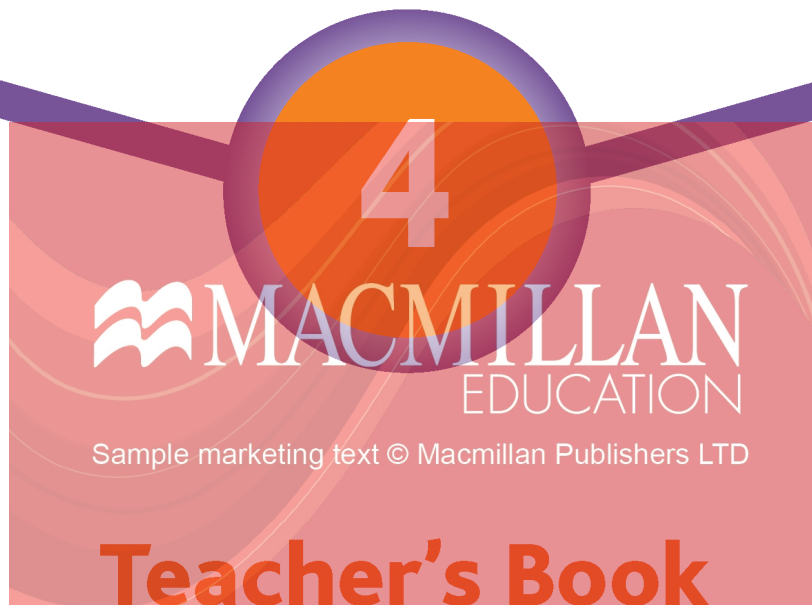


# Macmillan Mathematics



**Paul Broadbent & Mary Ruddle**



# Contents

Page 4 Introduction  
Page 5 Oral and mental starters

## Block A Understanding numbers 7

<b>Unit 1</b>	<b>Large numbers</b> 8 4- and 5-digit numbers Thousands Millions Comparing and ordering Rounding and approximation
<b>Unit 2</b>	<b>Number patterns</b> 14 Counting Counting in 10s, 100s and 1000s Sequences Function machines Patterns and relationships
<b>Unit 3</b>	<b>Multiples and factors</b> 20 Multiples Lowest common multiple Factors Highest common factor Multiples and factors
<b>Unit 4</b>	<b>Assess and review</b> 26 Revision and assessment of Units 1, 2 and 3

## Block B Addition and subtraction 30

<b>Unit 5</b>	<b>Addition and subtraction: revision</b> 31 Mental addition Mental subtraction Written addition: revision Written subtraction: revision Addition and subtraction problems
<b>Unit 6</b>	<b>Addition and subtraction</b> 37 Adding 6-digit numbers Adding millions Subtracting 6-digit numbers Subtracting millions Addition and subtraction problems

<b>Unit 7</b>	<b>Adding and subtracting money</b> 43 Converting units Adding money Giving change Subtracting money Money problems
<b>Unit 8</b>	<b>Assess and review</b> 49 Revision and assessment of Units 5, 6 and 7

## Block C Geometry 53

<b>Unit 9</b>	<b>Angles and lines</b> 54 Lines Angles and degrees Measuring angles Drawing angles Compass directions
<b>Unit 10</b>	<b>2-D and 3-D shapes</b> 60 Naming 3-D shapes Properties of 3-D shapes Polygons Quadrilaterals Drawing quadrilaterals
<b>Unit 11</b>	<b>Problem-solving and geometry</b> 66 Symmetry Reflections Triangles Drawing triangles Shape patterns
<b>Unit 12</b>	<b>Assess and review</b> 72 Revision and assessment of Units 9, 10 and 11

## Block D Multiplication and division 76

<b>Unit 13</b>	<b>Multiplication</b> Multiplying 4-digit numbers by a single digit Multiplying by tens Multiplying 2-digit by 2-digit numbers Multiplying 3-digit by 2-digit numbers Calculator patterns	<b>77</b>
<b>Unit 14</b>	<b>Division</b> Rules of divisibility Dividing numbers to 999: no remainders Dividing 2-digit numbers with remainders Dividing 3-digit numbers with remainders Dividing by multiples of 10	<b>83</b>
<b>Unit 15</b>	<b>The four operations</b> Inverse relationships: addition and subtraction Inverse relationships: multiplication and division Open sentences Brackets Number problems	<b>89</b>
<b>Unit 16</b>	<b>Assess and review</b> Revision and assessment of Units 13, 14 and 15	<b>95</b>

## Block E Fractions and decimals 99

<b>Unit 17</b>	<b>Fractions and mixed numbers</b> Proper and improper fractions Mixed numbers Equivalent fractions Simplifying fractions Fractions of amounts	<b>100</b>
<b>Unit 18</b>	<b>Comparing and ordering fractions</b> Comparing fractions Common denominators	<b>106</b>

	Ordering fractions Adding unlike fractions Subtracting unlike fractions	
<b>Unit 19</b>	<b>Decimal fractions</b> Tenths Mixed numbers and decimals Tenths and hundredths $\times$ and $\div$ by 10 and 100 Fractions and decimals	<b>112</b>
<b>Unit 20</b>	<b>Assess and review</b> Revision and assessment of Units 17, 18 and 19	<b>118</b>

## Block F Measures and data 122

<b>Unit 21</b>	<b>Standard units of measure</b> Centimetres and metres Estimating and rounding length Kilometres Weight and capacity Time: a.m. and p.m.	<b>123</b>
<b>Unit 22</b>	<b>Measures problems</b> Addition and subtraction of length Addition and subtraction: litres Addition and subtraction of weight	<b>129</b>
	Area and perimeter of rectangles Area and perimeter of compound shapes	
<b>Unit 23</b>	<b>Handling data and probability</b> Constructing bar graphs Frequency graphs Interpreting graphs Probability Probability experiments	<b>135</b>
<b>Unit 24</b>	<b>Assess and review</b> Revision and assessment of Units 21, 22 and 23	<b>141</b>

# Introduction

Macmillan Mathematics is a complete mathematics scheme for pupils from Grades 1 to 6. It is wide-ranging and written not only to develop a thorough understanding of mathematics, but also to try to foster interest, enthusiasm and confidence in mathematics. It has a thorough mathematical structure, and careful progression and development to ensure continuity and curriculum coverage.

## Components

- The **Teacher's Book** gives clear guidance on planning, practical activities and the use of the pupil material for each unit of work.
- The **Pupil's Book** provides a clear explanation of the key steps needed to learn specific skills and concepts, as well as practice, reinforcement and enrichment activities to consolidate these skills and concepts.
- The **Pupil's CD-ROM** provides further reinforcement and assessment of the skills and concepts developed within each unit, with the provision of interactive exercises.

## Planning and organisation

For each year group, the curriculum has been organised into six blocks of work that are progressed over the year. Each block is organised into four teaching units that each covers a week of lessons. Within each unit is contained the set of objectives that guide planning, teaching and students' learning. These blocks support an extended period of learning when students' progress can be assessed and those students who are not keeping up with their peers can receive the additional attention and support they need. The fourth unit in each block is an 'assess and review' unit, allowing teachers to assess and monitor students' progress, and use and apply the skills and concepts learnt in the previous three units.

## Teaching sequence

### Term 1

September	October	November	December
Block A	Block B	Block C	

### Term 2

January	February	March	April	May
Block D	Block E		Block F	

## Successful teaching and learning with Macmillan Mathematics

Macmillan Mathematics is intended to be used in the context of quality first teaching, with activities to support the teacher in their efforts to develop pupils' learning, confidence and love of mathematics. The authors give these principles to outline their thoughts on teaching and learning mathematics:

- 1 Plan and provide a balanced, practical experience that incorporates the acquisition, consolidation and application of knowledge and skills, with opportunities to use and extend thinking and reasoning.
- 2 Model ways to explore mathematics and look for patterns, rules and properties; direct their learning by providing examples that enable them to identify appropriate methods and understand rules and ideas.
- 3 Give pupils the opportunity to consolidate their learning, with frequent and regular periods of practice that are short, sharp and focused.
- 4 Ensure that pupils recognise how their learning builds on previous learning and help them to see connections; ensure that they feel appropriately supported and challenged by the work they are given.
- 5 Engage with pupils' thinking; give them sufficient time for discussion and time to think about their ideas and methods with prompting and probing questions.
- 6 Demonstrate the correct use of mathematical vocabulary and the interpretation and use of symbols, images, diagrams and models as tools to support their mathematical thinking and communication.
- 7 Share the excitement of mathematics, capturing pupils' imagination by teaching creatively and with enthusiasm.

## Structure of Teacher's Book

**Objectives:** The objectives from the syllabus covered by this unit.

**Vocabulary:** The key words to use and develop with pupils. List these on the wall or board for the pupils to read.

**Lessons:** The focus for each lesson. Share these with your pupils at the start of each lesson.

**Oral and mental starters:** Suggested starter activities for the first 5 minutes of each lesson (see below).

**Resources:** Practical resource suggestions to help support the teaching and learning of this unit.

**Prior learning:** The step before this unit of work. Use this as a basis for some questions at the start of the unit to assess the pupils' prior knowledge and understanding.

**Background notes:** Linking theory with practice, this briefly outlines some common difficulties and misconceptions for this unit of work and gives key teaching points.

**Supporting the topic:** Lists possible suggestions for using and applying the mathematics in real-life situations.

**End of unit evaluation:** Learning outcomes for this unit of work, with key area of assessment linked to the objectives.

This unit overview is followed by lesson notes containing practical activities and references to the Pupil's Book.

### Oral and mental starters

These are suggestions for whole-class mental maths activities for the first 5 or 10 minutes of each lesson.

They are interactive and lively oral activities, with questions, games and practical activities that actively involve the pupils. They enable pupils to become confident and agile with mental calculation and number, as well as consolidating work done on shape, measures and handling data. The starters have a number of purposes.

- They can prepare the pupils for the unit of work ahead, rehearsing and sharpening skills. For example, for a unit on fractions of amounts you may plan mental starters on division facts to support their understanding.
- They can be used as a method of 'keeping sharp' the skills and concepts introduced in previous units. For example, an oral starter on names and properties of 2-D shapes, four weeks after teaching shape, will remind them of that teaching and consolidate their learning.
- They reinforce the importance of the language of mathematics, with regular re-visiting of vocabulary.
- They allow you to quickly assess pupils' knowledge and understanding of an area you intend to teach in the main part of the lesson. For example, before teaching subtraction of 2-digit numbers, you could ask oral questions on adding tens to check pupils' understanding.

Basic resources such as number cards, counters and number lines are important. Once you have used some of the activities, refine and develop them and plan your own starters to support your teaching.

**Hands up (reading and writing numbers to 99 999):** Write 8 numbers on the board, using a mixture of numerals or words. Ask a pupil to point to a given number. Ask the class to raise their hands if they agree. Now ask *each* pupil to write a given number on paper then hold it up. Repeat both activities with other numbers. Include decimals after Unit 19.

**Start here (counting to 99 999 999):** Ask the class to count on from and back to different starting numbers, e.g. start at 460 387 and count to 460 405. Include decimals after Unit 19.

**Steps (multiples and sequences):** Ask the class to count on and back from a given number in multiples (e.g. in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 20s, 25s, 50s, 60s, 100s, 1000s, 10 000s, 100 000s).



**What's the order? (ordering numbers to 99 999 999):** Write a random set of numbers on the board. Explain that the numbers need to be put in order, starting with the smallest. Ask 'Which should come first?' etc. and write in the order suggested. Ask 'Is this correct?' Alter if needed. Include decimals after Unit 19.

**Arrows away (place value to 99 999 999):** You need a large set of 'arrow cards' as shown in Pupil's Book 4A page 4, numbered 0–9, in tens 10–90, in hundreds 100–900, in thousands 1000–9000, in ten thousands 10 000–90 000, in hundred thousands 100 000–900 000, in millions 1 000 000–9 000 000, in ten millions 10 000 000–90 000 000. The arrows must match exactly and the unit cards must fit over the 0 of the tens, the tens over the 00 of the hundreds etc. Show a number using the arrow cards, e.g. 63 479. 'What is this number?' 'What does the 6 mean?' Move the bottom arrow card to reveal 60 000 on the card. Replace the card then ask 'What does the 7 mean?' Move the top card to reveal 70. Repeat with the other digits.

**What's the rule? (number sequences):** Write a sequence on the board, e.g. 3, 8, 13, 18, ... ; 8 436 750, 8 436 720, 8 436 690, 8 436 660, ... Ask pupils to work out the rule (e.g. the numbers go up in steps of 5; down in steps of 30). Ask the class to say the sequence together and continue until you stop them. Include decimals after Unit 19.

**Double it (doubling numbers):** Give a few numbers to double, ask the class, then individuals. Repeat several times. Include 2- and 3-digit numbers, and decimals after Unit 19.

**Just a fraction (fractions of whole numbers):** Give multiples of numbers for pupils to find a given fraction, e.g. multiples of 10 to find  $\frac{7}{10}$ , multiples of 4 to find  $\frac{3}{4}$ , multiples of 3 to find  $\frac{2}{3}$  etc.

**Equal parts (equivalent fractions):** Write a fraction or mixed number on the board. Ask pupils to suggest equivalent fractions. Include decimal fraction equivalents to common fractions after Unit 19.

**Ordering parts (ordering fractions):** Write 4 proper fractions, improper fractions or mixed numbers on the board. Ask 'Which is the smallest, the next smallest?' etc. 'How do you know?' until they are in order.

**Language (understanding mathematical language):** Give instructions or ask questions involving mathematical terms such as multiply, divide, product, factor, multiple, common multiple, lowest common multiple, common factor, highest common factor, plus, sum, subtract, difference, equivalent fraction, lowest terms, improper fraction, mixed number, decimal fraction etc. For example 'What is the product of 7 and 5?; What is the sum of 37 and 25? Is 3 a factor of 32?; Give me the lowest common multiple of 4 and 6' etc.

**Flash facts (addition, subtraction, multiplication or division facts):** Ask addition, subtraction, multiplication or division fact questions (e.g.  $8 + 7$ ,  $13 - 6$ ,  $7 \times 8$ ,  $42 \div 6$ ) for pupils to answer as a class, or by each holding up a number card when you give a signal. Reduce the time before your signal as confidence increases.

**Pairs (addition or multiplication facts):** Give a number, e.g. 65. Pupils choose 2 numbers which when added have that total. They could hold up number cards or give answers orally. Give another number, e.g. 36. Pupils show 2 numbers which make the number when multiplied.

**My way (adding and subtracting 2-digit numbers mentally):** Write a 2-digit calculation on the board for pupils to work out mentally. Ask for the answer and how they worked it out. Record the method, e.g. for  $26 + 35$  'I added 26 and 30 which is 56' (record  $26 + 30 = 56$ ) 'then I added 5 more to 61' (record  $56 + 5 = 61$ ). Include decimals after Unit 19.

**Name it (2-D and 3-D shapes):** Describe shapes using mathematical properties, e.g. A shape has 3 faces, 2 faces are circles, it can roll. A 2-D shape has 8 sides all the same length. Name the shape from its description.

**What's the question? (using and developing knowledge of relationships in number):** Provide a number, e.g. 48. 'The answer is 48, what's the question?' Pupils give number statements which have 48 as the answer, e.g.  $16 \times 3$ ,  $35 + 13$ ,  $100 - 52$ ,  $96 \div 2$ , etc. Use whole numbers, fractions or decimals, as appropriate.

**In time:** Set the teaching clock to a time. Ask pupils to give both the analogue and digital form (e.g. twenty-five past 10; 10:25). Ask questions such as 'What time will it be in  $2\frac{1}{2}$  hours? What time was it  $3\frac{1}{4}$  hours earlier?'

**What's my number?:** Ask questions such as 'I'm thinking of a number. When I add 26 to it the answer is 61. What's my number?' Invite pupils to make up similar questions.

# Pupil's Book 4A

## Block A Understanding numbers

Maths Topic	National Standards from Government Guidelines	
Unit	Curriculum area	End of year objectives / success criteria
1 Large numbers	Understanding numbers, methods of representing them and the relations between them	<ul style="list-style-type: none"> <li>● Extend the range and recognition of whole numbers up to 9 digits.</li> <li>● Distinguish between place value and the value of a digit in a number</li> <li>● Read, say and write whole numbers with up to 9 digits in symbols and words</li> <li>● Arrange, compare and order a set of numbers, with up to 9 digits, and represent them on a number line</li> <li>● Approximate to the nearest 10, 100, 1000, ..., 100 000.</li> </ul>
2 Number patterns	Understanding, and recognising number patterns, relations and functions	<ul style="list-style-type: none"> <li>● Use tables, drawings, models and rules to express mathematical relationships</li> <li>● Complete number patterns.</li> <li>● Deduce a group of generalisations, from observing models and relationships.</li> <li>● Deduce generalisations from observation of some number patterns and express them by different methods.</li> <li>● Use the calculator to discover and form number patterns.</li> </ul>
3 Multiples and factors	<p>Understanding numbers, methods of representing them and the relations between them</p> <p>Understanding operations on numbers and the relations between them</p>	<ul style="list-style-type: none"> <li>● Express a number in terms of its factors.</li> <li>● Recognise prime and composite numbers.</li> <li>● Understand the meaning of divisibility.</li> <li>● Factorise natural numbers to 100 into their factors.</li> <li>● Express natural numbers as prime factors.</li> <li>● Find the HCF and LCM of two or more numbers.</li> </ul>
4 Assess and review	<p>Revision and assessment of previous 3 units – problems, formative and summative assessment.</p> <p>Activities to monitor, assess, evaluate and consolidate children's knowledge and understanding.</p>	

During this block of work, pupils will experience:

- 1 Revision of previous work on reading, writing, comparing, ordering, rounding and understanding place value in 4- and 5-digit numbers.
- 2 Reading, writing, comparing, ordering, rounding, approximating and understanding place value in 6-, 7- and 8-digit numbers.

## Unit 1 Large numbers

<p><b>Term 1 Block A</b></p> <p><b>Numbers and addition</b></p> <p><b>Unit 1 Large numbers</b></p> <p>Unit 2 Number patterns</p> <p>Unit 3 Multiples and factors</p> <p>Unit 4 Assess and review</p>	<p><b>Objectives</b></p> <p><i>At the end of the unit, students should be able to...</i></p> <ul style="list-style-type: none"> <li>● Extend the range and recognition of whole numbers up to 9 digits.</li> <li>● Distinguish between place value and the value of a digit in a number.</li> <li>● Read, say and write whole numbers with up to 9 digits in symbols and words.</li> <li>● Arrange, compare and order a set of numbers, with up to 9 digits, and represent them on a number line.</li> <li>● Approximate to the nearest 10, 100, 1000, ..., 100 000.</li> </ul>
<p><b>Vocabulary</b></p> <p>units, tens, hundreds, thousands, ten thousands, hundred thousands, millions, ten millions, hundred millions, digit, place value, numeral, round, approximate, estimate, greater than, less than, abacus, arrow cards, area, kilowatt hours, square kilometres</p>	<p><b>Lesson</b></p> <ol style="list-style-type: none"> <li>1 4- and 5-digit numbers</li> <li>2 Thousands</li> <li>3 Millions</li> <li>4 Comparing and ordering</li> <li>5 Rounding and approximation</li> </ol>
<p><b>Oral and mental starters</b></p> <p>Hands up</p> <p>Arrows away</p> <p>Hold up</p> <p>What's the order?</p>	<p><b>Resources</b></p> <p>A large set of arrow cards, abacus, calculators, current information available about the population of world cities, e.g. reference books or internet</p> <p><i>Pupil's Book pages 4–13</i></p>
<p><b>Prior learning</b></p> <p>Reading, writing, comparing, ordering, rounding and understanding place value in numbers up to 99 999.</p>	<p><b>Background notes</b></p> <p>Pupils need to have a firm understanding of place value when working with large numbers. The use of materials such as an abacus and arrow cards (as shown on Pupil's Book 4A page 4) is very helpful in the development and reinforcement of the concept of place value. This unit revises and develops work covered in Grade 3.</p>
<p><b>End of unit evaluation</b></p> <p>Check that the pupils are able to:</p> <ol style="list-style-type: none"> <li>1 Identify the place value of each digit in any number to 99 999 999.</li> <li>2 Read, write, compare, order and approximate any number to 99 999 999.</li> </ol>	<p><b>Supporting the topic</b></p> <p>Discuss real-life examples of numbers to 99 999 999, e.g. population of countries, government expenditure, statistics giving annual profits of large companies, approximations of large numbers found in the media etc.</p> <p>Provide opportunities for pupils to visualise and estimate large quantities, e.g. the number of bricks in a large building, the number of letters in a book.</p>



# Lesson 1 4- and 5-digit numbers

Pupil's Book pages 4 and 5 Oral and mental starter: Hands up (numbers to 99 999)

## Unit 1 Large numbers

### 4- and 5-digit numbers

2814 5104 3011 3926

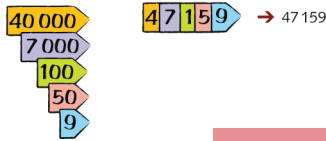
These numbers all have four digits. This shows that they are all in the 'thousands'.  
21 394 has five digits.

T T h	Th	H	T	U
2	1	3	9	4

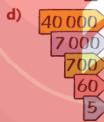
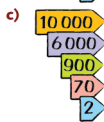
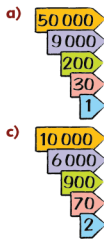
20 000 + 1 000 + 300 + 90 + 4

Twenty-one thousand three hundred and ninety-four

1 These arrow cards show the value of each digit.



Write the number shown by each set of cards.

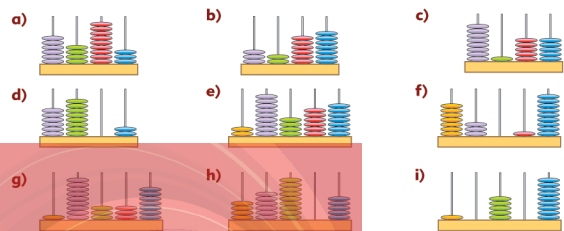


2 Copy the sentences, replacing the number words with numerals.

- Approximately **two thousand two hundred people** visited the museum on its opening day.
- The population of Inverness is approximately **fifty-one thousand** people.
- The coastline of Egypt is approximately **two thousand four hundred and fifty** kilometres in length.
- Approximately **two-hundred and forty-five thousand** people live in Bergen.
- One of Jordan's highest mountain is Jabal Rami. It is **one thousand seven hundred and thirty-four** metres high.

1734  
2200  
2450  
51 000  
245 000

3 Write the number shown on each abacus.



Try this

Which different numbers can you make on this abacus with five beads?

## Activities

- Revise the meaning of *digit* and *place value*. Establish that place value means the value of the digits in a number, depending on their position.
- Hold up some 3-, 4- and 5-digit numbers using a large set of arrow cards. Each time ask pupils to read the number together, then ask volunteers to give the place value of particular digits. Each time reveal the whole card for that digit to confirm its place value.
- Using the numbers on the board from the oral and mental starter, ask volunteers to indicate the digit which shows the number of hundreds; units; thousands; tens; ten thousands. Vary the order of the digits each time.
- Show some 4- and 5-digit numbers on an abacus and ask pupils to say the number together.
- Look at page 4 and go through the introduction with the class.

### Answers

- 59 231
  - 82 487
  - 16 972
  - 47 765
- 2200
  - 51 000
  - 2450
  - 245 000
- 6493
  - 3267
  - 8155
  - 6802
  - 29 467
  - 73 019
  - 19 337
  - 46 905
  - 10 509

### Try this

5, 50, 500, 5000, 50 000, 41 000, 40 100, 40 010, 40 001, 4100, 4010, 4001, 410, 401, 41, 32 000, 30 200, 30 020, 30 002, 3200, 3020, 3002, 320, 302, 32, 23 000, 20 300, 20 030, 20 003, 2300, 2030, 2003, 230, 203, 23, 14 000, 10 400, 10 040, 10 004, 1400, 1040, 1004, 140, 104, 14

# Lesson 2 Thousands

Pupil's Book pages 6 and 7 Oral and mental starter: Arrows away (numbers to 99 999)

## Thousands

A place value chart helps us read large numbers.

THOUSANDS			ONES		
hundreds	tens	units	hundreds	tens	units
4	1	7	3	6	9

417 369 is read as 417 thousand 369

$$400\,000 + 10\,000 + 7\,000 + 300 + 60 + 9 = 417\,369$$

1 Complete this table.

	THOUSANDS			ONES		
	hundreds	tens	units	hundreds	tens	units
65 thousand 245 →						
100 thousand 180 →						
645 thousand →						
189 thousand 210 →						
450 thousand 609 →						

2 Circle the digit in each number that represents the numbers written in words.

- a) 6 6 7 6 6 7  
b) 3 4 3 4 3 4  
c) 4 0 4 4 0 0  
d) 9 9 9 4 4 9  
e) 5 8 8 5 8 8  
f) 6 0 6 0 6 0

sixty thousand

three hundred thousand

four hundred

ninety thousand

eight thousand

six hundred thousand

3 Write the value of each number shown by the arrow cards.

Example

$$\rightarrow 40\,000 + 2\,000 + 800 + 50 + 3 = 42\,853$$

42853

a) 32498

b) 40773

c) 91120

d) 61385

e) 432671

f) 943008

g) 314498

h) 651709

Try this

These dials show the amount of electricity used in a building. It is measured in kilowatt hours (kWh).



$$2000 + 500 + 60 + 7 = 2567 \text{ kWh}$$

How much electricity is used in these?



## Activities

- Show any 5-digit number on the arrow cards and ask the class to read it together. Ask for the place value of each digit in order, starting with the units. Place a hundred thousand card behind the arrow cards, e.g. 400 000, and ask whether anyone knows its place value. Show the card to the class and emphasise that it is (4) hundred thousand. Ask the class to read the 6-digit number.
- Show 6-digit numbers to the class, ask them to read the numbers, then ask for the place value of different digits. Each time show the full card for that digit to reinforce its place value, paying particular attention to the hundred thousands.
- Go through the introduction on page 6 with the class. Explain the pattern of 'hundreds, tens, units' beneath the two main headings (thousands and ones), and how the headings are used when reading the number. Draw the place value chart on the board and write 362 305 at the side. Ask volunteers to indicate where each digit should go on the chart as you record them. Read the number with the class, indicating how the headings are used as you do so. Repeat.

## Answers

1

THOUSANDS			ONES		
hundreds	tens	units	hundreds	tens	units
	6	5	2	4	5
1	0	0	1	8	0
6	4	5	0	0	0
1	8	9	2	1	0
4	5	0	6	0	9

2 a) 667 667      b) 343 434      c) 404 400      d) 999 449

e) 588 588      f) 606 060

3 a) 32 498      b) 40 773      c) 91 120      d) 61 385

e) 432 671      f) 943 008      g) 314 498      h) 651 709

Try this

a) 180 362 kWh      b) 334 965 kWh

# Lesson 3 Millions

Pupil's Book pages 8 and 9 Oral and mental starter: Hold up (numbers to 999 999)

## Millions

1 more than 999 999 is 1 million.  
1 million is written as 1 000 000.  
Use this chart to help you read numbers greater than 1 million.

MILLIONS			THOUSANDS			ONES		
hundreds	tens	units	hundreds	tens	units	hundreds	tens	units
		7	8	4	9	2	1	8

7 849 218 is read as 7 million 849 thousand 218  
 $7\,000\,000 + 800\,000 + 40\,000 + 9\,000 + 200 + 10 + 8 = 7\,849\,218$

### 1 Read these and write each as a number.

- seven million four hundred thousand nine hundred and twenty-five
- nine million one hundred and eighteen thousand and seventy-nine
- two million four hundred thousand
- thirteen million two hundred and ninety thousand five hundred and ninety-one
- twenty million four hundred thousand two hundred and fourteen
- twelve million one thousand three hundred and ninety
- one hundred and forty million two thousand and eight
- one hundred and twenty-seven million four hundred thousand two hundred and seventy

### 2 Write each of these numbers as words.

- 4785 141
- 1513 930
- 4690 081
- 6243 225
- 3912 198
- 5006 702

### 3 Circle the correct digit in each number to match the value.

#### Example

1 0 9 7 ③ 9 3 three hundred

- 1 9 6 7 9 2 9 nine hundred thousand
- 4 2 2 8 0 8 2 twenty thousand
- 3 3 9 3 8 8 0 three million
- 5 5 5 0 1 2 5 7 five hundred thousand
- 1 1 1 0 0 9 2 0 ten million
- 8 8 2 8 4 1 6 6 eight million

### Try this

Estimate whether you could do each of the following tasks.  
Use a calculator to help check your estimates.  
Write how you decided on your answer.



Is it possible to read one million pages of a book in one year?



Could you walk one million strides in a day?



Will you have spent one million hours at school by the time you leave?



If you saved \$5 each week for a lifetime, would it be possible to save \$1 million dollars?



Would you be able to lift a book which had one million pages?



Would 100 jumps be longer than one million pins?

MACMILLAN EDUCATION

Sample marketing text © Macmillan Publishers LTD

## Activities

- Show a 6-digit number using the large set of arrow cards. Ask the class to say the number, then the place value of each digit. Hold up the 1 000 000 card and ask whether anyone knows the number. Establish that it is one million. Put the card behind the arrow cards and read the whole 7-digit number.
- Look at page 8 and go through the introduction with the class. Point out that 'hundreds, tens, ones' appears under each of the three headings and how they are used when reading the number.
- Say a 7-digit number and then write it in figures on the board. Repeat with a few more 7-digit numbers, asking volunteers to write each in figures.
- Ask the class to read the numbers in question 1.

## Answers

- 7 400 925
  - 9 118 079
  - 2 400 000
  - 13 290 591
  - 20 400 214
  - 12 001 390
  - 140 002 008
  - 127 400 270
- four million seven hundred and eighty-five thousand one hundred and forty-one
  - one million five hundred and thirteen thousand nine hundred and thirty
  - four million six hundred and ninety thousand and eighty-one
  - six million two hundred and forty-three thousand two hundred and twenty-five
  - three million nine hundred and twelve thousand one hundred and ninety-eight
  - five million six thousand seven hundred and two
- 1 967 929
  - 4 228 082
  - 3 393 880
  - 55 501 257
  - 11 100 920
  - 88 284 166

### Try this

Discuss how each task could be calculated.



## Lesson 4 Comparing and ordering

Pupil's Book pages 10 and 11 Oral and mental starter: What's the order? (include millions)

### Comparing and ordering

When you put numbers in order, compare each digit, starting with the digits with the largest place value. These are the digits on the left of the number.  
Put these in order, starting with the smallest.  
1 782 955    460 400    1 278 101  
 $460\,400 < 1\,278\,101 < 1\,782\,955$

**1** Join these numbers to the correct position on the number lines.

a) 200 000    450 000    650 000    800 000

b) 960 000    965 000    980 000    995 000

**2** Write each set of numbers in order, using the signs < or >.

Starting with the smallest	Starting with the largest
a) 493 751    610 028 4901 122	e) 9 419 712    3 012 819 4 622 093
b) 7 400 321    3 912 249 3 934 007	f) 3 193 444    7 129 028 56 023 450
c) 14 321 111    380 956 514 090 012	g) 19 921 803    53 291 001 6 490 212
d) 1 904 094    193 409 670 93 023 406	h) 1 198 491    1 198 409 119 842 994

**3** Here are the estimated populations of some of the largest cities in the world.  
Write the cities in order of population, starting with the largest.

Mexico City Mexico 22 843 550	Seoul South Korea 21 735 390	Cairo Egypt 15 837 460
Manila Philippines 16 608 340	New York USA 22 310 740	Mumbai India 19 463 950
Moscow Russia 14 432 190	London UK 12 412 330	Shanghai China 16 708 510
Tokyo Japan 35 521 740		

**Try this**  
Investigate the populations of other cities around the world.  
Which capital cities have the largest and smallest populations?

### Activities

- Write two 7-digit numbers on the board such as 1 829 630 and 2 184 206 and ask the class to read each number together. Ask 'Which is the larger number? How do you know?' Establish that the number with the largest millions digit is the larger. Write another 7-digit number on the board, ask the class to read it, then compare whether it is larger or smaller than each of the other two numbers.
- Revise the meaning of the greater than (>) and less than (<) signs. Write the three numbers on the board in order, starting with the smallest, using the < sign between each. Read the statement with the class. Order the numbers again, starting with the largest and using the > sign. Read the statement together.
- Look at page 10 and go through the introduction with the class. Emphasise that any 7-digit number

is greater than a 6-digit number and ask a volunteer to explain why.

### Answers

- Check numbers are joined to lines correctly.
- $493\,751 < 610\,028 < 4901\,122$
  - $3\,912\,249 < 3\,934\,007 < 7\,400\,321$
  - $380\,956 < 14\,321\,111 < 514\,090\,012$
  - $1\,904\,094 < 93\,023\,406 < 193\,409\,670$
  - $9\,419\,712 > 4\,622\,093 > 3\,012\,819$
  - $56\,023\,450 > 7\,129\,028 > 3\,193\,444$
  - $53\,291\,001 > 19\,921\,803 > 6\,490\,212$
  - $119\,842\,994 > 1\,198\,491 > 1\,198\,409$
- Tokyo 35 521 740, Mexico City 22 843 550, New York 22 310 740, Seoul 21 735 390, Mumbai 19 463 950, Shanghai 16 708 510, Manila 16 608 340, Cairo 15 837 460, Moscow 14 432 190, London 12 412 330

### Try this

Check the populations are in size order.

# Lesson 5 Rounding and approximation

Pupil's Book pages 12 and 13 Oral and mental starter: Arrows away (millions)

### Rounding and approximation

Rounding makes numbers easier to work with – changing them to the nearest 10, 100, 1000, 10 000 or 100 000.

Example	nearest 10	nearest 100	nearest 1000	nearest 10 000
343 565	343 570	343 600	344 000	340 000


1 Complete this table.

	a) Round to the nearest 100	b) Round to the nearest 1000	c) Round to the nearest 10 000
41 653			
29 832			
60 157			
29 129			
845 235			
628 536			
745 834			
294 258			

2 Write the smallest and largest numbers that will give the following.

- 15 000 when rounded to the nearest thousand
- 2 800 000 when rounded to the nearest hundred thousand
- 16 200 000 when rounded to the nearest ten thousand
- 900 000 when rounded to the nearest ten thousand

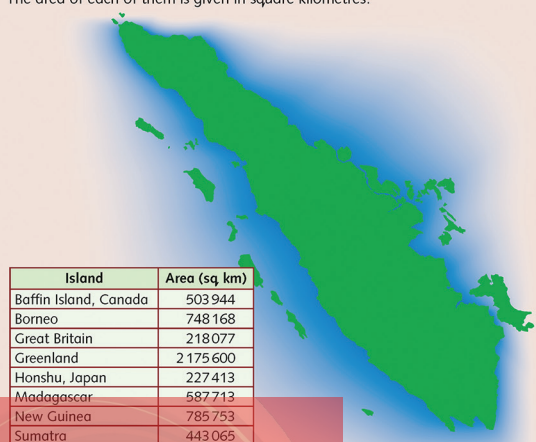
3 Copy this out, rounding each number to the nearest thousand.



The Moon is 405 696 kilometres away from the Earth at its furthest distance. When it is at its nearest it is 363 104 kilometres away. The Moon is 10 921 kilometres all the way around. The Earth is about four times bigger, with a distance of 40 075 kilometres around the equator.

### Assessment

These are some of the largest islands on our planet. The area of each of them is given in square kilometres.



Island	Area (sq km)
Baffin Island, Canada	503 944
Borneo	748 168
Great Britain	218 077
Greenland	2 175 600
Honshu, Japan	227 413
Madagascar	587 713
New Guinea	785 753
Sumatra	443 065

- Which island has an area of two hundred and eighteen thousand and seventy-seven kilometres?
- Which is the larger island, New Guinea or Borneo?
- Write the islands in order of size, starting with the largest.
- Round each of the areas to the nearest thousand.

Try this

Egypt has an area of 997 739 square kilometres. What is this rounded to the nearest 10, 100, 1000, 10 000 and 100 000?

## Activities

- Go through the introduction on page 12 and explain that if the digit to the right of the significant digit is 5 or more, the number is rounded up, if it is less than 5 the number is rounded down, e.g. 343 565 is rounded up to the nearest 1 000 because the hundreds digit is 5, but rounded down to the nearest 10 000 because the thousands digit is 3.
- Ask 'Which is the largest number that can be rounded down to 1000? Which is the smallest number that can be rounded up to 1000?' Record the numbers and establish why they are correct. Repeat with other rounding targets, e.g. 90 000.

### Answers

- 41 700, 29 800, 60 200, 29 100, 845 200, 628 500, 745 800, 294 300
- 42 000, 30 000, 60 000, 29 000, 845 000, 629 000, 746 000, 294 000
- 40 000, 30 000, 60 000, 30 000, 850 000, 630 000, 750 000, 290 000

- smallest 14 500, largest 15 499
  - smallest 2 750 000, largest 2 849 999
  - smallest 16 195 000, largest 16 204 999
  - smallest 895 000, largest 904 999
- 3 406 000 km, 363 000 km, 11 000 km, 40 000 km

### Assessment

- Great Britain      2 New Guinea
  - Islands in size order      4 Rounded to nearest 1000
- |               |           |           |
|---------------|-----------|-----------|
| Greenland     | 2 175 600 | 2 176 000 |
| New Guinea    | 785 753   | 786 000   |
| Borneo        | 748 168   | 748 000   |
| Madagascar    | 587 713   | 588 000   |
| Baffin Island | 503 944   | 504 000   |
| Sumatra       | 443 065   | 443 000   |
| Honshu        | 227 413   | 227 000   |
| Great Britain | 218 077   | 218 000   |

### Try this

997 740 km, 997 700 km, 998 000 km, 1 000 000 km, 1 000 000 km