Unit 1: Place value within 100,000

Lesson 1: Numbers to 10,000

➜ pages 6–8

1. a) There are 1 thousands, 2 hundreds, 5 tens and 3 ones.
1,000 + 200 + 50 + 3 = 1,253
The number is 1,253.
b) There are 2 thousands, 4 hundreds, 4 tens and 0 ones.
The number is 2,440.

2. a) Children should add counters: 1 thousand, 3 hundreds, 0 tens and 1 one.
b) 5,632 = 5,000 + 600 + 30 + 2

3. Box crossed out which says in words: Four thousand, two hundred and twenty-five.

4. a) 6,230 3,575 9,499 7,009
b) 3,230 575 6,499 4,009

5. Andy's number is 8,520.

Kate's number is 5,208.

Reflect

7,562 = 7,000 + 500 + 60 + 2

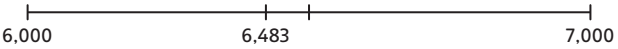
Explanations will vary; for example: Only the digit 7 (value 7,000) will change: 3,000 less than 7,000 is 4,000, so the 7 in the thousands column will change to a 4. The other digits will stay the same so:

3,000 less than 7,562 will be 4,562.

Lesson 2: Rounding to the nearest 10, 100 and 1,000

➜ pages 9–11

1. a) The number is 6,483.
b) 6,483 is between 6,000 and 7,000.



It is closer to 6,000.
The number rounds to 6,000 to the nearest 1,000.
c) 6,480
d) 6,500

2. Circled numbers: 2,850 2,909 2,949

3. a) 10,000
b) Answers may vary; children should mark four numbers between 9,000 and 9,499 (just before half-way along the number line) on the number line.

4. Table completed with the following amounts in the empty fields:
Charity A: £4,700 £4,700
Charity B: £5,350 £5,000

5. a) Accept answers between 7,525 and 7,925.
b) Accept answers between 6,100 and 6,140.
c) Accept answers between 945 and 949.
d) 6,501
e) 1,000
f) 10

6. Two counters added to the hundreds column.

7. The number could be any number between 2,650 and 2,659.

The number could **not** be any number outside of that range.

Reflect

Answers may vary.

Some possible similarities include: Rounding involves writing a number which is close to the given number. When you round a number to the nearest 10, 100 or 1,000 it will give a number with a zero in the ones column.

Some possible differences include: When you round to the nearest 10, the answer will be a multiple of 10. When you round to the nearest 100, the answer will be a multiple of 100. When you round to the nearest 1,000, the answer will be a multiple of 1,000.

Lesson 3: 10,000s, 1,000s, 100s, 10s and 1s (1)

➜ pages 12–14

1. a) 5,000
10
80,000
0
b) 58,013
Fifty-eight thousand and thirteen

2. Lines drawn to match:
43,250 ➜ 40,000
32,409 ➜ 400
34,250 ➜ 4,000
23,546 ➜ 40

3. Counters added into columns:

TTh	Th	H	T	O
1	1	0	1	2

4. Numbers written in to complete part-whole models:
a) 50,000 5,000 7
b) 10,000 300
c) 20,090

5. a) 14,572
b) 13,672
c) 13,372
d) 63,572

6. First card: 5 Second card: allow 6–9
Third card: any digit

Examples given should contain the digits the child has chosen plus 2 and 0:

Any 5-digit number greater than 60,000.

Any 5-digit number with an even digit in the tens position.

Any 5-digit number with 5 in the thousands position.

Reflect

Answers may vary; for example:
64,231 = 60,000 + 4,000 + 200 + 30 + 1

Lesson 4: 10,000s, 1,000s, 100s, 10s and 1s (2)

→ pages 15–17

1. a) 86,521
b) 40,070

2. Boxes completed:
a) 53,604 3 6 4
b) 53,604 600 4
c) 53,604 100
d) 53,604 104

3. a) Boxes completed:
Above number line: 30,000 82
Below number line: 30,500
b) 30,000 + 500 + 82 = 30,582

4. Boxes completed:
8,000 300 50
(or any three numbers that total 8,350)

Any four numbers that total 68,359.
Any three numbers that total 68,359.
Any two numbers that total 68,359.

5. Buckets circled: 7,000 ml 9,000 ml 2,750 ml

6. Answers may vary.

Numbers in each column must total 5,400. Only numbers greater than, or equal to, 1,000 can be used, for example:

Ship	Solution 1	Solution 2
Voyager	1,000	1,200
Princess	1,000	2,200
Neptune	3,400	2,000

Reflect

Explanations may vary; for example:

Because 20,000 + 6,000 = 10,000 + 16,000
and 500 + 30 + 2 = 500 + 32.

Lesson 5: The number line to 100,000

→ pages 18–20

1. Numbers on number line from left to right:
23,000 25,500 27,000 29,900 (approximately)

2. a) Point A is 65,000 (approximately).
Point B is 29,000 (approximately).
b) Any three numbers between 45,000 and 55,000.
c) 47,300 marked on line just under $\frac{3}{4}$ of the way between 40,000 and 50,000.
d) Explanations may vary; for example:
Because the number with the greatest place value in both numbers is the ten thousands number. 98,500 has 9 in this position (value 90,000) but 89,500 only has 8 (value 80,000).

3. B circled.

4. 76,100 circled.

5. Answers may vary; for example:
A = 35,000
B = 16,000
C = 52,000
D = 47,000
(Allow +/– 2,000)

6. a) Possible answers:
6,023 6,027 6,032 6,037 6,072 6,073
b) Possible answers: 36,027 36,207
c) Any number made from the 5 digits (apart from those with 76 thousands).
d) 72,360

Reflect

Answers may vary; for example:
They are all between 40,000 and 50,000.

Lesson 6: Comparing and ordering numbers to 100,000

→ pages 21–23

1. 84,054 (bottom number) > 84,045
Explanations may vary; for example:
Both numbers have same numbers of ten thousands, thousands and hundreds, but the bottom number has 1 more ten so it is the larger number.

2. 6,432 < 23,460 < 26,034 < 32,604

3. 51,795 or 51,975 54,500 or 63,124

4. a) False
b) True
c) False
Explanations may vary; for example:
The first number has 9,000 while the second has 12,000 and 12,000 > 9,000.

5. 9,999 km 11,561 km 11,651 km 13,200 km 13,320 km

6. 56,787 < 56,794 or 56,787 < 56,974

7. Answers may vary; for example:
Car A: £24,510 Car B: £24,150

Reflect

8,976 67,559 74,030 74,300 76,955

Children should mention comparing the digit in the place of largest value first (ten thousands). Where the digit in this place is the same, they need to look at the digit in the next place (thousands), etc.

Lesson 7: Rounding numbers within 100,000

➜ pages 24–26

1. a) 90,000 100,000
b) 90,000 100,000
90,000

2. 96,304 100,000 96,000 96,300 96,300

3. a) Number between 39,001 and 39,499.
b) Number between 39,500 and 39,999.

4. a) 45,300
b) 90,000
c) 20,010

5. a) Number between 5 and 9.
b) Number between 0 and 4.
c) 8
d) Possible answers: 50, 51, 52, 53 or 54.

6. Amounts circled: £19,450 £19,549 £19,488

7. Answers may vary.
Top row: digits in the thousands and ones positions are between 5 and 9;
digits in the hundreds and tens positions are between 0 and 4.
Bottom row: digits in the thousands and ones positions are between 0 and 4;
digits in the hundreds and tens positions are between 5 and 9.

Reflect

hundreds
10,000
10
tens

Explanations may vary; for example:
The number 87,500 is between 87,000 and 88,000. Look at the hundreds digit – this is 5, so 87,500 will round up to 88,000.

Lesson 8: Roman numerals to 10,000

➜ pages 27–29

1.

100	C	600	DC
200	CC	700	DCC
300	CCC	800	DCCC
400	CD	900	CM
500	D	1,000	M

2. a) 1,000 + 1,000 + 100 + 10 + 1 = 2,111
b) 500 + 100 + 100 + 50 = 750
c) 100 + 100 – 10 + 5 = 195

3. Part-whole diagrams completed:
a) CD LXX
b) 1,047 (whole)
40 7 (parts)

4. a) MCCXI ➜ 1211
b) MDXLV ➜ 1545
c) MCDLXI ➜ 1461
d) MCMI ➜ 1901

5. Lexi is wrong.
MCX = 1,000 + 100 + 10 = 1,110
CMX = 1,000 – 100 + 10 = 910

6. a) MCMLXXV
b) MDLXXX
c) MMXII

7. MCDXCV 1,495

8. a) There are three possible solutions:
Solution 1:
L (to give MDCLIX) = 1,659
D (to give MCDVI) = 1,406
X (to give DCCLX) = 760
C (to give CDXXI) = 421
V (to give CCCXV) = 315
Solution 2:
L (MDCLIX) = 1,659
D (to give MCDVI) = 1,406
V (to give DCCLV) = 755
C (to give CDXXI) = 421
X (to give CCCXX) = 320

Solution 3:
X (MDCXIX) = 1,619
D (to give MCDVI) = 1,406
V (to give DCCLV) = 755
C (to give CDXXI) = 421
L (to give CCCXL) = 340

b) 315/320/340 < 421 < 760/755/755 < 1,406 < 1,659/1,619

Reflect

1,000
500 50

Together, MDXL represents the number 1,540 because M = 1,000, D = 500 and XL = 50 – 10 = 40.

End of unit check

➜ pages 30–31

My journal

1. Children may describe the number 12,546 in many ways. For example:

12,546 is a 5-digit number because it has a digit in the 10,000s place;
12,546 is 546 more than 12,000;
12,546 is between the multiples 12,000 and 13,000;
12,546 is a little more than half-way between 12,000 and 13,000;
12,546 rounds to 13,000 to the nearest 1,000;
12,546 rounds to 10,000 to the nearest 10,000.

Representations could include place value grids and partitioning in part-whole models, on number lines or as abstract number sentences.

Unit 2: Place value within 1,000,000

Lesson 1: 100,000s, 10,000s, 1,000s, 100s, 10s and 1s (1)

→ pages 32–34

1. 600,000 six hundred thousand

2. a) 500,000 five hundred thousand
b) 1,000,000 one million (not 'a million')

3. a) One hundred and twenty-three thousand, four hundred and nineteen.
b) Six hundred and ninety thousand, four hundred and three.

4. a) 329,100
b) 37,581
c) 600,040
d) 400,596

5. a) 4,000 (4 thousands)
b) 40 (4 tens)
c) 40 (4 tens)
d) 4 (4 ones)
e) 400,000 (4 hundred thousands)

6. Answers will vary; all answers must have one counter in the thousands column. For example:

111,225 301,035 311,205 411,114 301,134

Reflect

Check that the number drawn on the place value grid matches numerals and words.

Lesson 2: 100,000s, 10,000s, 1,000s, 100s, 10s and 1s (2)

→ pages 35–37

1. 252,723

2. a) 310,450
b) Circled: 2 × £100,000 1 × £10,000 5 × £1,000 4 × £1

3. a) Circled: 1 × 100,000 7 × 10,000 6 × 1,000 3 × 1
b) Circled: 4 × 10,000 5 × 1,000 1 × 100 4 × 10

4. a) 218,492 = 200,000 + 10,000 + 8,000 + 400 + 9 + 2
b) 710,388 = 700,000 + 10,000 + 300 + 80 + 8
c) 39,448 = 30,000 + 9,000 + 400 + 40 + 8
d) 279,731
e) 502,981
f) 7,073
g) 650,103

5. a) 549,527
b) 70,506
c) 910,028

6. a) 536,215
b) 735,000
c) 10,976
d) 15,100
e) 2,132

Reflect

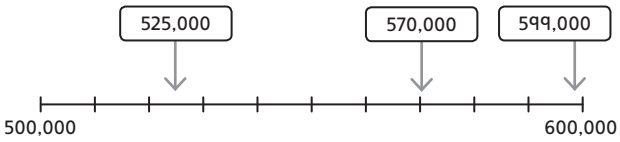
Answers may vary. Look for 452,093 partitioned in a variety of ways; for example:
400,000 + 50,000 + 2,000 + 90 + 3
200,000 + 200,000 + 52,000 + 80 + 13

Lesson 3: Number line to 1,000,000

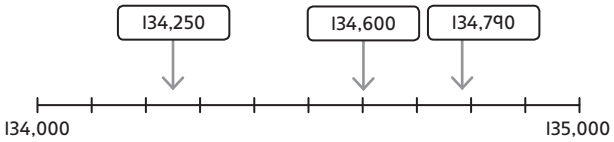
→ pages 38–40

1. a) 200,000 650,000 900,000
b) 210,000 270,000
Allow answers between 297,500 and 299,000.
c) 270,500 275,000 279,000

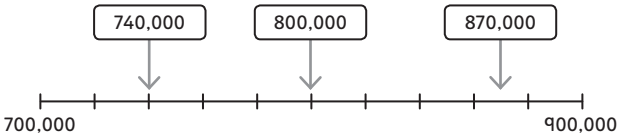
2. a)



b)



c)

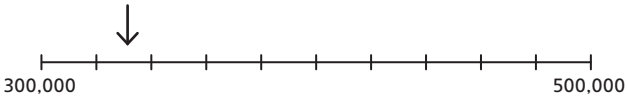


3. A: approximately 410,000
B: approximately 475,000
C: approximately 495,000
Answers will vary and children should explain their reasoning for estimation.

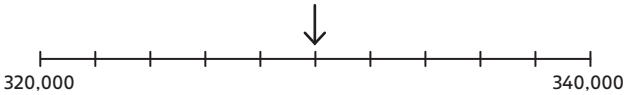
4. Circled: 370,000 507,000 429,781

5. Top number: 330,000

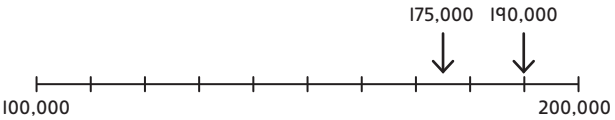
Middle number line:



Lower number line:



Reflect



Answers will vary; for example:

150,000 is half-way between 100,000 and 200,000 so 175,000 is $\frac{3}{4}$ of the way along the line.

Lesson 4: Comparing and ordering numbers to 1,000,000

➜ pages 41–43

1. Circled numbers:
a) Lower number (258,300)
b) Lower number (131,500)
c) Right-hand number (70,000)
d) Right-hand number (six hundred thousand)
e) Middle number (523,000)

2. a) Cliff Edge
b) Cliff Edge Fred's Farm Shaw Farm High Top

3. a) 56,720 < 73,405
b) 300,000 > 37,940
c) 517,182 < 517,185
d) 59,472 < 59,505
e) one million > 764,914
f) 3,189 < thirty thousand

4.

	Population
Hull	265,180
Southampton	238,700
Dover	31,200

5. Missing digits:
a) Number between 0 and 4.
b) If 2nd digit is 4 or less, 1st digit can have any value. If 2nd digit is 5, 1st digit must be 3 or more.
c) If 1st digit is 8 or 9, other digits can take any value. If 1st box is 7, there are many possible answers – check answer given.
d) 2nd digit = 8; 1st digit = 3rd digit.
e) 2nd digit = 3; other digits can take any value.

6. a) 5
b) 7
c) Answers will vary; middle number must start with a digit between 4 and 7.

Reflect

Explanations will vary. Children should explain that they will compare the digits with the greatest place value first (hundred thousands). If these are the same, they will need to compare the digits with the second greatest place value (ten thousands) and so on.

Lesson 5: Rounding numbers to 1,000,000

➜ pages 44 –46

1. a) 200,000
b) 600,000
c) 300,000
d) 700,000
e) 100,000
f) 700,000

2. a) 240,000
b) 470,000
c) 160,000
d) 420,000
e) 30,000
f) 720,000
g) 350,000
h) 610,000

3. (Danny's number is 237,412.)
a) 200,000
b) 237,000
c) Counters cannot be drawn in the hundred thousands or ten thousands columns but can be drawn anywhere else, to make numbers such as: 239,634 or 237,492.

4.

Number	Rounded to the nearest 10,000	Rounded to the nearest 1,000	Rounded to the nearest 10
239,145	240,000	239,000	239,150
128,783	130,000	129,000	128,780
758,007	760,000	758,000	758,010
632,175 – 632,184	630,000	632,000	632,180
825,425 – 825,434	830,000	825,000	825,430
627,141 – 627,149	630,000	627,000	627,150
635,*72 (* any digit)	640,000	635,000 or 636,000	635,*70

(Bottom row: third column will be 635,000 if * is between 0 and 4, and 636,000 if * is between 5 and 9.)

5. Answers will vary.
a) Allow numbers 450,000 to 549,999 made with correct digits.
b) Allow numbers 605,000 to 614,999 made with correct digits.
c) 610,548 or 610,584.

6. Answers will vary.
a) Ten thousands digit must be 5 or more; other digits cannot be 0.
For example: 151,111 ➜ 200,000
372,481 ➜ 400,000
699,999 ➜ 700,000
b) Ten thousands digit and thousands digit must be 9; other digits cannot be 0.
For example: 199,111 ➜ 200,000
399,481 ➜ 400,000
699,999 ➜ 700,000

Reflect

Explanations will vary; for example:
I would look at the ten thousands digit. If it is 4 or less I will need to round down. If it is 5 or more I will need to round up.

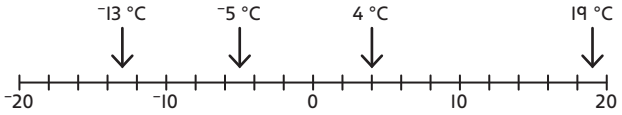
Lesson 6: Negative numbers

➜ pages 47–49

1. a) ⁻8
b) 5
c) 13

2. 11

3. a)



b) 17
c) ⁻13 ⁻5 4 19
d) ⁻4

4. a) 15
b) 7

5. 2,300

6. 108

Reflect

Answers will vary; for example:
From 6 am to 2 pm the temperature increases by 19 °C. The temperature is below freezing before 6:00 am and after 10:00 pm.

Lesson 7: Counting in 10s, 100s, 1,000s, 10,000s

➜ pages 50–52

1. a) 230,416
b) 240,416
c) 230,516
d) 220,516 (assuming she is starting from 230,516)

2. Missing numbers:
a) 170,000 180,000 190,000 200,000
b) 97,000 100,000 101,000 102,000
c) 760,400 760,700 760,800 761,000

3. Missing numbers:
a) 308,150 408,150 508,150 708,150
b) 555,420 565,420 575,420 585,420
c) 751,097 751,107 751,127 751,137

4. Answers will vary; for example:
+ 100,000: 320,000 420,000 520,000 620,000 720,000 820,000
+ 10,000: 680,000 690,000 700,000 710,000 720,000 730,000

5.

100,000 less	695,104	100,000 more	895,104
10,000 less	785,104	10,000 more	805,104
1,000 less	794,104	1,000 more	796,104
100 less	795,004	100 more	795,204
10 less	795,094	10 more	795,114

6. a) 877,777
b) 434,444
c) 556,555

7. a) 825,007
b) 184,512
c) 869,300
d) 382,150
e) 392,107
f) 184,512

8. A = 126,928 B = 26,928 C = 36,928

Reflect

Answers will vary. Children should recognise that there will be more steps of 100 than steps of 10,000 so it will take longer to count in 100s than to count in 10,000s.

Lesson 8: Number sequences

➜ pages 53–55

1. a) Children should draw three matches to make 3 linked horizontal squares.
b) 4 7 10 13 16
c) 22 matchsticks. Explanations will vary; for example: The rule for the pattern is to add 3 each time so I added 3 and 3 again to 16 (which is the 5th number in the pattern).

2. Rule for the sequence is to add 4 but 19 + 4 = 23, not 22. All numbers in the sequence will be odd.

3. a) 23 26
b) 11 13
c) 23 27
d) 4 0
e) 31 37
f) 125 100
g) 7 2
h) 21 31
i) 7 10
j) ⁻2 ⁻8

4. 41

5. 204

6. 48

Reflect

Children should design and describe their own sequence.

End of unit check

➜ pages 56–57

My journal

1.

A number between 250,000 and 35,000.	For example: 315,689 315,869
A number that has a smaller number of 100s than 10,000s.	For example: 536,189 or 695,831
The greatest even number that can be made.	985,316
A number that rounds to 600,000 to the nearest 100,00.	For example: 613,589
The smallest number that rounds to 600,000 to the nearest 100,000.	561,389
The number that is 10,000 less than 875,913.	865,913

Power puzzle

$^{-}4$ 2 8 14 20

1 4 7 10 13 16

Unit 3: Addition and subtraction

Lesson 1: Adding whole numbers with more than 4 digits (1)

➜ pages 58–60

1. a) 77,467

b)
$$\begin{array}{r} 3\ 6\ 4\ 5\ 8 \\ +\ \ 2\ 9\ 2\ 0 \\ \hline 3\ 9\ 3\ 7\ 8 \\ \hline \end{array}$$

c) 42,824 e) 81,509
d) 77,796 f) 16,245

2. a) Kate has not lined up 4,362 correctly.

b)
$$\begin{array}{r} 5\ 3\ 1\ 7\ 5 \\ +\ \ 4\ 3\ 6\ 2 \\ \hline 5\ 7\ 5\ 3\ 7 \\ \hline \end{array}$$

3. a)
$$\begin{array}{r} 1\ 7\ 2\ 7\ 0 \\ +\ 2\ 4\ 1\ 9\ 5 \\ \hline 4\ 1\ 4\ 6\ 5 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 4\ 5\ 9\ 0\ 7 \\ +\ 3\ 3\ 2\ 8\ 4 \\ \hline 7\ 9\ 1\ 9\ 1 \\ \hline \end{array}$$

4. a) 35,510 + 26,138 = 61,648
b) 73,825 + 4,395 = 78,220
c) 20,327 + 18,872 = 39,199

5.
$$\begin{array}{r} 2\ 6\ 5\ 0\ 0 \\ +\ \ 2\ 3\ 0\ 0 \\ \hline 2\ 8\ 8\ 0\ 0 \\ \hline \end{array}$$

6. a) 400,005
b) 400,050
c) 405,000
d) 45,000

Reflect

Explanations will vary. Children should talk through correct placing of digits and exchanging when adding.

Lesson 2: Adding whole numbers with more than 4 digits (2)

➜ pages 61–63

1. a) 43,753
b) 44,527 c) 80,903

2. a) 127,420 + 337,293 = 464,713
b) 37,915 + 8,759 = 46,674
c) 11,759 + 817 = 12,576
d) 519,000 + 294,000 = 813,000

3. a)
$$\begin{array}{r} 1\ 9\ 2\ 5 \\ +\ 2\ 1\ 5\ 0 \\ +\ 2\ 4\ 7\ 5 \\ \hline 6\ 5\ 5\ 0 \\ \hline \end{array}$$

Yes, they reached the target as their total is 6,550 metres.

b) The digits in the ones position are 5, 5 and 0 which add up to make 10, which will be carried as 1 ten into the tens position. This means there will be no ones in the answer and it will be a multiple of 10.

4. a) Max has not lined up 6,293 correctly. The 6 should be in the thousands place value position.

b)
$$\begin{array}{r} 2\ 6\ 3\ 4\ 8 \\ +\ \ 6\ 2\ 9\ 3 \\ \hline 3\ 2\ 6\ 4\ 1 \\ \hline \end{array}$$

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

b)
$$\begin{array}{r} 6\ 5\ 6\ 4\ 2\ 6 \\ +\ 3\ 1\ 3\ 6\ 2\ 4 \\ \hline 9\ 7\ 0\ 0\ 5\ 0 \\ \hline \end{array}$$

6. Answers may vary; for example:

a)
$$\begin{array}{r} 7\ 4\ 6\ 3\ 9 \\ +\ 2\ 5\ 0\ 1\ 8 \\ \hline 9\ 9\ 6\ 5\ 7 \\ \hline \end{array}$$

b)
$$\begin{array}{r} 7\ 5\ 6\ 9\ 8 \\ +\ 1\ 4\ 3\ 0\ 2 \\ \hline 9\ 0\ 0\ 0\ 0 \\ \hline \end{array}$$

Reflect

Children should write a 5 digit + 5 digit calculation with two exchanges. For example:

a)
$$\begin{array}{r} 4\ 2\ 3\ 1\ 7 \\ +\ 1\ 5\ 8\ 2\ 3 \\ \hline 5\ 8\ 1\ 4\ 0 \\ \hline \end{array}$$

Lesson 3: Subtracting whole numbers with more than 4 digits (I)

➜ pages 64–66

1. a) 24,592 – 3,470 = 21,122
b) 51,340 – 30,720 = 20,620
c) 4,365 – 2,423 = 1,942
d) 76,185 – 5,224 = 70,961
e) 15,712 – 6,000 = 9,712

2. a) 48,200

	$^{6}\not{7}$	$^{1}3$	2	0	0
–	2	5	0	0	0
	4	8	2	0	0

b) 11,541

	4	8	$^{8}\not{9}$	$^{1}2$	3
–	3	7	3	8	2
	1	1	5	4	1

3. a) 127,365 – 102,724 = 24,641
The house next door costs £24,641 less.
b) 18,495 – 7,620 = 10,875
The motorbike is £10,875 cheaper than the car.

4. a)

	2	$^{5}\not{6}$	$^{1}1$	8	2
–		4	7	3	2
	2	1	4	5	0

b)

	4	9	9	$^{7}\not{8}$	$^{1}3$
–	1	4	6	2	7
	3	5	3	5	6

5. The first chest contains 18,455 coins.
The second chest contains 14,255 coins.
The third chest contains 9,135 coins.

Reflect

Children should explain subtraction including exchanging 1 ten thousand for 10 thousands.

Lesson 4: Subtracting whole numbers with more than 4 digits (2)

➜ pages 67–69

1. a) 2,417
b) 23,640
c) 1,647
d) 4,749

2. a) 6,347
b) 38,963
c) 83,652
d) 651,123

3. 19,572

4. a)

	$^{*6}\not{*7}$	$^{14}\not{5}$	$^{1}0$	6	
–	*4	8	3	2	
	*2	6	7	4	

(* where these digits can vary.)

b)

	3	$^{8}\not{9}$	$^{11}\not{2}$	$^{1}1$	7
–	1	1	8	3	7
	2	7	3	8	0

5. a) 2,700 – 1,375 = 1,325
b) 27,000 – 18,904 = 8,096

6. 349,500 – 186,956 = 162,544
162,544 – 73,290 = 89,254
89,254 boys attend the concert.

Reflect

Children should show a 5 digit – 5 digit calculation with two exchanges. For example:
52,971 – 44,753 = 8,218

Lesson 5: Using rounding to estimate and check answers

➜ pages 70–72

1. a) 300
200
300 + 200 = 500
500
b) 7,000
2,000
7,000 – 2,000 = 5,000
5,000
c) 300
7,200
300 + 7,200 = 7,500
7,500

2. a) 12,000
7,600
12,000 + 7,600 = 19,600
b) Bella has not lined up 7,620 correctly using her place value knowledge.
c) 19,625

3. a) 3,200 (3,400 – 200)
b) 220,000 (170,000 + 50,000)

4. Max made his estimate by rounding to the nearest thousand.
Jamie made his estimate by rounding to the nearest hundred.

5. a) £20,000 + £4,000 = £24,000
£24,000 – £4,000 = £20,000
b) £19,995 + £3,941 = £23,936
£23,936 – £4,081 = £19,855

Reflect

Answers will vary. Children should explain that estimating helps to check whether an answer seems sensible.

Lesson 6: Mental addition and subtraction (I)

➜ pages 73–75

1. a) 40 + 30 = 70
5 + 2 = 77
45 + 32 = 70 + 7 = 77
b) 84 c) 379

2. a) 57 c) 87
57 87
570 870
5,700 87,000
b) 288 d) 840
288 840
1,288 84,000
2,817 8,400

3. 38 + 2 = 40 40 + 50 = 90
The missing number is 52.

4. a) 24 d) 67
b) 56 e) 58
c) 606 f) 33

5. a) 330 f) 1,200
b) 260 g) 34
c) 4,700 h) 340
d) 560 i) 54
e) 450 j) 18

6. Methods will vary. Children should have recorded steps in their working.
a) 64 + 83 = 127 c) 64 + 830 = 894
b) 260 + 197 = 457 d) 125 + 575 = 700

7. a) 1,230 c) 420
b) 278

Reflect

Children's methods will vary. Children should have recognised that the numbers in calculation b) are ten times larger than the numbers in calculation a).
a) 40 + 30 = 70, 5 + 2 = 7
So, 70 + 7 = 77
b) 450 + 380 = 770, using answer to a).
c) 360 + 198 = 360 + 200 – 2 = 560 – 2 = 558

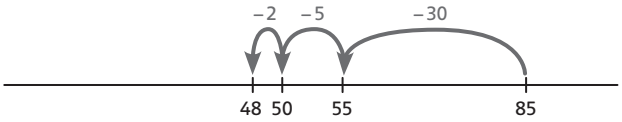
Lesson 7: Mental addition and subtraction (2)

➜ pages 76–78

1. a) 78 – 20 = 58 70 – 20 = 50
58 – 5 = 53 8 – 5 = 3
So, 78 – 25 = 53 So, 78 – 25 = 53
b) 670 – 200 = 470 600 – 200 = 400
470 – 20 = 450 70 – 20 = 50
So, 670 – 220 = 450 So, 670 – 220 = 450

2. a) 43 d) 22
430 220
4,300 2,200
b) 37 e) 250
c) 300 f) 3,200

3. a) 85 – 30 = 55
55 – 5 = 50
50 – 2 = 48
So, 85 – 37 = 48
b) Children should draw jumps on the number line:



4. a) 27 c) 16
27 53
b) 122 d) 82
118 78

5. a) 4 d) 13
b) 8 e) 10
c) 8 f) 16
g) The difference between 8,002 and 7,997 is 5.

6. a) 261
b) 747
c) 7
d) 388
e) 245

Reflect

Methods may vary but children should have recognised that 792 and 801 are close to each other so may choose to use a counting on method. For example:
792 + 8 = 800
800 + 1 = 801
So, 801 – 792 = 9

Lesson 8: Using inverse operations

➜ pages 79–81

1. a) 1,440 + 1,264 = 2,704
Ticked: The answer is correct.
b) 15,995 – 14,600 = 1,395
Ticked: The answer is incorrect.
c)

	1	8	4	6	8
+	1	8	4	8	2
	3	6	9	5	0

Ticked: The answer is incorrect.

2. a) Order of calculations may vary:
2,600 + 3,500 = 6,100
3,500 + 2,600 = 6,100
6,100 – 2,600 = 3,500
6,100 – 3,500 = 2,600
b) 26,000 + 35,000 = 61,000

3. a) 1,120 needs to be written into the correct place value positions.
Correct answer = 35,846
b) Exchange needs to be completed.
Correct answer = 128

4. a) 10,000 – 7,500 = 2,500 or 10,000 – 3,500 = 6,500
b) Richard has forgotten 500 + 500 = 1,000 so the answer is 11,000.

5. 14,264 – 764 = 13,500 or 14,264 – 13,500 = 764

Reflect

Answers will vary; for example, children may suggest that if they just do the calculation again they might repeat the same mistake.

Lesson 9: Problem solving – addition and subtraction (1)

➜ pages 82–84

1. a) 3,240
b) 127,500 kg
c) £3,371

2. 34,055

3. 1,308 + 750 = 2,058 2,058 + 1,308 = 3,366
The café sells 3,366 cups of coffee in total.

4. 3,456 + 2,922 = 6,378 8,000 – 6,378 = 1,622

5. 126,000 + 12,600 + 1,260 + 126 = 139,986

6. Week = 12,440
Weekend = 14,660 14,660 – 12,440 = 2,220
2,220 more eggs were sold at the weekend than during the week.

Reflect

Children should write their own problem involving adding two numbers and then subtracting a third number.

Lesson 10: Problem solving – addition and subtraction (2)

➜ pages 85–87

1. 160,500 + 85,000 – 7,900 = 237,600
There are 237,600 litres of water in the pool now.

2. a) Tex made more toys than Karl in September and in October, so he must have made more toys than Karl in total.
b) Karl: 12,675 + 9,580 = 22,255
Tex: 13,188 + 10,680 = 23,868
23,868 – 22,255 = 1,613
Alternatively, some children may work out:
13,188 – 12,675 = 513 10,680 – 9,580 – 1,100
513 + 1,100 = 1,613
Tex made 1,613 more toys in total.

3. 12,840 + 7,319 = 20,159 30,000 – 20,159 = 9,841
The missing number is 9,841.

4. First barrel: 1,280
Second barrel: 1,280 + 480 = 1,760
Third barrel: 1,280 – 276 = 1,004
Total: 1,280 + 1,760 + 1,044 = 4,044
(Alternatively, some children may work out:
3 × 1,280 + 480 – 276)
There are 4,044 apples in total.

5. a) 100,385 – 75,560 = 24,825
100,385 + 24,825 = 125,210
125,210 is at A.
b) 125,210 + 24,825 + 24,825 + 24,825 + 24,825 = 224,510
224,510 is the first number above 200,000 that Kate will reach.

Reflect

Explanations will vary. Children should explain their methods for each calculation. For example:
182,000 – 79,000 = 103,000 500 – 320 = 180
So, 182,500 – 79,320 = 103,180
75,000 + 28,000 = 103,000
111 + 396 = 111 + 400 – 4 = 507
So 75,111 + 28,396 = 103,507
So, the second calculation has the bigger answer.

End of unit check

➜ pages 88–89

My journal

1. Children should make up a story problem using the bar model provided.
39,480 + 39,480 = 78,960
100,000 – 78,960 = 21,040
So, ? = 21,040

Power puzzle

1. a)

13,197	5,966	**837**	**20,000**
3,457	11,102	15,441	**30,000**
23,346	32,932	3,722	**60,000**
40,000	**50,000**	**20,000**	

b) Answers will vary; children should complete the table provided, and then make their own table for a partner to solve.

Unit 4: Graphs and tables

Lesson 1: Interpreting tables

➜ pages 90–92

1. a) 799
b) Friday
c) 103
d) Monday and Wednesday
e) Isla is not correct; 192 × 2 = 384

2. a) thread snake
b) 6·5 m
c) 4 m
d) The acrochordus is half the length of the cobra.

3. Bus = 71
The difference between the number of children who travel by bus and the number of children who walk to school is 83.

4. 8 + 9 + 7·5 + 4 + 1·5 = 30
30 × 15 = 450
In total, Toshi gets paid £450.

Reflect

Answers will vary; for example:
50 cars were in the survey.
The difference between the number of black cars and red cars is 14.
There were more black than red and white cars put together.

Lesson 2: Two-way tables

➜ pages 93–95

1. a)

	Spots	Stripes	Solid black
Square	///	//	/
Triangle	//	//// /	/
Star	///	//	//

b)

	Spots	Stripes	Solid black	Total
Square	3	2	1	6
Triangle	2	6	1	9
Star	3	2	2	7
Total	8	10	4	22

c) 8 shapes have spots.
I worked this out by looking at the total of the spots column.

2. a)

	Girl	Boy	Total
Brown	3	10	13
Blue	7	5	12
Total	10	15	25

b) 13
c) 4
d) $\frac{10}{25}$ or $\frac{2}{5}$.

3. a)

	Rabbits	Guinea Pigs	Hamsters	Total
Petz R Us	24	15	49	88
Animals	52	17	26	95
We Love Pets	28	51	13	92

b) We Love Pets
c) Animals
d) 275

4. a)

	Walk	Cycle	Car	Other	Total
Boys	7	3	4	1	15
Girls	8	1	3	0	12
Total	15	4	7	1	27

b) 11
c) Mrs Dean is correct because double 15 is 30, which is greater than 27.

Reflect

Answers will vary. Children should appreciate that two-way tables are used to show data against two criteria.

Lesson 3: Interpreting line graphs (I)

➜ pages 96–98

1. a) 2 pm
b) 20
c) 20, 7, 10, 25, 0
d) 18
e) The pool was closed (though children might suggest other reasons).

2. a) Day 7
b) 390 (approximately)
c) 210 (approximately)
d) 340 km + 285 km + 410 km = 1,035 km
e) The graph starts at 180 km as the shortest distance travelled is 190, so you don't need to show 0–180 km.

3. 60 (approximately)

Reflect

Explanations will vary. Children should explain that they would need to identify the time on the horizontal axes and then look vertically upwards to see what temperature the graph shows at this point. To work out the value of the temperature, they will need to look horizontally to read the temperature from the vertical axis.

Lesson 4: Interpreting line graphs (2)

➜ pages 99–101

1. a) 22
b) 5
c) 3 and 11·75
d) The balloon bursts after 10 seconds because, at this point, its height starts to drop quickly.
e) 10

2. a) 7
b) 7
c) 2 pm and 5:30 pm
d) 6
e) 3

3. Approximately 19,500 (about 18,000 to 37,500).

Reflect

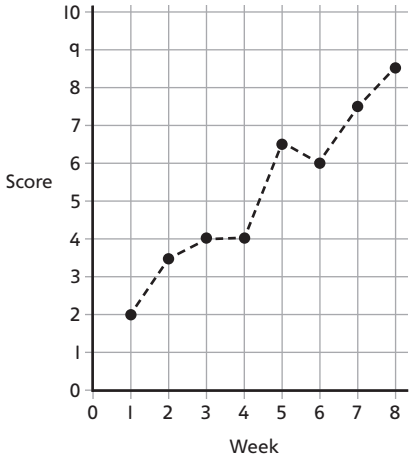
The statement is sometimes true. Children's explanations will vary; for example:

A temperature graph could start from below zero if it were recording temperatures in winter, whereas a graph measuring the height of a hot air balloon would start at zero. This shows that some line graphs will start from zero but not all.

Lesson 5: Drawing line graphs

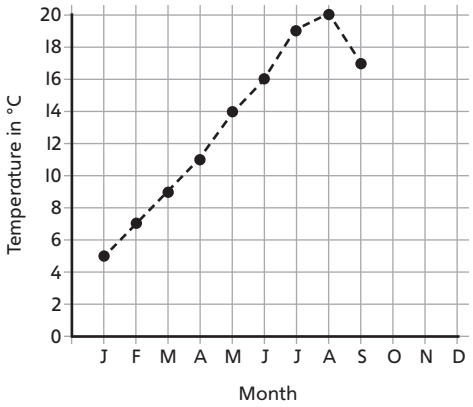
➜ pages 102–104

1. a)

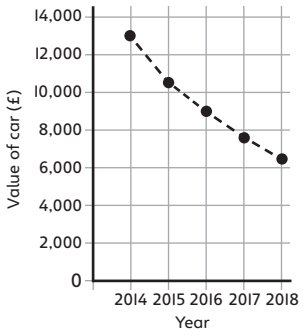


b) Week 8 = 8·5

2.



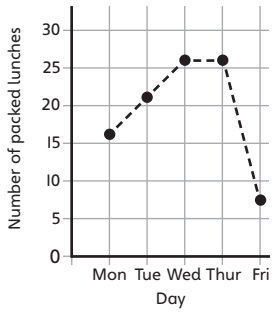
3.



4. a)

Day	Mon	Tue	Wed	Thur	Fri
Number of packed lunches	16	21	26	26	7

b) Graphs that children will draw may vary; for example:



Reflect

Answers will vary; for example:

1. Label the axes.

2. Make sure the numbers are equally spaced along the axes.

3. Draw a dotted line when there is no measured data between points.

End of unit check

→ pages 105–107

My journal

1. a) 12–16 people because the graph shows 16 people were there at 3 pm and 12 people were there at 4 pm. (Allow approximately 14 people.)

b) 7 pm because there are no people in the shop after that time.

c) Answers will vary; for example:
The shop might open at 9 am; the shop is busiest at 1 pm; there are 22 people in the shop at 12 pm; etc.

2. a) A line graph would not work because there are different types of clothes.

b) Answers will vary; for example:
Shorts were sold the most; swimwear was sold the least; people bought more T-shirts than trainers; etc.

Power puzzle

	First	Second	Total
Red	34	26	60
Blue	16	74	90
Total	50	100	150

There are 58 more blue counters in the second box.

Unit 5: Multiplication and division (I)

Lesson I: Multiples

➜ pages 108–110

1. 3 × 3 = 9
5 × 3 = 15
8 × 3 = 24
These all show the multiples of the number 3.
9, 15 and 24 are all multiples of 3.

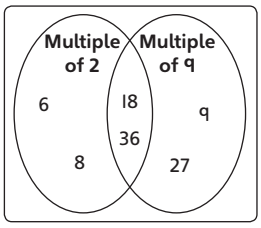
2. a) 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 should be shaded in.
b) 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96 and 99 should be shaded in.

3. a) 80, 30, 102 and 300 should be circled.
b) 70, 95, 530, 35 and 300 should be circled.

4. Circled: is not
Explanations will vary; for example:
64 is not a multiple of 6 because 64 ÷ 10 has a remainder so 64 is not a multiple of 6.

5. a) Answers may vary, but the top right box in the two-way table cannot be filled in as all multiples of 6 are also multiples of 2:

	Multiple of 2	Not a multiple of 2
Multiple of 6	6 12	
Not a multiple of 6	8 4	5 9



b) The section 'multiple of 6 and not a multiple of 2' has no numbers in it as all multiples of 6 are also multiples of 2.

6. It is sometimes true.
Explanations will vary; for example:
If you add the same number of multiples of 4 and 5 together, then the answer will also be a multiple of 9; for example: (3 × 4) + (3 × 5) = 12 + 15 = 27. 27 is a multiple of 9.
It is not always true, though, because 12 is a multiple of 4 and 20 is a multiple of 5 but 4 + 20 = 24, which is not a multiple of 9.

7. No, 777 will not be in the sequence even though it is a multiple of 7 because the start number is not zero but 2. That means all the numbers in the sequence will be 2 more than a multiple of 7.

Reflect

Richard is confused about multiples. A multiple of 7 is any number in the 7 times-table. As 10 is not in the 7 times-table it is not a multiple of 7. However, the calculation does show that 70 is in the 7 times-table so 70 is a multiple of 7.

Lesson 2: Factors

➜ pages 111–113

1. 1 × 18 = 18
2 × 9 = 18
6 × 3 = 18
4 × 5 = 20
2 × 10 = 20
1 × 20 = 20
The factors of 18 are: 1, 2, 3, 6, 9, 18
The factors of 20 are: 1, 2, 4, 5, 10, 20

2. Arrays should be drawn for 1 × 32, 2 × 16 and 4 × 8.
The factors of 32 are 1, 2, 4, 8, 16 and 32.

3. a) Circled: is not
Explanations may vary; for example:
6 is not a factor of 28 because 6 does not divide into 28 exactly.
b) Circled: is
Explanations may vary; for example:
7 is a factor of 84 because 7 goes into 84 exactly 12 times.

4. a) 1 × 36 = 36
2 × 18 = 36
3 × 12 = 36
4 × 9 = 36
6 × 6 = 36
b) 36 ÷ 1 = 36
36 ÷ 2 = 18
36 ÷ 3 = 12
36 ÷ 4 = 9
36 ÷ 6 = 6
36 has 9 factors. They are 1, 2, 3, 4, 6, 9, 12, 18 and 36.

5. 1, 2, 5, 10, 25 and 50.

6. a) Numbers shaded: 20, 1, 10, 50, 4, 5, 100
b) The missing factors are 2 and 25.

7. It is always true. If X is a factor of Y, then Y is a multiple of X.

Reflect

Andy is wrong. Explanations will vary; for example:
Some even numbers (4, 8, 12, …) are multiples of 4 but others are not (2, 6, 10, …).
70 is even, which means it is a multiple of 2. Therefore 70 does have a factor of 2.

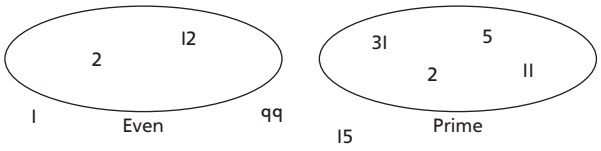
Lesson 3: Prime numbers

➜ pages 114–116

1. 11 cannot be made into an array (other than a 1 by 11 array) as there is always a remainder. Children should show this pictorially.
11 has 2 factors. It is a prime number.

2. Arrays should be drawn for:
15: 1 × 15 or 3 × 5
17: 1 × 17
19: 1 × 19
21: 1 × 21 or 3 × 7
17 and 19 are prime numbers.
15 and 15 are composite numbers.

3.



2 is in both groups.
1, 15 and 99 are not in either group.
No other number can join both groups. All even numbers have 2 as a factor, therefore even numbers which are not 2 will have more than 2 factors (1, 2, the number itself …) so they are not prime.

4. 99 is not a prime number as it is divisible by 1, 3, 9, 11, 33 and 99 so it has more than 2 factors. It is sufficient to show that it has at least 1 factor in addition to 1 and itself; for example: recognising that 3 is a factor of 99 is sufficient to show that it is not prime.

5. a) Circled: true
This is true because some odd numbers (3, 5, 7, 11, …) are prime, but others (9, 15, 21, 25, …) are not.
b) Circled: true
This is true because all numbers that end in 5 have 5 as a factor. So every number that ends in 5 (apart from 5 itself) will have more than 2 factors (1, 5, the number itself …) so they are not prime.

6. a) Circled: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41
b) Answers may vary; for example:
Most prime numbers appear in the 1st and 5th columns.
c) Some columns have no prime numbers because they only contain even numbers greater than 2.
d) Chart filled in up to 100 and circled: 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97
The 5th column has the most prime numbers.

Reflect

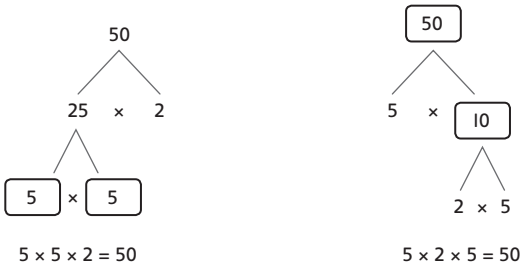
Answers will vary; for example:
Children could draw 33 dots in groups of 3 or 11 to show that 33 has factors of 3 and 11, making it a composite number.

Lesson 4: Using factors

➜ pages 117–119

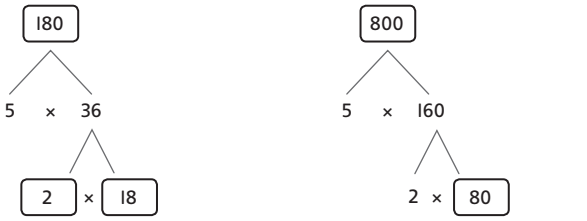
1. a) 3 × 2 × 2 = 12
b) 2 × 3 × 2 = 12 or 2 × 2 × 3 = 12
c) The two calculations give the same product. This is because the 3 factors are the same.

2.



3. 4 × 20 × 5 = 400
a) 4 × 20 = 80
80 × 5 = 400
b) 20 × 5 = 100
100 × 4 = 400
There are 400 hinges in total.

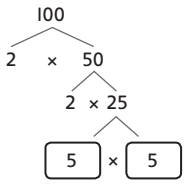
4.



5 × 36 = 5 × 2 × 18 = 180 5 × 160 = 5 × 2 × 80 = 10 × 80

Answers may vary, but look out for the most efficient calculations.

5. Order of factors may vary.
a)



100 = 2 × 2 × 5 × 5

b) Children should draw a factor tree showing:
75 = 3 × 5 × 5
c) Children should draw a factor tree showing:
200 = 2 × 2 × 2 × 5 × 5
d) Answers will vary; ensure all factors are prime numbers.

Reflect

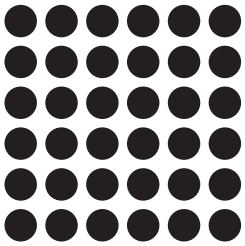
Answers will vary; for example:
Children could draw a factor tree to show the different factors of 28 and then use the factors in a number sentence to equal 140. Encourage the use of the factor 2, as 2 × 5 = 10 and will be easier to multiply; for example: 28 × 5 = 14 × 2 × 5 = 14 × 10 = 140.

Lesson 5: Squares

➜ pages 120–122

1. a) $3^2 = 3 \times 3 = 9$
9 is a square number.
b) 6 squared = 6^2
$6 \times 6 = 36$
36 is a square number.

2. Children must show 6 × 6 = 36 as a square number.



$6^2 = 36$

3. 10 is not a square number. Drawings should show that 10 cannot be arranged as a square array.

4. a) Circled: does
This does show a square number because it represents 3 × 3 = 9.
b) Circled: does not
This does not show a square number because 18 cannot be arranged as a square array.
c) Circled: does
This does show a square number because there are 5 parts of 5. 25 is a square number.

5. Diagrams may vary. Ensure children represent 16 as 4 × 4.

6. Shaded: 4, 1, 81, 144

7. a)

Number	9	25	49
All factors	1, 3, 9	1, 5, 25	1, 7, 49
How many factors?	3	3	3

b) Answers will vary; for example:
16 has factors 1, 2, 4, 8 and 16 so has 5 factors.
c) Yes, Isla is correct. Non-square numbers have pairs of factors, so will always have an even number of factors. As one of the factor pairs in a square number uses the same factor twice, this will mean the square number will always have an odd number of factors.

Reflect

There are 5 square numbers between 50 and 150. They are: 64, 81, 100, 121 and 144.

Lesson 6: Cubes

➜ pages 123–125

1. Diagrams matched:
1st diagram ➜ 3 × 3 × 3
2nd diagram ➜ 2^3
3rd diagram ➜ 2 squared
4th diagram ➜ 2 × 3

2. a) $5^3 = 5 \times 5 \times 5$
b) 6 cubed = 6 × 6 × 6
c) $1^3 = 1 \times 1 \times 1$

3. a) 4 × 4 = 16
4 × 16 = 64
$4^3 = 4 \times 4 \times 4 = 64$
b) 2 × 4 = 8
4 × 8 = 32
32 × 2 = 64
c) 2 × 8 = 16
2 × 16 = 32
32 × 2 = 64

4. a) 3 is not a cube number as $1^3 = 1 \times 1 \times 1 = 1$
b) To work out 3^3, multiply
3 × 3 × 3. So, 3 × 3 = 9; 9 × 3 = 27

5. a) 7 cubed = 343
b) $10^3 = 1{,}000$
c) $1^3 = 1$
d) $0^3 = 0$

6. a) Eight 2 × 2 × 2 cubes will make a 4 × 4 × 4 cube.
Explanations may vary; for example:
$4^3 = 64$ and $2^3 = 8$ and eight lots of 8 go into 64.
b) Eight 5 × 5 × 5 cubes would make a 10 × 10 × 10 cube.
Explanations may vary; for example:
$10^3 = 1{,}000$ and $5^3 = 125$ and eight lots of 125 go into 1,000.
c) $20^3 = 20 \times 20 \times 20 = 8{,}000$

Reflect

You could work systematically to calculate the first 5 cube numbers. These are:
$1^3 = 1 \times 1 \times 1 = 1$
$2^3 = 2 \times 2 \times 2 = 8$
$3^3 = 3 \times 3 \times 3 = 27$
$4^3 = 4 \times 4 \times 4 = 64$
$5^3 = 5 \times 5 \times 5 = 125$

Lesson 7: Inverse operations

➜ pages 126–128

1. a) 8 × 4 = 32
32 ÷ 8 = 4
32 ÷ 4 = 8
b) 6 × 3 = 18
18 ÷ 6 = 3
18 ÷ 3 = 6
c) 4 × 25 = 100
100 ÷ 4 = 25
100 ÷ 25 = 4

2. a) 48 ÷ 6 = 8
b) 8 × 6 = 48

3. a) There are 6 vases and 12 white roses.
b) She needs 33 red roses.

4. a) 2 × 16 = 32
32 ÷ 16 = 2
64 ÷ 2 = 32
32 × 2 = 64
b) 4 × 5 = 20
20 ÷ 5 = 4
100 ÷ 5 = 20
100 = 20 × 5
c) 15 = 45 ÷ 3
30 = 90 ÷ 3
150 ÷ 5 = 30
15 = 75 ÷ 5

5. Bella has written the numbers 5, 13 and 65 in the wrong order in the second division. It should say 65 ÷ 5 = 13. When you use the numbers in a multiplication calculation to write a related division calculation, the product (answer from the multiplication) will be the first number in the related division.

6. a) Reena started with 23.
b) Andy divided by 7.
c) Possible starting numbers: 61, 67, 73, 79 or 97.

Reflect

18 ÷ 6 = 3 54 ÷ 3 = 18
Encourage children to use the inverse to solve the missing number equations; for example:
3 × ? = 18 and 3 × 18 =?

Lesson 8: Multiplying whole numbers by 10, 100 and 1,000

➜ pages 129–131

1. a) 4 × 100 = 400
b) 10 × 6 = 60 (6 ten counters drawn)
c) 1,000 × 5 = 5,000 (5 thousand counters drawn)

2. Diagrams matched:
1st diagram ➜ 1 × 3
2nd diagram ➜ 100 × 3
3rd diagram ➜ 3 × 1,000
4th diagram ➜ 10 × 10

3. a) 11 × 1 = 11
b) 11 × 100 = 1,100
c) 11 × 10 = 110
d) 11 × 1,000 = 11,000

4. Errors corrected: 40 × 100 = 4,000 (not 400)
1,000 × 20 = 20,000 (not 2,000)

5.

	TTh	Th	H	T	O
Number				3	7
× 10			3	7	0
× 100		3	7	0	0
× 1,000	3	7	0	0	0

	TTh	Th	H	T	O
Number				7	0
× 10			7	0	0
× 100		7	0	0	0
× 1,000	7	0	0	0	0

6. a) 5 × 10 = 50
50 × 10 = 500
50 × 100 = 5,000
5 × 1,000 = 5,000
b) 3 × 1,000 = 3,000
300 × 10 = 3,000
300 × 100 = 30,000
300 × 1 = 300
c) 15 × 1,000 = 15,000
100 × 15 = 1,500
1,500 = 150 × 10
15,000 = 150 × 100
Children may explain what they notice in different ways; for example:
Each set of calculations are related.

7. a) Answers will vary; for example:
8 × 100 < 90 × 10
5 × 10 × 10 < 20 × 100
100 × 50 > 10 × 10 × 10 × 4
7 × 10 < 10 × 10 × 6 < 10 × 100
b) Possible answers (the order of operations may vary):
2 × 1,000 × 10 = 2,000 × 10
2 × 100 × 100 = 2,000 × 10
2 × 1,000 × 100 = 2,000 × 100
2 × 1,000 × 1,000 = 2,000 × 1,000
20 × 100 = 200 × 10
20 × 1,000 = 200 × 100
2,000 × 10 = 200 × 100
2,000 × 100 = 200 × 1,000

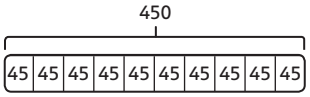
Reflect

Answers will vary. Children should show calculations which involve powers of 10 and have the answer 1,300; for example:
13 × 100 = 1,300
130 × 10 = 1,300
1,300 × 1 = 1,300

Lesson 9: Dividing whole numbers by 10, 100 and 1,000

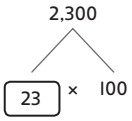
➜ pages 132–134

1. a)



450 is 45 tens.
450 ÷ 10 = 45

b)



2,300 is 23 hundreds.
2,300 ÷ 100 = 23

c) 7,000 is 7 thousands.
7,000 ÷ 1,000 = 7

d) Answers may vary but most likely answer is:
500 is 5 hundreds.
500 ÷ 100 = 5

2. 1,100 ÷ 11 = 100
1,100 ÷ 100 = 11

3. a) 8,000 ÷ 1,000 = 8
8 1,000 kg weights would balance the scales.

b) 8,000 ÷ 100 = 80
80 100 kg weights would balance the scales.

c) 8,000 ÷ 10 = 800
800 10 kg weights would balance the scales.

4. a) 500 ÷ 10 = 50
500 ÷ 100 = 5
50 ÷ 10 = 5

b) 1,500 ÷ 100 = 15
150 ÷ 10 = 15
15,000 ÷ 1,000 = 15

c) 5,000 ÷ 50 = 100
5,000 ÷ 500 = 10
500 ÷ 50 = 10

5. a) There are 20 marbles in each jar.

b) In total, there are 100 jars.

6. a)

★	▲
5	500
70	7,000
7	700
500	50,000

▲ is 100 times greater than ★.

b) Calculations will vary but ♥ should be 1,000 × ☁; for example:
4,000 ÷ 10 = 10 × 10 × 4; 13,000 ÷ 10 = 10 × 10 × 13

Reflect

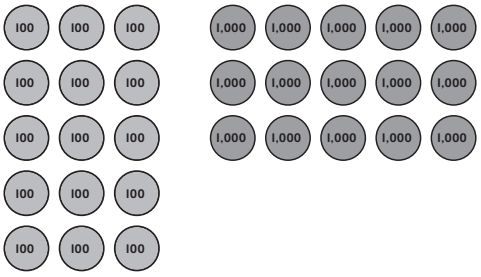
3,300 ÷ 100 = 33 is correct. When you divide by 100, all the digits move 2 places to the right. You can use a place value grid to check.

Lesson 10: Multiplying and dividing by multiples of 10, 100 and 1,000

➜ pages 135–137

1. Diagrams matched:
Top diagram ➜ 4 × 3 tens ➜ 12 tens = 120
2nd diagram ➜ 3 × 2 hundreds ➜ 6 hundreds = 600
3rd diagram ➜ 2 × 3 thousands ➜ 6 thousands = 6,000
4th diagram ➜ 3 × 4 hundreds ➜ 12 hundreds = 1,200

2. Children should draw 5 lots of 3 hundred counters and 3 lots of 5 thousand counters.



a) 5 × 300 = 15 hundreds = 1,500

b) 3 × 5,000 = 15 thousands = 15,000

3. a) 300 × 6 = 1,800
6 × 300 = 1,800
1,800 ÷ 300 = 6
1,800 ÷ 6 = 300

b) 30 × 60 = 1,800
60 × 30 = 1,800
1,800 ÷ 30 = 60
1,800 ÷ 60 = 30

4. a) 3 × 700 = 2,100
b) 5,000 × 9 = 45,000
c) 5 × 80 = 400
d) 1,200 ÷ 300 = 4
e) 150 ÷ 5 = 30
f) 72,000 ÷ 9,000 = 8

5. I agree with Reena.
Explanations will vary; for example:
because 4 × 5 = 20 so 40 × 5 = 200 and 40 × 50 = 2,000.

6. a) 600 × 6 = 400 × 9
There are nine 400 g boxes.
b) 80 × 70 = 800 × 7
2,100 ÷ 30 = 21,000 ÷ 300
40,000 ÷ 500 = 400 ÷ 5

Reflect

Answers may vary but should include multiplying and/or dividing by powers of ten or multiples of powers of ten; for example: 4 × 10 = 40; 80 ÷ 2 = 40; 800 ÷ 20 = 40

End of unit check

➜ pages 138–139

My journal

Children may write answers such as:

I know 250 isn't a square number because 15 squared is 225 and 16 squared is 256; 2,500 is a square number because 50 × 50 is 2,500; I know 2,500 is going to be square because 5 × 5 is 25. If I multiply both 5s by 10 then the answer must be multiplied by 100.
25 × 100 = 2,500.

Power puzzle

Prime factors of 90 = 2 × 3 × 3 × 5

Prime factors of 210 = 2 × 3 × 5 × 7

Unit 6: Measure – area and perimeter

Lesson 1: Measuring Perimeter

➜ pages 140–142

1. a) 8 cm + 6 cm + 4 cm + 4 cm + 4 cm + 2 cm = 28 cm
The perimeter of the shape is 28 cm.
b) 6 cm + 5 cm + 3 cm + 2 cm + 8 cm + 5 cm + 1 cm + 2 cm = 32 cm
The perimeter of the shape is 32 cm.

2. a) Perimeter = 16 cm
b) Perimeter = 26 cm
c) Perimeter = 12 cm
d) Perimeter = 24 cm
e) Shape B

3. Words circled: incorrect shorter

4. A rectangle has 4 sides. Amelia has 5 measurements, so it looks like she has measured the same side twice.
52 cm

5. False: because you need to double its length too
True: because the perimeter of a square is 4 × the length of one side
False: because two of the sides now lie inside the new shape so won't count as part of the perimeter

Reflect

Explanations may vary. Children should discuss the need to measure sides accurately and write the length of each side then add all the lengths together. Some children may explain how you can work out the length of one vertical/horizontal side if you have measured the other vertical/horizontal sides.

Lesson 2: Calculating perimeter (I)

➜ pages 143–145

1. a) = (220 × 2) + (90 × 2)
= 440 + 180
= 620
The perimeter of this playing field is 620 m.
b) = (125 × 2) + (110 × 2)
= 250 + 220
= 470
The perimeter of this playing field is 470 m.

2. A = 70 cm B = 70 cm C = 80 cm

3.

Shape	Number of tiles used	Perimeter (cm)
A	1	40
B	2	60
C	3	80
D	3	80

4. 2 × 8 cm = 16 cm; 50 cm – 16 cm = 34 cm;
34 cm ÷ 2 = 17 cm
Alternative method: 50 cm ÷ 2 = 25 cm;
25 cm – 8 cm = 17 cm
The length of the rectangle is 17 cm.

5. 128 ÷ 4 = 32
One side is 32 cm long.

6. Answers will vary. Children should give 4 pairs of dimensions where length + width = 90 cm each time; for example:
1 cm by 89 cm; 40 cm by 50 cm; 30 cm by 60 cm;
a square with side 45 cm

Reflect

Children should have ticked the methods explained by Bella and Max.

Lesson 3: Calculating perimeter (2)

➜ pages 146–148

1. Route A 100 m + 80 m + 100 m + 40 m + 200 m + 120 m = 640 m
Length of Route A = 640 m

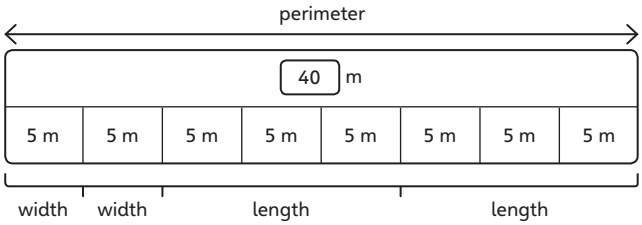
Route B A + C = 180 m B + D = 240 m
(180 m × 2) + (240 m × 2)
= 360 m + 480 m
= 840 m
Length of Route B = 840 m

Route C (230 m × 2) + (300 m × 2) = 1,060 m
Length of Route C = 1,060 m

2. 6 cm + 23 cm = 29 cm; 13 cm + 6 cm = 19 cm
(29 cm × 2) + (19 cm × 2) = 96 cm
Perimeter = 96 cm

3. 102 – (21 × 2) = 102 – 42 = 60
60 ÷ 2 = 30 width = 30 cm
30 – 20 = 10 B = 10 cm
Side B = 10 cm

4.



width = 10 m ÷ 2 = 5 m
length = 5 m × 3 = 15 m

5. Children should sketch 6 squares joined in different arrangements and find perimeters. Answers will vary; for example:
All 6 tiles in one row have a perimeter of 140 cm; tiles arranged in two rows of 3 have a perimeter of 100 cm.

Reflect

Answer will vary; for example:
Add the two horizontal measurements to find the overall horizontal width of the shape:
9 cm + 31 cm = 40 cm.
Add the two vertical measurements to find the overall vertical height of the shape:
10 cm + 23 cm = 33 cm.
Doubling these gives:
40 cm × 2 = 80 cm 33 cm × 2 = 66 cm
Adding together to find the total perimeter:
80 cm + 66 cm = 146 cm

Lesson 4: Calculating Area (I)

➜ pages 149–151

1. a) 18
10
18 squares × 10 m^2 = 180 m^2
b) 12 squares × 10 m^2 = 120 m^2
c) 35 squares × 10 m^2 = 350 m^2

2. A = 16 squares × 3 m^2 = 48 m^2
B = 12 squares × 5 m^2 = 60 m^2
C = 21 squares × 2 m^2 = 42m^2
C A B

3. a) Children should draw a 1 × 8, 4 × 2, 2 × 4 or 8 × 1 rectangle.
b)

If I square is equal to …	the actual area is …
1 cm^2	8 cm^2
1 m^2	8 m^2
4 cm^2	32 cm^2
9 m^2	72 m^2
25 cm^2	200 cm^2

4. 90 ÷ 10 = 9 cm^2, so the area of each square is 9 cm^2.

5. 600 cm^2

6. Left-hand grid: Children should draw a rectangle with an area of 40 squares; for example:
4 × 10 or 5 × 8
Right-hand grid: Children should draw a rectangle with an area of 20 squares; for example:
2 × 10 or 5 × 4

Reflect

The actual area of the room in real life is 96 m^2.
I know this because the drawing contains 24 squares (8 × 3) and each square is worth 4 m^2.
24 squares × 4 m^2 = 96 m^2

Lesson 5: Calculating Area (2)

➜ pages 152–154

1. a) 6 rows
5 squares in each row
6 × 5 = 30
Area = 30 cm^2
b) 7 × 6
Area = 42 cm^2
c) 9 × 8
Area = 72 cm^2

2. a) Possible arrays: 1 × 16, 2 × 8, 4 × 4
b) Children should draw two rectangles from: 1 × 16, 2 × 8, 4 × 4

3.

Shape	Length	Width	Area (cm^2)
A	9	7	63
B	7	7	49
C	11	3	33
D	7	4	28

4. Factor pairs for 40: 1 × 40 2 × 20 4 × 10 5 × 8
Rectangles: 1 cm × 40 cm 2 cm × 20 cm
4 cm × 10 cm 5 cm × 8 cm

5. 100 cm^2
Area of card = 25 cm × 20 cm = 500 cm^2
Area of square = 20 cm × 20 cm = 400 cm^2
500 cm^2 – 400 cm^2 = 100 cm^2

Reflect

Length of each side = 8 m
So, area = 8 m × 8 m = 64 m^2

Lesson 6: Comparing area

➜ pages 155–157

1. a) Window A
2 rows of 6
= 2 × 6
= 12 m^2

Window B
5 rows of 3
= 5 × 3
= 15 m^2

Window C
9 × 8 = 72 m^2

Window D
8 × 8 = 64 m^2

b) C D B A

2. a) A = 42 cm^2 B = 49 cm^2 C = 55 cm^2 D = 42 cm^2

b) Area of A < Area of C Area of D < Area of B
Area of A = Area of D Area of B < Area of C

3. a) Assuming Max uses one straw for each side, possible rectangles are:

Shape	Length	Width	Area (cm^2)
A	9 cm	9 cm	81 cm^2
B	10 cm	10 cm	100 cm^2
C	12 cm	12 cm	144 cm^2
D	10 cm	9 cm	90 cm^2
E	12 cm	9 cm	108 cm^2
F	12 cm	10 cm	120 cm^2

b) A

c) 12 12

4. Aki is incorrect; for example, a 2 cm × 4 cm rectangle has an area of 8 cm^2 whereas a 1 cm × 12 cm rectangle has an area of 12 cm^2. The rectangle with the shorter width has the greater area.

5. If area of square is 100 cm^2 then length of side = 10 cm, so width of original strip = 10 cm.
82 cm – 20 cm = 62 cm 62 cm ÷ 2 = 31 cm
Length of original strip = 31 cm
Length of paper left over = 31 cm – 10 cm = 21 cm
Area of rectangle leftover is 21 cm × 10 cm = 210 cm^2

Reflect

Answers will vary; children should explain why the square with the longer side length will have the greater area.

Lesson 7: Estimating areas

➜ pages 158–160

1. Answers may vary slightly.

Footprint	Whole squares	Almost-whole squares	Half squares	Less-than-half squares	Estimated area
A	12	4	6 (= 3 whole squares)	4	19
B	18	4	8 (= 4 whole squares)	4	26
C	27	11	4 (= 2 whole squares)	10	40
D	24	9	2 (= 1 whole square)	15	34

2. Answers vary; squares should be divided in half in a variety of ways, not always with straight lines.

3. The area of the paint spillage is about 30 cm^2.

4. Children should draw shapes with areas of about 15 squares.

5. Children should draw round their own hand and record their findings in the form of whole, almost whole, half and less than half, then estimate their hand area.

Reflect

Explanations may vary; for example:
I would count whole squares then look at part-squares. I will count part-squares that are larger than half towards the area. I will count half-squares as one half. I will ignore part-squares smaller than half.

End of unit check

➜ pages 161–162

My journal

1. a) I know that the perimeter of the shape is 58 cm because the perimeter is the total of double the length (which is 40 cm) plus double the width (which is 18 cm).

b) I know that the area of this shape is 63 m2 because the area of a rectangle is found by multiplying the length by the width. 9 × 7 = 63

Power puzzle

1. The possible rectangles are: 24 cm × 1 cm (perimeter: 50 cm), 12 cm × 2 cm (perimeter: 28 cm), 8 cm × 3 cm (perimeter: 22 cm) and 6 cm × 4 cm (perimeter: 20 cm).

The rectangle that maximises perimeter, therefore, is the one with the longest length (24 cm × 1 cm).

2. The possible rectangles are: 11 cm × 1 cm (area: 11 cm^2), 10 cm × 2 cm (area: 20 cm^2), 9 cm × 3 cm (area: 27 cm2), 8 cm × 4 cm (area: 32 cm^2), 7 cm × 5 cm (area: 35 cm^2) and 6 cm × 6 cm (area: 36 cm^2).

The rectangle that maximises area, therefore, is the one that is square (6 cm × 6 cm).