Unit 7 – Multiplication and division (2)

I Multiply a number up to 4-digits by a I-digit number

→ pages 8–11

Discover

1. a) There are 8 rows of trees, with 17 trees in each row.
   $8 \times 10 = 80$ $8 \times 7 = 56$
   $80 + 56 = 136$
   There are 136 trees in total.

   b)

H	T	O
	I	7
×		8
I	3	6
	5	

Think together

1. a) $26 \times 4 = $ **104**
      $20 \times 4 = $ **80**
      $6 \times 4 = $ **24**
      80 + **24** = **104**
   b) $135 \times 5 = $ **675**
      $100 \times 5 = $ **500**
      $30 \times 5 = $ **150**
      $5 \times 5 = $ **25**

2. a) $42 \times 7 = $ **294**
   b) $142 \times 7 = $ **994**
   c) $3,142 \times 7 = $ **21,994**

3. a) $3,285 \times 3 = $ **9,855**
   b) $329 \times 6 + 658 \times 5 = 1,974 + 3,290 = $ **5,264**

2 Multiply 2-digit numbers (area model)

→ pages 12–15

Discover

1. a) The length of the new supermarket will be 28 m.
      The width will be 15 m.
   b) The total area of the new supermarket will be 420 m^2.

Think together

1. a) Crafts: $30 \times 20 = $ **600** m^2
      Bikes $7 \times$ **20** = **140** m^2
      Toys: **30** $\times$ **3** = **90** m^2
      Board games: **7** $\times$ **3** = **21** m^2
   b) The total area of the toy shop is **851** m^2.

2.

$52 \times 18 = $ **936**

3. a)

	40	5
30	$30 \times 40 = 1,200$	$30 \times 5 = 150$
7	$7 \times 40 = 280$	$7 \times 5 = 35$
	$45 \times 37 = 1,665$	

	20	9
80	$80 \times 20 = 1,600$	$80 \times 9 = 720$
1	$1 \times 20 = 20$	$1 \times 9 = 9$
	$29 \times 81 = 2,349$	

	30	8
30	$30 \times 30 = 900$	$30 \times 8 = 240$
8	$8 \times 30 = 240$	$8 \times 8 = 64$
	$38^2 = 1,444$	

   b) 34×18 is not 594 because $4 \times 8 = 32$ so the last digit of 34×18 should be 2 not 4.

3 Multiply 2-digit numbers

→ pages 16–19

Discover

1. a) The calculations in the grid are all correct but Richard has lined up the numbers incorrectly in his addition.
   b) Lexi partitioned her number and worked out each multiplication separately.
      Zac did the same but used column multiplication which is called long multiplication.
      Lexi made a mistake adding her two totals together. Zac did not make any mistakes.

Think together

1. Children complete the column multiplications to show:
   a) $46 \times 3 = $ **138**
      $46 \times 10 = $ **460**
      $46 \times 13 = $ **598**
   b) $34 \times 4 = $ **136**
      $34 \times 20 = $ **680**
      $34 \times 24 = $ **816**
   c) $37 \times 1 = $ **37**
      $37 \times 20 = $ **740**
      $37 \times 21 = $ **777**

2. $29 \times 15 = $ **£435**

3. a) Josh has written the whole answer to each multiplication in the top line (4 × 3 and 4 × 6) in the answer lines instead of writing the exchanges under the line to be added on in each column.

	Th	H	T	O
			6	3
×			2	4
		2	5	2
	I	2²	6¹	0
	I	5	I	2

b) **43 × 19** = 817

4 Multiply a 3-digit number by a 2-digit number

→ pages 20–23

Discover

1. a) There are **1,716** boxes of cereal in 143 packs.
b)

	Th	H	T	O	
		I	4	3	
×			I	2	
		2	8	6	143 × 2
	I	4	3	0	143 × 10
	I	7	I	6	143 × 12
			I		

Think together

1. Children complete both grids to show that:
217 × 16 = **3,472**
217 × 6 = 1,302
217 × 10 = 2,170

2. a) 263 × 32 = **8,416**
263 × 2 = 526
263 × 30 = 7,890
263 × 32 = 8,416
b) 520 × 26 = **13,520**
520 × 6 = 3,120
520 × 20 = 10,400
520 × 26 = 13,520

3. a) 15 × 398 = **5,955**
b) Many rearrangements give a greater answer, for example, 19 × 357 = 7,543 and 31 × 579 = 17,949.
15 × 379 = 5,685 gives a smaller answer.

5 Multiply a 4-digit number by a 2-digit number

→ pages 24–27

Discover

1. a) **£40,768** has been made from adult tickets.
b) **£7,315** has been made from child tickets.

Think together

1. a) 1,226 × 21 = **25,746**   b) 3,405 × 35 = **119,175**
1,226 × 1 = 1,226   3,405 × 5 = 17,025
1,226 × 20 = 24,520   3,405 × 30 = 102,150
1,226 × 21 = 25,746   3,405 × 35 = 119,175

2. The plane travels **144,500** km in 25 days.
Children may work out the daily km first and then the total:
1,445 × 4 = 5,780
5,780 × 25 = 144,500
Some children may realise that 2 × 2 × 25 = 100:
1,445 × 100 = 144,500

3. a)

	Th	H	T	O
			7	5
×			I	6
		4	5	0
	7	5	0	
	I	2	0	0

b)

	TTh	Th	H	T	O
			2	4	0
×				3	6
	I	4	4	5	4
	7	2	2	7	0
	8	6	7	2	4

6 Divide a number up to 4 digits by a 1-digit number (1)

→ pages 28–31

Discover

1. a) Each class gets **32** tickets.
b) They will need **12** cars in total.

Think together

1. Each class receives **32** pens.

2. a) 428 ÷ 2 = **214**
b) 9,636 ÷ 3 = **3,212**

3. a) The owner is not correct. In the answer line he should have written a 0 above the 0 instead of a 3 and the 3 above the 9.
609 ÷ 3 = **203**
b) 9,600 ÷ 3 = **3,200**
4,800 ÷ 2 = **2,400**
5,055 ÷ 5 = **1,011**

7 Divide a number up to 4 digits by a 1-digit number (2)

Discover

1. a)

		4	9	2

b) 92 ÷ 4 = 23

Think together

1. 575 ÷ 5 = **115**

2. a) 726 ÷ 6 = **121**
b) 522 ÷ 3 = **174**

3. a) The first digit of the number being divided (the dividend) is not divisible by the number it is being divided by (the divisor).
b) Max should have carried over the 4 hundreds to the tens column. He has only carried over 1.
475 ÷ 5 = 95
c) 305 ÷ 5 = **61**
615 ÷ 5 = **123**
7,080 ÷ 5 = **1,416**

8 Divide with remainders

Discover

1. a) Children should count back in 6s from 80 to 2.
b) 80 ÷ 6 = **13 r 2**

Think together

1. Lexi will not be able to do this because 80 divided by 3 does not give a whole number.
80 ÷ 3 = 26 r 2

2. a) 97 ÷ 7 = **13 r 6**
b) 173 ÷ 4 = **43 r 1**

3. a) 95 ÷ 5 = 19
191 ÷ 2 = 95 **remainder** 1
535 ÷ 4 = 133 **remainder** 3
b) Children can work out the remainders to the divisions if they know the last digit. When dividing a number by 5, it will have a remainder if the last digit is not a multiple of 5. When dividing a number by 2, it will have a remainder if the last digit is not a multiple of 2 or an even number (all even numbers are divisible by 2). The first three divisions all have a remainder of 1. Children cannot know if the last division has a remainder because they do not know the last digit.

9 Efficient division

Discover

1. a) 6 is an even number so cannot be a factor of an odd number. 253 cannot divide exactly by 6, so there will be a remainder and not a whole number of pizzas.
b) The chefs can make 42 whole pizzas.
There is 1 slice left over. 1 slice is $\frac{1}{6}$ of a pizza.

Think together

1. a) 1,350 divides exactly by 5 because the 1s digit is a multiple of 5.
b) 1,350 ÷ 5 = 270

2. Children may be able to predict:
remainder 0:   575 ÷ 5; 140 ÷ 7; 138 ÷ 2; 140 ÷ 2
remainder 1:   137 ÷ 2; 576 ÷ 5; 139 ÷ 2; 1,401 ÷ 7
remainder 2:   577 ÷ 5; 142 ÷ 7
remainder 3:   45 ÷ 7
remainder 4:   579 ÷ 5
575 ÷ 5 = 115   137 ÷ 2 = 68 r 1   140 ÷ 7 = 20
576 ÷ 5 = 115 r 1   138 ÷ 2 = 69   142 ÷ 7 = 20 r 2
577 ÷ 5 = 115 r 2   139 ÷ 2 = 69 r 1   45 ÷ 7 = 6 r 3
579 ÷ 5 = 115 r 4   140 ÷ 2 = 70   1,401 ÷ 7 = 200 r 1

3. a) Children should notice that when they add the digits of a multiple of 3 together the answer is another multiple of 3.
b) Divide exactly by 3: 729, 111, 2,538.
Do not divide exactly by 3: 715, 1,651.
The remainder will always be 1 or 2. If the digits add to 1 more or 2 less than a multiple of 3, the remainder is 1. If the digits add to 2 more or 1 less than a multiple of 3, the remainder is 2.

10 Solve problems with multiplication and division

Discover

1. a) Zac could have made **516** or **156**.
There are 6 possible numbers that can be found.
b) Reena made the number **615**.

Think together

1. Lexi could have made **791** or **971**.

2. a) **683** ÷ **5** = **136** r **3**
b) **189** ÷ 4 = 47 r 1

3. To have a remainder of 4, Richard could only have divided by 5, 7 or 9.
There are several possibilities for each:
÷ 5: numbers with a ones digit of 9 or 4 – for example, 234 or 459.
÷ 7: 382
÷ 9: numbers with a digit sum of 13 – for example, 751 or 427.

End of unit check

1. C

2. A

3. B

4. C

5. C

6. B

7. 58 bags with **1** apple left over.
$72 \times 4 + 3 = 291$
$291 \div 5 = 58$ r 1
Ebo will fill 58 bags with 1 apple left over.

Unit 8 – Fractions (3)

1 Multiply unit fractions by an integer

→ **pages 52–56**

Discover

1. a) $\frac{3}{5}$ of the jug of milk is needed to make 3 milkshakes.

b) $1\frac{2}{5}$ of a jug of milk is needed to make 7 milkshakes.

Think together

1. $4 \times \frac{1}{7} = \frac{4}{7}$

2. $11 \times \frac{1}{8} = \frac{11}{8} = 1\frac{3}{8}$

3. a) All show $\frac{4}{5}$ except for $\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$ which shows $\frac{5}{5}$ or 1.

b) Children could show $\frac{5}{8}$ as $5 \times \frac{1}{8}, \frac{1}{8} \times 5, \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$ and a diagrams showing 5 out of 8 equal sections shaded.

2 Multiply non-unit fractions by an integer

→ **pages 56–59**

Discover

1. a) $\frac{2}{3} \left(\frac{6}{9}\right)$ of the box is needed each day for the 3 dogs.

b) The dogs need $3\frac{1}{3}$ boxes for 5 days. Lexi and her mum will need to buy **4** boxes to feed the dogs for 5 days.

Think together

1. a) $\frac{3}{7} \times 2 = \frac{6}{7}$

b) $\frac{2}{5} \times 3 = \frac{6}{5} = 1\frac{1}{5}$

2. Kate runs $1\frac{1}{2} \left(1\frac{5}{10}\right)$ km.

3. Set A

$\frac{1}{5} \times 2 = \frac{2}{5}$

$\frac{2}{5} \times 2 = \frac{4}{5}$

$\frac{3}{5} \times 2 = \frac{6}{5} = 1\frac{1}{5}$

$\frac{4}{5} \times 2 = \frac{8}{5} = 1\frac{3}{5}$

Set B

$1 \times \frac{3}{8} = \frac{3}{8}$

$2 \times \frac{3}{8} = \frac{6}{8} = \frac{3}{4}$

$3 \times \frac{3}{8} = \frac{9}{8} = 1\frac{1}{8}$

$5 \times \frac{3}{8} = \frac{15}{8} = 1\frac{7}{8}$

Set C

$\frac{3}{4} \times 4 = \frac{12}{4} = 3$

$\frac{2}{5} \times 5 = \frac{10}{5} = 2$

$\frac{5}{6} \times 6 = \frac{30}{6} = 5$

$7 \times \frac{3}{7} = \frac{21}{7} = 3$

The answers to Set C are whole numbers because the denominator and the multiplier are the same number.

3 Multiply mixed numbers by integers (1)

→ **pages 60–63**

Discover

1. a) The glacier travels $5\frac{1}{4}$ yards in 3 days.

b) It will take **9** days for the glacier to move more than 15 yards.

Think together

1. $2\frac{1}{3} = \frac{7}{3}$

$\frac{7}{3} \times 4 = \frac{28}{3} = 9\frac{1}{3}$

2. a) Kate has converted $1\frac{3}{5}$ into an improper fraction which is easier to multiply. After multiplying, she converts the improper fraction back into a mixed number.

b) $3\frac{1}{2} \times 5 = \frac{7}{2} \times 5 = \frac{35}{2} = 17\frac{1}{2}$

$9 \times 1\frac{1}{10} = 9 \times \frac{11}{10} = \frac{99}{10} = 9\frac{9}{10}$

3.
$1\frac{1}{3} \times 3 = \mathbf{4}$ $\qquad 2\frac{1}{3} \times 3 = \mathbf{7}$

$1\frac{1}{3} \times 6 = \mathbf{8}$ $\qquad 2\frac{1}{3} \times 6 = \mathbf{14}$

$1\frac{1}{3} \times 9 = \mathbf{12}$ $\qquad 2\frac{1}{3} \times 9 = \mathbf{21}$

$1\frac{1}{3} \times 12 = \mathbf{16}$ $\qquad 2\frac{1}{3} \times 12 = \mathbf{28}$

$3\frac{2}{3} \times 3 = \mathbf{11}$ $\qquad 3\frac{1}{4} \times 3 = \mathbf{9\frac{3}{4}}$

$3\frac{2}{3} \times 6 = \mathbf{22}$ $\qquad 3\frac{1}{4} \times 6 = \mathbf{19\frac{1}{2}}$

$3\frac{2}{3} \times 9 = \mathbf{33}$ $\qquad 3\frac{1}{4} \times 9 = \mathbf{29\frac{1}{4}}$

$3\frac{2}{3} \times 12 = \mathbf{44}$ $\qquad 3\frac{1}{4} \times 12 = \mathbf{39}$

The first three groups follow a pattern derived from the numerator of the improper fraction made by converting the mixed number.

$1\frac{1}{3} = \frac{4}{3}$, so the answer increases by 4 each time;

$2\frac{1}{3} = \frac{7}{3}$, so the answer increases by 7 each time,

$3\frac{2}{3} = \frac{11}{3}$, so the answer increases by 11 each time.

4 Multiply mixed numbers by integers (2)

→ **pages 64–67**

Discover

1. a) The children use $5\frac{5}{6}$ jugs of stock in total.

b) The children use $7\frac{1}{2}$ onions in total.

Think together

1. $3\frac{1}{4} \times 5 = (3 \times 5) + \left(\frac{1}{4} \times 5\right)$

$= 15 + \frac{5}{4} = 15 + 1\frac{1}{4} = \mathbf{16\frac{1}{4}}$ **potatoes**

2. a) $1\frac{2}{5} \times 4 = 4 + \frac{8}{5} = 4 + 1\frac{3}{5} = \mathbf{5\frac{3}{5}}$

b) $2\frac{2}{5} \times 4 = 1\frac{2}{5} \times 4 + 1 \times 4$

$= 5\frac{3}{5} + 4 = \mathbf{9\frac{3}{5}}$

$1\frac{2}{5} \times 5 = 1\frac{2}{5} \times 4 + 1\frac{2}{5}$

$= 5\frac{3}{5} + 1\frac{2}{5} = \mathbf{7}$

3. Method 1: $20 - 7\frac{1}{2} = \mathbf{12\frac{1}{2}}$ onions left

Method 2: $4 - 1\frac{1}{2} = 2\frac{1}{2}$

$\qquad 2\frac{1}{2} \times 5 = \mathbf{12\frac{1}{2}}$ onions left

5 Fraction of an amount

→ **pages 68–71**

Discover

1. a) There are **192** children in the theme park.

b) A child ticket costs £6.

Think together

1. 65 people are 16 years or over.

2. Luis spends **147** minutes queuing.

3. 336 people gave the theme park 2 stars or less.

6 Finding the whole

→ **pages 72–75**

Discover

1. a) There are **600** g of jam in the jar when it is full.

b) There are **90** g of cheese left.

Think together

1. 5 × 100 = **500** ml

A full bottle has **500** ml of juice.

2. $35 \div \mathbf{5} = \mathbf{7}$

$\mathbf{7} \times 7 = \mathbf{49}$

A full packet of sweets has **49** sweets.

3. Lexi's box had 49 chocolates.

Andy's box had 40 chocolates.

Lexi had more chocolates in her box to start with.

7 Using fractions as operators

→ **pages 76–79**

Discover

1. a) Amal has painted $\frac{1}{3}$ of 6.

Toshi has painted $\frac{1}{3} \times 6$.

b) They have both painted the same amount of the fence.

Amal divided 6 into 3 groups, Toshi multiplied $\frac{1}{3}$ by 6. Both calculations equal 2.

Think together

1. a) $15 \div 5 = \mathbf{3}$ $\qquad\qquad$ $\frac{1}{5}$ of 15 = **3**

$\qquad\qquad\qquad\qquad\qquad$ $\frac{2}{5}$ of 15 = **6**

b) $15 \times \frac{2}{5} = \frac{30}{5} = \mathbf{6}$

c) Children should notice that $\frac{2}{5}$ of 15 is the same as $15 \times \frac{2}{5}$.

2. $\frac{1}{10} \times 120 = \frac{1}{10}$ of 120

$\frac{3}{4} \times 24 = \frac{3}{4}$ of 24

$84 \times \frac{2}{3} = \frac{2}{3}$ of 84

3. a) $24 \div 4 \times 3 = \mathbf{18}$

b) $\frac{1}{3} \times 7 = \frac{7}{3} = \mathbf{2\frac{1}{3}}$

End of unit check

→ **pages 80–81**

1. A

2. C

3. D

4. B

5. D

6. C

7. Lee has 12 nuts left.

8. 15

Unit 9 – Decimals and percentages

1 Write decimals up to 2 decimal places – less than 1

→ **pages 84–87**

Discover

1. a) The arrow is pointing to **0·3**.
   b) Mo has made the number **0·35**.

Think together

1. a) 0·2, 0·45, 0·7
   b) 0·43, 0·49

2. a) 0·64
   b) 0·29
   c) 0·15

3. a) Malik has made the number **0·45**.
   b) The value of the 4 digit is **4 tenths** and the value of the 5 digit is **5 hundredths**.
   c) Now Malik has the number **0·75**.
   d)
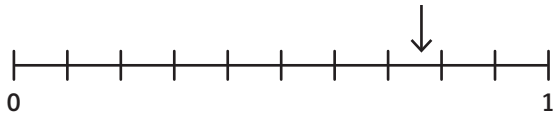
2 Write decimals up to 2 decimal places – greater than 1

→ **pages 88–91**

Discover

1. a) Isla's score is **1·4**.
   b)

   The value of the 1 digit is **one**.
   The value of the 4 digit is **4 tenths**.
   The value of the 5 digit is **5 hundredths**.

Think together

1. Lexi: 2·5
   Andy: 1·65
   Lee: 2·05

2. a) 0·7
   b) 3·05

3. a) Ebo: 1·9 is not followed by 1·10. 1·10 is the same as 1·1. So, 1·9 is followed by 2·0 which is followed by 2·1.
   b) Kate is counting down in tenths but when she gets to 2·1 she starts counting down in hundredths. 2·1 should be followed by 2·0, 1·9 and 1·8 when counting down in tenths.
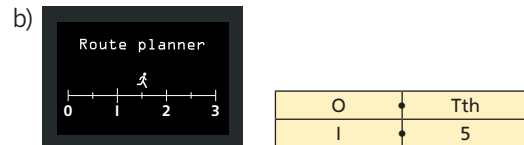
3 Equivalent fractions and decimals – tenths

→ **pages 92–95**

Discover

1. a)
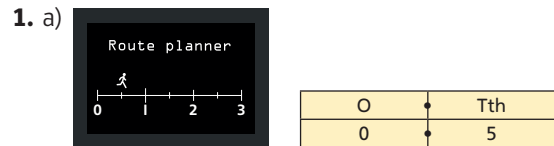
Sofia has run **0·5 km**, which can be written as $\frac{1}{2}$ km.
   b)

1·5 is equivalent to $1\frac{1}{2}$ and $1\frac{5}{10}$.
Sofia has run **1·5 km**.

Think together

1. a) Children should place **7** counters in the tenths column to represent 0·7.
   b) $\frac{7}{10}$

2.

Runner	Distance as a decimal	Distance as a fraction
Aki	0·6 km	$\frac{6}{10}$ km
Richard	**0·3** km	$\frac{3}{10}$ km
Jamilla	**0·9** km	$\frac{9}{10}$ km
Ambika	**2·3** km	$2\frac{3}{10}$ km

3. Group 1: $\frac{35}{10}$, 3·5, $3\frac{1}{2}$
   Group 2: $\frac{23}{10}$, 2·3, $2\frac{3}{10}$

4 Equivalent fractions and decimals – hundredths

→ **pages 96–99**

Discover

1. a) The games app requires $\frac{8}{100}$ GB.
   b) The music app requires $\frac{1}{10}$ or $\frac{10}{100}$ GB.

Think together

1. a) 0·15 = $\frac{15}{100}$ or $\frac{3}{20}$ GB
   b) $\frac{17}{100}$ = **0·17** GB

2. a) 0·23 = $\frac{23}{100}$
   b) 1·19 = $1\frac{19}{100}$
   c) 0·9 = $\frac{90}{100}$ or $\frac{9}{10}$

3. a) $1 \cdot 27 = \frac{127}{100} = 1\frac{27}{100}$

b) $2 \cdot 32 = \mathbf{\frac{232}{100}} = \mathbf{2\frac{32}{100}}$

c) $2 \cdot 20 = \mathbf{\frac{220}{100}} = \mathbf{2\frac{20}{100}}$ or $\mathbf{2\frac{1}{5}}$

d) $1 \cdot 05 = \mathbf{\frac{105}{100}} = \mathbf{1\frac{5}{100}} = \mathbf{1\frac{1}{20}}$

e) $3 \cdot 5 = \mathbf{\frac{350}{100}} = \mathbf{3\frac{50}{100}}$ or $\mathbf{3\frac{5}{10}}$ or $\mathbf{3\frac{1}{2}}$

5 Equivalent fractions and decimals

→ **pages 100–103**

Discover

1. a) Jamie has covered $\frac{2}{10}$ or $\frac{1}{5}$ of her grid.
Luis has covered $\frac{1}{4}$ of his grid.

b) $\frac{1}{5} = 0 \cdot 2$

$\frac{1}{4} = 0 \cdot 25$

Think together

1. a) $\frac{40}{100}$ or $\frac{4}{10}$ or $\frac{2}{5}$ and $0 \cdot 4$

b) $\frac{60}{10}$ or $\frac{6}{10}$ or $\frac{3}{5}$ and $0 \cdot 6$

2.

Fraction	Decimal
$\frac{4}{5}$	$0 \cdot 8$
$\frac{1}{2}$	$0 \cdot 5$
$\frac{3}{4}$	$0 \cdot 75$
$1\frac{2}{5}$	$1 \cdot 4$
$2\frac{1}{4}$	$2 \cdot 25$

3.
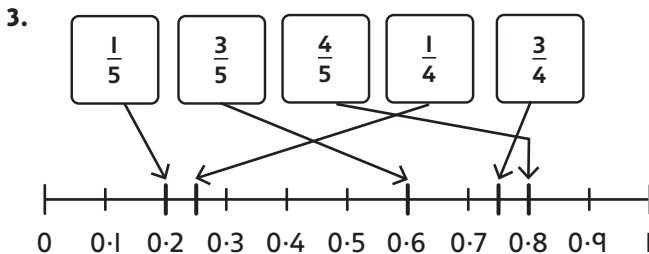
6 Thousandths as fractions

→ **pages 104–107**

Discover

1. a) $\frac{1}{10}$ or **0·1** of grid A has been shaded.

$\frac{1}{100}$ or **0·01** of grid B has been shaded.

b) $\frac{1}{1000}$ of grid C has been shaded.

Think together

1. a) $\frac{12}{1,000}$

b) $\frac{125}{1,000}$

c) $\frac{999}{1,000}$

2. a) $\frac{9}{1,000}$ c) $\frac{12}{1,000}$

b) $\frac{20}{1,000} = \frac{2}{100}$

3. a) $\frac{1}{2} = \frac{500}{1,000}$ b) $\frac{1}{4} = \frac{250}{1,000}$

7 Thousandths as decimals

→ **pages 108–111**

Discover

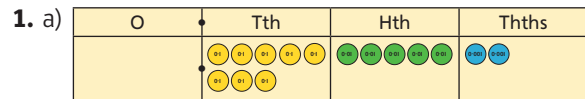**1.** a) Reena has shaded in $\frac{138}{1,000}$.

b) $\frac{138}{1,000} = \mathbf{0 \cdot 138}$

Think together

1. a) $0 \cdot 017$ c) $0 \cdot 503$
b) $0 \cdot 117$

2. $0 \cdot 013$

3. a) Amelia has made the decimal number **0·235**.

b) $0.235 = \mathbf{\frac{235}{1,000}}$

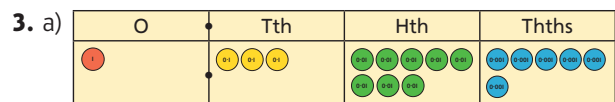# 8 Thousandths on a place value grid

→ **pages 112–115**

Discover

1. a)

b) The value of the 8 digit is **0·8** or **8 tenths**.
The value of the 5 digit is **0·05** or **5 hundredths**.
The value of the 2 digit is **0·002** or **2 thousandths**.

Think together

1. a) $0 \cdot 354$
b) $1 \cdot 623$
c) $0 \cdot 407$

2. a) The value of the 3 digit is **0·03** or **3 hundredths** or $\frac{3}{100}$.

b) The value of the 9 digit is **0·009** or **9 thousandths** or $\frac{9}{1000}$.

3. a)

b) The value of the 1 digit is one.
The value of the 3 digit is 0·3 or 3 tenths.
The value of the 8 digit is 0·08 or 8 hundredths.
The value of the 6 digit is 0·006 or 6 thousandths.

c) Alex can make 1·368, 1·638, 1·683, 1·836 and 1·863 using the same four digits. If she also used the digit 5, there are 24 possible options but all numbers will have 1 one.

9 Compare and order decimals – same number of decimal places

Discover

1. a) 5·9 cm < 6·2 cm < 6·5 cm
Emma's result was the shortest distance, so she had the quickest reaction time.

b) $6·2 = 6\frac{2}{10} = \frac{\textbf{62}}{\textbf{10}}$
That is 62 tenths.
$6·5 = 6\frac{5}{10} = \frac{\textbf{65}}{\textbf{10}}$
That is 65 tenths.
$5·9 = 5\frac{9}{10} = \frac{\textbf{59}}{\textbf{10}}$
That is 59 tenths.
59 < 62 < 65

Think together

1. a) **0·35** and **0·42** are represented on the grids.
b) **0·42** is greater that 0.35.

2. a) Smallest to greatest: **4·1** < **5·1** < **5·5**
b) **Mo** is the tallest child.

3. a) Ambika: 0·255
Kate: 0·3
b) **Kate's** decimal is greater.

10 Compare and order any decimals with up to 3 decimal places

Discover

1. a) Olivia is in first place, Isla is in second place and Luis is in third place.
b) Andy's jump could be any distance between **4·21 m** and **4·44 m**.

Think together

1. Slowest to fastest runners:
21·49 > 21·30 > 21·09 > 21·07 > 21·04
D > B > A > C > E

2. B is too heavy.
A and C are too light.
D is the correct weight.

3. a) Children should write any number between 4·001 and 4·099, such as 4·02 or 4·095.
b) Children should write any number between 4·591 and 4·599.
c) Children should write any fraction between $\frac{601}{1,000}$ and $\frac{609}{1,000}$.

11 Round to the nearest whole number

Discover

1. a) 9·2 and 9·3 round to 9 kg to the nearest whole number.
9·5 and 9·8 round to 10 kg to the nearest whole number.
b) The mass of the box is between **8·5 kg** and **9·49 kg** if it rounds to 9 kg.

Think together

1. 5·2 rounds to 5 to the nearest whole number.
5·5, 5·75 and 5·99 round to 6 to the nearest whole number.

2. Set A
2·4 rounds to 2 to the nearest whole number.
3·4 rounds to 3 to the nearest whole number.
8·4 rounds to 8 to the nearest whole number.
11·4 rounds to 11 to the nearest whole number.
38·4 rounds to 4 to the nearest whole number.
Set B
3·65 rounds to 4 to the nearest whole number.
3·61 rounds to 4 to the nearest whole number.
3·62 rounds to 4 to the nearest whole number.
3·69 rounds to 4 to the nearest whole number.
3·648 rounds to 4 to the nearest whole number.

3. a) Ebo is **not correct**. We know the number is less than 7·5, so we know it rounds to 7 to the nearest whole number.
b) There are many possible answers but all must be between 5·5 and 6·499, such as 5·723 or 6·145. The smallest number that rounds to 6 to the nearest whole number is **5·5**.

12 Round to one decimal place

Discover

1. a) **2·36** is the interval marker after 2·35.
b) 2·36 rounds to **2·4** to the nearest tenth.

Think together

1. 4·12 rounds to **4·1** to the nearest tenth.
4·15 rounds to **4·2** to the nearest tenth.
4·18 rounds to **4·2** to the nearest tenth.

2. 1·67 rounds to **1·7** to one decimal place.
1·672 rounds to **1·7** to one decimal place.
23·67 rounds to **23·7** to one decimal place.
2·367 rounds to **2·4** to one decimal place.
9·345 rounds to **9·3** to one decimal place.

3. a) 1·24 rounds to **1** to the nearest whole number.
b) 1·24 rounds to **1·2** to the nearest tenth.
c) A decimal number **between 1·15** and **1·249** rounds to 1·2 to the nearest tenth.

13 Understand percentages

→ **pages 132–135**

Discover

1. a) **29%** of Alex's grid is covered.
71% of Alex's grid is empty.
b) **22%** of the grid is covered.
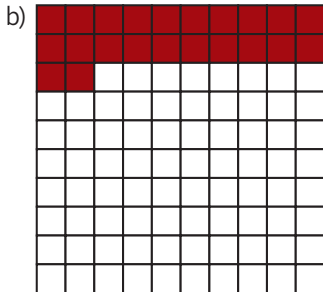**78%** of the grid is empty.

Think together

1. a) 41%
b) 59%
c) 100%

2. B is the odd one out because it shows 90%. A and C both show 99%.

3. a) **Zac is correct**. Each diagram shows $\frac{1}{100}$ = 1%.
b) **Max is not correct**. There are only 50 squares.
The fraction shaded is $\frac{1}{50} = \frac{2}{100}$ = 2%.

14 Percentages as fractions and decimals

→ **pages 136–139**

Discover

1. a) Cards **D**, **A** and **G** match.
Cards **F**, **E** and **B** match.
b)

$\frac{22}{100}$ will match card C.

Think together

1. a) $\frac{1}{100}$ = 0·01 = 1%   c) $\frac{21}{100}$ = 0·21 = 21%

b) $\frac{11}{100}$ = 0·11 = 11%

2.

Fraction	Decimal	Percentage
$\frac{9}{100}$	**0·09**	**9%**
$\frac{5}{100}$	0·05	**5%**
$\frac{12}{100}$	**0·12**	12%
$\frac{70}{100}$	**0·7**	**70%**

3. a) Whether Richard is right or wrong depends on how much pocket money each person gets.
100% of a greater amount is more than 100% of a smaller amount.
b) 100% = 1 or 1·0

15 Equivalent fractions, decimals and percentages

→ **pages 140–143**

Discover

1. a) $\frac{1}{10}$, **10%** or **0·1** of the board is covered by circle pegs.
$\frac{3}{10}$, **30%** or **0·3** of the board is covered by square pegs.
b) $\frac{3}{10}$, **30%** or **0·3** of the board is covered by triangular pegs.

Think together

1.

Decimal	0·1	0·2	**0·4**	**0·8**	0·9	1	0
Tenths	$\frac{1}{10}$	$\frac{2}{10}$	$\frac{4}{10}$	$\frac{8}{10}$	$\frac{9}{10}$	$\frac{10}{10}$	$\frac{0}{10}$
Hundredths	$\frac{10}{100}$	$\frac{20}{100}$	$\frac{40}{100}$	$\frac{80}{100}$	$\frac{90}{100}$	$\frac{100}{100}$	$\frac{0}{100}$
Percentage	10%	**20%**	40%	**80%**	**90%**	**100%**	**0%**

2. a) $\frac{1}{2}$, **0·5** or **50%** is shaded.
b) $\frac{1}{4}$, **0·25** or **25%** is shaded.
c) $\frac{3}{4}$, **0·75** or **75%** is shaded.

3. a) Reena and Andy's scores can be compared if Reena's score is converted to a percentage.
Reenas' score is $\frac{30}{60} = \frac{1}{2}$ = 50%.
50% > 30%
Reena has the greater score.
b) **10%** of Emma's marbles are blue.

End of unit check

→ **pages 144–145**

1. A
2. C
3. C
4. D
5. D

6. Smallest to greatest: 0·04, 13%, $\frac{131}{1,000}$, $\frac{2}{10}$, 0·3, $\frac{31}{100}$

Unit I0 – Measure – perimeter and area

I Perimeter of rectangles

→ **pages 148–151**

Discover

1. a) The perimeter of the football pitch is **340 m**.
b) The length of the playground is **50 m**.

Think together

1. (120×2) + (70×2)
= **240** + **140**
= **380 m**

2. a) 40×4 = **160 m**
b) $80 \div 4$ = **20 m**

3. Lee is correct. The joining sides of the two squares are inside the rectangle so are not part of the perimeter. The perimeter is $6 \times 25 = 150$ cm.

2 Perimeter of rectilinear shapes (I)

→ **pages 152–155**

Discover

1. a) The perimeter of the red stripy sticker is **28 cm**.
b) The perimeter of the blue dotty sticker is **26 cm**.

Think together

1.
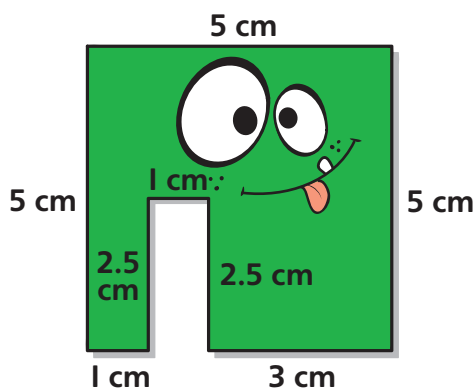
The perimeter is 25 cm.

2. (6×2) + (8×2)
= **12** + **16**
= **28**

3. Children point to the two longest sides: the bottom side and the right side.

3 Perimeter of rectilinear shapes (2)

→ **pages 156–159**

Discover

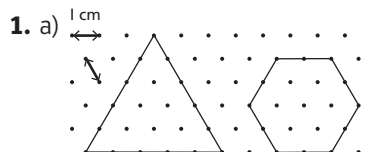**1.** a) The length of the queue of three vehicles is **35 m**.
b) Car A travels **450 m**.

Think together

1. a) **A** + **C** = 250 m
B + **D** = 300 m
b) (250×2) + (300×2)
= **500** + **600**
= **1,100 m**

2. The perimeter of the playground is **330 m**.

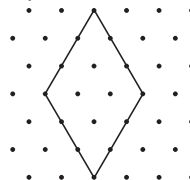**3.** The perimeter is **198 cm**.

4 Perimeter of polygons

→ **pages 160–163**

Discover

1. a)
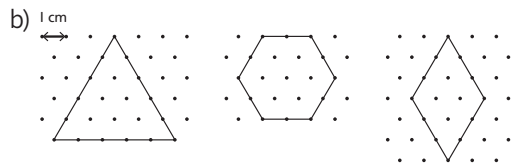

Each of these shapes is a regular polygon. The sides are of equal length, and all of the angles are equal.
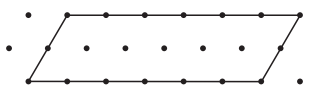

This shape has 4 equal sides, but the angles are different.

b)

| $3 \times 5 = 15$ | $6 \times 2 = 12$ | $4 \times 3 = 12$ |
| The perimeter is 15 cm. | The perimeter is 12 cm. | The perimeter is 12 cm. |

Calculate the perimeter in two steps.

i) $2 \times 7 = 14$ $2 \times 2 = 4$
ii) $14 + 4 = 18$
The perimeter is 18 cm.

Think together

1. a) Hexagon: 6 × 20 cm = **120 cm**
   b) Pentagon: (35 × 2) + (30 × 3) =
                        70 + 90 = **160 cm**

2. Triangle: **100 mm**   Rhombus: **75 mm**
   Pentagon: **60 mm**   Hexagon: **50 mm**

3. a) Children should draw a quadrilateral with a
      perimeter of 18.
   b) Children should draw a pentagon with a perimeter
      of 18.
      A regular pentagon cannot be drawn, the sides will
      have to be different lengths.
   c) Children should draw a hexagon with a perimeter
      of 18. A regular hexagon will have sides of 3.

5 Area of rectangles (1)

→ **pages 164–167**

Discover

1. a) The area of Amal's flower bed will be 16 m².
   b) The length and width could either be **8 m** × **1 m** or
      4 m × **2 m**.

Think together

1. There are **3** rows of metre squares.
   Each row contains **6** squares.
   3 × **6** = **18**
   There are **18** metre squares altogether.
   The area of the flower bed is **18 m²**.

2. a) 30 cm²
   b) 15 cm²

3. The possible dimensions are: 1 × 24, 2 × 12, 3 × 8
   and 4 × 6.
   The dimensions must be multiples of 24 which equal
   24 when multiplied together.

6 Area of rectangles (2)

→ **pages 168–171**

Discover

1. a) Window **A** has the larger area.
   b) The area of window C is **20 m²**.

Think together

1. Shape **B** has the larger area.

2. a) X = **36 m²**   Y = **35 m²**   Z = **40 m²**
   b) Largest to smallest: Z, X, Y

3. Kate is correct.
   2 × 12 = 4 × 6 = 24

7 Area of compound shapes

→ **pages 172–175**

Discover

1. a) The area of A is **6 cm²**.
      The area of B is **10 cm²**.
   b) The area of C is **16 cm²**.

Think together

1. 12 cm² + 6 cm² = **18 cm²**

2. 24 cm²
   17 cm²
   7 cm²

3. a) 450 m²
   b) 1,800 m²

8 Estimate area

→ **pages 176–179**

Discover

1. a) Children should count the number of whole,
      almost-whole and half squares.
      Fish A is approximately **14$\frac{1}{2}$** squares.
   b) B: 17$\frac{1}{2}$ squares   C: 21 squares
      D: 11 squares
      Fish **C** has the largest area.

Think together

1. 17 whole squares
   4 almost-whole squares
   10 half squares = 5 squares
   17 + 4 + 5 = **26 cm²**

2.
Sail	Whole squares	Almost-whole squares	Half squares	Less-than-half squares	Estimated area (squares)
A	13	3	3	3	17$\frac{1}{2}$
B	15	0	6	0	18

3. Flo is correct that they are part of the area, but Astrid
   is also correct because the 'less-than-half' and
   'more-than-half' squares combine to make full
   squares, so the 'more-than-half' squares are counted
   and the 'less-than-half' squares can be ignored.

End of unit check

→ **pages 180–181**

1. D   5. B
2. C   6. C
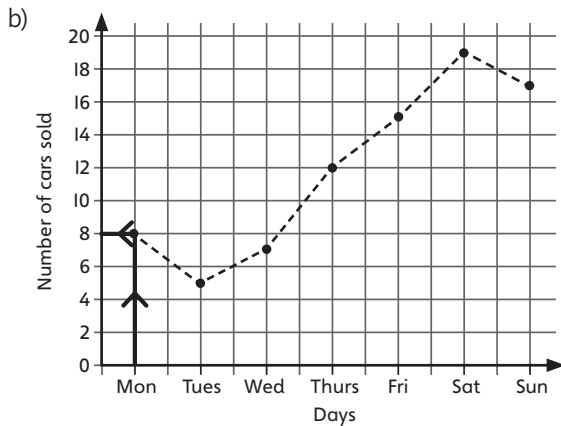3. A   7. **64 m²**
4. B

Unit II – Graphs and tables
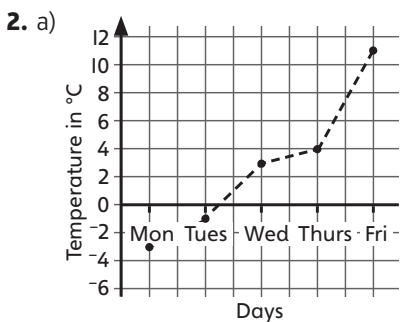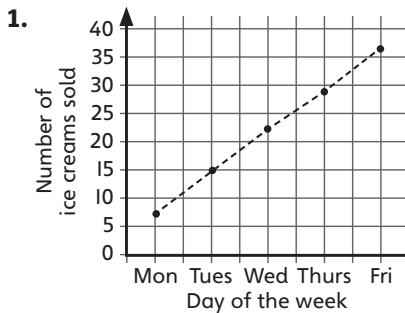
I Draw line graphs

→ **pages 184–187**

Discover

1. a) The sales people need to think about what to show and the scale to use on each of the axes.

b)

Think together

1.

2. a)

b) Children should notice that the higher the temperature, the more ice creams are sold.

3. Children should notice the following mistakes:
- The population scale on the vertical axis is not evenly distributed, every interval should be 100.
- He has missed out 300 and 200 is squashed in between 100 and 400 on the vertical axis.
- He has not labelled the population axis.
- He has not plotted 2019.
- He has plotted 2020 in the wrong place, in between 2019 and 2020 instead of directly above 2020.
- He has plotted 2022 as 495 instead of 395.

2 Read and interpret line graphs (I)

→ **pages 188–191**

Discover

1. a) The temperature at 11 am was **16 °C**.
The temperature at 2 pm was **23 °C.**
b) The temperature was 22 °C at **1 pm** and at **4 pm.**

Think together

1. a) The highest recorded temperature during the day was **25** °C.
b) The temperature at 11:30 am was about **17 °C**.

2. The temperature was above 20 °C for about **4** hours.

3. a) **40** children were late on Thursday.
b) **8** more children were late on Monday than on Tuesday.
c) The graph does not necessarily show 100 different children as the same children could be late on more than one day.

3 Read and interpret line graphs (2)

→ **pages 192–195**

Discover

1. a) The height of the helicopter at 10:30 am is **3,500 m**.
The helicopter stays at this height for half an hour or **30 minutes**.
b) The helicopter flight lasts 2 hours and 15 minutes or **2 $\frac{1}{4}$ hours**.

Think together

1. a) **15 °C**
b) **18 °C**
c) In April, City A is **10–11 °C** warmer than City B.
d) City **A** is warmer. Children should explain that the graph shows a higher temperature throughout the year. The line for City A is always higher than the line for City B.

2. The drone starts from the ground.
TRUE. It starts at 0 m above the ground.
For the first 5 minutes, the drone's height increases by 100 metres every minute.
TRUE. The drone increased by 100 m at 1 min, 200 m after 2 mins, 300 m after 3 mins and so on.
When it reaches 500 metres the drone flies at this height for 7 minutes.
FALSE. It stays at this height for **5** minutes.
The drone returns to the ground after 15 minutes in the air.
FALSE. The graph shows it returns to the ground again after **12** minutes in the air.

4 Read and interpret tables

→ pages 196–199

Discover

1. a) In total **279** loaves of bread were sold on Monday and Thursday.
   b) **77** loaves were not sold on Friday.

Think together

1. a) Ernie weighs **20 kg**.
   b) Both **Arnie** and **Digga** are the same weight.
   c) Charlie weight **26 kg**. Buddy weighs **19 kg**.
      26 – 19 = 7
      Charlie weighs **7 kg** more than Buddy.
   d) **Charlie** is overweight.
   e) Rufus could weigh **19.5 kg** or any number between 19 and 20.

2. Alex needs to walk **8** more kilometres on Friday.

3. Holly is not correct. Exactly $\frac{1}{4}$ of the 40 children (10) preferred blue.
   More than a quarter of 40 is 11 or more.

5 Two-way tables

→ pages 200–203

Discover

1. a)

	Spots	Stripes
Socks	8	4
Hats	3	5

   b) There are 12 socks and 8 hats.
      12 – 8 = 4
      There are 4 more socks than hats.

Think together

1. Adults total = 24
   Sunday total = 28
   a) **5** children went to the cinema on Saturday.
   b) In total, **28** people went to the cinema on Sunday.
   c) **14** more children than adults went to the cinema on Sunday.
   d) The greatest number of people went to the cinema on **Sunday**.

2. a) 5A Apples = **12**
      5B Pears = **10**
      Overall total = **54**

   b) Children's answers will vary but should include five of the following:
   • The total number of apples and pears collected by Class 5A.
   • The total number of apples and pears collected by Class 5B.
   • The total number of apples and pears collected
   • The difference between the number of apples and pears collected.
   • The difference between the number of apples and pears collected by each class.
   • Which class collected more or less.
   • Whether more or less apples or pears were collected.

3. a)

Flavour	Cone size			
	Small	**Medium**	**Large**	**Total**
Strawberry	2	12	42	**56**
Chocolate	**8**	1	2	11
Vanilla	**28**	49	**6**	**83**
Total	**38**	**62**	50	150

   b) $\frac{50}{100} = \frac{1}{3}$
   $\frac{1}{3}$ of the ice creams sold were large cones.

6 Timetables

→ pages 204–207

Discover

1. a) Emma arrives at school at **08:05**.
   b) Bus C arrives at school at **08:35**.

Think together

1. a) Isla arrives in Ashtown Central at **15:50**.
   b) It takes **24** minutes to get to Birchfield.

2. It takes **32** minutes to get from Birchfield to Ashtown Parkway.

3. It is **20 minutes** quicker to take the express train.

End of unit check

→ pages 208–209

1. C

2. A

3. B

4. B

5. C

6. False. There are 64 people in total.
   15 people are adult singers.
   $\frac{16}{64} = \frac{1}{4}$ so, $\frac{15}{64} < \frac{1}{4}$.