Unit 6 – Multiplication and division (2)

I Factor pairs

➜ pages 6–8

1. a) **1** × **10** = 10
10 × **1** = 10
b) **2** × **5** = 10
5 × **2** = 10

2. a) **1** × **14** = 14
14 × **1** = 14
b) **2** × **7** = 14
7 × **2** = 14

3. **1** × **15** = 15
15 × **1** = 15
3 × **5** = 15
5 × **3** = 15

4. The factor pairs for 36 are 1 and 36, 2 and 18, 3 and 12, 4 and 9, 6 and 6.

5. Olivia is wrong because the counters are not evenly distributed in the rows.

6. a) The factor pairs for 24 are 1 and 24, 2 and 12, 3 and 8, 4 and 6.
b) The factor pairs for 18 are 1 and 18, 2 and 9, 3 and 6.
c) The factor pairs for 25 are 1 and 25, 5 and 5.

7. The factor pairs for 100 are 1 and 100, 2 and 50, 4 and 25, 5 and 20, 10 and 10.

Reflect

30, 32 and 34 have a factor of 2. Children should recognise that they are all even numbers and divisible by 2.

2 Multiply and divide by I0

➜ pages 9–11

1. a) 5 × 10 = **50**
b) 15 × 10 = **150**
c) 35 × 10 = **350**
d) **65** × 10 = 650
e) 90 ÷ 10 = **9**
f) 190 ÷ 10 = **19**
g) 490 ÷ 10 = **49**
h) **990** ÷ 10 = 99

2. a) 18 × 10 = **180**
b) 318 × 10 = **3,180**
c) 35 × 10 = **350**
d) 103 × 10 = **1,030**

3. a) 450 ÷ 10 = **45**
b) 1,600 ÷ 10 = **160**

4. a) 43 × 10 = **430** **430** ÷ 10 = 43
b) 65 × 10 = **650** **650** ÷ 10 = 65
c) **57** × 10 = 570 570 ÷ 10 = **57**
d) **80** × 10 = 800 800 ÷ 10 = **80**
e) 703 × 10 = **7,030** **7,030** ÷ 10 = 703
f) **156** × 10 = 1,560 1,560 ÷ 10 = **156**

5. The missing factor from the triangle is **36**.
10 × **36** = 360
36 × 10 = 360
360 ÷ 10 = **36**
360 ÷ **36** = 10

6. a) 130 × 10 = **1,300**
b) **790** × 10 = 7,900
c) **605** × 10 = 6,050
d) **450** ÷ 10 = 45
e) **5,300** ÷ 10 = 530
f) 7,530 ÷ 10 = **753**

7. a) The snake is **120 cm**.
b) Children's stories will vary.

Reflect

Explanations may vary, but children should mention moving a digit to the left in a place value grid.

3 Multiply and divide by I00

➜ pages 12–14

1. a) 7 × 100 = **700**
b) 17 × 100 = **1,700**
c) 37 × 100 = **3,700**
d) **67** × 100 = 6,700
e) 6,600 ÷ 100 = **66**
f) 6,700 ÷ 100 = **67**
g) 6,800 ÷ 100 = **68**
h) **700,000** ÷ 100 = 7,000

2. a) 8 × 100 = **800**
b) 26 × 100 = **2,600**
c) 60 × 100 = **6,000**
d) 93 × 100 = **9,300**

3. a) 9,400 ÷ 100 = **94**
b) 4,000 ÷ 100 = **40**

4. a) 19 × 100 = **1,900** **1,900** ÷ 100 = 19
b) **21** × 100 = 2,100 2,100 ÷ 100 = **21**
c) 44 × 100 = **4,400** **4,400** ÷ 100 = 44
d) **60** × 100 = 6,000 6,000 ÷ 100 = **60**
e) 5 × 100 = **500** **500** ÷ 100 = 5
f) 100 × 100 = **10,000** **10,000** ÷ 100 = 100

5. The missing factor from the triangle is **72**.
72 × 100 = 7,200
100 × **72** = 7,200
7,200 ÷ 100 = **72**
7,200 ÷ **72** = 100

6. a) **300 cm**
b) **1,000 cm**
c) **3,000 cm**

Reflect

Children's explanations will vary, but they should explain moving digits to the left and right on a place value grid.

4 Related facts – multiplication

→ pages 15–17

1. a) 3 × 2 = **6**
b) 3 × 20 = **60**
c) 3 × 200 = **600**

2. a) 8 × 40 = **320**
8 × 400 = **3,200**
80 × 4 = **320**
800 × 4 = **3,200**
b) 70 × 8 = **560**
80 × 7 = **560**
7 × 800 = **5,600**
8 × 700 = **5,600**
c) The missing number in the triangle is **20.**
5 × 40 = **200**
500 × 4 = **2,000**
400 × 5 = **2,000**
5 × 50 = **250**

3. a) 7 × 4 = **28**
7 × 40 = **280**
7 × 400 = **2,800**
b) 8 × 80 = **640**
8 × 30 = **240**
3 × 8 = **24**
c) 9 × 2 = **18**
9 × 20 = **180**
200 × 9 = **1,800**
d) 9 × 50 = **450**
80 × 9 = **720**
600 × 4 = **2,400**

4. 8 × 200 = 1,600

5. Mass = **1,000 kg**

6. Method 1: 7 × 30 = **210**
Method 2: 7 × 3 ones = **21** ones = **21**
So, 7 × 3 tens = **21** tens = **210**
Method 3: 7 × 3 = **21** So, **21** × 10 = **210**

Reflect

Children should explain:

7 × 40 = 7 × 4 × 10 = 280
70 × 4 = 7 × 10 × 4 = 280
700 × 4 = 7 × 100 × 4 = 2,800
7 × 400 = 7 × 4 × 100 = 2,800

5 Related facts – division

→ pages 18–20

1. a) 6 ÷ 2 = **3**
b) 60 ÷ 2 = **30**
c) 600 ÷ 2 = **300**

2. a) 150 ÷ 3 = **50**
1,500 ÷ 3 = **500**
b) 15 ÷ 5 = **3**
150 ÷ 5 = **30**
1,500 ÷ 5 = **300**
c) 210 ÷ 3 = **70**
2,100 ÷ 3 = **700**
d) 25 ÷ 5 = **5**
250 ÷ 5 = **50**
2,500 ÷ 5 = **500**
e) 24 ÷ 3 = **8**
240 ÷ 3 = **80**
2,400 ÷ 3 = **800**
f) 45 ÷ 5 = **9**
450 ÷ 5 = **90**
4,500 ÷ 5 = **900**

3. 400 ÷ 5 = 80
480 ÷ 6 = 80
40 ÷ 5 = 8
32 ÷ 4 = 8
32 tens ÷ 4 = 80
800 = 1,600 ÷ 2
800 = 4 thousands ÷ 5
80 = 720 ÷ 9
80 = 800 ÷ 10

4. a) 4 × **900** = 3,600
b) 40 × **90** = 3,600
c) 400 × **9** = 3,600
d) **3,600** ÷ 9 = 400
e) **3,600** ÷ 4 = 900
f) **360** ÷ 4 = 90

5.

IN	6	60	600	20	300	**10**	**30**
OUT	**24**	**240**	**2,400**	**80**	**1,200**	40	120

Children should be able to work forwards and backwards depending on whether they have been given the input number or the output number.

Reflect

Children's explanations may vary.
For example, 1,200 ÷ 4 = 12 ÷ 4 × 100 = 300 or 12 hundreds ÷ 4 = 3 hundreds.

6 Multiply and add

→ pages 21–23

1. a) 5 × 2 = **10**
2 × 2 = **4**
7 × 2 = **14**
b) 5 × 4 = **20**
2 × 4 = **8**
7 × 4 = **28**

c) 5 × 6 = **30**
3 × 6 = **18**
8 × 6 = **48**
d) 5 × 6 = **30**
4 × 6 = **24**
9 × 6 = **54**
e) 5 × 5 = **25**
4 × 5 = **20**
9 × 5 = **45**

2. a) 7 × 8 = **56**
7 × 8 = **40** + **16**
b) 9 × 8 = **72**
9 × 8 = **40** + **32**

3. 9 × 4 = **36**

4. a) 4 × 6 + 3 × 6 = **7** × 6
b) 7 × 5 + 3 × 5 = **10** × 5
c) 9 × 4 + **2** × 4 = 11 × 4
d) 5 × 2 + 1 × 2 = **6** × 2
e) 4 × 2 + 2 × 5 = **9** × 2
f) **4** × 3 + 5 × 3 = 9 × 3

5. Children's answers will vary. The first method is the most efficient.
First I would **add together the number of columns of counters** (**3** + **2** + **5** = **10**).
Then I would **multiply the number of columns by the number of rows** (**10** × **4** = **40**).
There are **40** counters in total.
OR
First I would work out how many black counters (4 × 3 = 12), white counters (4 × 2 = 8) and grey counters (4 × 5 = 20).
Then I would add these totals together (12 + 8 + 20 = 20).
There are **40** counters in total.

Reflect

Children's explanations may vary. For example, 5 threes + 2 threes = 7 threes altogether so 5 × 3 + 2 × 3 = 7 × 3.

Alternatively, children may draw diagrams or write calculations to show that 5 × 3 = 15 and 2 × 3 = 6, so 15 + 6 = 21 and 7 × 3 = 21.

7 Informal written methods

➜ pages 24–26

Discover

1. a) There are **78** eggs.
b) There are **96** eggs.

2. a) 16 × 3 = **30** + **18**
= **48**
b) 13 × 8 = **80** + **24**
= **104**

3. a) 10 × 5 = **50**
7 × 5 = **35**
17 × 5 = **85**
b) 4 × 10 = **40**
4 × 6 = **24**
4 × 16 = **64**
c) 3 × 6 = **18**
20 × 6 = **120**
23 × 6 = **138**
d) 3 × 40 = **120**
3 × 5 = **15**
3 × 45 = **135**
e) 20 × 8 = **160**
5 × 8 = **40**
25 × 8 = **200**
f) 11 × 7 = **77**
5 × 7 = **35**
16 × 7 = **112**

4. a) 15 × 3 = **45**
b) 21 × 6 = **126**
c) 18 × 5 = **90**
d) 5 × 51 = **255**

5. a) 37 × 3 = **111**
b) 77 × 3 = **231**

Reflect

Children's explanations may vary.

Method 1: Find the totals separately for the pencils on the left-hand side (5 × 10 = 50) and on the right-hand side (5 × 3 = 15) and then add these together (50 + 15 = 65).

Method 2: Add together the number of packs of pencils (10 + 3 = 13) and multiply this by 5 (13 × 5 = 65).

8 Multiply 2 digits by 1 digit

➜ pages 27–29

1. 41 × 5 = **205**

2. a) 53 × 6 = **318**
b) 47 × 3 = **141**
c) 29 × 4 = **116**
d) 22 × 8 = **176**

3. a) 28 × 5 = **140**
b) 37 × 4 = **148**
c) 64 × 9 = **576**
d) 7 × 32 = **224**

4. Amal travels **270** km in 5 days.

5. Children should explain that Lee has not correctly considered the value of each digit in his answer.
4 ones × 6 gives 24 ones = 2 tens and 4 ones
5 tens × 6 gives 30 tens = 3 hundreds
So, the answer = 3 hundreds, 2 tens and 4 ones = 324

6. a) 57 × **3** = 1**7**1
b) 2**3** × 6 = **13**8
c) **69** × 7 = **4**83

Reflect

Children's explanations will vary. For example:

There are 4 rows of 26 on the left-hand side; 2 sets of 10 one counters are grouped to make 2 tens. In the middle the 2 sets of 10 one counters are exchanged for 2 ten counters and 10 ten counters are now grouped together.

On the right-hand side the group of 10 ten counters are exchanged for 1 hundred counter, showing the answer of 104.

9 Multiply 3 digits by 1 digit

➜ pages 30–32

1. 134 × 2 = **268**

2. a) 213 × 4 = **852**
b) 114 × 5 = **570**
c) 115 × 4 = **460**
d) 148 × 3 = **444**
e) 252 × 7 = **1,764**
f) 318 × 6 = **1,908**

3. a) 122 × 6 = **732**
b) 215 × 5 = **1,075**
c) 270 × 3 = **810**
d) 4 × 624 = **2,496**

4. a) 2**9**3 × 5 = 146**5** b) 516 × **7 = 3,6**12

5. 8 bars of soap weigh **1,160 g**.

6. Alex has incorrectly multiplied 6 × 7 to get 43 instead of 42. She has also written 25 in the tens column rather than exchanging 20 tens for 2 hundreds and carrying the 2 into the hundreds column.

7. **215** × 7 = 1,505
152 × 7 = 1,064
512 × 7 = 3,584
251 × 7 = 1,757

Reflect

Children's explanations will vary. For example, column multiplication or expanded multiplication.

10 Solve multiplication problems

➜ pages 33–35

1. Emma uses **161 cm** of ribbon.

2. a) Holly travels **672 km**.
b) It costs **6,048p** in total for the 3 journeys.

3. Andy spends **£7** and **52p** in total.

4. The total weight of the cookies is **1,608 g**.

5. Tower **A** is taller.

Reflect

Alex travels 7 days × 83 km = 581 km

Bella cycles 5 days × 127 km = 635 km

Bella cycles 54 km more over the week.

Children's explanations will vary, but should explain: The first bar model is split into 7 sections, one for each day of the week. Placing 83 in each section helps work out the total of 7 × 83 = 581.

The second bar model is split into 5 sections, one for each day of Monday to Friday. Placing 127 in each section helps work out the total of 5 × 127 = 635. The difference is 635 km – 581 km = 54 km

11 Basic division

➜ pages 36–38

1. a) 66 ÷ 3 = **22**
b) 66 ÷ 6 = **11**

2. a) 64 ÷ 2 = **32**
b) 39 ÷ 3 = **13**

3. a) 46 ÷ 2 = **23**
b) 48 ÷ 4 = **12**
c) 77 ÷ 7 = **11**
d) 93 ÷ 3 = **31**

4. Lexi is correct in saying that 8 ÷ 4 = 2 and 4 ÷ 4 = 1, but she needs to remember that the 8 represents 8 tens and that dividing 8 tens by 4 gives 2 tens: 80 ÷ 4 = 20 and 4 ÷ 4 = 1, so 84 ÷ 4 = 20 + 1 = 21.

5. a) 40 ÷ 4 = **10**
44 ÷ 4 = **11**
48 ÷ 4 = **12**
52 ÷ 4 = **13**
b) 63 ÷ 3 = **21**
66 ÷ 3 = **22**
69 ÷ 3 = **23**
72 ÷ 3 = **24**

6. 48 ÷ 4 = 12 and 48 ÷ 2 = 24
Children's explanations may vary. For example, dividing the same number (48) into a larger number of groups will give a smaller answer or 2 is half of 4 so the answer to ÷ 2 will be double the answer of ÷ 4.

Reflect

Children's methods will vary. For example: 26 is 20 + 6. Half of 20 is 10 and half of 6 is 3. Adding these together gives 13. This could be shown with a part-whole model, counters in a diagram or base 10 equipment.

I2 Division and remainders

➜ pages 39–41

1. a) 29 ÷ 2 = **14** r **1**
b) 97 ÷ 3 = **32** r **1**

2. The diagram shows 45 ÷ **2** = **22** remainder **1**.

3. a) 41 ÷ 4 = **10** r **1**
b) 59 ÷ 5 = **11** r **4**
c) 62 ÷ 3 = **20** r **2**
d) 89 ÷ 4 = **22** r **1**
e) 62 ÷ 6 = **10** r **2**
f) 98 ÷ 3 = **32** r **2**

4. There are many possible answers. For example:
13 ÷ 2 = 6 r 1; 97 ÷ 2 = 48 r 1; 25 ÷ 3 = 8 r 1; 64 ÷ 7 = 9 r 1

Reflect

87 is an odd number and is not divisible by 4, so there will be a remainder. Pictures could include a part-whole model showing 87 split into 80 and 7 or counters or base 10 equipment divided into 4 groups.
87 ÷ 4 = 21 r 3

I3 Divide 2-digit numbers

➜ pages 42–44

1. a) 32 ÷ 2 = **16**
b) 42 ÷ 3 = **14**
c) 52 ÷ 4 = **13**

2. They each get **19** cakes.

3. a) 56 ÷ 4 = **14**
b) 45 ÷ 3 = **15**
c) 58 ÷ 2 = **29**
d) 96 ÷ 4 = **24**
e) 76 ÷ 2 = **38**
f) 65 ÷ 5 = **13**

4. Tilly needs **25** plant pots.

5. a) 48 ÷ 3 = **16**
b) 65 ÷ 5 = **13**

Reflect

Children should explain that this part-whole model does not help divide 57 by 3 because neither 40 nor 17 are divisible by 3. When partitioning it is useful to partition into numbers that are divisible by the divisor. Here it would be more helpful to partition 57 into 30 and 27 which are both divisible by 3.

I4 Divide 3-digit numbers

➜ pages 45–47

1. a) 188 ÷ 2 = **94**
b) 189 ÷ 3 = **63**
c) 195 ÷ 5 = **39**
d) 275 ÷ 5 = **55**

2. a) 128 ÷ 2 = **64** Part-whole model: **20** and **8**
b) 128 ÷ 2 = **64** Part-whole model: **28**
c) 156 ÷ 3 = **52** Part-whole model: **6**
d) 256 ÷ 4 = **64** Part-whole model: **16**

3. a) 185 ÷ 5 = **37**
b) 264 ÷ 6 = **44**
c) 312 ÷ 2 = **156**
d) 372 ÷ 3 = **124**

4. a) **184** ÷ 4 = **46**
b) 360 ÷ 9 = **40** and **27** ÷ 9 = 3
387 ÷ 9 = **43**

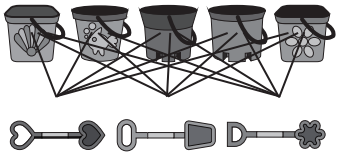
5. Children's answers may vary. For example:
584 = **500** + **84**
584 = **400** + **160** + **24**
584 = **400** + **160** + **20** + **4**

Reflect

Children's answers will vary. For example, partitioning 172 into 160 and 12 which are both divisible by 4.
172 ÷ 4 = 43

I5 Correspondence problems

➜ pages 48–50

1. a) 
There are **15** different ways to choose a bucket and a spade.
b) **5** × **3** = **15**

2. **7** × **5** = **35**
Andy has **5** T-shirts.

3. 5 × 2 = 10, so there are 10 possible choices. The ten possible totals are:
2p + £1 = £1 and 2 pence; 2p + £2 = £2 and 2 pence;
5p + £1 = £1 and 5 pence; 5p + £2 = £2 and 5 pence;
10p + £1 = £1 and 10 pence; 10p + £2 = £2 and 10 pence;
20p + £1 = £1 and 20 pence; 20p + £2 = £2 and 20 pence;
50p + £1 = £1 and 50 pence; 50p + £2 = £2 and 50 pence.

4. a) The possible 2-digit numbers that Jamilla could make are: 12, 13, 14, 15, 16, 21, 23, 24, 25, 26, 31, 32, 34, 35, 36, 41, 42, 43, 45, 46, 51, 52, 53, 54, 56, 61, 62, 63, 64 and 65.
b) **6** × **5** = **30**
30 different 2-digit numbers can be made.

5. There are **15** different pairs of snacks that Reena can buy.

Reflect

Each hat can be matched with 3 scarves. There are 5 hats, so 5 × 3 = 15, meaning there are **15** different ways of choosing one hat and one scarf.

I6 Efficient multiplication

➜ pages 51–53

1. **5** × **3** × **5**
15 × **5** = **75**
25 × **3** = **75**
There are **75** beads in total.

2. **7** × **2** × **7** = **98**
There are 98 counters in total.
First I **found 7** × **7** = **49**.
Then I **doubled 49 to get 98**.

3. a) Children should explain that there are 16 frames with 9 counters in each frame, organised into 2 rows of 8 frames with 9 counters in each frame. So, the total number of counters can be worked out using the calculation 16 × 9 or the calculation 2 × 8 × 9. Therefore, 16 × 9 = 2 × 8 × 9.
b) There are **144** counters in total.

4. Andy is correct because **5** × **3** = **15, so**
5 × **3** × **8** = **15** × **8** = **120**.
Reena is correct because **5** × **8** = **40, so 5** × **3** × **8** = **120**.

5. 35 is equal to 5 × **7**.
16 is equal to 2 × **8**.
So, I can work out 35 × 16 by working out
5 × 7 × 2 × 8 = **560**.

6. a) 6 × 2 × 3 × 5 × 4 × 5 = **3,600**
b) 6 × 2 × 3 × 5 × 4 × 5 = 12 × 15 × 20 because 6 × 2 = 12, 3 × 5 = 15 and 4 × 5 = 20

Reflect

Children should explain that multiplication is commutative which means that the order in which you multiply the numbers does not matter. As 3 × 4 = 4 × 3,

then 3 × 4 × 6 = 4 × 3 × 6.

My journal

➜ page 54

1. 45 × 7 = **315**
132 × 6 = **792**
78 ÷ 6 = **13**
94 ÷ 5 = **18** r **4**

2. Children should recognise that the answer is the same but the method is different. The answers are the same (126 × 3 = 378) whichever method is used. On the left-hand side the expanded method for column multiplication has been used, whereas on the right-hand side they have used column multiplication and carried over the tens.

Power play

➜ pages 55–56

1.

Number divided by	2	3	4	5	6	7	8
Remainder	1	1	1	4	1	0	1

2.

Number divided by	2	3	4	5	6	7	8
Remainder	0	2	2	0	2	1	2

3.

Number divided by	2	3	4	5	6	7	8
Remainder	1	0	3	1	3	2	3

4. Children should notice that when dividing by 2 there is a remainder for odd numbers but no remainder for even numbers.
The remainders increase by 1 as the numbers increase (for example, from 48 to 49 to 50 to 51) until a number divisible by that number is reached and then the remainder is 0.

5. This must be an odd number because it leaves a remainder of 1 when divided by 2. It is divisible by 3. It ends in a 7 (because it has a remainder of 2 when divided by 5 and cannot end in a 2 because then it would be even). One number that ends in a 7 and is divisible by 3 is 27. Now, checking the other remainders:
27 ÷ 4 = 6 r 3
27 ÷ 5 = 5 r 2
27 ÷ 6 = 4 r 3
27 ÷ 7 = 3 r 6
27 ÷ 8 = 3 r 3
So, Lee started out with the number 27.

Unit 7 – Length and perimeter

I Measure in km and m

➜ pages 57–59

1. a) Children should complete the bar models to show 1,000 m in each part.
3 km = **3,000 m**
Barwich is **3,000 metres** away.
b) Children should complete the bars to show 1,000 m in each part.
6 km = **6,000 m**
Littleton is **6,000 metres** away.
c) Children should complete the bar model to show 1 km in each part.
9 km = 9,000 m
Newville is **9 kilometres** away.

2. a) 5 km = **5,000 m**
b) 1,500 m = **$1\frac{1}{2}$ km**
c) **3,500 m** = $3\frac{1}{2}$ km
d) **$1\frac{1}{4}$ km** = 1,250 m

3. a) 6 km = **6,000 m**
b) $4\frac{1}{2}$ km = **4,500 m**
c) **8 km** = 8,000 m
d) **$7\frac{1}{2}$ km** = 7,500 m
e) 3,700 m = **3 km** and **700 m**
f) 4 km and 200 m = **4,200 m**
g) 7 km and 375 m = **7,375 m**
h) 6,050 m = **6 km** and **50 m**

4. The length of the road is **9,500 m**.

5. Answers will vary. Children should draw a route from A to B and correctly complete the number of kilometres.

6. a) $\frac{1}{2}$ km = **500 m**
b) $\frac{3}{4}$ km = **750 m**
c) $\frac{2}{5}$ km = **400 m**
d) $\frac{1}{4}$ km = **250 m**
e) $\frac{1}{5}$ km = **200 m**
f) $\frac{1}{10}$ km = **100 m**

Reflect

2,000 m + 500 m + 1 km = $3\frac{1}{2}$ km
Children should explain converting metres to kilometres or kilometres to metres to work out the answer.

2 Perimeter on a grid

➜ pages 60–62

1. 13 cm + 13 cm + 6 cm + 6 cm = **38 cm**

2. a) **18 cm**
b) **28 cm**
c) **18 cm**
d) **30 cm**

3. No, the perimeter is 7 cm + 4 cm + 7 cm + 4 cm = **22 cm**.

4. a) Width = **10 m**
Length = **15 m**
b) Perimeter = **50 m**

5. **Jack** has run further.
Jack runs 3 × 50 m = 150 m.
Evie runs 50 m + 50 m + 23 m + 23 m = 146 m.

6. a)

Side length	5 m	6 m	7 m	**8 m**	**10 m**
Perimeter	**20 m**	**24 m**	**28 m**	32 m	40 m

b) Children should notice that the perimeter is equal to four times the side length.

Reflect

To work out the perimeter of this classroom, I would **add the sides together (two lengths and two widths): 6** + **5** + **6** + **5** = **22 m**.

3 Perimeter of a rectangle

➜ pages 63–65

1. a) 5 cm + 3 cm + 5 cm + 3 cm = **16 cm**
b) 6 cm + 5 cm + 6 cm + 5 cm = **22 cm**
c) 14 mm + 3 mm + 14 mm + 3 mm = **34 mm**

2. a) Width = **2 cm**
b) Length = **40 mm**

3. Children should match:
- Perimeter = 40 m (top left) with 6 m
- Perimeter = 10 m (bottom left) with 3 m
- Sides equal 100 cm and 150 cm (top right) with 5 m
- Sides equal 3 m and 1 $\frac{1}{2}$ m (bottom right) with 9 m.

4. a)

Width	**Length**
1 cm	7 cm
2 cm	**6 cm**
3 cm	**5 cm**
4 cm	**4 cm**

b) Children should notice that the last shape in the table is a square because its length and width are the same.

5. a) **280 cm**
b) **420 cm**
Children should draw a diagram to show a rectangle with a length of 140 cm and a width of 70 cm.

Reflect

Children should work out that the length is 5 cm and explain their reasoning. For example:
12 – 1 – 1 = 10 and 10 ÷ 2 = 5, so the length = 5 cm.

4 Perimeter of rectilinear shapes

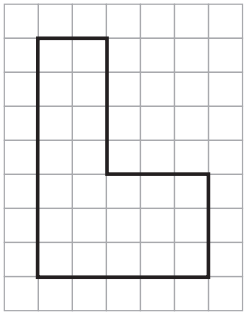
➜ pages 66–68

1. a) Clockwise from top, the measurements are: 2 m, 1 m, 2 m, 1 m, 4 m and 2 m.
b) The perimeter of the flower bed is **12 m**.

2. **18 cm**

3. a) **14 m**
b) **14 m**
c) **20 m**
d) **26 m**

4. a) The perimeter of the badge is **24 cm**.
b) Children should draw:



5. a) and b) Children should draw a factory with all side lengths labelled. All angles should be right angles (no sloping roofs).
c) Answers will vary depending on the lengths of the sides of the factory the children drew in part a).

Reflect

Children should circle **No**. Amy is not correct.
Perimeter = **22 cm**

Amy has put a number in each corner where there is no length to measure, and she has not noticed that square 9 includes two 1 cm lengths of the perimeter instead of just one.

5 Find missing lengths in rectilinear shapes

➜ pages 69–71

1. a) The zookeeper needs 3 more logs.
b) **10** logs

2. a) **8 cm**
b) **5 cm**
c) Children's explanations will vary, but may include using the measurements provided on the opposite sides to work out the missing sides.
A = 6 + 2 = 8 cm
B = 7 – 2 = 5 cm

3. a) Missing sides = 9 cm and 9 cm
Perimeter = 42 cm
b) Missing sides = $14\frac{1}{2}$ cm and $14\frac{1}{2}$ cm
Perimeter = 58 cm

4. 12 m + 18 m + 12 m + 9 m + 7 m + 4 m + 7 m + 5 m = 74 m
The perimeter is **74 m**.

5. Children's shapes will vary depending on the routes they took. There are more than two possible routes, but all routes must travel eight 20 m sides.

Reflect

Children's answers will vary depending on the problem they have designed.

6 Perimeter of polygons

➜ pages 72–74

1. a) **9 cm**
b) **25 cm**
c) **55 cm**
d) **15 cm**
e) **30 cm**
f) **78 cm**

2. a) **80 mm**
b) **80 mm**
c) **102 cm**

3. a) **19 mm**
b) **49 mm**

4. a) **17 cm**
b) **21 cm**
c) **56 cm**

Reflect

Children's polygons will vary but the lengths of the sides must total 48 cm.

My journal

➜ page 75

Children's polygons will vary. Children should explain thinking about addition and multiplication facts for 12 to work out the lengths of their sides.

Power puzzle

➜ page 76

a) Children should make two rectangles with the shapes.
b) Perimeter of rectangle 1: **18** squares
Perimeter of rectangle 2: **20** squares

Unit 8 – Fractions (I)

I Count beyond I

→ pages 77–79

1. a) $1\frac{2}{5}$
b) $2\frac{1}{3}$
c) $2\frac{5}{8}$

2. a) $4\frac{3}{4}$
b) $3\frac{1}{6}$

3. Children should shade:
a) 2 whole circles and 1 section out of 4.
b) 3 whole circles and 4 sections out of 5.
c) 3 whole circles and 4 sections out of 7.

4. Max is incorrect. There are 2 wholes and $\frac{1}{6} = 2\frac{1}{6}$.

5. Children should shade 2 whole circles and $\frac{3}{4}$ of a third circle.

6. $\mathbf{1\frac{3}{6} = 1\frac{1}{2}}$

Reflect

A mixed number is made up of a whole number and a (proper) fraction.

2 Partition a mixed number

→ pages 80–82

1. a) Whole: $1\frac{3}{5}$; parts: **1** and $\mathbf{\frac{3}{5}}$.
b) Whole: $2\frac{1}{3}$; parts: **2** and $\mathbf{\frac{1}{3}}$.
c) Whole: $3\frac{5}{8}$; parts: **3** and $\mathbf{\frac{5}{8}}$.
d) Whole: $\mathbf{3\frac{1}{6}}$; parts: **3** and $\mathbf{\frac{1}{6}}$.

2. a) $\frac{4}{7}$
b) 3 and $\frac{1}{4}$
c) $1\frac{3}{4}$
d) $4\frac{1}{3}$
e) $6\frac{2}{5}$
f) $7\frac{3}{8}$

3. a) $2 + \frac{1}{5} = \mathbf{2\frac{1}{5}}$
b) $3 + \frac{1}{4} = \mathbf{3\frac{1}{4}}$
c) $4 + \frac{2}{3} = \mathbf{4\frac{2}{3}}$
d) $5 + \frac{7}{10} = \mathbf{5\frac{7}{10}}$

4. There are various possible answers for the parts. For example:
4 and $\frac{3}{4}$
3 and $1\frac{3}{4}$
2 and $2\frac{3}{4}$
1 and $3\frac{3}{4}$
0 and $4\frac{3}{4}$
$4\frac{3}{4}$ and 0
$4\frac{1}{4}$ and $\frac{2}{4}$ or $\frac{1}{2}$
$2\frac{1}{2}$ and $2\frac{1}{4}$.

Reflect

Many answers are possible. Children can partition a mixed number into a whole number and a fractional part or by splitting the whole number. For example, $2\frac{5}{6}$ could be partitioned into 2 and $\frac{5}{6}$ or into $1\frac{2}{6}$ and $1\frac{3}{6}$.

3 Number lines with mixed numbers

→ pages 83–85

1. a) $1, 1\frac{1}{3}, 1\frac{2}{3}$
b) $\frac{3}{4}, 1, 1\frac{1}{4}, 1\frac{2}{4}, 1\frac{3}{4}$
c) $\frac{3}{5}, \frac{4}{5}, 1, 1\frac{1}{5}, 1\frac{2}{5}, 1\frac{3}{5}, 1\frac{4}{5}$

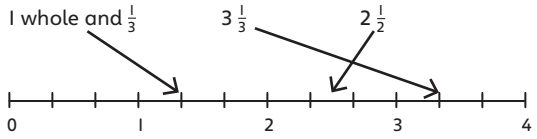
2. $5, 5\frac{1}{3}, \mathbf{5\frac{2}{3}}, \mathbf{6}, \mathbf{6\frac{1}{3}}, \mathbf{6\frac{2}{3}}, \mathbf{7}$

3. a) $\frac{4}{6}, 1\frac{2}{6}, 1\frac{5}{6}$
b) $2\frac{4}{5}, 3\frac{1}{5}, 3\frac{4}{5}$
c) $3\frac{7}{8}, 4\frac{3}{8}, 4\frac{7}{8}$

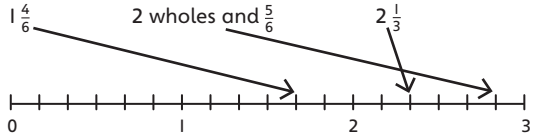
4. Emma is **not correct**. The number lines shows fifths. The arrow is pointing to $2\frac{3}{5}$.

5. a) $2\frac{1}{4}$
b) $1\frac{7}{9}$

6. a)



b)



Reflect

Children should count from 5 to 8: 5, $5\frac{1}{3}$, $5\frac{2}{3}$, 6, $6\frac{1}{3}$, $6\frac{2}{3}$, 7, $7\frac{1}{3}$, $7\frac{2}{3}$, 8.

4 Compare and order mixed numbers

→ pages 86–88

1. Children should circle:
a) $3\frac{1}{5}$
b) $1\frac{5}{8}$

2. Children should circle:
a) $2\frac{1}{4}$
b) $2\frac{1}{5}$

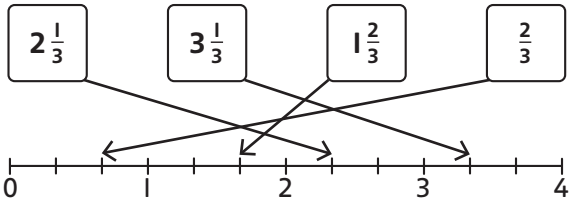
3. a) $2\frac{1}{3}$ is **greater than** $1\frac{2}{3}$.
b) $1\frac{7}{8}$ is **greater than** $1\frac{2}{8}$.
c) $5\frac{1}{3}$ is **less than** $5\frac{2}{3}$.
d) $5\frac{1}{9}$ is **greater than** $3\frac{8}{9}$.

4. $2\frac{5}{6} > 2\frac{3}{6}$

5. a) $4\frac{2}{3} > 3\frac{1}{3}$
b) $2\frac{7}{10} < 5\frac{7}{10}$
c) $3\frac{3}{5} < 3\frac{4}{5}$
d) $2\frac{1}{5} > 2$

6. From greatest to smallest: $4\frac{5}{6}$, $4\frac{3}{6}$, $3\frac{1}{6}$.

7.



From smallest to greatest: $1\frac{2}{3}$, $2\frac{1}{3}$, $3\frac{1}{3}$.

Reflect

Children should explain that to compare two mixed numbers they should start by comparing the whole number first. If the whole number is the same, then they should compare the fractions.

5 Convert mixed numbers to improper fractions

→ pages 89–91

1. a) $\mathbf{\frac{8}{3}}$
b) $\mathbf{\frac{7}{4}}$
c) $\mathbf{\frac{11}{6}}$

2. Children should explain that $\frac{5}{5} + \frac{5}{5} + \frac{1}{5} = \frac{11}{5} = 1 + 1 + \frac{1}{5} = 2\frac{1}{5}$.

3. a) $4\frac{1}{4} = \mathbf{\frac{17}{4}}$
b) $2\frac{2}{7} = \mathbf{\frac{16}{7}}$

4. a) Children should shade 3 whole circles and 1 section.
$3\frac{1}{5} = \mathbf{\frac{16}{5}}$
b) Children should shade 3 whole rectangles and 1 section.
$3\frac{1}{4} = \mathbf{\frac{13}{4}}$
c) Children should shade 1 whole rectangle and 7 sections.
$1\frac{7}{10} = \mathbf{\frac{17}{10}}$

5. $\frac{5}{3}, \frac{6}{3}, \frac{7}{3}, \frac{8}{3}, \frac{9}{3}$
$1\frac{1}{3}$, 2, $2\frac{1}{3}$, $2\frac{2}{3}$, 3

6. a) There are $\mathbf{11}$ $\frac{1}{2}$s in $5\frac{1}{2}$.
b) There are $\mathbf{22}$ $\frac{1}{4}$s in $5\frac{1}{2}$.

Reflect

Children should draw diagrams to show two wholes split into thirds. 1 whole and 2 thirds should be shaded to show that $1\frac{2}{3} = \frac{5}{3}$.

6 Convert improper fractions to mixed numbers

→ pages 92–94

1. a) Children should shade 2 whole circles and 2 sections.
b) $\frac{8}{3} = \mathbf{2\frac{2}{3}}$

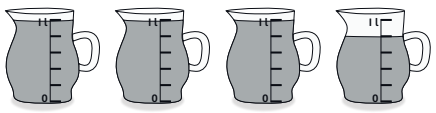
2. a) Children should shade 1 complete rectangle and 5 sections.
b) $1\frac{3}{8} = \mathbf{1\frac{5}{8}}$

3. a) Children should shade 3 complete rectangles and 1 section.
b) $\frac{13}{4} = \mathbf{3\frac{1}{4}}$

4. a) $\frac{17}{5} = \mathbf{3\frac{2}{5}}$
b) $\frac{13}{10} = \mathbf{1\frac{3}{10}}$
c) $\frac{13}{6} = \mathbf{2\frac{1}{6}}$

5. Kate fills $\mathbf{4\frac{1}{2}}$ boxes.

6. a)



b)

c) **Emma** has more juice.

Reflect

Children should explain that a diagram can be used to write $\frac{13}{3}$ as a mixed number by drawing 5 sets of 3 thirds and shading 13 thirds to show 4 wholes and 1 third. $\frac{13}{3} = 4\frac{1}{3}$.

7 Equivalent fractions

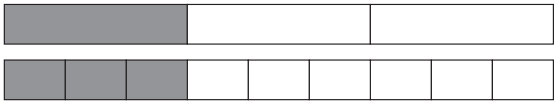
→ pages 95–97

1. a) $\frac{2}{3} = \mathbf{\frac{4}{6}}$
b) $\mathbf{\frac{6}{8}} = \mathbf{\frac{3}{4}}$
c) $\mathbf{\frac{5}{10}} = \mathbf{\frac{4}{8}} = \mathbf{\frac{6}{12}}$

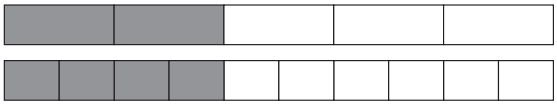
2. a) $\frac{5}{8}$ **is not** equal to $\frac{1}{2}$.
b) $\frac{3}{6}$ **is not** equal to $\frac{3}{9}$.
c) $\frac{4}{8}$ **is not** equal to $\frac{1}{4}$.
d) $\frac{4}{6}$ **is** equal to $\frac{6}{9}$.
e) $\frac{4}{4}$ **is** equal to $\frac{9}{9}$.

3. Children should shade:

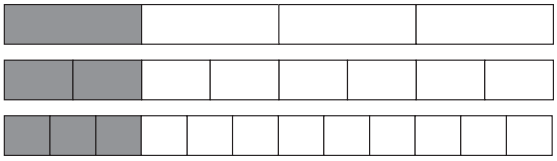
a) $\frac{1}{3}$ is equal to $\frac{3}{9}$.



b) $\frac{2}{5}$ is equal to $\frac{4}{10}$.



c) $\frac{1}{4}$ is equal to $\frac{2}{8}$ which is equal to $\frac{3}{12}$.



4. Lee has shaded 3 out of 4 sections = $\frac{3}{4}$.
Zac has shaded 3 out of 8 sections = $\frac{3}{8}$.
These are not the same fraction.
$\frac{3}{4} = \frac{6}{8} > \frac{3}{8}$

Reflect

Equivalent fractions on a fraction wall are the same length.

For example, on this wall $\frac{1}{2} = \frac{2}{4}$.

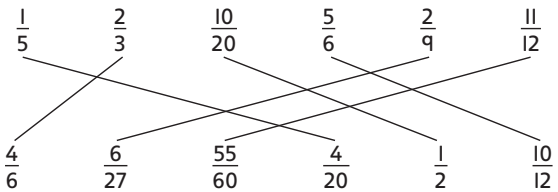
8 Equivalent fraction families

➜ pages 98–100

1. a) $\frac{1}{2} = \frac{\mathbf{3}}{6}$
b) $\frac{4}{5} = \frac{\mathbf{8}}{10}$
c) $\frac{1}{4} = \frac{\mathbf{2}}{\mathbf{8}}$
d) $\frac{10}{15} = \frac{\mathbf{2}}{\mathbf{3}}$

2. a) $\frac{1}{2} = \frac{\mathbf{4}}{8}$
b) $\frac{3}{4} = \frac{15}{\mathbf{20}}$
c) $\frac{3}{5} = \frac{9}{\mathbf{15}}$
d) $\frac{1}{6} = \frac{\mathbf{4}}{24}$
e) $\frac{\mathbf{2}}{7} = \frac{6}{21}$
f) $\frac{20}{24} = \frac{\mathbf{10}}{\mathbf{12}} = \frac{\mathbf{5}}{\mathbf{6}}$

3.



4. a) $\frac{\mathbf{9}}{45} = \frac{\mathbf{1}}{5}$
$\frac{\mathbf{18}}{45} = \frac{\mathbf{2}}{5}$
$\frac{\mathbf{27}}{45} = \frac{\mathbf{3}}{5}$
$\frac{\mathbf{36}}{45} = \frac{\mathbf{4}}{5}$
$\frac{\mathbf{45}}{45} = \frac{\mathbf{5}}{5}$

b) The second denominator must be 3 times the first denominator.
$\frac{6}{\mathbf{7}} = \frac{18}{\mathbf{21}}$
$\frac{6}{\mathbf{8}} = \frac{18}{\mathbf{24}}$
$\frac{6}{\mathbf{9}} = \frac{18}{\mathbf{27}}$
$\frac{6}{\mathbf{10}} = \frac{18}{\mathbf{30}}$

5. Various answers are possible:
a) For example, $\frac{5}{6} = \frac{\mathbf{10}}{\mathbf{12}} = \frac{\mathbf{15}}{\mathbf{18}} = \frac{\mathbf{50}}{\mathbf{60}}$.
b) Any fraction where the numerator = the denominator, for example, $\frac{10}{10} = \frac{\mathbf{3}}{\mathbf{3}}, \frac{\mathbf{6}}{\mathbf{6}}, \frac{\mathbf{11}}{\mathbf{11}}$.
c) Any fraction where the denominator = 8 times the numerator, for example, $\frac{1}{8} = \frac{\mathbf{2}}{\mathbf{16}} = \frac{\mathbf{3}}{\mathbf{24}} = \frac{\mathbf{10}}{\mathbf{80}}$.

6. Children should explain that $\frac{12}{20}$ and $\frac{9}{15}$ are both equivalent to $\frac{3}{5}$.

Reflect

The denominator of fractions that are equivalent to $\frac{1}{4}$ is 4 times its numerator.

For example, $\frac{1}{4} = \frac{2}{8} = \frac{5}{20} = \frac{10}{40}$

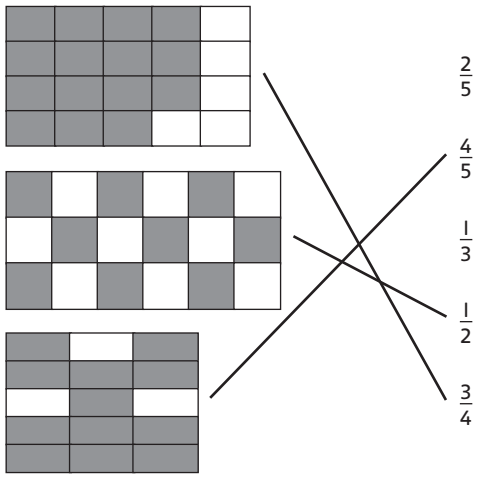
9 Simplify fractions

➜ pages 101–103

1. a) $\frac{2}{10} = \frac{1}{\mathbf{5}}$ b) $\frac{5}{10} = \frac{\mathbf{1}}{\mathbf{2}}$

2. a) $\frac{6}{9} = \frac{2}{3}$ b) $\frac{10}{12} = \frac{5}{6}$

3.



4. Richard ate the least amount of chocolate.

5. a) $\frac{12}{30}$ should be simplified by dividing by 6 to give $\frac{2}{5}$.
b) $\frac{8}{32}$ should be simplified by dividing by 8 to give $\frac{1}{4}$.
c) $\frac{18}{36}$ should be simplified by dividing by 18 to give $\frac{1}{2}$ or children should recognise that 18 is half of 36.

6. Children should not agree. $\frac{3}{9}$ can be simplified further by dividing by 3: $\frac{3}{9} = \frac{1}{3}$.

Reflect

A fraction is in its simplest form when 1 is the only common factor of the numerator and the denominator.

My journal

➜ page 104

There are many possible answers.
$\frac{3}{12} = \frac{6}{24} = \frac{30}{120}$
$\frac{3}{12} = \frac{1}{4}$ in its simplest form.
$\frac{6}{18} = \frac{3}{9} = \frac{12}{36}$
$\frac{6}{18} = \frac{1}{3}$ in its simplest form.
$\frac{11}{20} = \frac{22}{40} = \frac{33}{60} = \frac{44}{80}$
$\frac{11}{20}$ is already in its simplest form.

Power play

➜ page 105

There are many possible answers for each of the questions on the board.

- A fraction equivalent to $\frac{3}{4} = \frac{6}{8}, \frac{9}{12}, \frac{12}{16}$.
- A fraction equivalent to $\frac{15}{20} = \frac{3}{4}, \frac{45}{60}, \frac{30}{120}$.
- A fraction less than $\frac{1}{2}$ could be any unit fraction ($\frac{1}{3}, \frac{1}{4}, \frac{1}{5}$)or any fraction where the numerator is less than half of the denominator ($\frac{3}{10}, \frac{4}{9}, \frac{5}{12}$).
- $\frac{11}{13}$ can't be simplified because the numerator and denominator do not share a common factor other than 1, they are both prime numbers.
- A fraction equivalent to $\frac{1}{3}$ could be any fraction where the denominator is 3 × the numerator ($\frac{2}{6}, \frac{3}{9}, \frac{4}{12}$).
- A fraction less than $\frac{1}{3}$ could be any unit fraction with a denominator greater than 3 ($\frac{1}{4}, \frac{1}{5}, \frac{1}{6}$) or any fraction where the numerator is less than a third of the denominator ($\frac{2}{9}, \frac{3}{12}, \frac{4}{15}$).
- $\frac{21}{24}$ can be simplified to $\frac{7}{8}$ because the 3 is a factor of both the numerator and denominator.
- A fraction equivalent to $\frac{22}{33}$ could be $\frac{2}{3}$ or any fraction that is equivalent to $\frac{2}{3}$.
- A fraction equivalent to $\frac{1}{9}$ could be any fraction where the denominator is 9 times the numerator ($\frac{2}{18}, \frac{3}{27}, \frac{4}{36}$).

Unit 9 – Fractions (2)

1 Add and subtract two or more fractions

➜ pages 106–108

1. a) $\frac{4}{9}+\frac{4}{9}=\mathbf{\frac{8}{9}}$

b) $\frac{5}{9}+\frac{6}{9}=\mathbf{\frac{11}{9}}$

c) $\frac{7}{9}+\frac{8}{9}=\mathbf{\frac{15}{9}}$

d) $\frac{8}{9}-\frac{3}{9}=\mathbf{\frac{5}{9}}$

e) $\frac{11}{9}-\frac{5}{9}=\mathbf{\frac{6}{9}}$

f) $\frac{15}{9}-\frac{11}{9}=\mathbf{\frac{4}{9}}$

2. a) $\frac{3}{7}+\frac{3}{7}=\mathbf{\frac{6}{7}}$

b) $\frac{2}{5}+\frac{4}{5}=\mathbf{\frac{6}{5}}$

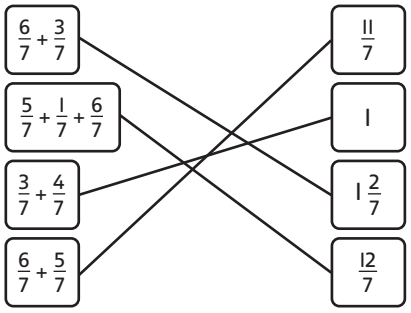
c) $\frac{11}{12}-\frac{5}{12}=\mathbf{\frac{6}{12}}$

d) $\frac{3}{10}+\frac{1}{10}+\frac{9}{19}=\mathbf{\frac{13}{10}}$

e) $\frac{3}{5}+\frac{3}{5}+\frac{3}{5}=\mathbf{\frac{9}{5}}$

f) 8 ninths + 5 ninths = $\mathbf{\frac{13}{9}}$

3.



4. a) Fred has added the denominators together, when he should only have added the numerators together.

b) $\frac{10}{8}$ ($\frac{5}{4}$ or $1\frac{2}{8}$ or $1\frac{1}{4}$)

5. Missing numbers:

a) $\frac{4}{5}+\mathbf{\frac{3}{5}}=\frac{7}{5}$ $\quad\frac{4}{5}+\mathbf{\frac{3}{5}}=1\frac{2}{5}$ $\quad\frac{4}{5}+\mathbf{\frac{4}{5}}=1\frac{3}{5}$

b) $\frac{11}{13}-\mathbf{\frac{4}{13}}=\frac{7}{13}$ $\quad\frac{7}{8}-\mathbf{\frac{4}{8}}=\frac{3}{8}$ $\quad\mathbf{\frac{5}{6}}+\frac{1}{6}=1$

c) Different answers are possible. For example:

$\frac{15}{8}=\frac{3}{8}+\mathbf{\frac{6}{8}}+\mathbf{\frac{6}{8}}$ (missing numerators should total 12)

$\frac{15}{8}=\frac{5}{8}+\mathbf{\frac{5}{8}}+\mathbf{\frac{5}{8}}$ (missing numerators should total 10)

$\frac{15}{8}=\frac{4}{8}+\mathbf{\frac{5}{8}}+\mathbf{\frac{6}{8}}$ (missing numerators should total 11)

$\frac{15}{8}=\frac{6}{8}+\mathbf{\frac{5}{8}}+\mathbf{\frac{4}{8}}$ (missing numerators should total 9).

Reflect

Children's diagrams may vary. For example, they may draw a number line marked in fifths and count on $\frac{4}{5}$ from $\frac{4}{5}$ or they may draw two shapes divided into fifths with $\frac{4}{5}$ of each shape shaded.

2 Add fractions and mixed numbers

➜ pages 109–111

1. a) $1\frac{1}{4}+\frac{1}{4}=\mathbf{1\frac{2}{4}}=\mathbf{1\frac{1}{2}}$

b) $1\frac{1}{4}+\frac{2}{4}=\mathbf{1\frac{3}{4}}$

c) $1\frac{1}{4}+\frac{3}{4}=\mathbf{1\frac{4}{4}}=\mathbf{2}$

d) $1\frac{1}{4}+\frac{5}{4}=\mathbf{2\frac{2}{4}}=\mathbf{2\frac{1}{2}}$

2. a) $2\frac{2}{3}+\frac{2}{3}=\mathbf{3\frac{1}{3}}$

b) $1\frac{4}{5}+\frac{3}{5}=\mathbf{2\frac{2}{5}}$

3. a) $1\frac{4}{7}+\frac{2}{7}=\mathbf{1\frac{6}{7}}$

b) $1\frac{4}{7}+\frac{3}{7}=\mathbf{1\frac{7}{7}}=\mathbf{2}$

c) $1\frac{4}{7}+\frac{5}{7}=\mathbf{1\frac{9}{7}}=\mathbf{2\frac{2}{7}}$

d) $1\frac{4}{7}+\frac{6}{7}=\mathbf{1\frac{10}{7}}=\mathbf{2\frac{3}{7}}$

4. $1\frac{7}{10}+\frac{9}{10}=\mathbf{2\frac{6}{10}}=\mathbf{2\frac{3}{5}}$ kg

5. $3\frac{3}{4}+\frac{3}{4}=\mathbf{4\frac{2}{4}}=\mathbf{4\frac{1}{2}}$

6. a) $2\frac{4}{5}+\mathbf{\frac{4}{5}}=3\frac{3}{5}$

b) $1\mathbf{\frac{11}{7}}+\frac{6}{7}=3\frac{3}{7}$

Reflect

Children should explain using a fraction strip to help them add a mixed number to a fraction. They should also explain crossing from one whole to another.

3 Subtract from mixed numbers

➜ pages 112–114

1. a) $2\frac{3}{5}-\frac{2}{5}=\mathbf{2\frac{1}{5}}$

b) $2\frac{3}{5}-\frac{3}{5}=\mathbf{2}$

c) $2\frac{3}{5}-\frac{4}{5}=\mathbf{1\frac{4}{5}}$

d) $2\frac{3}{5}-\frac{7}{5}=\mathbf{1\frac{1}{5}}$

2. $2\frac{7}{10}-\mathbf{\frac{9}{10}}=\mathbf{1\frac{8}{10}}=\mathbf{1\frac{4}{5}}$ kg

3. a) $1\frac{7}{8}-\frac{3}{8}=\mathbf{1\frac{4}{8}}=\mathbf{1\frac{1}{2}}$

b) $2\frac{1}{9}-\frac{5}{9}=\mathbf{1\frac{5}{9}}$

4. a) $3\frac{2}{5}-\frac{4}{5}=\mathbf{2\frac{3}{5}}$

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

c) $1\frac{5}{8}-\frac{7}{8}=\mathbf{\frac{6}{8}}$

d) $3\frac{2}{8}-\frac{5}{8}=\mathbf{2\frac{5}{8}}$

e) $7\frac{5}{12}-\frac{11}{12}=\mathbf{7\frac{6}{12}}=\mathbf{7\frac{1}{2}}$

f) $\mathbf{4\frac{2}{10}}-\frac{7}{10}=3\frac{5}{10}$

g) $\mathbf{5}\frac{1}{8}-\frac{5}{8}=4\mathbf{\frac{4}{8}}$

h) $7\frac{1}{5}-\mathbf{\frac{3}{5}}=6\frac{3}{5}$

5. $2\frac{9}{11} - \frac{3}{11} - \frac{9}{11} = \mathbf{1\frac{8}{11}}$

6. a) Millie has enough juice for **3** days.

b) There is $\mathbf{\frac{1}{7}}$ of a litre of juice left over.

Reflect

$2\frac{1}{5} - \frac{3}{5} = \mathbf{1\frac{3}{5}}$

Children's diagrams may vary. For example, a fraction strip showing $2\frac{1}{5}$ with $\frac{3}{5}$ crossed out.

4 Subtract from whole amounts

→ pages 115–117

1. $2 - \frac{3}{8} = 1\frac{8}{8} - \frac{3}{8} = 1\frac{5}{8}$.

Amelia has $\mathbf{1\frac{5}{8}}$ cake left.

2. a) $3 - \frac{1}{5} = \mathbf{2\frac{4}{5}}$

b) $3 - \frac{2}{5} = \mathbf{2\frac{3}{5}}$

c) $3 - \frac{3}{5} = \mathbf{2\frac{2}{5}}$

d) $3 - \frac{4}{5} = \mathbf{2\frac{1}{5}}$

e) $3 - \frac{5}{5} = \mathbf{1\frac{5}{5}}$ or $\mathbf{2\frac{0}{5} = 2}$

3. a) $3 - \frac{4}{7} = \mathbf{2\frac{3}{7}}$

b) Children should explain that Mary has worked out the answer to $\frac{5}{7} - \frac{2}{7}$, not $5 - \frac{2}{7}$. Mary has forgotten that the 5 represents 5 wholes or $\frac{35}{7}$.

The correct answer is $5 - \frac{2}{7} = 4\frac{5}{7}$.

4. a) $4 - \frac{6}{9} = \mathbf{3\frac{3}{9}}$ $4 - \frac{7}{9} = \mathbf{3\frac{2}{9}}$ $4 - \frac{8}{9} = \mathbf{3\frac{1}{9}}$

b) $5 - \frac{6}{9} = \mathbf{4\frac{3}{9}}$ $5 - \frac{7}{9} = \mathbf{4\frac{2}{9}}$ $5 - \frac{8}{9} = \mathbf{4\frac{1}{9}}$

c) $10 - \frac{2}{3} = \mathbf{9\frac{1}{3}}$ $8 - \frac{2}{3} = \mathbf{7\frac{1}{3}}$ $6 - \frac{2}{3} = \mathbf{5\frac{1}{3}}$

d) $6 - \frac{3}{4} = \mathbf{5\frac{1}{4}}$ $6 - \frac{4}{5} = \mathbf{5\frac{1}{5}}$ $6 - \frac{9}{10} = \mathbf{5\frac{1}{10}}$

5. a) $5 - \mathbf{\frac{4}{7}} = 4\frac{3}{7}$

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

c) $16 - \frac{2}{9} = \mathbf{15\frac{7}{9}}$

d) $10 - \mathbf{\frac{2}{3}} = 9\frac{1}{3}$

e) $5 - \mathbf{\frac{2}{5}} = 4\frac{3}{5}$

f) $\mathbf{10} - \frac{1}{4} = 9\frac{3}{4}$

6. No, Jen will not complete the run in less than 1 hour.

After 60 mins Jen will have run: $\frac{5}{8} + \frac{5}{8} + \frac{5}{8} + \frac{5}{8} + \frac{5}{8} + \frac{5}{8} + \frac{5}{8} = \frac{30}{8} = 3\frac{6}{8}$ km.

Reflect

No, the calculation is not correct. $4 - \frac{2}{9} = 3\frac{7}{9}$

Children's diagrams may vary. For example, 4 circles divided into ninths with 2 ninths crossed out to leave 3 wholes and 7 ninths.

5 Problem solving – add and subtract fractions (I)

→ pages 118–120

1. a) There is $\mathbf{2\frac{2}{7}}$ **kg** of flour left in the cupboard.

b) Tulpesh uses $\mathbf{1\frac{4}{7}}$ **kg** of flour.

c) $\mathbf{2\frac{2}{7}}$ **kg** of flour is used in total.

2. The farmer ploughed $\mathbf{1\frac{2}{7}}$ acres of his field in total.

3. $\mathbf{\frac{9}{17}}$ of the juice is remaining.

4. Children's answers will vary. For example: $\mathbf{\frac{3}{8} + \frac{9}{8} - \frac{5}{8} = \frac{7}{8}}$ or $\mathbf{\frac{8}{8} + \frac{6}{8} - \frac{7}{8} = \frac{7}{8}}$.

5. $\mathbf{\frac{4}{7}}$ **kg** of strawberries were left.

Reflect

Children's answers will vary.

6 Problem solving – add and subtract fractions (2)

→ pages 121–123

1. $\mathbf{\frac{12}{8}}$ or $\mathbf{1\frac{1}{2}}$ of the omelettes have been eaten in total.

2. a) $\frac{9}{5} - \mathbf{\frac{2}{5}} = \frac{7}{5}$

b) $\frac{3}{5} + \mathbf{\frac{4}{5}} = \frac{7}{5}$

c) $\frac{1}{5} + \frac{1}{5} + \mathbf{\frac{5}{5}} = \frac{7}{5}$

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

e) $\frac{10}{5} - \mathbf{\frac{3}{5}} = \frac{7}{5}$

f) $2 - \mathbf{\frac{3}{5}} = \frac{7}{5}$

g) $2 - \frac{1}{5} - \mathbf{\frac{2}{5}} = \frac{7}{5}$

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

3. a) $\frac{5}{6} + \frac{3}{6} - \frac{4}{6} = \mathbf{\frac{4}{6}}$

b) $\frac{7}{9} - \frac{5}{9} + \frac{8}{9} = \mathbf{\frac{10}{9}}$

c) $1 + \frac{3}{5} + \frac{2}{5} - \frac{8}{5} = \mathbf{\frac{2}{5}}$

4. Two full jars of coffee can be made with $\frac{1}{8}$ left over.

$\frac{3}{8} + \frac{7}{8} + \frac{7}{8} = 1\frac{7}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8} = 2\frac{1}{8}$

5. Florence runs $\mathbf{2\frac{1}{4}}$ **km** more than Kofi.

6. a) $\frac{3}{6} + \frac{2}{5} + \frac{3}{6} + \frac{3}{5} = \frac{3}{6} + \frac{3}{6} + \frac{2}{5} + \frac{3}{5} = 1 + 1 = \mathbf{2}$

b) $\frac{4}{7} + \frac{3}{8} + \frac{5}{8} + \frac{3}{7} = \frac{4}{7} + \frac{3}{7} + \frac{3}{8} + \frac{5}{8} = 1 + 1 = \mathbf{2}$

c) $\frac{4}{5} + \frac{1}{5} - \frac{2}{3} = 1 - \frac{2}{3} = \mathbf{\frac{1}{3}}$

Reflect

Children's calculations will vary. For example,

$1 + \frac{7}{10} = \frac{10}{10} + \frac{7}{10} = \frac{17}{10}$.

7 Problem solving – add and subtract fractions (2)

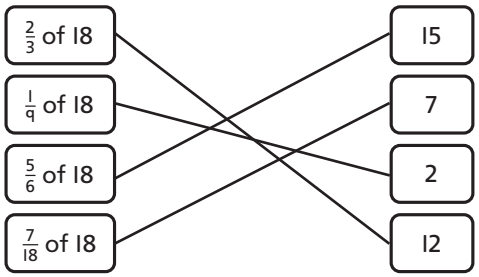
➜ pages 124–126

1. a) **42** ÷ **7** = **6**
The small teddy bear is **6 cm** tall.
b) **42** ÷ **7** = **6**
6 × **4** = **24**
The medium teddy bear is **24 cm** tall.

2. a) $\frac{1}{3}$ of 30 m = **10 m**
b) $\frac{2}{3}$ of 27 kg = **18 kg**
c) $\frac{5}{6}$ of £18 = **£15**

3. The statement is true.
$\frac{3}{8}$ of 24 is $\frac{3}{8} \times 24 = \frac{78}{8} = 9$.
$\frac{1}{4}$ of 36 is $\frac{1}{4} \times 36 = \frac{36}{4} = 9$.

4.



5. a) $\frac{1}{3}$ of **6** = 2
b) $\frac{1}{5}$ of **40** = 8
c) $\frac{1}{\mathbf{7}}$ of 70 kg = 10 kg
d) $\frac{\mathbf{5}}{\mathbf{6}}$ of 42 = 35

6. $\frac{5}{7}$ of 56 is 40, so Chloe scored 40 marks in the test.
$\frac{3}{8}$ of 56 is 21, so Mike got 21 marks wrong in the test.
He therefore scored 56 – 21 = 35 marks in the test.
Chloe got **5** more marks than Mike.

Reflect

Children should write a question based on the calculation $\frac{7}{9}$ of 45 cm = 35 cm. For example: A piece of ribbon is 45 cm long. Amy cuts $\frac{7}{9}$ of the ribbon. How long is the piece Amy cuts?

8 Problem solving – add and subtract fractions (2)

➜ pages 127–129

1. $\frac{\mathbf{2}}{\mathbf{9}}$ of **36** is greater.

2. a) **60**
b) **45**

3. a) Red = **2** Blue = **6** Yellow = **8**
b) Red = **24** Blue = **6** Green = **10**

4. Cailyn has made the number **387**.

5. a) $\frac{3}{5}$ of 40 = $\frac{2}{3}$ of **36**
b) $\frac{3}{5}$ of 40 = $\frac{2}{\mathbf{5}}$ of 60

Reflect

Eva has found $\frac{2}{3}$ of 18 (a part) instead of the whole if $\frac{2}{3}$ = 18.
If $\frac{2}{3}$ = 18, then $\frac{1}{3}$ = 9 and $\frac{3}{3}$ = 27.
The original number is 27 not 12.

My journal

➜ page 130

1. a) $1 = \frac{6}{6}$ so, $1\frac{5}{6} = \frac{6}{6} + \frac{5}{6} = \frac{11}{6}$
b) $\frac{5}{6} + \frac{3}{6} = \frac{8}{6} = \frac{6}{6} + \frac{2}{6} = 1\frac{2}{6}$
c) $2 = 1 + \frac{6}{6}$ so, $2 - \frac{5}{6} = 1\frac{6}{6} - \frac{5}{6} = 1\frac{1}{6}$

Power puzzle

➜ page 131

Emma gets 8 grapes, Andy gets 13 grapes, Reena gets 9 grapes and Lee gets 9 grapes.

Holly eats **9** grapes in total.

Andy gets the most grapes.

Unit 10 – Decimals

1 Tenths as fractions

➜ pages 132–134

1. a) $\frac{2}{10} = \frac{1}{5}$ is shaded.
b) $\frac{9}{10}$ is shaded.

2. a) $\frac{3}{10}$ of the cubes are grey.
b) $\frac{6}{10} = \frac{3}{5}$ of the beads are grey.

3. a) $\frac{1}{10}$
b) $\frac{5}{10} = \frac{1}{2}$

4. Children should shade in **7** sections of each diagram in parts a) to c).

5. Annie is not correct. Although 3 pieces are shaded, the shape is not divided into 10 equal pieces so these pieces do not represent $\frac{3}{10}$.

6. Children should shade in **half of 1 section** of each diagram in parts a) and b).

Reflect

Children should explain that there are 10 tenths in a whole. Children may use 1 ÷ 10 = 0·1 (1 tenth), so 1 tenth × 10 = 1. They may show a shape divided into 10 equal pieces or a ten frame filled with 10 counters.

2 Tenths as decimals

➜ pages 135–137

1. a) 1·0
b) 0·5
c) 0·9

2. a) Children should explain that Danny is wrong because 10 tenths makes 1 or one whole. 0·10 is the same as 0·1.
b) Danny has made 1.

3. a) Children should draw **three 0·1 counters**.
b) Children should draw **six 0·1 counters**.

4. a) The white cubes represent **0·7** of the whole.
b) The white beads represent **0·4** of the whole.

5. a) Children should shade in **2** sections.
b) Children should shade in **2** sections.
c) Children should shade in **half of 1** section.

Reflect

Children's answers may vary. Various representations are possible including 2 tenths counters in a place value grid, 2 counters in a ten frame or a fraction strip divided into 10 with 2 sections shaded.

3 Tenths on a place value grid

➜ pages 138–140

1. a) 1·7
b) 2·6

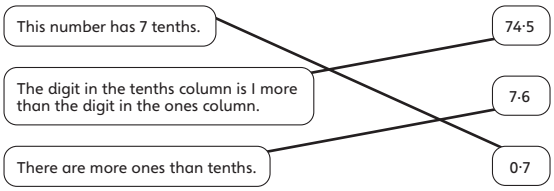
2. a) The number **4·3** has **4** ones and **3** tenths.
b) The number **2·6** has **2** ones and **6** tenths.

3. a) Children should draw 3 ones counters and 5 tenths counters.
b) Children should draw 4 tens counters, 2 ones counters and 6 tenths counters.

4. a) Filip is not correct because there are 4 tens and 0 ones, not 4 ones.
b) Filip has made the number **40·6**.

5. a) 3·7 has **37** tenths.
b) 24·7 has **247** tenths.
c) 73·5 has **735** tenths.

6.



7. a) The largest decimal Olivia can make is **87·6**.
b) The smallest decimal Olivia can make is **26·7**.

Reflect

Children should show 3·5 and 17·5 on a place value grid. They should explain that both numbers have 5 tenths but they have a different number of tens and ones.

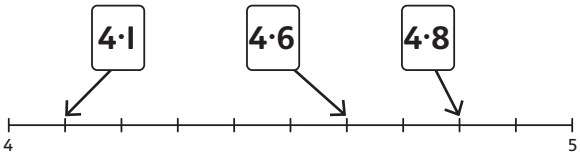
4 Tenths on a number line (I)

➜ pages 141–143

1. a) $\frac{4}{10}, \frac{5}{10}, \frac{6}{10}, \frac{7}{10}, \frac{8}{10}, \frac{9}{10}$
b) 0·2, 0·3, 0·5, 0·6, 0·9, 1
c) 2·2, 2·4, 2·7, 2·9

2. The arrows point to 3·2, 3·5 and 3·7.

3.

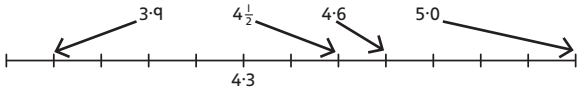


4. When Ambika reaches 2·9, the next number should be 3 not 2·10. Children might explain that 10 tenths equals 1 not 0·1 or that 2·10 is the same as 2·1.

5. 4·8, 4·9, 5, 5·1

6. 3·9, 4, 4·1, 4·2, 4·3, 4·4, 4·6, 4·7, 4·8, 4·9, 5·1, 5·2

7.



Reflect

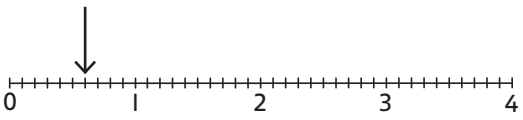
After 4·9 the next number is 5 as 10 tens is equal to 1.

The correct number line is: 4·7, 4·8, 4·9, 5, 5·1, 5·2, 5·3, 5·4, 5·5, 5·6, 5·7, 5·8, 5·9, 6, 6·1.

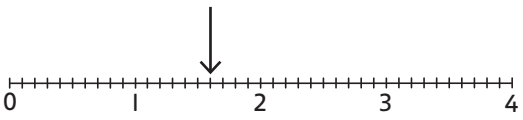
5 Tenths on a number line (2)

→ pages 144–146

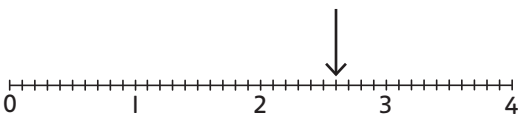
1 a)



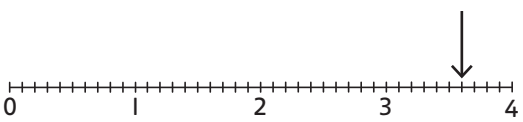
b)



c)



d)



2. The arrows point to 7·5, 8·7, 9·3 and 10·9.

3. a) The worm is **1·1 cm** long.
b) The ladybird is **0·8 cm** long.

4. a) The container holds **9·3 ml** of water.
b) The container holds **15·9 ml** of water.

5. a) The grasshopper is **9·6 cm** long.
b) The second grasshopper is **8·9 cm** long.

Reflect

Children's answers will vary depending on the objects they measure.

6 Divide 1-digit by 10

→ pages 147–149

1. 3 ÷ 10 = **0·3**

2. a) 4 ÷ 10 = **0·4**
b) 7 ÷ 10 = **0·7**
c) 9 ÷ 10 = **0·9**
d) 2 ÷ 10 = **0·2**

3. a) Each section in the bar model represents **0·5**.
b) Each section in the bar model represents **0·6**.

4. a) 6 ÷ 10 = 0·**6**
b) 8 ÷ **10** = 0·8
c) 1 ÷ 10 = **0·1**
d) 0 ÷ 10 = **0**
e) **4** ÷ 10 = 0·4
f) 0·5 = **5** ÷ 10
g) 0·3 = 3 ÷ **10**
h) **10** ÷ 10 = 1

5. Children should explain that 1 ones counter is equal to 10 tenths counters. However, Max is not just exchanging 1 ones counter for 10 tenths counters, he is dividing the ones counters by 10. 1 ÷ 10 = $\frac{1}{10}$ or 0·1 or 1 tenth.

6. I **disagree** because **5 divided by 10 does not equal 2. 5 ÷ 10 = $\frac{5}{10}$ or 0·5**.

7. Children should notice that when a single-digit number is divided by 10 the answer will have the digit in the tenths column and 0 in the ones column. The pattern will continue: 4 ÷ 10 = 0·4, 5 ÷ 10 = 0·5.

Reflect

Children's explanations will vary but methods might include using a place value grid and exchanging to convert the ones into tenths and then dividing these by 10. Answers should show that when a 1-digit number is divided by 10 the answer will have the digit in the tenths column and 0 in the ones column.

7 Divide 2-digits by 10

→ pages 150–152

1. a) Andy could move the counters on the place value grid. He should move the 3 ones to the tenths column and the 1 ten to the ones column.
b) 13 ÷ 10 = **1·3**
c) Children should explain that when you divide by 10, the digits move one place value column to the right.

2. a) 15 ÷ 10 = **1·5**
b) 19 ÷ 10 = **1·9**
c) 25 ÷ 10 = **2·5**
d) 50 ÷ 10 = **5**
e) 93 ÷ 10 = **9·3**
f) 7 ÷ 10 = **0·7**
g) 19 ÷ 10 = **1·9**
h) 38 ÷ 10 = **3·8**
i) 77 ÷ 10 = **7·7**
j) 100 ÷ 10 = **10**

3. Each section in the bar model represents **7·6**.

4. Each piece of rope is **2·8 m** long.

5. 43 ÷ 10 = 3·4 **False**
10 ÷ 43 = 4·3 **False**
43 ÷ 10 = 4·3 **True**
4·3 = 43 ÷ 10 **True**

6. a) **64** ÷ 10 = 6·4
b) **18** ÷ 10 = 1·8
c) **72** ÷ 10 = 7·2
d) 4·4 = 44 ÷ **10**
e) **39** ÷ 10 = 3·9
f) 6·5 = **65** ÷ 10

7. This statement is **sometimes true**. If the 2-digit number has the digits 1 to 9 in the ones column then dividing by 10 will give an answer with a digit in the tenths column. However, if the 2-digit number has a 0 in the ones column, then dividing by 10 will give a 0 in the tenths column, which does not need to be written in. For example: 12 ÷ 10 = 1·2 but 10 ÷ 10 = 1.

8. The missing number could be 78, 77, 76, 75 or 74. There are **5** ways to complete the statement.

Reflect

Same: Both are being divided by 10. The digits stay the same but their positions in the place value grid changes – they will move one place to the right. The digit in the ones column will become the digit in the tenths column. Answers will have no digit in the tens column.

Different: The answer when dividing the 2-digit number by 10 will have a (non-zero) digit in the ones column, whereas the answer when dividing the 1-digit number by 10 will have zero in the ones column. Dividing the 2-digit number by 10 could make a whole number (if the 2-digit number was a multiple of 10) but dividing the 1-digit number by 10 will always produce a decimal.

8 Hundredths as fractions

➜ pages 153–155

1. a) $\frac{\mathbf{2}}{100}$
b) $\frac{\mathbf{17}}{100}$
c) $\frac{\mathbf{31}}{100}$
d) $\frac{\mathbf{97}}{100}$

2. Children should shade:
a) **14** squares
b) **30** squares

3. a) $\frac{\mathbf{10}}{100} = \frac{1}{10}$
b) $\frac{\mathbf{29}}{100}$

4. $\frac{\mathbf{70}}{100}$ and $\frac{\mathbf{7}}{10}$ of the grid is shaded.

5. a) Children should explain that both are correct because $\frac{3}{10}$ is equivalent to $\frac{30}{100}$, so $\frac{3}{10} + \frac{7}{100}$ is equivalent to $\frac{37}{100}$.
b) $\frac{5}{10}$ is equivalent to $\frac{50}{100}$, so children should shade **53** squares.

Reflect

23 out of 100 squares are shaded in which represents $\frac{23}{100}$ or 2 tenths and 3 hundredths.

9 Hundredths as decimals

➜ pages 156–158

1. a) **0·02**
b) **0·15**
c) **0·51**
d) **0·95**

2. Children should shade:
a) **7** squares
b) **28** squares

3. 0·11

4.

Fraction	$\frac{16}{100}$	$\frac{18}{100}$	$\frac{20}{100}$	$\frac{22}{100}$	$\frac{24}{100}$
Decimal	0·16	**0·18**	0·20	**0·22**	**0·24**

Children's answers in the final column will vary but should be equivalent.

5. a) $\frac{32}{100}$ = **0·32**
b) 0·27 = $\frac{\mathbf{27}}{100}$
c) 0·39 = $\frac{\mathbf{39}}{\mathbf{100}}$
d) Nineteen hundredths = **0·19**
e) 0·46 = **46** hundredths
f) $\frac{\mathbf{52}}{100}$ = 0·52
g) 0·59 = $\frac{\mathbf{59}}{\mathbf{100}}$
h) $\frac{\mathbf{93}}{\mathbf{100}}$ = 0·93
i) Ninety hundredths = **0·9**
j) 0·03 = **3** hundredths

6. I **disagree** because **only 5 of 100 squares are shaded which is $\frac{5}{100}$ = 0·05. If 0·5 of the grid was shaded, $\frac{50}{100}$ squares would be shaded**.

7. Mo has $\frac{\mathbf{23}}{100}$, or **0·23**.
Isla has $\frac{\mathbf{45}}{100}$, or **0·45**.
Zac has $\frac{\mathbf{32}}{100}$, or **0·32**.

Reflect

Children's representations will vary. For example, they may shade in 35 squares on a 100 square or show 3 tenths counters and 5 hundredths counters on a place value grid.

10 Hundredths on a place value grid

➜ pages 159–161

1. a) **0·38** c) **2·85** e) **13·8**
b) **0·72** d) **2·03** f) **13·85**

2. Children should draw 1 ones counter, 3 tenths counters and 5 hundredths counters.

3. a) Children should circle: 0·57 and 7·58.
b) Children should circle: 0·03 and 7·13 and 9·33.

4. a) The value of the 7 digit is **7 tenths**.
b) The value of the 2 digit is **2 hundredths**.
c) The value of the 2 digit is **2 ones**.

5. a) Part: 0·07
b) Part: 0·8
c) Parts: 1, 0·8 and 0·07
d) Whole: 0·75

6. a) 6·18 = 6 + 0·1 + **0·08**
b) 1·59 = 1 + **0·5** + **0·09**
c) **5·61** = 5 + 0·6 + 0·01
d) **7·03** = 7 + 0·03
e) **7·83** = 7 + 0·03 + 0·8

7. Lee had 5 tenths and 10 hundredths which are equivalent to 1 tenth so his place value grid represents 0·6 which is 6 tenths.

Reflect

Children's answers may vary but they should know that 8·45 has 8 ones, 4 tenths and 5 hundredths.

I1 Divide 1 or 2 digits by 100

→ pages 162–164

1. a) Children should shade in **1** square on each hundredths grid.
b) 5 ÷ 100 = **0·05**

2. Children's explanations may vary. For example:
The values of the digits change but the order of the digits remains the same.
The digits move 2 columns to the right when dividing by 100.
So, when you divide 15 by 100 the answer is 0·15.

3. Missing numbers:
a) 9 ÷ 100 = **0·09**
b) 12 ÷ 100 = **0·12**
c) 17 ÷ 100 = **0·17**
d) 28 ÷ 100 = **0·28**
e) 35 ÷ 100 = **0·35**
f) 42 ÷ 100 = **0·42**
g) 7 ÷ 100 = **0·07**
h) 70 ÷ 100 = **0·7**
i) 83 ÷ 100 = **0·83**
j) 99 ÷ 100 = **0·99**

4. There are **0·48 litres** of water in each bucket.

5. a) **2** ÷ 100 = 0·02
b) **38** ÷ 100 = 0·38
c) **60** ÷ 100 = 0·6
d) 33 ÷ **100** = 0·33

6. False
False
True
True

7. a) The value of the digit 5 in the answer is $\frac{5}{100}$ or **5 hundredths**.
b) The value of the digit 9 in the answer is $\frac{9}{100}$ or **9 hundredths**.

Reflect

Children should explain that $\frac{12}{100}$ is the same as 12 ÷ 100, so if you know that $\frac{12}{100}$ = 0·12 then you know 12 ÷ 100 = 0·12.

I2 Divide by 10 and 100

→ pages 165–167

1. a) 12 ÷ 10 = **1·2**
12 ÷ 100 = **0·12**
b) 35 ÷ 10 = **3·5**
35 ÷ 100 = **0·35**
c) 48 ÷ 10 = **4·8**
48 ÷ 100 = **0·48**
d) 57 ÷ 10 = **5·7**
57 ÷ 100 = **0·57**
e) 91 ÷ 10 = **9·1**
91 ÷ 100 = **0·91**

Children should notice that the digits move 1 column to the right when you divide by 10 and 2 columns to the right when you divide by 100.

2. The mass of each box is **4·5 kg**.

3. **83** ÷ **10** = **8·3**

4. Children should circle: 3 hundredths.

5. a) 56 ÷ 10 = **5·6**
56 ÷ 100 = **0·56**
b) **34** ÷ 10 = 3·4
34 ÷ 100 = 0·34
c) 72 ÷ 10 = **7·2**
72 ÷ 100 = **0·72**
d) 14 ÷ **10** = 1·4
14 ÷ **100** = 0·14

6. a) 68 ÷ 10 = **6·8**
b) 46 ÷ 100 = **0·46**
c) **0·18** = 18 ÷ 100
d) 4·9 = 48 ÷ **10**
e) 0·97 = **97** ÷ 100
f) 0 ÷ 100 = **0**

7. a) 96 ÷ 10 = 9·6, so Danny started with the number 96.
96 ÷ 100 = **0·96**
b) 7 ÷ 100 = 0·07, so Bella started with the number 7.
7 ÷ 10 = **0·7**

8. $\frac{1}{10}$ of 7 = 0·7
$\frac{1}{100}$ of 70 = 0·7
So, $\frac{1}{10}$ of 7 is equal to $\frac{1}{100}$ of 70.

Reflect

Children's answers may vary but they might explain that when dividing a number by 10 or 100 the values of the digits change but the order of the digits remains the same. The digits move one column to the right when dividing by 10 and 2 columns to the right when dividing by 100.

They might also explain that dividing by 100 is the same as dividing by 10 and then dividing by 10 again.

My journal

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1. Children should make the following numbers: 1·34, 1·43, 3·14, 3·41, 4·13, 4·31, 13·4, 14·3, 31·4, 34·1, 41·3 and 43·1.

2. Children's answers will depend on the number they have chosen. Visual representations could include place value grids, hundredths grids and part-whole models.

Power play

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Check that children understand the difference between moving 0·1 more or less and 0·01 more or less.