Rotation refers to the movement about a point. The distance of the object to the centre or pivot remains the same before and after a rotation. Emphasise to pupils that clockwise direction is the direction that the clock hands move while anticlockwise direction is the direction opposite to the direction of the movement of the clock hands.

PROBLEM SOLVING, MATHS JOURNAL AND PUPIL REVIEW

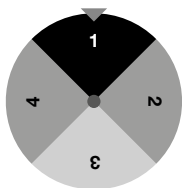


Mind Workout

Date: _____

The spinner goes through the following rotations in the clockwise direction.

1. First, a whole rotation.
2. Then, three quarter rotations.
3. Followed by a half rotation.
4. Finally, a quarter rotation.



Which number does it land on?

3

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Mind Workout

This task requires pupils to carry out the rotations in sequence. Lead pupils to draw the spinner that results from each rotation to help them solve the problem.

Workbook 2B P154



MIND WORKOUT

Write down all the letters of the alphabet in uppercase.
Which letters, after making 4 quarter rotations, show the original letter more than once?

MATHS JOURNAL

Look around you.
How many things, after making 2 half rotations, show the original thing exactly once?

Example



I know how to...

- rotate a shape clockwise and anticlockwise.
- rotate a shape in quarter, half and whole turns.

SELF-CHECK



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ROTATION 284

Textbook 2 P284



MIND WORKOUT

Get pupils to write down all the letters of the alphabet and emphasise to them that the letters are to be written in uppercase. Ask them what 4 quarter rotations mean and get them to write out the letters after the rotations.

MATHS JOURNAL

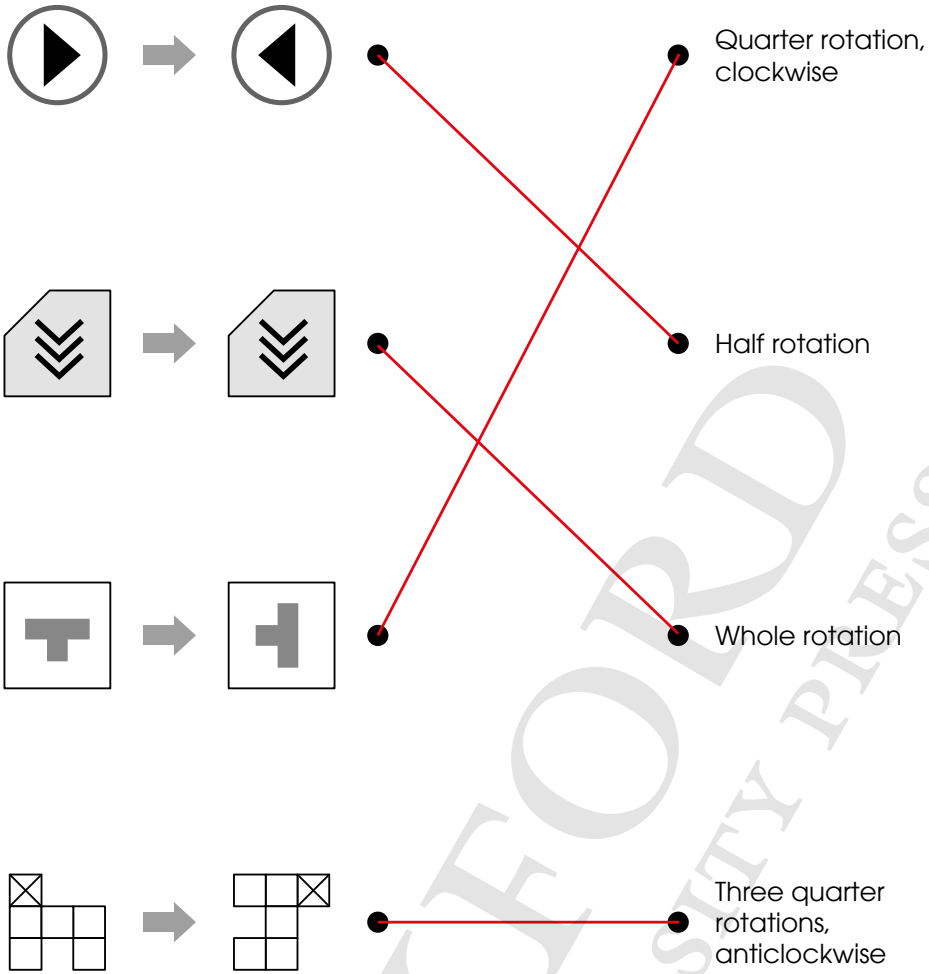
Get pupils to walk around the classroom to look for things. Get them to share with the class the things that show the original thing exactly once after making 2 half rotations.

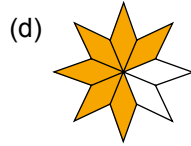
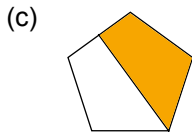
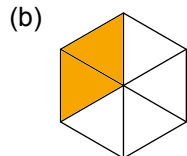
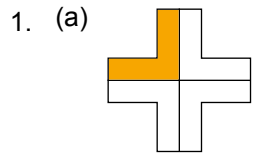
SELF-CHECK



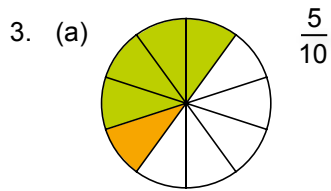
Before the pupils do the self check, review the important concepts once more by asking for examples learnt for each objective. For instance, get pupils to describe how a thing should rotate to end up in a particular orientation.

This self check can be done after pupils have completed Review 17 (Workbook 2B P156) as consolidation of understanding for the chapter.





2. (a) $\frac{2}{3}$
 (b) $\frac{3}{7}$
 (c) $\frac{8}{11}$

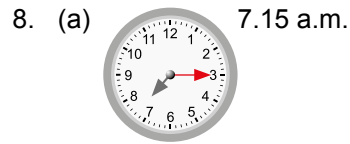


4. (a) smaller
 (b) greater
 (c) smaller

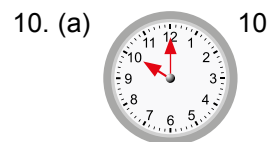
5. (a) $\frac{3}{6}$
 (b) $\frac{4}{8}$
 (c) $\frac{7}{12}$
 (d) $\frac{3}{7}$
 (e) 1
 (f) $\frac{6}{11}$

6. (a) $\frac{2}{11}, \frac{6}{11}, \frac{10}{11}$
 (b) $\frac{1}{9}, \frac{1}{10}, \frac{1}{12}$

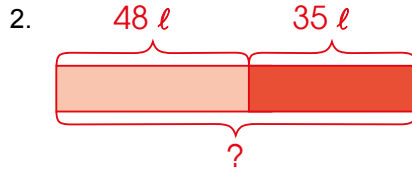
7. (a) a.m.
 (b) p.m.
 (c) p.m.



9.

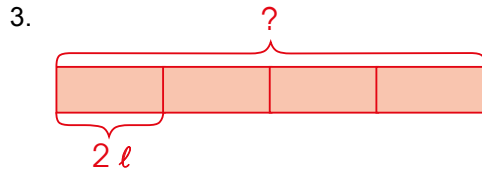


1. (a) 4
(b) 5
(c) 1



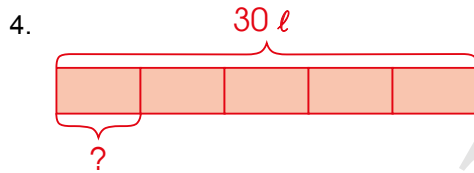
$$48 + 35 = 83$$

Mr Tan sold 83 l of sugarcane juice on both days.



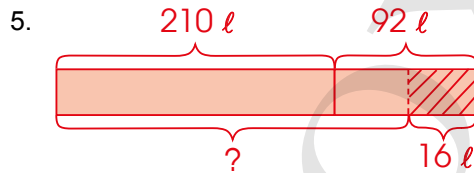
$$4 \times 2 = 8$$

The volume of water in the fish tank was 8 l.



$$30 \div 5 = 6$$

The volume of rose syrup in each bottle is 6 l.



$$210 + 92 = 302$$

There was 302 l of paint.

$$302 - 16 = 286$$

The painters used 286 l of paint.

6. (a) 15
(b) 25
(c) 10
(d) 30

7. (a) 12
(b) 18
(c) 4
(d) Monday

8. 18, 20, 14, 16

9. (a) 11
(b) 16
(c) 60
(d) Playing piano

10. **RY**

1. 2

2. 4

3. 2

4. 4

5. 1

6. 3

7. 1

8. 4

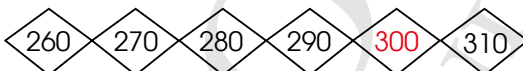

9. 1

10. 3

11. (a) Eight hundred and twenty-one
 (b) Five hundred and nine
 (c) Three hundred and forty

12. (a) 563, 635, 653
 (b) 309, 903, 930

13. (a) $4 \times 4 = 16$
 (b) $5 \times 3 = 3 + 3 + 3 + 3 + 3$

14. (a) 
 (b) 

15. (a)
$$\begin{array}{r} 7 \quad 2 \quad 4 \\ + \quad 5 \quad 3 \\ \hline 7 \quad 7 \quad 7 \end{array}$$

(b)
$$\begin{array}{r} 2 \quad 10 \quad 6 \\ + \quad 3 \quad 2 \quad 9 \\ \hline 5 \quad 3 \quad 5 \end{array}$$

(c)
$$\begin{array}{r} 5 \quad 1 \quad 5 \quad 3 \\ - \quad 1 \quad 6 \quad 2 \\ \hline 4 \quad 9 \quad 1 \end{array}$$

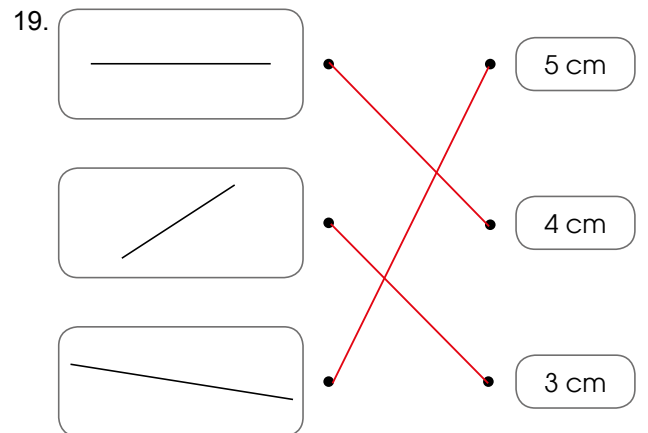
(d)
$$\begin{array}{r} 6 \quad 9 \quad 10 \\ - \quad 8 \quad 9 \\ \hline 6 \quad 1 \quad 1 \end{array}$$



$$\begin{array}{l} 9 \times 3 = 27 \\ 3 \times 9 = 27 \end{array} \quad \begin{array}{l} 27 \div 3 = 9 \\ 27 \div 9 = 3 \end{array}$$

17. $27 \div 3 = 9$
 There are 9 oranges in each bag.

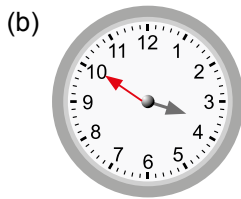
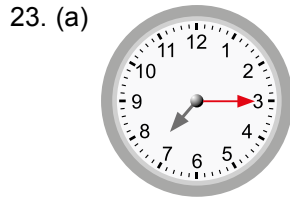
18. (a) 265
 (b) 1000
 (c) 0.80
 (d) 6.05



20. \$5.05 or 505 ¢

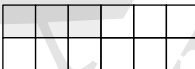
21. $3 \times 3 = 9$
3 bags of sweets have 9 sweets altogether.

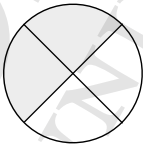
22. (a) $\frac{3}{4}$
(b) $\frac{2}{5}$
(c) $\frac{1}{2}$
(d) $\frac{5}{6}$

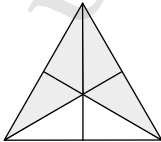


24. (a) 100
(b) 300
(c) 200
(d) biscuits, chocolate

25. Bag

26. $\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$ 

$1 - \frac{2}{6} = \frac{4}{6}$ 

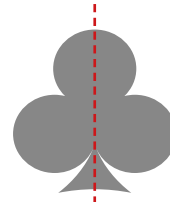
$\frac{1}{12} + \frac{2}{12} = \frac{3}{12}$ 

27. (a) 3.30 p.m.
(b) 12.00 p.m.
(c) 9.30 p.m.
(d) 1.30 p.m.
(e) 1.00 p.m.

28. (a) Side B
(b) 5

29. (a) $\frac{2}{3}$

30. (a)



(b)

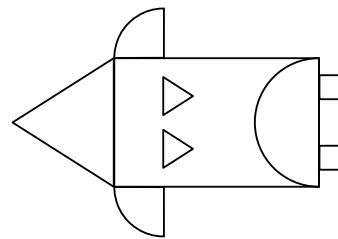


31. (a) $\frac{2}{7}, \frac{3}{7}, \frac{6}{7}$
(b) $\frac{1}{3}, \frac{1}{5}, \frac{1}{8}$

32. $\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$ Ans: $\frac{5}{6}$

33. (a) Triangle, Quarter circle, Rectangle, Square, Semicircle

(b)



35. (a) cube
(b) sphere
(c) cone
(d) cuboid

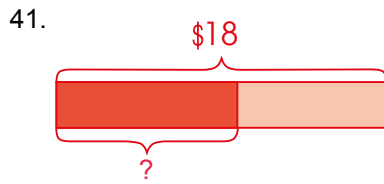
36. \$9

37. $3 \times 10 = 30$
He will save \$30 in 10 days.

38. $28 \div 4 = 7$
There are 7 cupcakes in each box.

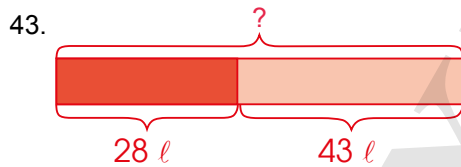
39. (a) 12
(b) Bina
(c) Ann
(d) Ahmad, Junhao

40. A: Monkey
B: Zebra
C: Lion
D: Goat

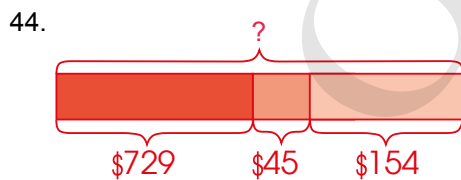


$18 \div 2 = 9$
Each of them gets \$9.

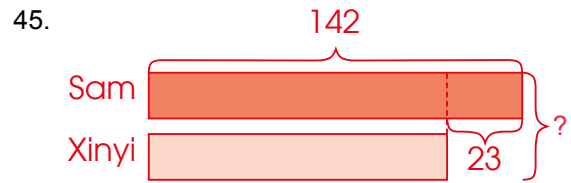
42. $5 - 3 = 2$
 $5 + 2 = 7$
The total mass of the bag of rice and the bag of sugar is 7 kg.



$28 + 43 = 71$
She uses 71 l of water altogether.



$729 + 45 = 774$
Mr Lim spent \$774 on the computer and computer game.
 $774 + 154 = 928$
Mr Lim had \$928 at first.



$142 - 23 = 119$
Xinyi has 119 stamps.
 $119 + 142 = 261$
They have 261 stamps altogether.

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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.

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.

