Unit 6: Multiplication and division (2)

Making equal groups

➜ pages 6–8

1. Children should have completed the number line by continuing to jump back in 5s. 20 ÷ 5 = 4. Jo can make 4 towers of 5 blocks.

2. a) 10 ÷ 5 = 2
b) 16 ÷ 2 = 8

3. I think the second child is right. Children could have described their reasoning in different ways, e.g.

The first child made a mistake about the number of tennis balls in each group because the picture shows the tennis balls grouped in 3s.

4. 20 ÷ 2 makes the most groups. Children could have described their reasoning in different ways, e.g.

This is because the answer is 10, which is greater than 4 or 2. This is because you are arranging 20 into groups of the smallest size. This will give the greatest number of groups.

Reflect

15 ÷ 5 = 3. Children should have drawn three jumps of 5 on a number line backwards from 15 to 0.

Sharing and grouping

➜ pages 9–11

1. 15 ÷ 5 = 3. There are 3 flowers in each vase.

2. 15 ÷ 3 = 5. Each wheelbarrow carries 5 bricks.

3. a) 4 ÷ 4 = 1. Each class gets 1 hockey stick.
b) 12 ÷ 4 = 3. Each class gets 3 balls.

4. The 10 represents the total number of carrots. The 2 represents the number of rabbits. The 5 represents the number of carrots each rabbit will get when the carrots are shared into 2 equal sets.

5. Children should have joined the sentences as follows:

I shared the ice lollies between 4 people. ➜ Each person had 5.

I shared the ice lollies between 2 people. ➜ Each person had 10.

20 ÷ 4 = 5

20 ÷ 2 = 10

Reflect

Children should have drawn 10 marbles shared between 5 people so each person will have 2 marbles.

10 ÷ 5 = 2.

Children should have identified that the 10 represents the total number of marbles. The 5 represents the number of people. The 2 represents the number of marbles each person will get when the marbles are shared into five equal sets.

Dividing by 2

➜ pages 12–14

1. 8 ÷ 2 = 4. There are 4 pairs of swans.

2. 14 ÷ 2 = 7. 7 pictures can be hung up.

3. 3 × 2 = 6 8 × 2 = 16
6 ÷ 2 = 3 16 ÷ 2 = 8

4. 4 × 2 = 8 6 × 2 = 12
8 ÷ 2 = 4 12 ÷ 2 = 6
5 × 2 = 10 7 × 2 = 14
10 ÷ 2 = 5 14 ÷ 2 = 7

5. Children should have matched times-table facts to completed divisions as follows:

1 × 2 = 2 ➜ 2 ÷ 2 = 1

2 × 2 = 4 ➜ 4 ÷ 2 = 2

3 × 2 = 6 (no matching division number sentence, children could have written in 6 ÷ 2 = 3)

4 × 2 = 8 ➜ 8 ÷ 2 = 4

5 × 2 = 10 ➜ 10 ÷ 2 = 5

6 × 2 = 12 (no matching division number sentence, children could have written in 12 ÷ 2 = 6)

7 × 2 = 14 ➜ 14 ÷ 2 = 7

8 × 2 = 16 ➜ 16 ÷ 2 = 8

Reflect

Children may have given different reasoning, e.g.

So I know that 10 ÷ 2 = 5 because 10 is 5 groups of 2.

So I know that 10 ÷ 2 = 5 because division is the inverse of multiplication.

So I know that 10 ÷ 2 = 5 because 5 is half of 10.

Odd and even numbers

➜ pages 15–17

1. There are 8 children. There will be 0 on their own.
So 8 is an even number.
There are 9 children. There will be 1 on their own.
So 9 is an odd number.

2. 11 is an odd number.
19 is an odd number.
14 is an even number.

3. Children should have ticked the picture of 7 straws.

4. The following answers are possible: 4 and 9, 6 and 11, 14 and 9, 16 and 11.

Reflect

Children should have recognised that Jamal cannot make groups of two because he has 9 stars and 9 is an odd number.

Dividing by 5

➜ pages 18–20

1. Children should have completed the number line to show three jumps of 5 backwards from 15 to 0.
15 ÷ 5 = 3.

2. Children should have completed the number line to show six jumps of 5 backwards from 30 to 0.
30 ÷ 5 = 6. Tao can make 6 house shapes.

3. 10 ÷ 5 = 2 20 ÷ 5 = 4
5 × 5 = 25 7 × 5 = 35
25 ÷ 5 = 5 35 ÷ 5 = 7

4. 20 ÷ 5 = 4 40 ÷ 5 = 8
25 ÷ 5 = 5 35 ÷ 5 = 7

5. Malik could have chosen 10, 20, 30 or 40. Lily could have chosen 5, 15, 25, 35 or 45. Children could have described what they noticed in different ways, e.g.

Malik's numbers all end in 0. Malik's numbers and in the 10 times-table.

Lily's numbers all end in 5. Lily's numbers are in the 5 times-table but not in the 10 times-table.

Reflect

Each friend gets 7 grapes. Children could have explained different methods, e.g.

I shared 35 counters into 5 equal sets and each set had 7 counters in so I knew the answer was 7.

I know that 7 × 5 = 35, so I know that 35 ÷ 5 = 7.

Dividing by 10

➜ pages 21–23

1. 40 ÷ 10 = 4. She plants 4 rows.

2. 60 ÷ 10 = 6
30 ÷ 10 = 3
50 ÷ 10 = 5

3. Children should have completed and matched the number sentences as follows:
I know 3 × 10 = 30 ➜ so 30 ÷ 10 = 3
I know 7 × 10 = 70 ➜ so 70 ÷ 10 = 7
I know 4 × 10 = 40 ➜ so 40 ÷ 10 = 4
I know 9 × 10 = 90 ➜ so 90 ÷ 10 = 9

4. Missing number from top to bottom as follows:
Left-hand column: 4, 6, 8, 7, 90, 2, 10, 3
Right-hand column: 1, 10, 30, 5, 60, 7, 10

5. a) square = 3, triangle = 97
b) square = 7, triangle = 3

Reflect

Children should have been able to use the 10 times-table to write related division sentences, e.g.

10 ÷ 10 = 1, 20 ÷ 10 = 2, 30 ÷ 10 = 3 … 100 ÷ 10 = 10.

Some children may have written other facts, e.g.
110 ÷ 10 = 11

Bar modelling – grouping

➜ pages 24–26

1. 14, 14 ÷ 2 = 7. There are 7 pairs.

2. 40 ÷ 5 = 8. Jamal can make 8 patterns.

3. 40 ÷ 10 = 4. 40 is 4 groups of 10.
10 ÷ 2 = 5. 10 is 5 groups of 2.

4. Children should have matched the pictures, bar models and number sentences as follows:
sets of stars ➜ 4 groups of 4 (16) ➜ 16 ÷ 4 = 4
array of counters ➜ 4 groups of 3 (12) ➜ 12 ÷ 3 = 4
towers of cubes ➜ 3 groups of 5 (15) ➜ 15 ÷ 5 = 3

5. Different answers are possible. The circle could be any multiple of 10.

Reflect

Children could have written many different division problems to represent the bar model. All stories should match the bar diagram which shows 20 as four groups of 5, e.g.

Chocolate bars come in packs of 5. How many packs do I need if I want 20 chocolate bars for a party?

I have 20 straws. I need 5 straws to make a pentagon. How many pentagons can I make?

Bar modelling – sharing

→ pages 27–29

1. Children should have drawn 5 counters, or written the number 5, in each part of the bar model.
15 ÷ 3 = 5. Each child carries 5 books.

2. Children should have completed the table as follows:
Top row: 5, 5, 5, 5, 5
Middle row: 4, 4, 4, 4, 4
Bottom row: 2, 2, 2, 2, 2

3. Children should have completed the number sentences and bar models as follows:

12 ÷ 4 = 3 Equal parts on bar model: 3, 3, 3, 3
Each guinea pig gets 3 treats.

12 ÷ 6 = 2 Equal parts on bar model: 2, 2, 2, 2, 2, 2
Each rabbit gets 2 treats.

12 ÷ 3 = 4 Equal parts on bar model: 4, 4, 4
Each cat gets 4 treats.

4. 30 ÷ 5 = 6. Children should have drawn a bar model where the whole is 30 and the bar is divided into 5 equal parts, so each part has a value of 6.

Reflect

Children could have used different words to explain the models, e.g.

Sharing 30 between 5: The whole bar represents 30. It needs to be divided into 5 equal parts. This means the value of each part is 6.

Making groups of 5 from 30: Equal parts of 5 need to be drawn until the total value is 30. 6 parts of 5 will be needed.

Solving word problems – division

→ pages 30–32

1. a) 50 ÷ 10 = 5. Meg should buy 5 packs.
b) 20 ÷ 2 = 10. Malik buys 10 boxes of pins.

2. 35 ÷ 5 = 7. She needs 7 counters.

3. Each person will get £5.

4. The possible solutions are 10, 30 and 50.

Reflect

Children could have written any word problem that can be represented by the number sentence 35 ÷ 5 = 7, e.g.

There are 35 children in a class. They sit at table so that there are 5 children at each table. How many tables are there?

There are 35 children in a class. There are 5 big tables in the classroom and the same number of children sit at each table. How many children sit at each table?

End of unit check

→ pages 33–34

My journal

Children should articulate that numbers ending in 0 are even and numbers ending in 5 are odd, using words from the word bank, e.g.

The pattern for blue is numbers that end in 5 because they are odd already and so give an odd answer

For the next pattern, children should realise that all multiples of 10 are even. However, these numbers have either an odd or even number of tens. If the multiple of ten has an odd number of tens and is divided by 10, the answer will be odd. E.g.

The tens have to be odd so the answer will be odd. If the tens are even the answer will be even.

Power puzzle

Children should identify a number less than 50 that is a common multiple of 2, 3 and 4 when 1 is taken away from it, giving four possible solutions of 13, 25, 37 and 49.

Unit 7: Statistics

Making tally charts

➜ pages 35–37

1. Answers from top to bottom:
a) 19, 17, 13, 11
b) cat, fish, 4

2. Children should have completed the chart to show the following tallies and frequencies:

football: 𝍸 𝍸 𝍸, 15

rugby: 𝍸 IIII, 9

tennis: 𝍸 𝍸 III, 13

cricket: 𝍸 𝍸 II, 12

3. Children should have completed the chart to show the following tallies and frequencies:

vegetables: 𝍸 𝍸 𝍸 II, 17

chicken: 𝍸 𝍸 𝍸 IIII 19

meat feast: 𝍸 𝍸 IIII, 14

cheese: 𝍸 𝍸 III, 13

mushroom: 𝍸 II, 7

Children could have completed the statements in different ways, e.g.
More people prefer meat feast than cheese.
The least popular pizza topping was mushroom.
Two more people chose chicken than vegetables.

Reflect

Answers will vary depending on pupil data.

Creating pictograms (I)

➜ pages 38–40

1. a) Children should have completed the tally chart to show the following tallies and frequencies:

Shape	Tally	Number
circle	𝍸	5
square	III	3
triangle	𝍸 III	8

b) Children should have completed the pictogram as follows:

Shape	Number
circle	xxxxx (5 crosses)
square	xxx (3 crosses)
triangle	xxxxxxxx (8 crosses)

2. Children should have completed the pictogram using their chosen icon to represent 1 leaf, e.g.

Leaf	Number
ash	iiii (4 of chosen icon)
beech	ii (2 of chosen icon)
birch	iii (3 of chosen icon)
oak	iiiiiiii (8 of chosen icon)

3. Children should have matched:
Top tally chart ➜ bottom pictogram
Middle tally chart ➜ top pictogram
Bottom tally chart ➜ middle pictogram

4. Children should have drawn 7 children into the tennis row of the pictogram.

Reflect

Children should have written in the words in the following order:

count, draw, match, make (children may also have written 'count, match, draw, make')

Creating pictograms (2)

➜ pages 41–43

1. a) Children should have completed the chart to show tallies and frequencies as follows:

Sticker	Tally	Number
sun	𝍸 𝍸 𝍸	15
smiley face	𝍸 𝍸	10
rainbow	𝍸 III	8
star	𝍸 𝍸 I	11

b) Children should have drawn the following number of circles into the pictogram:
sun: $7\frac{1}{2}$
smiley face: 5
rainbow: 4
star: $5\frac{1}{2}$

2. Children should have matched:
Top tally chart ➜ middle pictogram
Middle tally chart ➜ top pictogram
Bottom tally chart ➜ bottom pictogram

3. Children should have drawn the following number of ball icons into the pictogram:
Hassan: $2\frac{1}{2}$
Alfie: 4
Lola: 5

Reflect

Children could have suggested different choices but should have given sensible reasons for their choice, e.g.

Book = 5 children: If 1 picture represents 1 child, it would be difficult to quickly interpret the pictogram because you would need to count lots of pictures. If 1 picture represents 10 children, it would be hard to show a number like 17 accurately. If the book represents 5 children, this would mean that there are not too many pictures but that it is possible to show numbers quite clearly.

Interpreting pictograms (I)

➜ pages 44–46

1. Children should have completed the tally chart as follows:

Medal colour	Tally
gold	𝍸 𝍸 II
silver	𝍸 II
bronze	𝍸 𝍸

a) 12
b) 17
c) 5

2. a) 3, 3, daisies
b) 46
c) There are two possible answers:
daisies and sunflowers
poppies and daffodils

Reflect

Children should have appreciated that the icons used in a pictogram should be the same size because, otherwise, it is hard to compare the information in different rows.

Interpreting pictograms (2)

➜ pages 47–49

1. a) 12
b) 4
c) 9
d) 33
e) No

2. a) Class 1
b) 4
c) 30

3. Children should have drawn the following number of tyre icons into the right-hand pictogram:
route 1: 5
route 2: 3
route 3: 4
route 4: 5

Reflect

Children might have made different choices but should have been able to give a clear reason for their choice, e.g.

I would choose the top pictogram because it is easier to see the information in the whole pictogram.

I would choose the bottom pictogram because it is easier to see which rows of icons are longer and shorter.

Block diagrams

➜ pages 50–52

1. a) Climbing frame
b) Horse
c) 18
d) 13

2. Children should have shaded the following number of blocks (from bottom upwards) in the columns of the block graph:
Apple: 16
Pineapple: 7
Banana: 14
Plum: 8
Grapes: 12

3. a) 16
b) 7
c) Children should have circled the safari.

4. Children could have noticed the following mistakes:

The number 11 has been missed out of the scale.

The rows (blocks) should all be the same height.

Children could also have commented that each column needs a label to show what the block graph is about.

Reflect

Children could have suggested different reasons, e.g.

It would need 80 blocks in the middle column and this is too many to sensibly draw.

Solving word problems

➜ pages 53–55

1. a) Children should have shaded 7 blocks in the bus column of the block graph and completed the tally chart to show the following tallies and frequencies:

Transport	Tally	Number
car	𝍸 III	8
bike	𝍸 I	6
walk	𝍸 IIII	9
bus	𝍸 II	7

b) 2

c) Children should have drawn the following number of circles into each row of the pictogram:
car 4
bike 3
walk $4\frac{1}{2}$
bus $3\frac{1}{2}$

2. BEEKEEPER

3. a) Children should have completed each diagram to show the following frequencies:
red 5
blue 8
green 2
black 7
yellow 3

For the pictogram, children should have drawn 1 t-shirt for green and $3\frac{1}{2}$ t-shirts for black.

b) T-shirt icon = 2 t-shirts

4. Children should have drawn the following number of ice cream icons in each row:
strawberry 5
vanilla 4
chocolate $2\frac{1}{2}$

Reflect

Children could have given different answers but should have been able to justify their choice, e.g.

I prefer to use a pictogram because I find the pictures easy to count.

I prefer to use a block graph because it has numbers on it so I can read the information easily using the numbers.

End of unit check

➜ pages 56–57

My journal

Children will need to realise that Ola is incorrect as the amounts are equal. They should make use of the vocabulary provided in the workbook to form their answer, e.g.

Ola is incorrect because there are 4 red and 4 purple cars. This means the amounts are equal.

Power puzzle

5 pears, 7 oranges and 10 apples plus 3 bananas = 25 pieces of fruit

Children could use counters or cubes of different colours to represent the fruits but should not try to complete the block graph before they know how many of each fruit is needed. Children will need to use reasoning to reach the correct answers.

Unit 8: Length and height

Measuring in centimetres

➜ pages 58–60

1. a) 8
b) 4
c) Children should have drawn an object which is between 4 and 8 cm long according to the ruler on the page.

2. a) 4
b) 11
c) 11 cm is greater than 4 cm (some children may have used alternative measurements to complete the statement).

3. Check the lines children have drawn for accuracy.

4. Children could have found many different objects to complete the table.

5. a) False. The beginning of the stick is at the 1 cm mark on the ruler and the end is at the 10 cm mark so the stick is only 9 cm long.
b) True. The beginning of the stick is at the 0 cm mark on the ruler and the end is at the 9 cm mark so the stick is 9 cm long.

Reflect

Answers will vary depending on the line each child draws. Children should know how to use a ruler, lining the ruler up with the line so that the 0 cm mark is at the start of the line.

Measuring in metres

➜ pages 61–63

1. Children could have written many different objects into the table, e.g.
Less than 1 metre: pencil, ruler, book
Equal to 1 metre: metre stick
Greater than 1 metre: table, whiteboard, door

2. Answers will vary.

3. Children should have matched: pencil case ➜ 30 cm, table ➜ 2 metres, rubber ➜ 5 cm and playground ➜ 20 metres.

4. Children should have ticked the following boxes:
a) 6 metres
b) 90 centimetres
c) 20 centimetres
d) 1 metre

5. Children could have suggested many items, e.g. table, display board, skipping rope

Reflect

Children could have suggested many different answers, e.g.

Metre stick: length of classroom, height of a climbing frame, length of the interactive whiteboard

30 cm ruler: pencil, handspan, book

Comparing lengths

➜ pages 64–66

1. Children should have ticked the following:
a) second set of cubes
b) first group of children
c) 45 m

2. 52 > 48. The bin is taller than the stool.

3. a) <
b) >
c) <
d) <
e) <
f) <

4. Children should have put the following digits in the boxes:
a) Any digit greater than 4
b) Any digit greater than 4
c) Any digit
d) 3, 6
e) The digit in the first box must be greater than the digit written into the second box.

5. The carrot is longer.

6. Children should have agreed with the statement but could have explained their reasoning in different ways, e.g. 1 m is the same as 100 cm so 20 cm is less than 1 m.

Reflect

Children's books are likely to be longer than their pencils.

Ordering lengths

➜ pages 67–69

1. C, A, B

2. c, a, b, d

3. a) 40 cm, 44 cm, 50 cm
b) 27 m, 31 m, 55 m

4. Children could have changed the following numbers:
a) The first number to a number less than 70 or the second number to a number between 80 and 90.
b) The third number to a number greater than 26.

5. a) any length smaller than 12 m
b) any length greater than 49 cm
c) and length smaller than 18 m

Reflect

Answers will depend on the dice rolls, e.g. children might have made the lengths 32 metres, 15 metres and 46 metres. They could have ordered them from smallest length to greatest length: 15 metres, 32 metres, 46 metres. Alternatively they could have ordered them from greatest length to smallest length: 46 metres, 32 metres, 15 metres.

Solving word problems – length

→ pages 70–72

1. a) 30
b) 14

2. a) 52
b) 68

3. a) 10
b) 20

4. Children could have added together 40 metres and 36 metres then subtracted the total from 100 metres. Alternatively, they could have worked out 100 metres subtract 40 metres and then subtracted 36 metres from the answer.

Tom still has 24 m still to run.

Reflect

The total length of the snakes is 88 cm.

Children might have explained their steps in different ways, e.g.

I started with 58 cm and counted on three tens to add the 30 cm.

I added 30 cm and 50 cm to get 80 cm and then added the 8 cm to get 88 cm.

End of unit check

→ pages 73–74

My journal

Hassan is wrong because e.g.

The end of the pencil is not on 0.

If the pencil is moved so that the end is on 0, the other end would be on 6, which means that the pencil is 6 cm long.

Unit 9: Properties of shapes

Recognising 2D and 3D shapes

➜ pages 75–77

1. Children should have coloured:
a) three triangles (1st, 2nd and 4th shapes)
b) three squares (in bottom row left, centre and right)

2. There are 16 cuboids. This includes the 2 cubes, since cubes are special types of cuboids.
There is 1 pyramid.
There are 6 spheres.

3. Sara will draw a circle.
Ibrahim will draw a triangle.

4. Children should have matched children to pictures as follows:
1st child ➜ 2nd picture
2nd child ➜ 3rd picture
3rd child ➜ 1st picture
4th child ➜ 4th picture

Reflect

Children could have named different 2-D and 3-D shapes, e.g.

2-D shapes: square, rectangle, circle, triangle, semi-circle

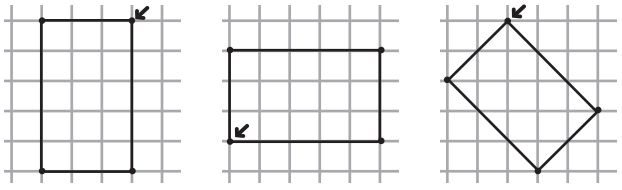
3-D shapes: cube, cuboid, sphere, pyramid

Drawing 2D shapes

➜ pages 78–80

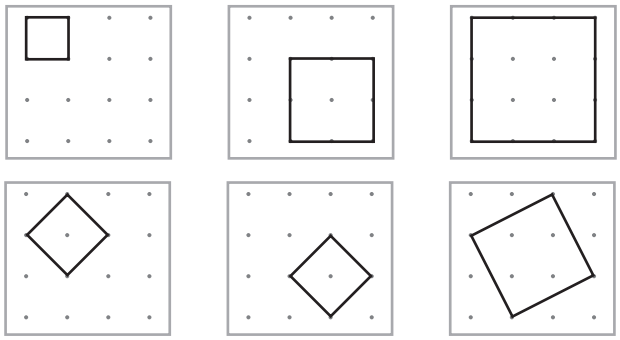
1. Children should have joined the dots to complete the following shapes:
Top row: triangle, triangle, square
Bottom row: square, triangle, rectangle

2. Children should have positioned the missing dots as follows to complete the rectangles:



3. Children should have drawn rough copies of the triangles. The first triangle should be right-angled. The second triangle should be roughly equilateral. The third triangle should be roughly isosceles.

4. There are many possible squares that can be drawn on the grids, e.g.



Reflect

Children could have given different instructions, e.g.

First, draw a dot on the page and another dot 2 squares to the right of it.

Then, find the place exactly in the middle of them and draw a dot 2 squares above this.

Finally, join the dots to make the triangle.

Counting sides on 2D shapes

➜ pages 81–83

1. Children should have completed the table as follows:
triangle, 3
pentagon, 5
square, 4
rectangle, 4
hexagon, 6

2. Children should have filled in answers as follows: 3, 4, E, C, A or B.

3. Children should have completed the shapes and written in the number of sides as follows:
A, 5
B, 4
C, 3
D, 4

4. a) 15
b) 25
c) Different answers are possible, e.g.
3 squares which have a stick of the same length on each side
A triangle, a quadrilateral and a pentagon
Two triangles and a hexagon

Reflect

Children could have suggested different answers, e.g.

The second shape is the odd one out because the others all have 5 sides.

The first shape is the odd one out because it is symmetrical but the others are not.

Counting vertices on 2D shapes

➜ pages 84–86

1. Children should have matched the shapes (from left to right) as follows:
   Top row: 3 vertices, 4 vertices, 4 vertices, 5 vertices
   Bottom row: 4 vertices, 5 vertices, 3 vertices, 4 vertices
2. Children should have completed the table from top to bottom as follows: 4, 3, 6, 6
3. Pentagon, square/rectangle, rectangle/square, triangle, hexagon
4. Children could have explained Toby's mistake in different ways, e.g.

   A vertex is a point where two sides of a shape meet. This is true for 3 of the points which Toby's shape touches but not the fourth one, so this point is not a vertex.

   Toby has drawn a triangle and triangles have 3 vertices.
5. Children could have drawn any two quadrilaterals and then any two pentagons.

Reflect

Children might have written different similarities and differences, e.g.

The same: A and B both have 6 sides. A and B both have 6 vertices. A and B are both hexagons.

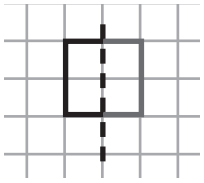
Different: The sides of A are all the same length but this is not true for B. A is symmetrical but B is not symmetrical.

Finding lines of symmetry

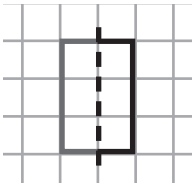
➜ pages 87–89

1. Children should have drawn a vertical line down the middle of each shape.
2. Children should have completed the shapes as follows:

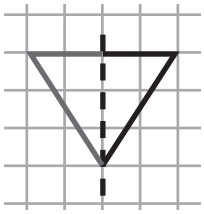
a)



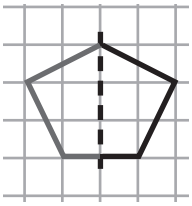
c)



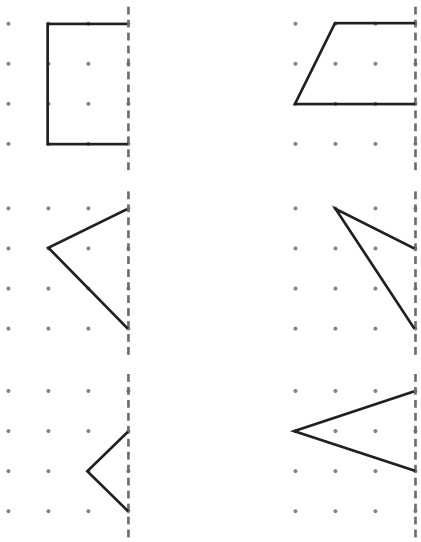
b)



d)



3. Children should have matched shapes as follows:
   Top row 1st shape ➜ bottom row 3rd shape
   Top row 2nd shape ➜ bottom row 4th shape
   Top row 3rd shape ➜ bottom row 2nd shape
   Top row 4th shape ➜ bottom row 1st shape
4. Children should have ticked the 1st, 2nd and 5th shapes.
5. Different answers are possible, e.g.



6. There are many possible answers. Children should have drawn a shape with at least one line of symmetry.

Reflect

There are many different triangles and quadrilaterals children could have visualised and described which fit the criteria e.g. isosceles or equilateral triangles, kite, arrow-head, rhombus, square or other rectangle.

Some children might have included shapes with curved sides e.g. a circle or semi-circle.

Sorting 2D shapes

➜ pages 90–92

1. Children should have matched the shapes to the descriptions from left to right as follows:

   Polygons, Not polygons, Polygons, Not polygons, Polygons, Not polygons
2. Children should have ordered the shapes as follows: F, E, B, A, C, D
3. Children could have labelled the groups in different ways but the most likely labels are: pentagons, polygons (or triangles and quadrilaterals) and shapes with a curved side.
4. Different answers are possible, e.g.
   Odd number of vertices: triangles, pentagons
   Even number of vertices: quadrilaterals, hexagons, octagons

5. a) Different answers are possible. In the first group, children could have drawn any 2-D shape which is shaded with vertical stripes. In the second group, children could have drawn any quadrilateral (or polygon).
b) Children should have drawn a pentagon which has a vertical line of symmetry.

Reflect

Children could have sorted the shapes into two equal groups using different criteria, e.g.

Polygons with an odd number of sides (triangle and two pentagons) and polygons with an even number of sides (square, hexagon and rectangle)

Polygons oriented so that they have a horizontal line of symmetry (square, hexagon and rectangle) and polygons oriented so that they do not have a horizontal line of symmetry (triangle and two pentagons).

Making patterns with 2D shapes

➜ pages 93–95

1. Children should have drawn loops round the following number of objects to show the repeating pattern:
a) 3 (done for them)
b) 4
c) 4
d) 5

2. Children should have circled the following set of shapes:
a) 2nd set (square, triangle, triangle)
b) 2nd set (circle … circle)

3. Children should have drawn the following shapes:

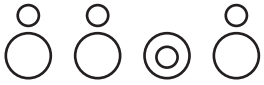
Top pattern: shape 10 – circle, shape 20 – circle

Middle pattern: shape 10 – rhombus, shape 20 – circle

Bottom pattern: shape 10 – rhombus, shape 20 – rhombus

4. Children should have drawn the following four shapes:
Top sequence:

Bottom sequence:



5. Children should have drawn the following shapes into the grids:
a) Third row 2nd shape – small, shaded square (oriented so sides are at 45 degrees to horizontal)
Fourth row 1st shape – small, unshaded pentagon
Fourth row 4th shape – large, shaded pentagon
b) Second row 2nd shape – large, unshaded pentagon
Third row 4th shape – small, shaded square (oriented so sides are at 45 degrees to horizontal)
Fourth row 3rd shape – large, shaded triangle

Reflect

Children could have completed many different pattern questions, e.g.

Complete the pattern ○ □ ○ ◇ ○ **?** ○ ◇ ○ □
using A: ○ B: □ C: ◇ D: ▯

Counting faces on 3D shapes

➜ pages 96–98

1. Children should have drawn a sphere and completed the shape names and number of faces in the table as follows:
cube, 6
pyramid, 5
cuboid, 6
pyramid, 4
sphere, 0

2. Children should have matched shapes to their faces as follows:
cube ➜ 2nd set of faces (6 squares)
cuboid ➜ 4th set of faces (2 squares and 4 non-square rectangles)
square-based pyramid ➜ 3rd set of faces (1 square and 4 triangles)
tetrahedron (triangle-based pyramid) ➜ 1st set of faces (4 triangles)

3. Children should have written the following letters:
First child: A, A and A
Second child: C, C and C
Third child: A, C and D

4. Children should have filled in the missing words and numbers as follows:
cylinder, 1
sphere, 1
hemisphere, cone

5. a) 30
b) cylinder, as a cylinder has 2 circular faces (it also has one curved **surface**)

Reflect

Answers will depend on the children's choice of shape, e.g. a cube has 6 square faces.

Counting edges on 3D shapes

➜ pages 99–101

1. 8, 12, 6

2. B, D, A, C

3. cube, triangular prism , square-based pyramid

4. 15, 18, 12, 9

5. a) 30
b) 5

Reflect

Children could have described the difference between a face and an edge in different ways, e.g. The faces of a shape are flat surfaces. The edges of a shape are the lines where the faces meet.

Counting vertices on 3D shape

➜ pages 102–104

1. 4, 0, 5

2. 6, 8, 10, 12

3. Children should have matched the shape to the number of vertices as follows:
hemisphere, cylinder and cone ➜ < 5 vertices
cube, cuboid and triangular prism ➜ > 5 vertices
square-based pyramid ➜ = 5 vertices

4. Children should have circled the following shapes:
a) cube and triangular prism
b) cube, square-based pyramid and tetrahedron (triangle-based pyramid)

5. Children should have completed the number of faces, edges and vertices as follows:

Faces = 5	Faces = 6	Faces = 7
Edges = 8	Edges = 10	Edges = 12
Vertices = 5	Vertices = 6	Vertices = 7

Reflect

Answers will vary depending on the shape children have chosen, e.g. My favourite shape is a triangular prism. It has 6 vertices.

Sorting 3D shapes

➜ pages 105–107

1. Children should have circled the following shapes:
Has a curved surface: square-based pyramid
Has more than one square face: tetrahedron (triangle-based pyramid)
Has fewer than five vertices: both shapes

2. Children should have ticked the square-based pyramid.

3. Children should have ticked the sphere.

4. Children could have sorted the shapes in different ways, e.g.

Has a curved surface (sphere); Does not have a curved surface (all other shapes)

Has an odd number of vertices (square-based pyramid); Does not have an odd number of vertices (all other shape).

5. Children should have written the shapes in order as follows:
Fewest to most edges: D, A, E, B and C
Fewest to most vertices: D, A, E, B, C

Reflect

Children could have sorted the shapes in different ways, e.g.

Has at least 1 triangular face (tetrahedron and triangular prism); Has no triangular faces (cube and cylinder)

Every face is the same shape (cube and tetrahedron); Not every face is the same shape (cylinder and triangular prism)

Making patterns with 3D shapes

➜ pages 108–110

1. Missing shapes from left to right:
a) cylinder
b) cone
c) sphere, cube

2. Answers will vary depending on the pattern children have made.
a) The cone should be numbered 4.
The numbers below identical shapes should total 8.
b) The cuboid should be numbered 4.
The numbers below the cubes should total 8.
Numbers below the square-based pyramids should consist of two pairs that total 8.

3. a) and b) Answers will vary depending on the pattern children have made. One of the spheres should be labelled 4. The numbers below the other spheres should total 8.

4. Answers will vary.

5. a) and b) The following answers are possible:

cube, tetrahedron (triangle-based pyramid), cube – 30 edges in pattern

cuboid, tetrahedron (triangle-based pyramid), cuboid – 30 edges in pattern

square-based pyramid, cube, square-based pyramid – 28 edges in pattern

square-based pyramid, cuboid, square-based pyramid – 28 edges in pattern

Reflect

Children could have explained the difference between a symmetrical and a repeating pattern in different ways, e.g. In a symmetrical pattern, the shapes have to be the same on each side around the middle of the pattern. In a repeating pattern, a group of shapes is repeated again and again.

End of unit check

→ pages 111–112

My journal

If children cut off one of the square's corners, they produce a pentagon and a triangle. Children could then cut off a corner from the triangle to create a smaller triangle, a quadrilateral and a pentagon.

Alternatively, children could cut the square from side to side to produce two quadrilaterals. By cutting a corner off from either quadrilateral, children will end up with a pentagon, a quadrilateral and a triangle.

Power puzzle

With 24 cubes, children could create a 1 × 1 × 24 cuboid, a 1 × 2 × 12 cuboid, a 1 × 3 × 8 cuboid, a 1 × 4 × 6 cuboid, a 2 × 2 × 6 cuboid or a 2 × 3 × 4 cuboid. In order to find all the possibilities, children need to understand that cuboids need to have six faces and that the faces can be square or oblong.

With 27 cubes, children can create a 1 × 1 × 27 cuboid, a 1 × 3 × 9 cuboid or a 3 × 3 × 3 cuboid. To find all 3, children need to understand that a cube is a special type of cuboid.

Unit 10: Fractions

Introducing whole and parts

➜ pages 113–115

1. Children should have matched: cat ➜ whiskers, house ➜ chimney, bus ➜ wheel, tree ➜ leaf

2. The truck is the whole (in both instances). Children could have completed the other statements with: wheel, light, bumper or window.

3. Children could have completed the sentences using different parts, e.g.
a) The cake is the whole and the sugar is a part.
b) The flour is a part and the cake is the whole.

4. Children could have completed the sentences in different ways, e.g.
a) The flower is the whole. The petal is a part.
b) The swings are the whole. The seat is a part.

5. Children could have suggested different answers, e.g.

The house is the whole. The school is the whole. The wall is the whole.

Reflect

Children could have chosen many different items, e.g.

The cupboard is the whole. The drawer is a part.

The computer is the whole. The screen is a part.

Making equal parts

➜ pages 116–118

1. a) 2
b) 3
c) 4

2. a) equal
b) unequal
c) equal (although some children might say that the parts are unequal because they are different shapes)

3. Children should have drawn lines to descriptions as follows (from top to bottom):
Equal parts
Unequal parts
Equal parts
Equal parts
Equal parts
Unequal parts

4. Children should have drawn 3 biscuits on each plate.

5. Children could have folded one sheet into equal parts in many different ways, e.g. using a horizontal fold, vertical fold or diagonal fold. The fold should pass through the centre of the paper.

Children could have folded the other sheet into unequal parts in many different ways.

Reflect

Children should have recognised that the loaf has not been cut into 2 equal parts. They could have explained how they know in different ways, e.g. The part on the left is longer than the part on the right.

Recognising a half ($\frac{1}{2}$)

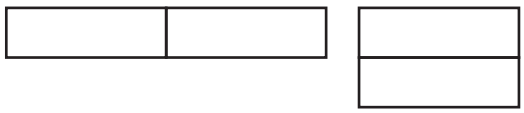
➜ pages 119–121

1. Children should have ticked shapes a, c and d.

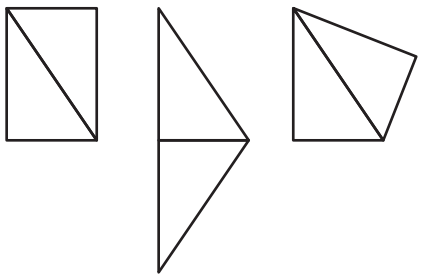
2. Children should have shaded:
a) one of the drawn halves
b) any half of the square
c) two of the quarters
d) any half of the rectangle

3. Children could have completed the whole in different ways, probably by drawing the image of the given shape in one of its sides, e.g.

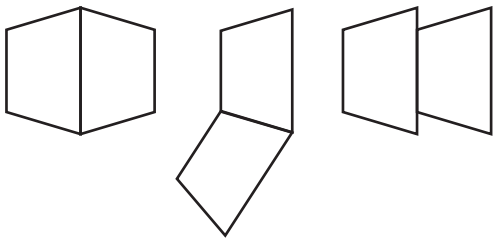
a)



b)



c)



4. No, Tom is not correct. Children could have explained their reasoning in different ways, e.g.
The part on the right is bigger than the part on the left; The parts of the log are not equal.

5. The first diagram shows $\frac{1}{2}$ shaded, the others do not. Children could have explained their reasoning in different ways, e.g.

The first diagram shows $\frac{1}{2}$ shaded because the shaded part is the same size as the unshaded part.

None of the second shape is shaded. It is divided into halves, though, because it is divided into 2 equal parts.

The third shape does not have half shaded. 2 squares are shaded but 4 squares are not shaded. So, the shaded and unshaded parts are not equal.

Reflect

The hexagon and circle can be split into two equal parts. Children could have explained their reasoning in different ways, e.g.

If you draw a horizontal line through the middle of the hexagon and one through the middle of the circle, this will divide these shapes into two equal parts.

The sides of the final shape are not the same length so it is not simple to split this shape into two equal parts.

Finding a half

➜ pages 122–124

1. a) 4
b) 6

2. Children should have shaded squares and completed the number sentences as follows:
a) 5 squares, $\frac{1}{2}$ of 10 is 5.
b) 10 squares, $\frac{1}{2}$ of 20 is 10.

3. Children should have circled images and completed the number sentences as follows:
a) 12 stars, $\frac{1}{2}$ of 24 is 12.
b) 9 balls, $\frac{1}{2}$ of 18 is 9.

4. Children should have matched the fractions as follows:

$\frac{1}{2}$ of 28 ➜ 14

$\frac{1}{2}$ of 22 ➜ 11

$\frac{1}{2}$ of 30 ➜ 15

$\frac{1}{2}$ of 26 ➜ 13

5. Most children are likely to have suggested that Tom and Mo cannot share the sweets equally because there are 9 sweets and 9 is an odd number. Some children might have said the sweets can be shared because one of the sweets could be cut in half.

6. a) 14
b) 14

Reflect

Children could have suggested different methods, e.g.

I can find $\frac{1}{2}$ of 16 by taking 16 counters and sharing them equally into two sets.

I can find $\frac{1}{2}$ of 16 using my 2 times-tables. I know that $2 \times 8 = 16$ so $\frac{1}{2}$ of 16 = 8.

Recognising a quarter ($\frac{1}{4}$)

➜ pages 125–127

1. Children should have drawn lines to descriptions as follows (from top to bottom):

Shows $\frac{1}{4}$

Shows $\frac{1}{4}$

Does not show $\frac{1}{4}$

Shows $\frac{1}{4}$

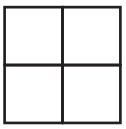
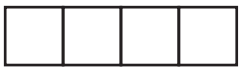
Does not show $\frac{1}{4}$

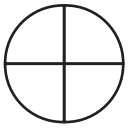
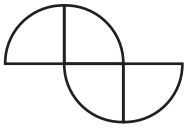
Does not show $\frac{1}{4}$

Shows $\frac{1}{4}$

2. Children should have shaded shapes as follows:
Top row, first shape: any one of the drawn quarters
Top row, second shape: any one of the drawn quarters
Top row, third shape: any two of the drawn eighths
Bottom row, first shape: children should have drawn two diameters that cross at right-angles and shaded one of the quarters
Bottom row, second shape: any one of the drawn quarters
Bottom row, third shape: any one of the drawn parts (quarters)

3. Children could have drawn the full shape in different ways, e.g.

a)  or 

b)  or 

4. Joe is not correct. Children could have explained in different ways, e.g. Joe has split the stick into two equal parts so the parts are halves not quarters.

5. Children could have shaded any 1 of the quarters in each diagram in the top row. Children could have split the squares in the bottom row into quarters in different ways, e.g. by drawing in the two diagonals and shading one of the quarters produced.

Reflect

Children should have ticked the cross and the circle. They could have explained their reasoning in different ways, e.g.

The cross and circle can easily be split into four equal parts with a horizontal line through the middle and a vertical line through the middle. The other shapes do not easily split into four equal parts.

Finding a quarter

➜ pages 128–130

1. 2

2. Children should have drawn 5 flowers in each vase and completed the sentences: $\frac{1}{4}$ of 20 = 5. There are 5 flowers in each vase.

3. Children should have shaded the following items and completed the number sentences:
a) 3 squares, $\frac{1}{4}$ of 12 = 3
b) 10 stars, $\frac{1}{4}$ of 40 = 10

4. $\frac{1}{4}$ of 24 = 6

5. 3

6. 16, 16

Reflect

Children should have been able to complete number sentences when they had chosen numbers that were multiples of 4, e.g.

$\frac{1}{4}$ of 20 = 5, $\frac{1}{4}$ of 4 = 1, $\frac{1}{4}$ of 28 = 7

Unit fractions

➜ pages 131–133

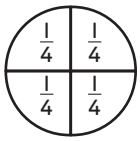
1. a) 2, 1, $\frac{1}{2}$
b) 3, 1, $\frac{1}{3}$

2. Children should have ticked the 1st and 2nd shapes.

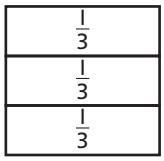
3. Children should have ticked the 1st, 2nd, 3rd and 5th shapes.

4. Children should have shaded 1 part of the shape.

5. Children could have completed the shape in different ways, using 4 quarter-circles altogether for the first shape and 3 rectangles altogether for the second shape. The most likely answers are:
a)



b)



6. 4

7. Children should have matched the fractions as follows: $\frac{1}{2}$ ➜ 6, $\frac{1}{3}$ ➜ 4, $\frac{1}{4}$ ➜ 3.

Reflect

Children should have drawn a flag that is split into equal parts with one part shaded yellow.

They could have explained their method in different ways, e.g.

I know that the fraction shaded yellow is a unit fraction because I split the flag into equal parts and have shaded one part.

I know that the fraction shaded yellow is a unit fraction because I split the flag into quarters and have shaded one quarter.

Understanding other fractions

➜ pages 134–136

1. 3, 3, 2, 2, $\frac{2}{3}$

2. Children should have matched shapes as follows:

Top shape ➜ $\frac{2}{3}$

Middle shape ➜ $\frac{3}{4}$

Bottom shape ➜ $\frac{2}{4}$

3. Children should have shaded:
a) 2 balloons
b) 2 bottles

4. a) Children should have disagreed with Sam. They could have explained their answer in different ways, e.g. There are 4 counters. 3 counters are shaded so this is $\frac{3}{4}$ of the counters.
b) $\frac{3}{4}$ because 3 out of 4 counters are shaded. $\frac{1}{4}$ because 1 out of 4 counters is not shaded.

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

Reflect

Children should have circled the following fractions: $\frac{2}{3}$, $\frac{3}{3}$, $\frac{2}{4}$, $\frac{3}{4}$.

Children could have drawn any of these fractions and explained why it is a non-unit fraction in different ways, e.g.

My drawing is a non-unit fraction because I have drawn 4 counters and shaded 3 of them so I have shaded $\frac{3}{4}$. This is not a unit fraction because I have shaded more than 1 part.

$\frac{1}{2}$ and $\frac{2}{4}$

➜ pages 137–139

1. Children should have ticked the 2nd and 4th images.
2. Children should have shaded 2 cubes in each picture and noticed that $\frac{2}{4}$ is the same amount as $\frac{1}{2}$.
3. Children should have completed the fraction and matched to the descriptions as follows:

   $\frac{2}{4}$ ➜ Equal to $\frac{1}{2}$

   $\frac{1}{3}$ ➜ Less than $\frac{1}{2}$

   $\frac{3}{4}$ ➜ Greater than $\frac{1}{2}$
4. 10, the same (or equal or equivalent).
5. Children should have written multiples of 4 in the left-hand box and numbers which are not multiples of 4 in the right-hand box.

Reflect

Children could have explained their methods in different ways, e.g.

I used paper. I showed that $\frac{1}{2}$ is equal to $\frac{2}{4}$ by taking two identical pieces of paper and folding one in half and the other into quarters. I could see that $\frac{1}{2}$ was the same size as $\frac{2}{4}$.

I used cubes. I took 8 cubes and noticed that $\frac{1}{2}$ was 4 cubes and that $\frac{2}{4}$ was also 4 cubes.

Finding $\frac{3}{4}$

➜ pages 140–142

1. Children should have shaded:
   a) 3 triangles
   b) 6 squares
2. a) 3
   b) 9
3. a) Children should have drawn 4 brushes in each pot and completed the number sentences:
   $\frac{3}{4}$ of 16 = 12. Jack puts 4 brushes in each pot.
   b) 4
4. 15
5. Children should have drawn 3 counters into the empty box.
   a) 3
   b) 12

Reflect

Children might have answered the questions in different ways, e.g.

What is the same about the fractions? They have the same denominator. They both involve quarters.

What is different? They have different numerators. One of the fractions is a unit fraction but the other is a non-unit fraction.

Understanding a whole

➜ pages 143–145

1. $\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$
2. Children should have circled: 1st shape (rectangle), 4th shape (octagon), $\frac{2}{2}$, $\frac{4}{4}$
3. Children should have matched the drawings that show the following fractions:

   $\frac{1}{4}$ ➜ $\frac{3}{4}$

   $\frac{1}{2}$ ➜ $\frac{1}{2}$

   $\frac{1}{3}$ ➜ $\frac{2}{3}$
4. a) $\frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$ (or $\frac{1}{4} + \frac{3}{4} = \frac{4}{4} = 1$)
   b) $\frac{1}{3} + \frac{2}{3} = \frac{3}{3} = 1$ (or $\frac{2}{3} + \frac{1}{3} = \frac{3}{3} = 1$)
5. a) $\frac{1}{3}$
   b) $\frac{1}{4}$
   c) $\frac{2}{4}$ or $\frac{1}{2}$
6. Children could have explained this in different ways, e.g.

   The slices Jack ate could have been bigger than the slices that Jemima ate.

   If Jemima ate 3 thirds of a cake and Sam ate 2 halves of a cake, they would both have eaten the same amount (a whole cake).

Reflect

Children should have circled the statement 'always true'.

They could have written any fraction where the numerator and denominator are the same. They could have drawn their fraction using a shape (splitting it into the appropriate number of parts and shading all parts) or a set of objects (organising them into the appropriate number of sets and shading all sets).

Understanding whole and parts

→ pages 146–148

1. a) $6\frac{1}{4}$

b) $3\frac{3}{4}$

2. Missing numbers in part-whole diagrams from left to right: $\frac{1}{2}$, $8\frac{2}{4}$ or $8\frac{1}{2}$, 2 and $\frac{1}{3}$.

3. Children should have circled the oranges, apples and chocolate bars.

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

b) $2\frac{2}{3}$

5. $1\frac{1}{4}$

6. $6\frac{2}{4}$ or $6\frac{1}{2}$

Reflect

Answers will vary. Children should have been able to explain how many wholes and what fractional part they have drawn. Children should have been able to write their partner's fraction accurately using mixed numbers.

Counting in halves

→ pages 149–151

1. a) This shows 1 whole and 1 half.

This is $1\frac{1}{2}$.

2 (circled)

b) This shows 3 wholes and 0 halves (or 0 wholes and 6 halves).

This is 3 (or $\frac{6}{2}$).

$3\frac{1}{2}$ (circled)

2. Missing numbers:

a) $2\frac{1}{2}$, 3, $3\frac{1}{2}$

b) 4, $4\frac{1}{2}$, 5

c) $8\frac{1}{2}$, 9, $9\frac{1}{2}$

3. Children should have completed the table as follows:

Top row: 1st cell – blank, 4th cell – $1\frac{1}{2}$ sweets (drawn)

Bottom row: 3rd cell – 1, 5th cell – 2

4. Missing numbers: 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$, 5

5. Children could have explained the mistakes in different ways, e.g.

a) Maya has missed out $2\frac{1}{2}$ and 3.

b) Bob has missed out $5\frac{1}{2}$.

Reflect

Children could have explained their reasoning in different ways, e.g.

I know the next number is $2\frac{1}{2}$ because the sequence is going up in halves.

I know the next number is $2\frac{1}{2}$ because if you add $\frac{1}{2}$ to 2 that gives $2\frac{1}{2}$.

Counting in quarters

→ pages 152–154

1. 5

2. Missing numbers from left to right:

a) $\frac{3}{4}$, 1, $1\frac{1}{4}$ (alternatively, some children might continue the count in quarters i.e. $\frac{3}{4}$, $\frac{4}{4}$, $\frac{5}{4}$)

b) $3\frac{2}{4}$ (or $3\frac{1}{2}$), $3\frac{3}{4}$, $4\frac{1}{4}$

c) $1\frac{1}{4}$, 1, $\frac{3}{4}$

3. Missing numbers from left to right:

a) $\frac{1}{4}$, $1\frac{3}{4}$, $2\frac{3}{4}$

b) $7\frac{2}{4}$ (or $7\frac{1}{2}$), 8, $8\frac{1}{4}$

4. Both counts are both correct. Children could have explained this in different ways, e.g.

$\frac{2}{4}$ is the same as $\frac{1}{2}$.

5. $2\frac{1}{2}$ or $2\frac{2}{4}$

Reflect

Children might have explained their reasoning in different ways, e.g.

I know the next number is $1\frac{2}{4}$ because when you add a quarter to $1\frac{1}{4}$ you get $1\frac{2}{4}$.

I know the next number is $1\frac{1}{2}$ because $1\frac{1}{4}$ add $\frac{1}{4}$ gives $1\frac{1}{2}$.

End of unit check

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My journal

Children could have sorted the fractions in various ways, e.g.

All of the denominators are the same/different.

These fractions all make the same/a different amount.