Unit 1: Numbers to 100

Counting objects to 100

→ pages 6–8

1. There are 60 birds.

2. a) There are 43 beads.
b) There are 77 straws.

3. There are 40 dots.

4. You need 60 cubes to make the tower.

5. Children should have completed the numbering of the number line and tracks as follows:
0, 10, 20, 30, 40, 50, 60, 70, 80
0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 0

Reflect

Children should have ticked the middle box to show there are 55 cubes.

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

There are 5 tens, which is 50, and then 5 ones so that gives 55 cubes altogether.

The top count is wrong because it has missed out 40 when counting in tens and the bottom count is wrong because it has missed out 53 when counting in ones.

Representing numbers to 100

→ pages 9–11

1. a) There are 35 cakes.
b) There are 53 cups.
c) There are 55 cubes.

2. a) 29
b) 59
c) 79
d) 80

3. Children should have drawn lines and dots as follows:
43 4 lines and 3 dots
72 7 lines and 2 dots
63 6 lines and 3 dots
81 8 lines and 1 dot

4. a) 61
b) 40
c) 55

Reflect

Children could have represented 43 in various ways, e.g. using different objects such as tens frames, a bead string and cubes or by grouping in different ways such as 4 tens and 3 ones or 3 tens and 13 ones.

Tens and ones (1)

→ pages 12–14

1. 29 is 2 (tens) and 9 (ones).

2. Children should have matched:
35 to the third picture and to 3 tens and 5 ones.
53 to the fourth picture and to 5 tens and 3 ones.
33 to the second picture and to 3 tens and 3 ones.
30 to the first picture and to 3 tens.

3. a) 4 tens and 5 ones, 2 tens and 3 ones, 0 tens and 7 ones, 6 tens and 4 ones, 9 tens and 0 ones, 0 tens and 4 ones.
b) 4, 33, 0, 42, 2

4. Children should have chosen 'Yes'. For example, a child might have said 'Yes' because 2 tens and 20 ones are each worth 20 altogether.

5. Answers left to right along the number line: 8 tens and 4 ones, 8 tens and 7 ones, 9 tens and 0 ones, 9 tens and 1 one(s)

Reflect

Children could have chosen any number with a 9 in the ones column, e.g. 9, 19, 29, 79, 109.

Tens and ones (2)

→ pages 15–17

1. 20 and 4 (parts), 24 = 20 + 4

2. Children should have completed the part-whole diagrams and addition number sentences as follows:
a) 70 and 7 (parts), 77 (whole), 77 = 70 + 7
b) 10 and 9 (parts), 19 (whole), 19 = 10 + 9
c) 90 and 1 (parts), 91 (whole), 91 = 90 + 1

3. Answers from top to bottom: 1, 11, 21, 31

4. Answers from left to right: ✗, ✔, ✗, ✔

5. 64 = 60 + 4
74 = 14 + 60
46 = 26 + 20 or 46 = 20 + 26
46 = 40 + 6

Reflect

There are many possible answers. Children could have partitioned 39 in different ways where one part is a multiple of 10, e.g. 39 = 9 + 30 or 39 = 20 + 19. Children could have partitioned 39 into other pairs of numbers with a total of 39, e.g. 39 = 38 + 1, 39 = 35 + 4 or 39 = 25 + 14. Some children might have partitioned 39 into more than two parts, e.g. 39 = 10 + 10 + 10 + 9 or 39 = 20 + 15 + 4.

Representing numbers on a place value grid

➜ pages 18–20

1. a) 3 (Tens) 4 (Ones) There are 34 beads.
b) 4 (Tens) 3 (Ones) There are 43 cubes.
c) 1 (Tens) 0 (Ones) There are 10 straws.

2. Children should have matched the pictures to the place value grids as follows:
first picture ➜ 4 (Tens) 6 (Ones)
second picture ➜ 6 (Tens) 0 (Ones)
third picture ➜ 4 (Tens) 3 (Ones)
fourth picture ➜ 5 (Tens) 9 (Ones)

3. Answers from left to right along number line as follows: 7 (Tens) 1 (Ones), 8 (Tens) 0 (Ones), 8 (Tens) 5 (Ones), 9 (Tens) 3 (Ones)

4. a) There are two possible answers: 54 and 65.
b) 90

Reflect

85: 8 tens or 80

80: 8 tens or 80

88: 80 and 8, or 8 tens and 8 ones

8: 8 ones

82: 8 tens or 80

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

In a 2-digit number, the digit on the left stands for tens and the digit on the right stands for ones.

85 can be partitioned into 80 and 5 and the 80 is 8 tens.

Comparing numbers (I)

➜ pages 21–23

1. 50 is greater than 43. 50 > 43

2. a) 30 < 45
b) 45 < 50
c) 70 = 70
d) 21 > 20

3. Answers from top to bottom as follows:
62 > 40
55 > 40
38 < 40
33 < 40
51 > 40

4. 8 tens and 7 ones < 9 tens and 5 ones.
4 tens and 6 ones < 48.
2 tens and 8 ones < 32.

Reflect

The number sentence is true. Children could have explained their reasoning in different ways, e.g.

47 can be partitioned into 40 and 7. This is less than 50 so it is also less than 54.

When you count up from 0 you get to 47 before you get to 54.

Comparing numbers (2)

➜ pages 24–26

1. Children should have circled the following answers:
a) 6 (Tens) 5 (Ones)
b) 5 (Tens) 4 (Ones)
c) 2 (Tens) 9 (Ones)
d) 93
e) 99
f) 44
g) 45

2. Answers from top to bottom:
a) greater than, greater than, less than, is equal to
b) <, <, >, >

3. Children should have written the following digits into the empty boxes:
a) 1, 2, 3 or 4. Alternatively, some children could have written 0 or left the box blank.
b) 6, 7, 8 or 9. Alternatively, some children could have written more than 1 digit into the box.
c) 9

4. 53

Reflect

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

…87 is greater than 80 but 78 is less than 80.

…87 lies to the right of 78 on a number line.

Ordering numbers

➜ pages 27–29

1. Children should have circled:
a) 51
b) 2 (Tens) 9 (Ones)

2. Children should have circled:
a) the right-hand drawing (51)
b) the left-hand drawing (21)

3. Abbie, Anna, Maya

4. 65 < 67 < 76

5. a) 45 < 55 < 75
b) 54 < 55 < 57

6. 89, 90, 91 (in any order)

Reflect

28 < 58 < 98 Any 2-digit number with 9 tens is greater than any 2-digit number with 5 tens which, in turn, is greater than any 2-digit number with 2 tens. It is, therefore, only **necessary** to look at the tens to order these numbers. Children could, therefore, have just ticked the Tens box but might well have ticked the Ones box too to say that they looked at the ones.

41 < 47 < 48 Children should have ticked both the Tens and the Ones boxes for this example. Children could have started by looking at the tens and noticing that all of the numbers have 4 tens before using the ones to order them. Children could have used other methods such as placing the numbers on a number line but this would also have involved looking at both tens and ones.

Counting in 2s, 5s and 10s

➜ pages 30–32

1. a) 15, 20, 25, 30 Hanif has 30 marbles.
b) 8, 10, 12, 14, 16, 18 Cass has 18 cubes.

2. a) There are 38 cubes.
b) There are 80 straws.

3. Children should have filled in the gaps in the following counts:
a) 65, 70, 75, 80, 85, 90
b) 24, 26, 28, 30, 32, 34
c) 60, 62, 64, 66, 68, 70
d) 75, 70, 65, 60, 55, 50

4. Children should have crossed out: 15, 23, 52, 55, 65

5. a) <
b) =
c) <

Reflect

Leo will say the number 10.

Children could have explained their reasoning in different ways, e.g. 10 is an even number between 0 and 50 so when Leo counts down in 2s from 50 he will say 10. Eva will not say 10 because she is counting up from 20 but 10 is less than 20. Alternatively, children could have tried both counts.

Counting in 3s

➜ pages 33–35

1. Children should have added the following numbers to the number track: 3, 6, 9, 12, 15.

2. a) 3
b) 6
c) 9
d) 12
e) 15
f) 18

3. 12, 15, 18, 21, 24, 27, 30

4. The word 'yesterday' has 9 letters. The word 'kindergarten' has 12 letters.

5. Children should have shaded the following numbers on the grids: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30.
In the first grid this makes a diagonal pattern, which goes up to the right.
In the second grid this makes two vertical lines.
In the third grid this makes a diagonal pattern, which goes down to the right.

6. a) 9, 12, 15
b) 24, 27, 30
c) 27, 30, 33
d) 18, 21, 24

Reflect

Jodie will have said the numbers: 3, 9, 12, 15 and 30.

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

I counted up in 3s using a number line.

I looked at my work on page 34.

End of unit check

➜ pages 36–37

My journal

I can prove that c is a different number.

Children could have explained their reasoning in different ways, e.g. annotating the diagrams or explaining that diagram c shows 3 tens and 9 ones so represents the number 39. All the other diagrams represent 93.

Unit 2: Addition and subtraction (I)

Related facts – addition and subtraction

➜ pages 38–40

1. Children should have drawn 14 dots in the part-whole diagram and completed the number sentences:
9 + 5 = 14, 5 + 9 = 14, 14 – 9 = 5 and 14 – 5 = 9 (order may vary).

2. a) In any order: 15 = 7 + 8, 15 = 8 + 7, 8 = 15 – 7, 7 = 15 – 8
b) Children should have circled, and rewritten, the number sentences as follows:
12 + 20 = 8 ➜ 12 + 8 = 20 (or another correct number sentence, e.g. 20 = 8 + 12)
8 – 20 = 12 ➜ 20 – 8 = 12 (or another correct number sentence, e.g. 8 = 20 – 12)

3. Children should have completed the part-whole diagram and number sentences as follows:
5 and 6 (parts) 11 (whole)
11 – 6 = 5 and 11 – 5 = 6 (in either order)

4. Answers from left to right as follows:
11 12 4
4 6 5

5. a) Children should have placed numbers in the part-whole diagram as follows:
underneath the 16: 12 on the left and 4 on the right
bottom row: 3 and 9 (in either order)
b) There are many possible answers, e.g. 12 + 4 = 16, 12 = 9 + 3, 12 – 3 = 9 and 4 = 16 – 12.

Reflect

There are eight possible number sentences, as follows:
8 + 9 = 17, 9 + 8 = 17, 17 = 9 + 8, 17 = 8 + 9, 17 – 9 = 8, 17 – 8 = 9, 8 = 17 – 9, 9 = 17 – 8.

Using number facts to check calculations

➜ pages 41–43

1. a) 13 – 8 = 5 or 13 – 5 = 8
b) 13 – 5 = 8 or 13 – 8 = 5 (children must not give the same answer for parts a) and b))

2. a) 8 + 4 = 12 (or possibly 4 + 8 = 12)
b) 12 – 4 = 8 (or children might have written 12 – 8 = 4)
c) Koji took 4 sweets.

3. Children should have selected the calculations:
17 – 12, 5 + 12 and 12 + 5.

4. Children should have written a calculation to check each answer and corrected the top calculation, which contains a mistake:
For 15 + 4 = 20: Calculations to check 20 – 4 = 16, 20 – 15 = 5 or 4 + 15 = 19. Children should have noticed there is a mistake and corrected the calculation to 15 + 4 = 19, 16 + 4 = 20 or 15 + 5 = 20.

For 14 = 19 – 5: Calculations to check 14 + 5 = 19, 5 + 14 = 19, 19 – 14 = 5

For 8 + 8 = 16: Calculation to check 16 – 8 = 8

Reflect

There are many possible answers.

Children could have written an addition calculation, e.g. 18 + 2 = 20 and checked it using a related addition or subtraction calculation, e.g. 2 + 18 = 20 or 20 – 2 = 18.

Children could have written a subtraction calculation e.g. 15 – 10 = 5 and checked it using a related subtraction or addition calculation, e.g. 15 – 5 = 10 or 5 + 10 = 15.

Some children might have chosen to use multiplication, e.g. 5 x 2 = 10 and 5 + 5 = 10.

Comparing number sentences

➜ pages 44–46

1. a) 5 + 3 < 5 + 6. There are more bananas.
b) Children should have crossed out 5 counters in the top row and 8 in the bottom row and written 14 – 5 > 14 – 8 or 14 – 8 < 14 – 5. Tim has the most counters left.

2. There are several different ways of positioning the numbers to complete the number sentence, e.g.
8 + 7 > 7 + 6, 7 + 6 < 7 + 8 and 6 + 7 < 7 + 8.
The triangle has the greater value.

3. Children should have written symbols as follows:
< >
> >
> =

4. a)

any number less than 7	any number less than 5
any number less than 2	6
any number greater than 7	0

b) Children will have been unable to answer this question as it contains an error. The 'greater than' sign and the 'less than' sign in each number sentence should be swapped around, giving 8 and 9 as possible answers, as shown below:
7 + 6 < 6 + 8 (or 9)
14 – 8 (or 9) > 14 – 10

Reflect

There are several possible ways to complete the number sentences.

First number sentence, e.g. 4 + 5 < 6 + 7, 5 + 4 < 6 + 7 and 4 + 6 < 5 + 7

Second number sentence: 4 and 7 should be placed on one side of the = sign and 5 and 6 on the other, e.g. 4 + 7 = 5 + 6, 7 + 4 = 5 + 6 and 6 + 5 = 4 + 7.

Third number sentence: 7 – 6 = 5 – 4, 5 – 4 = 7 – 6, 7 – 5 = 6 – 4 or 6 – 4 = 7 – 5

Fourth number sentence: 7 – 4 > 6 – 5. Alternative answers are possible but these all involve negative numbers, e.g. 7 – 4 > 5 – 6 and 6 – 5 > 4 – 7

Finding related facts

➜ pages 47–49

1. Children should have completed diagrams and number sentences as follows:
Left-hand number family: 7, 2 (parts), 7, 7
Right-hand number family: drawing of 7 tens, 70 (part), 70, 70

2. Missing numbers in whole-part diagrams, from left to right: 80, 8
Missing numbers in number sentences, from left to write: 80, 80, 8

3. a) 4 + 6 = 10, 100 = 40 + 60, 100 – 40 = 60
b) 40 + 10 = 50, 50 – 40 = 10, 5 – 4 = 1
c) 9 = 4 + 5, 50 + 40 = 90, there are many possible answers, e.g. 40 + 10 = 90 – 40, 40 + 50 = 90 – 0

4. a) 10 + 60 = 70, 10 – 3 = 1 + 6, 90 – 70 = 10 + 10 (alternative answers are possible which are correct but do not use the number facts given)
b) Several answers are possible, e.g. 15 + 5 = 90 – 70, 6 + 1 = 10 – 3.

Reflect

There are many possible answers. Children might have written addition and subtraction facts using the same number family, e.g. 5 + 3 = 8, 8 – 5 = 3, 8 – 3 = 5. Alternatively, children may have written calculations that are related in another way, e.g. 30 + 50 = 80 or 3 + 6 = 9.

Making number bonds to 100

➜ pages 50–52

1. 25, 60

2. 20, 45

3. 60, 71

4. a) 30
b) 85
c) 79
d) 93
e) 23
f) 0

5. 50

6. Children should have filled in the missing digits so that the calculations say:
a) 36 + 64 = 100
b) 15 + 85 = 100

Reflect

The digits children have written in the boxes should total 10, e.g. using 6 and 4 to give 60 + 40 = 100.

Children might have chosen to write examples in a particular order to help them find all possibilities, e.g. 10 + 90 = 100, 20 + 80 = 100, 30 + 70 = 100… 90 + 10 = 100.

It is possible some children might have included 0 and written 0 + 100 = 100 and 100 + 0 = 100.

Adding and subtracting 1s

➜ pages 53–55

1. 22 + 7 = 29 There are 29 seeds in total.

2. Children should have completed the calculation 29 – 5 = 24 using the columnar method. There are 24 sheep in the field.

3. Children should have written the following missing numbers into the number sentences and written out each calculation using the columnar method.
a) 47
b) 59
c) 99
d) 42
e) 60

4. 18 4
47 40
31 37

5. Children could have written the correct number sentence as 48 – 20 = 28 and amended the columnar calculation by writing a zero in the ones column of the second row.
Alternatively, children could have written the correct number sentence as 48 – 2 = 46. If so, they should have amended the diagram, crossing out 2 ones instead of 2 tens, and amended the columnar calculation by writing 2 into the ones column instead of the tens column and changing the answer to 46.

Reflect

22 + 4 = 26, 59 – 7 = 52.

Children could have explained different methods, for example counting on or back methods or columnar methods.

Finding 10 more and 10 less

→ pages 56–58

1. a) There are 53 books. Now there are 63 books.
b) There are 29 cubes. 10 less is 19.

2. Answers from left to right:
a) 54, 84, 94
b) 27, 37, 47, 67, 77
c) 88, 78, 38, 28

3.

10 less	Number	10 more
20	30	40
62	72	82
23	33	43
34	44	54

4. 35 79
83 46
64 63
90 87

5. 48, 28

Reflect

There are many possible answers.

To complete the first number sequence, children should have chosen pairs of numbers with a difference of 10, placing the larger number on the right, e.g. 10 more than 48 is 58.

To complete the second number sequence, children should have chosen pairs of numbers with a difference of 10, placing the larger number on the left, e.g. 10 less than 53 is 43.

Adding and subtracting 10s

→ pages 59–61

1. a) 58. There are 58 cans in total.
b) 92
c) 81

2. a) 33. There are 33 pieces of cake left.
b) 14

3. a) 58
b) 58
c) 34

4. Digits from left to right: 3, 6, 0

5. Children should have filled in missing numbers as follows:
Left-hand number wall from top to bottom: 68, 30, 58
Right-hand number wall from top to bottom: 70, 54, 70

Reflect

There are several possible answers for each number sentence.

For the first number sentence, children should have completed the boxes with digits that total 7, e.g. 16 + 60 = 76 or 56 + 20 = 76.

For the second number sentence, children should have completed the boxes with digits that have a difference of 3, e.g. 96 – 60 = 36 or 46 – 10 = 36.

Adding a 2-digit number and a 1-digit number (1)

→ pages 62–64

1. Children should have completed the diagrams and number sentences as follows:
Tens frames: complete the addition of 7 doughnuts (3 completed ten frames and 3 ones counters)
Part-whole diagram: 3
Number line: Draw a jump of 3, from 30 to 33 (children might have jumped in ones).
26 + 7 = 26 + 4 + 3 = 33 There are 33 doughnuts in total.

2. Children might have partitioned 5 in a different way but the following method is efficient as it bridges onto 20:
Part-whole diagram: 2, 3
Number line: Draw a jump of 2, from 18 to 20, and a jump of 3, from 20 to 23.
18 + 5 = 18 + 2 + 3 = 23 There are 23 coins in the jar now.

3. a) Children might have partitioned 8 in a different way but the following method is efficient as it bridges onto 50:
Part-whole diagram: 8 (whole), 7 and 1 (parts)
Number line: Draw a jump of 7, from 43 to 50, and a jump of 1, from 50 to 51.
43 + 8 = 43 + 7 + 1 = 51
b) 57 + 7 = 57 + 3 + 4 = 64 (some children may have partitioned 7 in a different way)

4. a) 84 + 7 = 84 + 6 + 1 = 91
b) 8 + 46 = 46 + 4 + 4 = 54 (some children may have partitioned 8 in a different way)

5. If Mary had partitioned 8 into 5 and 3, she would have jumped onto 40, which would make the rest of the calculation more straight-forward. This would give the number sentence 35 + 8 = 35 + 5 + 3 = 43.

Reflect

Children could have explained their reasoning in different ways, e.g. I added 6 on first so that I landed on 60 (a multiple of 10). This makes it easy to do the rest of the addition.

Adding a 2-digit number and a 1-digit number (2)

→ pages 65–67

1. Children should have drawn a jump of 3, from 40 to 43, on the number line. There are 43 paper clips in total.

2. 51, 51

3. a) 23 + 8 = 31
b) 18 + 8 = 26 (in columnar layout), 26 = 18 + 8

4. Children should have filled in the gaps to complete calculations as follows:
a) 64 + 7 = 71 (in columnar layout)
b) 38 + 5 = 43 (in columnar layout)

5. a) 56 + 9 = 65 or 9 + 56 = 65
b) Children should have written two of the following calculations: 43 + 4 = 47, 4 + 43 = 47, 38 + 9 = 47, 9 + 38 = 47

Reflect

Children could have drawn different jumps along the number line but, to bridge on 70, they should have drawn a jump of 5, from 65 to 70, and a jump of 3, from 70 to 73.

65 + 8 = 65 + 5 + 3 = 73 (children could have partitioned the 8 in a different way)

65 + 8 = 73 (in columnar layout)

Subtracting a 1-digit number from a 2-digit number (1)

→ pages 68–70

1. Children should have completed the diagrams and number sentences as follows:
Number frames: crossed out 6 counters
Part-whole diagram: 4
Number line: label the left-hand jump as '- 4'
42 – 6 = 42 – 2 – 4 = 36 There are 36 leaves left on the tree.

2. Children could have partitioned numbers differently, but the following answers show efficient methods that bridge onto the multiple of 10:
a) 36 – 9 = 36 – 6 – 3 = 27
Part-whole diagram: 6, 3
Number line: Draw a jump of 6 backwards, from 36 to 30, and a jump of 3 backwards from 30 to 27
b) 63 – 9 = 63 – 3 – 6 = 54
Part-whole diagram: 3, 6
Number line: Draw a jump of 3 backwards, from 63 to 60, and a jump of 6 backwards from 60 to 54
c) 70 – 3 = 67
Part-whole diagram: 70 (whole), 3 and 0 (parts)
Number line: Draw a jump of 3 backwards, from 70 to 67 (alternatively, children could have jumped in ones)

3. a) 65 – 8 = 65 – 5 – 3 = 77
b) 33 – 8 = 33 – 3 – 5 = 25

4. Children could have explained each method using different language, e.g.
Tim started by subtracting 10 from 27 to give 17.
He had subtracted 10, which meant that he had subtracted one too many so he had to add one back, which gave an answer of 18.
The person on the right started at 27 and counted back 9 in ones to get to 18.

Reflect

Children could have made different suggestions but the most likely suggestion is that Hannah could have partitioned 9 into 7 and 2. Counting back 7 from 27 gives 20, which is a multiple of 10 so the Hannah could use number bonds to work out the remaining jump. This would give the calculation: 27 – 9 = 27 – 7 – 2 = 18

Subtracting a 1-digit number from a 2-digit number (2)

→ pages 71–73

1. Children should have crossed out 6 cubes from the bottom picture and completed the columnar subtraction to show 35 – 6 = 29. There are 29 blocks left.

2. Children should have completed the diagrams and columnar calculations as follows:
bottom place value grid: cross out 8 ones
columnar subtraction: record the exchange by crossing out the 5 (Tens) and replacing it with 4 and putting a 1 in front of the 5 (Ones) to show there are now 15 (Ones). Write in answer of 47.

3. a) Children should have completed the diagrams and columnar calculations as follows:
Bottom place value grid: draw 6 tens and 4 ones, show exchange by crossing out one of the tens and exchanging it for 10 ones, then cross out 7 of the ones.
Columnar subtraction: record the exchange by crossing out the 6 (Tens) and replacing it with 5 and putting a 1 in front of the 4 (Ones) to show there are now 14 (Ones). Write in answer of 57.
b) 81 – 8 = 73
c) 47 = 52 - 5

4. Children might have explained the mistakes in different ways, e.g.
The digit 7 has been written into the wrong place in the columnar calculation (Tens column, rather than Ones column).
The child on the right has made a mistake with the ones. He has written that 3 ones subtract 7 ones is 4 ones, which is not correct. Instead, he needs to exchange a ten for 10 ones so that he can then work out 13 (Ones) subtract 7 ones.

Reflect

Children will use different methods e.g. 65 – 8 = 65 – 5 – 3 = 57, counting back in ones from 93 or using a columnar method (with exchange).

They will explain their preferences in different ways:

The method I prefer is to partition the 8 into 5 and 3 and count back along a number line. I have chosen this because I can use my number bonds to help me.

I like to use the columnar method because it shows the tens and ones clearly.

End of unit check

→ pages 74–75

My journal

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

Freya has added on 2 ones instead of 2 tens.

Jack has subtracted 20 instead of adding 20.

Mira has made a mistake working out 56 + 10, giving the answer 76 (which is adding 20) instead of 66.

Power puzzle

Children should have considered which number sentences they could use straight away to find the value of a shape (first and third number sentences). They should then have used these answers in the remaining number sentences to find the value of the other shapes.

star = 5 triangle = 67 square = 72 rhombus = 95

Unit 3: Addition and subtraction (2)

Adding two 2-digit numbers (I)

➜ pages 76–78

1. Children should have completed the diagrams and number sentences as follows:
a) 88, 88. There are 88 balloons in total.
b) 41 + 17 = 58
Part-whole diagram: 7
Number line: 51, + 7, 58,
41 + 10 = 51, 51 + 7 = 58
There are 58 animals altogether.

2. Children should have used tens and ones blocks to represent the numbers and complete the part-whole diagram and columnar addition:
a) 87, 87
b) 79, 79

3. a) 25
b) 26
c) 13
d) 49
e) 59
f) 58

4. Children should have used tens and ones blocks to represent the numbers and complete the columnar addition:
49. They have 49 sweets in total.

5. Children should have placed two digits with a total of 8 into the boxes, e.g. 17 + 72 = 89, 27 + 62 = 89 and 57 + 32 = 89.

Reflect

Children could have described different methods to work out that 25 + 62 = 87, e.g.

To work out 25 + 62, I would add 2 tens and 5 ones to 6 tens and 2 ones.

To work out 25 + 62, I would start at 62 and count 10, 10 and 5 along a number line.

Adding two 2-digit numbers (2)

➜ pages 79–81

1. Children should have completed the diagrams and number sentences as follows:
a) 94
Place value grid: 2 tens and 6 ones drawn in second row
Columnar addition: 26 in second row, answer 94 (with digits in appropriate columns)
68 + 26 = 94
There are 94 pencils altogether.
b) 63
Place value grid: 1 ten and 8 ones drawn in second row
Number line: jumps drawn, starting at 45, then jumping 10 and then jumping 8.
45 + 10 + 8 = 63
There are 63 sweets.

2. 63 (whole in part-whole diagram). Children could have shown their working using a range of methods, e.g. number line, columnar addition.

3. Jim has 99 balloons in total.

4. 17 + 15 = 32
18 + 15 = 33 28 + 30 = 58
19 + 15 = 34 38 + 30 = 68
15 + 17 = 32 48 + 30 = 78
15 + 16 = 31 48 + 29 = 77

5. 82 from (63 + 19)

6. Possible answers are: 4 and 38, 5 and 37, 6 and 36, 7 and 35, 8 and 34, 9 and 33.

Reflect

Children could have chosen different methods to complete the calculation and explained their methods in different ways, e.g.

I can add 35 and 18 by using tens and ones blocks because 35 is 3 tens and 5 ones and 18 is 1 ten and 8 ones.

I can add 35 and 18 by using a number line because adding 18 is the same as jumping 10 and then 8 along a number line.

Subtracting a 2-digit number from another 2-digit number (I)

➜ pages 82–84

1. 58 – 23 = 35

2. Children should have used the tens and ones blocks to help them answer the calculations:
a) 71, 71
b) 20, 20 (children should have drawn a place value grid for 36 in tens and ones)
c) 21, 21 (children should have drawn a place value grid for 62 in tens and ones)

3. She has 42 left.

4. a) 24
b) 34
c) 45
d) 44
e) 54
f) 22

5. 36 – 24 = 12

6. Children should have completed the calculation using pairs of numbers with a difference of 10, with the greater number on the right-hand side of the number sentence, e.g.
29 – 1 = 39 – 11
29 – 5 = 39 – 15
29 – 29 = 39 – 39

Reflect

The calculation is not correct. Children could have explained how they know this in different ways, e.g.

I took 6 tens and 5 ones blocks and subtracted 3 tens and 2 ones. This left 3 tens and 3 ones so the answer to 65 – 32 is 33, not 45.

I added 32 to 44 but the answer was not 65.

Subtracting a 2-digit number from another 2-digit number (2)

➜ pages 85–87

1. Children should have completed the number line and the number sentence as follows:
Number line jump: – 1
Missing numbers (by marks) on number line from left to right: 26, 36, 46
Penny has 31 more.

2. Children should have completed the number line and the number sentences as follows:
Number line jump: – 3
Missing number (by mark) on number line: 35
45 – 32 = 13 (alternatively, children could have written 45 – 13 = 32)
Class 1 needs 13 more.

3. Children should have completed the number line and the number sentences as follows:
Number line jumps from left to right:
– 5, – 10, – 10, – 10, – 10
Missing numbers (by marks) on number line from left to right: 47, 57, 67, 77, 87
97 – 42 = 55 (alternatively, children could have written 97 – 55 = 42)

4. Children should have completed the number lines to complete the number sentences:
a) 65 – 43 = 22 (alternatively, children could have written 65 – 22 = 43)
b) 48 – 11 = 37

5. The calculation is not correct. Children could have described how they know in different ways, e.g.
85 – 43 = 42 but 65 – 43 = 22.
The difference between 85 and 43 cannot be the same as the difference between 65 and 43 since 85 and 65 are in different places on the number line.

6. The difference between 86 and 32 is 54.
Children could have shown different methods, e.g.
Jumping backwards along a number line from 86 to 32.
Using 8 tens and 6 ones to represent 86 then subtracting 3 tens and 2 ones.

Reflect

48 – 16 = 32. Children could have used different methods, e.g.

I solved it by jumping backwards along a number line from 48 to 16.

I could also have solved it by using 4 tens and 8 ones to represent 48 then subtracting 1 ten and 6 ones to get the answer 32.

Subtracting a 2-digit number from another 2-digit number (3)

➜ pages 88–90

1. Children should have completed the number line and number sentences as follows:
Number line missing numbers from left to right:
29, 30, 38
48 – 10 = 38
38 – 8 = 30
30 – 1 = 29
29 are dogs.

2. Children should have completed the number line and number sentences as follows:
Number line missing numbers from left to right are 17, 20, 24, 34, 44, 54
64 – 47 = 17.
There are 17 cars left.

3. Children should have completed the number lines as follows:
Mary missing number from left to right: 28, 30, 34, 44
Sam missing number from left to right: 28, 30, 50
Mary and Sam do get the same answer, 28.
Children could have suggested different ways of doing the same problem, e.g. using a columnar method with exchange or using tens and ones blocks.

4. Children should have completed the number sentence and number line as follows:
27 – 13 = 14
Number line jumps from left to right: – 1, – 1, – 1, – 10
Number line missing numbers from left to right: 14, 15, 16, 17

5. a) 65
b) 66
c) 16
d) 48
e) 38
f) 74

6. a) 16
b) 19
c) 61

Reflect

Children could have described different methods to work out that the missing number in the calculation is 15, e.g.

Using a number line and counting back from 32 to 17

Taking 32 counters and splitting them into 17 and another group then counting how many counters are in the other group

Subtracting a 2-digit number from another 2-digit number (4)

→ pages 91–93

1. Children should have completed the diagrams and calculation as follows:
Picture: crossed out 15 buns
Bottom place value grid: crossed out 1 ten and 5 ones
34 – 15 = 19 (columnar subtraction)

2. Children should have used tens and ones blocks on place value grids and completed the columnar subtractions (including exchange) to answer the calculations:
a) 57 – 28 = 29
b) 83 – 55 = 28

3. 59 37
36 27
42 37

4. Missing numbers in part-whole diagram as follows:
28, 36

5. The statement is true.
Children might have started to understand why this is true if they have used tens and ones blocks to try out examples. To subtract a number with 7 ones from a number with 2 ones, it will be necessary to exchange 1 ten for 10 ones. This will give 12 ones. When you subtract 7 ones, this leaves you with 5 ones.
Children might also start to appreciate repeating patterns if they use a number line to try out examples.

Reflect

Children could have completed the statement in different ways, e.g.

I know I can use subtraction when I want to find how much greater one number is than another number.

I know I can use subtraction when I want to find the missing part in a part-whole diagram.

Adding three 1-digit numbers

→ pages 94–96

1. Children should have drawn counters into the ten frames to find the answer:
7 + 6 + 4 = 17. There are 17 flowers.

2. Children should have drawn counters into the ten frames to find the answers:
a) 16
b) 18
c) 23

3. There are many different ways to complete the part-whole diagram and number sentence, e.g.
9 + 2 + 1 = 12
6 + 6 + 0 = 12
3 + 4 + 5 = 12
2 + 2 + 8 = 12

4. a) 4
b) 6
c) 8

5. =
<
=

Reflect

There are four different totals that can be made by adding three of the cards:
15: by adding 3, 5 and 7 in any order
17: by adding 3, 5 and 9 in any order
19: by adding 3, 7 and 9 in any order
21: by adding 5, 7 and 9 in any order
21 is the greatest possible total that can be made.

Solving word problems – the bar model (I)

→ pages 97–99

1. Children should have completed the bar model, columnar addition and number sentence as follows:
Bar model: 88 (whole), 31 and 57 (parts)
Columnar addition: 31 + 57 = 88 (or 57 + 31 = 88)
Martha sells 88 cards in total.

2. Children should have completed the bar model, columnar subtraction and number sentence as follows:
Bar model: 46 (part)
Columnar subtraction: 72 – 26 = 46 (showing exchange)
There are 46 children.

3. Children should have ticked bar model A. They could have explained their reasoning in different ways, e.g. In the problem, the whole represents 42 and one part is 18. The answer to the problem is the missing part.

4. Eva rolls 2 on the third dice.

5. The other number is 29.

Reflect

There are many possible questions that fit the bar model, e.g.

There are 25 children in a class. 17 of them are boys. How many are girls?

Amy is saving her pocket money to buy a computer game which costs £25. She has saved £17 so far. How much more money does she need?

Solving word problems – the bar model (2)

➜ pages 100–102

1. Katie's mum has 23 flowers. (Children should complete a bar model and subtraction showing 35 – 12 = 23.)

2. There are 22 toy cars altogether.

3. Sam scored 27 more goals than Jorge.

4. The total of their ages is 66.
To work this out, children will have needed to work through the following steps:
Megan is 25 years old. Genji is 16 years older than Megan, so Genji is 25 + 16, i.e. 41 years old.
The total of their ages is 25 + 41, i.e. 66.

5. There are 44 people on the second bus.
There are 16 more people on the second bus than on the first bus.

Reflect

Children could make up many different problems, e.g.

I need to collect 30 stickers to complete my sticker chart. I have 16 so far. How many more do I need?

Rohan is 3 years older than Samir. Samir is 8. What is the total of their ages?

End of unit check

➜ pages 103–104

My journal

Children are most likely to have circled the part-whole diagram containing the numbers 23 and 52. Children could have justified their answer in different ways, e.g.

It is the odd one out because 23 + 52 = 75 whereas 46 + 19 and 37 + 28 both give answers of 65.

Children could have chosen a different image as the odd one out, e.g. 46 + 19 is the odd one out because not of the numbers involved include the digit 2.

Power puzzle

When using the cards 1 to 9 each pile must total 15.

There are several ways to make three unequal piles that total the same amount, e.g.

Pile 1: 9 and 6 Pile 2: 8, 4 and 3 Pile 3: 7, 5, 2 and 1

Pile 1: 8 and 7 Pile 2: 6, 5, 3 and 1 Pile 3: 9, 2 and 4

It is possible to solve the puzzle using equal piles. There are two different ways to organise the cards, although the piles can be labelled differently and the cards can be arranged in a different order in each pile:

Pile 1: 9, 5 and 1 Pile 2: 8, 4 and 3 Pile 3: 7, 6 and 2

Pile 1: 9, 4 and 2 Pile 2: 8, 6 and 1 Pile 3: 7, 5 and 3

When using the cards 2 to 10 each pile must total 18.

There are several ways to organise the cards into unequal piles, although the piles can be labelled differently and the cards can be arranged in a different order in each pile, e.g.

Pile 1: 10 and 8 Pile 2: 9, 4, 3 and 2 Pile 3: 5, 6 and 7

Pile 1: 10 and 8 Pile 2: 9, 6 and 3 Pile 3: 2, 4, 5 and 7

There are two ways to organise the cards into equal piles, although the piles can be labelled differently and the cards can be arranged in a different order in each pile:

Pile 1: 10, 6 and 2 Pile 2: 9, 5 and 4 Pile 3: 8, 7 and 3

Pile 1: 10, 5 and 3 Pile 2: 9, 7 and 2 Pile 3: 8, 6 and 4

Unit 4: Money

Counting money – coins

→ pages 105–107

1. Children should have completed the number line from left to right:
30p, 40p, 45p, 50p, 55p.
There is 55p.

2. There is 80p.
Children should have used the number line to find the total of the coins. They could have put the coins in any order, though it is generally more efficient to start with the coins of greatest value.

3. Children have been prompted to add coins along the number line using the coins of greatest value first, which would give:
0, 50p, 55p, 60p, 61p, 62p, 63p, 64p, 65p
There is 65p.

4. a) 40p
b) 82p

5. Alice will not say 19p. Children could have explained their reasoning in different ways, e.g.
Alice will count 2p, 4p, 6p, 8p, 10p, 12p, 14p, 16p, 18p and 20p so will not say 19p.
When you count in twos you say the even numbers but 19 is odd.

6. The four possible answers are:
10p, 5p, 2p, 1p gives a total of 18p
20p, 5p, 2p, 1p gives a total of 28p
20p, 10p, 2p, 1p gives a total of 33p
20p, 10p, 5p, 2p gives a total of 37p

Reflect

Children could have answered this question in different ways, e.g.

The easiest way to count the coins is to use a number line to add up the value of each coin in turn.

The easiest way to count the coins is to start with the coins of greatest value first.

Counting money - notes

→ pages 108–110

1. a) Children should have completed the number line as follows, from left to right:
£35, £40, £45, £50
There is £50.
b) There is £46.
£20, £30, £40, £46

2. Children should have circled one £20 note, two £10 notes, one £2 coin and one £1 coin.

3. a) £35
b) £24
c) £38
d) £29
e) £17
f) £35

4. £10, £8

5. It cannot be a £5 note. Children could have counted up in 2s and 10s to test which numbers they say. Alternatively, children could have explained their reasoning in words, e.g.
Jenny does not say £5 because 5 is not even so is not in the 2 times-table.

Reflect

There are many possible answers, e.g.

£10 and £10

£10, £5 and £5

£5, £5, £5 and £5

Twenty £1 coins

Ten £2 coins

£10, £2, £2, £2, £1, £1, £1, 50p and 50p

Counting money – coins and notes

→ pages 111–113

1. There is £27. There is 34p. Together there is £27 and 34p.

2. First purse has £25. Second purse has 58p. The total is £25 and 58p.

3. a) £30 and 10p
b) £32 and 21p
c) £5, 5p
d) £50, 10p

4. Children should have circled the £10 note, the £2 coin, the 20p coin and the two 5p coins.

5. Poppy and James are both incorrect. Children could have recorded their working in different ways, e.g.
The £2 coin and £1 coin together total £3. The 5p and 2p coins together total 7p. This gives £3 and 7p altogether.

Reflect

Children might explain their methods in different ways, e.g.

First, I would add together the coins with a value of £1 or more. Next, I would add together the coins with a value of less than £1. Finally, I would add the two amounts together.

Showing equal amount of money (I)

➜ pages 114–116

1. a) Children could have chosen different ways of making 75p, e.g.
50p, 20p and 5p
50p 10p, 10p, 2p, 2p and 1p
50p, 20p, 2p, 1p, 1p and 1p
b) Children could have chosen different ways of making £25, e.g.
£10, £10 and £5
£10, £5, £5, £2, £2 and £1
£10, £10, £2, £1, £1 and £1

2. Children could have completed the part-whole diagram in different ways, e.g.
10p (one part) and 10p (other part)
20p (one part) and 0 (other part)
10p (one part) and 5p, 2p, 2p and 1p (other part)

3. a) Children could have circled different coins, e.g.
10p + 1p + 1p + 1p or 5p, + 5p + 2p + 1p
b) 1p + 2p + 5p + 5p
c) There are two possible answers:
£2 + £2 + £2 + £2 + £10 + £20
£1 + £1 + £2 + £2 + £2 + £10 + £20
d) There are three possible answers:
£1 + £1 + £1 + £5 + £10 + £20
£1 + £1 + £1 + £5 + £5 + £5 + £20
£1 + £1 + £1 + £5 + £5 + £5 + £5 + £5 + £10

4. Marie uses a 20p coin and a 5p coins.
Max uses a 20p coin, a 5p coin and a 2p coin.

5. There are two possible ways to complete the problem:
Top purse: 20p, £2 and £1
Bottom purse: 5p, 5p, 5p, 5p, 5p, 10p, 20p, £1 and £1
Top purse: 20p, £1, £1 and £1
Bottom purse: 5p, 5p, 5p, 5p, 5p, 10p, 20p, £2

Reflect

The smallest number of coins needed to make 58 pence is 4 (50p + 5p + 2p + 1p). To prove this, some children might have tried out lots of different ways to make 58p. Others might have explained their reasoning in words, e.g.

To use the smallest number of coins, you need to use coins with the greatest possible value. So, to make 58p using the smallest number of coins, you will use 50p, 5p, 2p and 1p.

Showing equal amounts of money (2)

➜ pages 117–119

1. Children should have matched amounts as follows:
top left-hand set ➜ bottom right-hand set (55p)
middle left-hand set ➜ top right-hand set (£1 and 10p)
bottom left-hand set ➜ middle right-hand set (22p)

2. Children could have completed the part-whole diagrams in different ways, e.g.
2-part diagram: 20p, 20p or 10p, 20p + 5p + 5p
3-part diagram: 20p, 10p, 10p or 10p + 5p, 10p + 5p, 10p
4-part diagram: 10p, 10p, 10p, 10p or 20p, 10p, 5p, 5p

3. a) There are many possible ways, e.g. £10 + £5 or £5 + £5 + £1 +£1 +£1 + £1 + £1
b) There are many possible ways, e.g. £2 + 10p or £1 +£1 + 5p + 5p

4. I do not agree with Sarah. Children could have explained their reasoning in different ways, e.g.
The tin could have three coins in it (20p + 5p + 1p) but it could contain more than 3 coins, e.g. 4 coins (20p + 2p + 2p + 2p) or 5 coins (10p +10p + 2p + 2p + 2p)

5. Children could have written coins in any order:
20p = 10p + 10p
20p = 10p + 5p + 5p
20p = 5p + 5p + 5p + 5p
20p = 10p + 5p + 2p + 2p + 1p
20p = 10p + 2p + 2p + 2p + 2p + 2p (alternative answers are possible)
20p = 5p + 5p + 2p + 2p + 2p + 2p + 2p (alternative answers are possible)

Reflect

Children could have shown different ways of making 66p, e.g.
20p + 20p + 20p + 5p + 1p
50p + 5p + 5p + 5p + 1p
10p + 10p + 20p + 20p + 2p + 2p + 2p

Comparing amounts of money

➜ pages 120–122

1. a) Jerry has the most money.
b) Sandeep has the least money.
c) Children should have circled the left-hand wallet.

2. a) =
b) >
c) <
d) <
e) =

3. False, False, False

4. There are two possible answers that use single notes:
£20 – £10 = £5 + £5
£20 – £5 = £5 + £10
Children might give alternative answers, where the amounts could be made using notes and coins e.g.
£20 – £1 = £5 + £14

5. Children should have chosen an amount between £26 and £50 and shown how to make it using notes and coins, e.g.
£30 = £20 + £10
£35 = £20 + £10 + £5
£46 = £20 + £20 + £2 + £2 + £2

Reflect

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

£10 + £2 + £2 + £1 gives a total of £15. £5 + £2 + £2 + £1 gives a total of £10. £15 is greater than £10.

Both bags contain an equal amount in coins. As well as the coins, bag 1 also includes a £10 but bag 2 includes a £5. £10 is greater than £5 so bag 1 has more money in it than bag 2.

Calculating the total amount

➜ pages 123–125

1. £58 (on bar model), £58. Ava has £58.

2. Children should have completed the bar model to show: £12 (whole) £6 (part). Peter spends £12.

3. Children should have completed the bar model, columnar addition and number sentences as follows:
Bar model: £72 (whole), £27 and £45 (parts)
Columnar addition: £27 + £45 = £72
£27 + £45 = £72
The total cost is £72.

4. Children should have drawn a bar model as follows:
£21 (whole), £7, £5 and £9 (parts)
Ali gives £21 to charity.

5. There are many different sets of objects Poppy could have bought, e.g.
One book, one notepad, one rubber, one pencil and one big sticker
Two pencil cases, two pens, three pencils and five small stickers

Reflect

Children could have written any word problem that could be represented by the calculation 27p + 14p, e.g.

I have 27p in my purse and find another 14p in my pockets. How much money do I have altogether?

Finding change

➜ pages 126–128

1. Children should have completed the bar model and number sentences as follows:
Bar model: £50 (whole), £18 (part)
£32 + £18 = £50
£50 – £32 = £18 (alternatively children could have written £50 – £18 = £32)
The change from £50 is £18.

2. Children should have completed the bar model and number sentences as follows:
Bar model: £28 (football), £37 (difference), £65 (kit)
The kit costs £37 more than the football.

3. There are 2 possible answers:
Amelia's coins were 10p, 2p, 1p, 1p (in any order)
Amelia's coins were 5p, 5p, 2p, 2p (in any order)

4. 65 + 35 = 100, 100 – 65 = 35. Li would have 35p change.

Reflect

Children could have used various methods to work out the change and explained their methods in different ways, e.g.

I would count along a number line to find the difference between 25p and 50p.

I would find the answer to 50 – 25 using a columnar subtraction.

Solving two-step word problems

➜ pages 129–131

1. Children should have completed the diagrams and number sentences as follows:
a) Bar model: £11 (whole)
£6 + £5 = £11
The total cost is £11.
b) Bar model: £11 and £9 (parts)
£20 - £11 = £9
Will gets £9 change.

2. Children should have completed the diagrams and number sentences as follows:
a) Bar model: £44 (top bar to represent cost of trainers), £14 (bottom bar on left to represent cost of football)
£14 + £30 = £44 (alternatively, children could have written £30 + £14 = £44)
The trainers cost £44.
b) The items cost £58 (£44 + £14)

3. 65p – 40p = 25p, so the drink costs 25p.
65p + 25p = 90p

4. Izzy has £12. Amin has £12 + £30 = £42. Izzy and Amin have £54 in total.

Reflect

Children could have written various second steps for this question, e.g.

Katie pays with a 50p coin. How much change will she get? Answer: 26p + 12p = 38p, 50p – 38p = 12p. Katie will get 12p change.

What coins could she use to pay exactly for the pen and pencil? Answer: 26p + 12p = 38p so Katie needs to pay 38p. One way Katie could pay is using one 20p coin, one 10p coin and four 2p coins.

End of unit check

➜ pages 132–133

My journal

It is false because 2 + 2 + 2 + 2 + 2 = 10 so the 2p coins have an equal value to the 10p coin.

Unit 5: Multiplication and division (I)

Making equal groups

➜ pages 134–136

1. There are 4 equal groups of 3 bananas.
There are 5 equal groups of 3 parcels.
There are 2 equal groups of 5 blocks.

2. Children should have matched descriptions to images as follows:
3 groups of 2 ➜ bottom image
5 groups of 5 ➜ top image
5 groups of 4 ➜ middle image

3. Children should have completed the images as follows:
a) ○○ ○○ ○○ ○○ ○○
b) ○○○○ ○○○○ ○○○○ ○○○○
c) ○○○○○ ○○○○○
d) ○ ○ ○ ○ ○ ○ ○

4. Children should have circled the following:
2nd pond from left (3 ducks instead of 2)
5th hoop from left (3 beanbags instead of 4)
right-most set of circles (4 circles instead of 1)

5. There are 3 groups of 2 children.
There are 3 groups of 4 clouds.
There are 2 groups of 3 birds.
Alternative answers are possible, e.g. There are 3 groups of 1 seesaw. There are 6 groups of 2 shoes.

Reflect

Children could have described a range of similarities and differences, e.g.

Same: Both pictures show groups of 4. Both pictures show dots.

Different: The first picture has 5 groups of 4 but the second picture has 3 groups of 4. The 4 dots are in lines in the first picture but in squares in the second picture. There are 20 dots in the first picture but 12 in the second picture.

Multiplication as equal groups

➜ pages 137–139

1. a) 4×2
$2 + 2 + 2 + 2$
b) 2×3
$3 + 3$
c) 5×1
$1 + 1 + 1 + 1 + 1$

2. a) 5×2
b) 4×3
c) 2×4

3. Children should have joined calculations to meanings as follows:
$3 + 3 + 3 + 3$ and 4×3 ➜ 4 groups of 3
$2 + 2$ and 2×2 ➜ 2 groups of 2
4×2 and $2 + 2 + 2 + 2$ ➜ 4 groups of 2

4. a) $3 + 3 + 3 + 3 = 4 \times 3$
b) $7 + 7 + 7 = 3 \times 7$
c) $5 + 5 + 5 + 5 + 5 = 5 \times 5$

5. a) $2 \times 3 = 3 + 3$
b) $2 \times 2 = 2 + 2$

Reflect

$3 + 3 + 3$ has the right multiplication partner, 3×3. Children may have described their reasoning in different ways, e.g.

$3 + 3 + 3$ is three groups of 3. Using multiplication this is written as 3×3.

$3 + 3 + 3 + 3 + 3$ shows 5 groups of 3 so does not match 6×3.

$3 + 3 + 3 + 3 + 3$ would match 5×3. Alternatively, $3 + 3 + 3 + 3 + 3 + 3$ would match 6×3.

Adding equal groups

➜ pages 140–142

1. a) $2 + 2 + 2 = 6$
$3 \times 2 = 6$
There are 6 cats in total.
b) Children should have completed four jumps of 5 along the number line and completed number sentences as follows:
$5 + 5 + 5 + 5 = 20$
$4 \times 5 = 20$
There are 20 balloons in total.

2. Children should have labelled the jumps along the number line and completed the number sentences:
a) $5 \times 5 = 25$
b) $4 \times 2 = 8$
c) $4 \times 1 = 4$

3. Children should have jumped in 10s along the number line and completed the number sentences:
$2 \times 10 = 20$ $8 \times 10 = 80$
$4 \times 10 = 40$ $7 \times 10 = 70$

4. Children should have labelled the jumps along the number line and completed the number sentences:
$6 \times 5 = 30$. There are 30 doughnuts in total.

5. $6 \times 2 > 5 \times 2$ $10 \times 2 = 5 \times 4$
$5 \times 4 = 4 \times 5$ $10 \times 3 < 10 + 10 + 10 + 10$

Reflect

The following are all possible multiplication facts for 20:

1 × 20 = 20 2 × 10 = 20 4 × 5 = 20

20 × 1 = 20 10 × 2 = 20 5 × 4 = 20

Children could jump to 20 along the number line by taking repeated jumps of 1, 2, 4, 5, 10 or 20.

Multiplication sentences

➜ pages 143–145

1. a) There are 5 groups of 2 people on tandems.
5 × 2 = 10
There are 10 people on tandems in total.
b) There are 2 groups of 4 people in balloons.
2 × 4 = 8
There are 8 people in balloons in total.
c) There are 9 people running (3 groups of 3).

2. Children should have matched multiplications to stories as follows:
5 × 3 ➜ Cost of 5 large loaves
2 × 5 ➜ Cost of 2 cakes
6 × 1 ➜ Cost of 6 rolls
5 + 5 + 5 ➜ Cost of 3 cakes
1 × 5 ➜ Cost of 1 cake

3. Children should have drawn a picture which shows 2 equal groups, each of which contains 4 objects, e.g. or 2 packets of apples, each containing 4 apples or a tray containing a 2 by 4 array of biscuits.

4. Children should have matched multiplications to pictures as follows:
6 × 3 ➜ set of 6 triangles
4 × 3 ➜ set f 4 triangles
2 × 4 ➜ set of 2 squares
3 × 6 ➜ set of 3 hexagons

5. 5 × 4 > 3 × 5. There are more cherries.

Reflect

Children could have made up different stories for the multiplications, e.g.

2 × 5: I hold up my 2 hands, showing all 5 fingers on each hand so I am showing 2 × 5 fingers. The 5 represents the number of fingers in each equal group.

5 × 2: 5 children each take off their 2 shoes and put them by the door as they go outside. There will be 5 × 2 shoes by the door. The 5 represents the number of equal groups (pairs) of shoes.

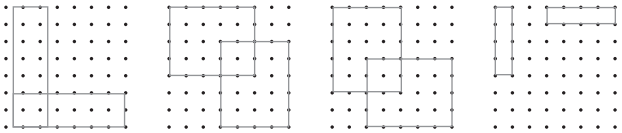
Using arrays

➜ pages 146– 148

1. a) 4 + 4 + 4 = 12
3 × 4 = 12
b) 4 + 4 + 4 + 4 + 4 + 4 = 24
6 × 4 = 24.
There are 24 tyres in the array.

2. a) 3 + 3 + 3 + 3 = 12
4 × 3 = 12
b) 10 × 2 = 20
2 × 10 = 20

3. Children will have drawn arrays as follows:
2 × 7: 2 rows and 7 columns, 2 columns and 7 rows
5 × 4: 5 rows and 4 columns, 4 columns and 5 rows
4 × 5: 4 rows and 5 columns, 5 columns and 4 rows
1 × 4: 1 row and 4 columns, 4 columns and 1 row



2 × 7 5 × 4 4 × 5 1 × 4

4. True, False

5. Children should have noticed that the 3 × 3, 4 × 4 and 5 × 5 arrays are squares. There will be 100 dots in a 10 × 10 array.

Reflect

Children should have appreciated that not all 2 × 7 arrays will look the same but that they will all share some common features.

Similarities: The arrays will all show 2 equal groups of objects in a line such that each group contains 7 objects.

Differences: Different arrays are likely to contain different objects. They are likely to have different dimensions and may be oriented in a different way.

2 times-table

➜ pages 149–151

1. a) 5 × 2 = 10
There are 10 gloves.
b) 7 × 2 = 14
There are 14 shoes.

2. a) 3 × 2 = 6
b) 4 × 2 = 8. Now there are 8 people.

3. Children should have matched the multiplications as follows:
<10: 3 × 2, 0 × 2
>10: 7 × 2, 10 × 2, 9 × 2
5 × 2 does not match to either circle because 5 × 2 is equal to 10.

4. 3 × 2 = 6
6 × 2 = 12

5. a) 8 × 3 = 12 × 2
b) 4 × 4 = 8 × 2

Reflect

Children could show 6 × 2 is 12 in many different ways, e.g.

by drawing a 6 × 2 array

by writing 2 + 2 + 2 + 2 + 2 + 2 = 12

by making 6 jumps of 2 along a number line

by drawing 6 groups of 2 objects such as 6 pairs of socks

5 times-table

➜ pages 152–154

1. 6 × 5 = 30

2. 7 × 5 = 35

3. 9 × 5 = 45

4. 5 × 5 = 25

5. a) 10
b) 25
c) 30
d) 35
e) 0
f) 55

6. 20 x 5 = 100. Children could have explained how they know in different ways, e.g.
I counted up 5 from 95 to add one more group of 5.
95 + 5 = 100

7. There are 9 possible answers:
eight 5p coins = 40p
seven 5p coins and one 10p coin = 45p
six 5p coins and two 10p coins = 50p
five 5p coins and three 10p coins = 55p
four 5p coins and four 10p coins = 60p
three 5p coins and five 10p coins = 65p
two 5p coins and six 10p coins = 70p
one 5p coin and seven 10p coins = 75p
eight 10p coins = 85p

Reflect

Children could have suggested several answers, e.g.

I can quickly work out that 5 × 6 = 30 because the answer will be the same.

I can quickly work out that 7 × 5 = 35 because the answer will be 5 more.

I can work out 12 × 5 = 60 because this is double the number of 5s.

10 times-table

➜ pages 155–157

1. a) 3 × 10 = 30. There are 30 stickers in total.
b) 6 × 10 = 60. There are 60 pencils in 6 boxes.

2. a) 5 × 10 = 50
b) 4 × 10 = 40

3. a) <
b) =
c) >
d) <

4. Children should have arranged the cards as follows:
1 × 10, 2 × 6, 3 × 5 and 5 × 3 (equal), 2 × 8, 10 × 2, 5 × 5, 4 × 10, 10 × 9

5. a) 5 × 4 = 2 × 10
b) 2 × 10 > 3 × 5 or 3 × 10 > 3 × 5 or 4 × 10 > 3 × 5
c) 2 × 3 > 0 × 10 or 3 × 3 > 0 × 10 or 4 × 3 > 0 × 10
d) The left-hand card must be 0. The right-hand cards can be any two cards from 2, 3 or 4.

Reflect

15, 75 and 99 are not in the 10 times-table. Children could have given different explanations for how they know, e.g.

I counted up in tens to 100. The other numbers were in the count but 15, 75 and 99 were not.

Numbers in the 10 times-table are made up of tens with 0 ones. This means they end in 0. 15, 75 and 99 do not end in 0 so are not in the 10 times-table.

Solving word problems – multiplication

➜ pages 158–160

1. a) 2 × 6 = 12. The tower is 12 cubes high.
b) 5 × 4 = 20. Jess has 20 balls.

2. a) There are 2 times as many light balls as dark balls.
b) 5 × 4 = 20
c) 6 × 10 = 60

3. 3 × 10 is 5 more than 5 × 5

4. Children could have drawn or written many different number stories that can be solved using the bar model, e.g.
How many wheels are there altogether on 3 cars?
There are 3 × 4 wheels, so there are 12 wheels altogether.
I have 4 stickers on my sticker chart. My sister has 3 times as many stickers as I do. How many stickers does she have?

Reflect

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

How many legs do 6 birds have? I drew the birds and counted the legs. I worked out 2 + 2 + 2 + 2 + 2 + 2, which gave me 12. I know that six groups of 2 is 12.

How many cubes high is Prisha's tower? I drew the towers and added 5 and 5. I worked out that 5 + 5 is 10. I knew that double 5 is 10.

End of unit check

→ pages 161–162

My journal

Children should recognise that Ajay's statement is false because both 50 and 30 are in both the 2 times-table and the 5 times-table. They could demonstrate this numerically as follows:

2 × 25 = 50
5 × 10 = 50

2 × 15 = 30
5 × 6 = 30

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

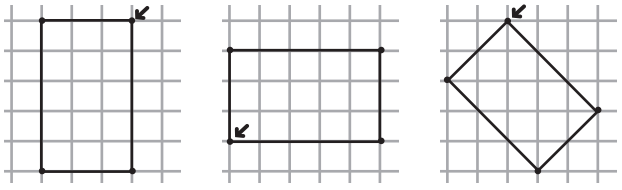
3-D shapes: cube, cuboid, sphere, pyramid

Drawing 2D shapes

➜ pages 78–80

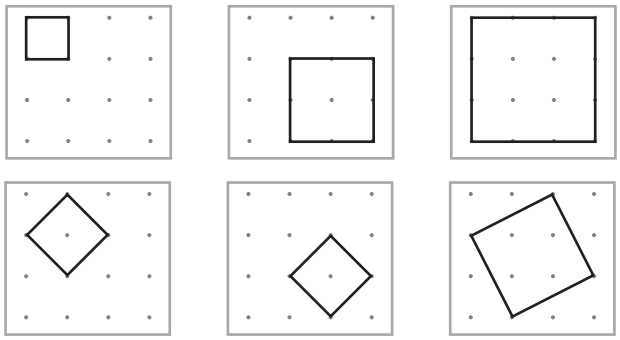
1. Children should have joined the dots to complete the following shapes:
Top row: triangle, triangle, square
Bottom row: square, triangle, rectangle

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.

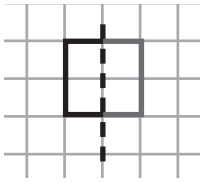
Different: The sides of A are all the same length but this is not true for B. A is symmetrical but B is not symmetrical.

Finding lines of symmetry

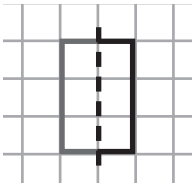
➜ pages 87–89

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

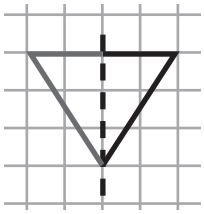
a)



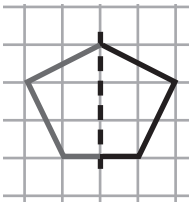
c)



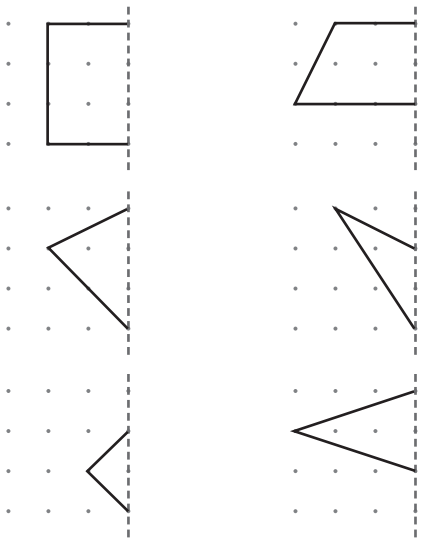
b)



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:

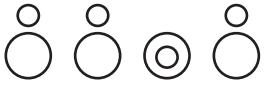
Top pattern: shape 10 – circle, shape 20 – circle

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

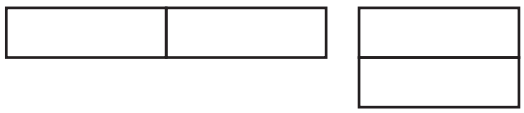
➜ pages 119–121

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

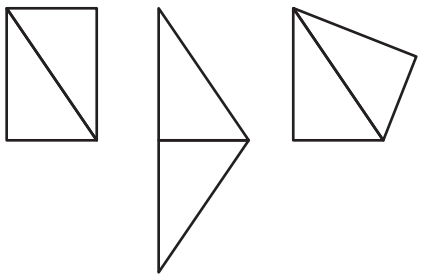
2. Children should have shaded:
a) one of the drawn halves
b) any half of the square
c) two of the quarters
d) any half of the rectangle

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.

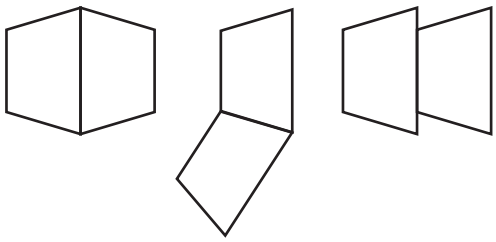
a)



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 $\frac{1}{4}$

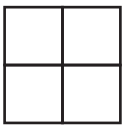
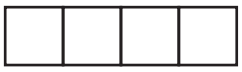
Does not show $\frac{1}{4}$

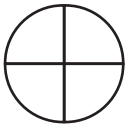
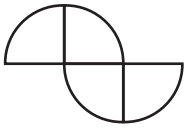
Does not show $\frac{1}{4}$

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

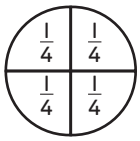
1. a) 2, 1, $\frac{1}{2}$
b) 3, 1, $\frac{1}{3}$

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

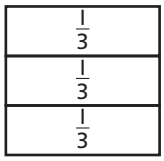
3. Children should have ticked the 1st, 2nd, 3rd and 5th shapes.

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

→ pages 155–156

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.

Unit 11: Position and direction

Describing movement

➜ pages 9–11

1. a) 2
b) 2

2. a) football
b) Children should have drawn a flower on the bottom shelf below the picture frame. They could have described its position in different ways, e.g.
The flower is to the left of the book.

3. a) cylinder, cuboid (either way round)
b) cube, cuboid (either way round)

4. Children should have labelled the squares as follows:

3	9	7
8	6	4
5	2	1

or

2	8	6
7	5	3
4	1	9

5. Top row: rectangle, circle
Bottom row: triangle, square

Reflect

Children could have given different descriptions, e.g.

I could say that the star is to the left of the dog.

I could say that the star is above the ice cream.

Describing turns

➜ pages 9–11

1. Children should have circled the words:
a) clockwise
b) anticlockwise
c) clockwise

2. a) half turn
b) quarter turn
c) whole

3. Children should have matched images to descriptions as follows:
Top image ➜ Half turn clockwise
Middle image ➜ Quarter turn clockwise
Bottom image ➜ Whole turn anticlockwise

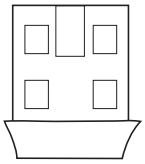
4. Children could have circled either yes or no, but they should have recognised that the fly could have turned clockwise or anticlockwise. Children could have explained their answer in various ways, e.g.

No, because the fly could have made a three-quarter turn anticlockwise.

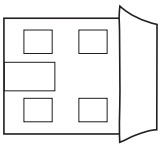
Reflect

Children should have drawn the picture rotated so that the door is: at the top; on the left; on the left:

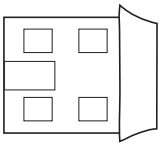
Half turn clockwise



Three-quarter turn anticlockwise



Quarter turn clockwise



Describing movement and turns

➜ pages 12–14

1. Children should have put an X in the middle square of the top row.

2. Go 2 spaces forwards. Make a quarter turn clockwise. Go 2 spaces forwards.

3. a) Children should have matched the diagrams to the instructions as follows:
Top diagram ➜ Bottom set of instructions
Middle diagram ➜ Top set of instructions
Bottom diagram ➜ Middle set of instructions
b) Different instructions are possible, the most obvious being:

Quarter turn anticlockwise, forwards 1, quarter turn clockwise, forwards 1.

Forwards 1, quarter turn anticlockwise, forwards 1, quarter turn clockwise.

4. Tom is correct. Children could have explained their reasoning in different ways, e.g.

I started facing in one direction and made a quarter turn clockwise. I faced the start direction again and made a three-quarter turn anticlockwise. I ended up facing the same direction both times.

A whole turn is the same as 4 quarter turns. If you make a three-quarter turn anticlockwise, this leaves you with one quarter turn anticlockwise to get back to where you started. So, you could get to the same position by making a quarter turn in the opposite direction, which is clockwise.

Reflect

Answers will depend on the children's choice of turn. Children should be able to describe their partner's chosen turn in two ways by recognising that it is possible to reach any position by turning clockwise or anticlockwise, e.g.

Half turn clockwise

Half turn anticlockwise

Quarter turn anticlockwise

Three-quarter turn clockwise

Making patterns with shapes

→ pages 15–17

1. Children should have circled:
a)  (inverted triangle)
b)  (left-pointing triangle)

2. Children should have drawn:
a)  (large square)
b)  (triangle with right angle top left)

3. Children should have drawn:
a)  (two semicircles with arcs facing inward)
b)  (white triangle on left, black on right, right angles together at the base)

4. a) Two possibilities:
The semicircle turns a quarter turn clockwise.
The semicircle turns a three-quarter turn anticlockwise.
b) Two possibilities:
The triangle turns a half turn clockwise.
The triangle turns a half turn anticlockwise.

5. Children should have circled the fifth shape: 

Children could have explained how they recognised the odd one out in different ways, e.g.

In the pattern, all other squares are split with a diagonal line from the top left vertex to the bottom right vertex but this square is split using the other diagonal.

Reflect

Answers will vary, e.g.

End of unit check

→ pages 18–19

My journal

Some children may ask qualitative rather than mathematical questions, such as 'Does it have packaging?', or may not realise that the question must be answerable with either 'Yes' or 'No'. However, suitable questions would include:

It is in the top / bottom row?

Is it in the first / second / third / fourth column?

Is it in the left / right group of four?

Is it one space away from the apple?

Power play

The quickest route to a grey circle will depend on successive dice rolls. Children may need supervision in interpreting the dice rolls correctly.

Unit I2: Problem solving and efficient methods

My way, your way!

➜ pages 20–22

1. 55 – 27 = 28 (or possibly 27 + 28 = 55). There are 28 girls.

2. 19 + 49 = 68 (or 49 + 19 = 68). The shopkeeper sells 68 apples in total.

3. 78 – 37 = 41 (or possibly 37 + 41 = 78).
Stacey's mum is 41 years older than Stacey.

4. 32 – 12 = 20 (or possibly 12 + 20 = 32).
'Starry Night' is 20 minutes long.

5. Kimi gets 32p change.

Reflect

Oskar has £75 in total. Children could have used a range of methods, such as counting on in tens or adding tens and ones.

Using number facts

➜ pages 23–25

1. Missing numbers as follows:
a) 53 63
73 27
b) 91 41
71 13

2. Children should have matched:
30 + 5 ➜ 20 + 15
50 + 5 ➜ 30 + 25
60 + 5 ➜ 50 + 15
90 + 5 ➜ 60 + 35

3. 48 g

4. Children should have completed the calculations and matched them to descriptions as follows:
75 + 7 = 82 ➜ one less
65 + 8 = 73 ➜ 10 less
75 + 18 = 93 ➜ 10 more
65 + 19 = 84 ➜ one more
45 + 38 = 83 ➜ equal to

5. 20

Reflect

The difference between the missing numbers is 20. Children might have explained how they knew in different ways, e.g.

When you add the first number to 45 you get 60. When you add the second number to 45 you get 80, which is 20 greater than 80. This means the second number must be 20 greater than the first number.

I worked out that the missing numbers are 15 and 35, and the difference between 15 and 35 is 20.

Using number facts and equivalence

➜ pages 26–28

1. Children should have written the calculations into the table as follows:
Correct: 32 + 30 = 62, 58 – 20 – 10 – 10 – 10 = 8
Incorrect: 2 + 45 = 65, 17 + 53 = 60, 75 – 15 = 90, 40 – 40 = 40

2. Children should have written 58 + 4 = 62, although some children might have written 58 + 40 = 98.

3. a) Answers may vary but children should have been able to justify their choice, e.g.

No, it is not the most efficient way. Since 100 is a round number it is easy to find the difference between 76 and 100 by counting from 76 to 100, jumping on to the next ten.

No, it is not the most efficient way. This column method involves lots of exchange so it will be more efficient to use a mental method.

b) Children could have used different methods, e.g. Counting backwards from 100 in ones and tens (in either order) using a number line.

4. Sofia knows that 45 + 30 is 75. 29 is one less than 30 so 45 + 29 will be one less than 75. So, Sofia should have subtracted 1 from 75, not added 1.

Reflect

The correct answer is 60.

Children might explain the errors in different ways, e.g.

Someone might get the wrong answer of 50 if they used a column method incorrectly. When they added the ones (7 and 3), they would get 10 ones. This would need to be exchanged for 1 ten. This ten then needs to be added to the 4 tens and 1 ten. It looks like they forgot to add this ten.

Someone might get the answer 34 if they subtracted 13 from 47 rather than adding it.

Using a 100 square

➜ pages 29–31

1. a) 59
b) 36
c) 82
d) 14

2. a) 49
b) 64
c) 20
d) 10

3. Missing numbers:
a) 43
b) 29
c) 80
d) 57

4. a) Children should have drawn two more jumps of 10, from 37 to 47 and from 47 to 57. They then need to jump 8, possibly in 1s, or possibly jumping 3 from 57 to 60, and then another 5 from 60 to 65.
27 + 38 = 65
b) On the 100 square and the number line, children should have jumped back 1 ten from 52 to 42 and then 4 ones, from 42 to 38 (or a 2 from 42 to 40, and another 2 from 40 to 38). Some children might have counted back the 1s before the 10.
52 – 14 = 38

5. Children might notice different patterns in the shaded numbers, e.g.

As you move down the rows, the 10s digits go up by 1 and the 1s digits go down by 1.

The 10s and 1s digits add up to 9.

Reflect

12 + 43 = 55

Children should have noticed that they get the same answer if they swap the numbers around within the addition calculation, that is: 43 + 12 gives the same answer as 12 + 43.

Getting started

➜ pages 32–34

1. 9 + 2 = 11 or 2 + 9 = 11, 7 – 6 = 1

2. There are many different ways to complete the number sentences e.g.

7 + 9 = 16, 0 + 16 = 16, 10 + 6 = 16

1 + 1 + 14 = 16, 3 + 5 + 8 = 16, 10 + 2 + 4 = 16

3. a) 36
b) 98

4. a) 6 + 8 + 3 = 17 (numbers could have been added in any order)
The bag of sweets costs 17p.
b) 9p + 8p + 6p = 23p (prices could have been added in any order)
c) There are two possible answers (prices could have been added in any order):
9p + 8p + 3p + 3p = 23p
8p + 6p + 6p + 3p = 23p

5. For the first calculation, children could have written any single digit into the first box. They should have written the bond to 16 in the second box. E.g.
40 + 16 = 56, 41 + 15 = 56, 45 + 11 = 56 or 49 + 7 = 56

For the second calculation, the following answers are possible: 65 = 8 + 57, 65 = 18 + 47, 65 = 28 + 37, 65 = 38 + 27, 65 = 48 + 17, 65 = 58 + 7

Reflect

The ? can only be 14, but children could have filled the grid in a number of ways, e.g.

1	9	10
7	5	12
8	14	

3	7	10
5	7	12
8	14	

8	2	10
0	12	12
8	14	

Methods for completing the grid could have varied.

It is sensible to start by completing one known bond, for example writing a pair of numbers that total 10 into the first row. Once two numbers have been placed in this way, the other numbers must be written in to give the correct totals for the remaining rows and columns.

In some cases, children may have started with a number bond that will not work, for example placing 9 and 1 in that order in the first row. In these case, they will have needed to start again, trying a different number bond.

Missing numbers

➜ pages 35–37

1. a) 8 + 12 = 20, 12 + 8 = 20 (in either order)
20 – 12 = 8, 20 – 8 = 12 (in either order)
b) 35 + 16 = 51, 16 + 35 = 51 (in either order)
51 – 16 = 35, 51 – 35 = 16 (in either order)

2. a) 46 – 27 = 19 (some children could have written 27 + 19 = 46)
b) 53 + 39 = 92 or 39 + 53 = 92

3. Missing numbers:
a) 21
b) 25
c) 34
d) 68

4. The first number must end in 1. The second box should have been completed with the tens digit of the first number plus 2. Some of the possible solutions are: 1 + 23 = 24, 11 + 23 = 34, 21 + 23 = 44, 31 + 23 = 54

Reflect

Answers will vary depending on the calculation and method chosen, e.g.

32 + 18 = 50: I worked out 50 subtract 18 by counting back 10 from 50 and then 8 from 40. I got the answer 32 so 32 + 18 = 50.

81 – 35 = 46: I found the difference between 46 and 81 by drawing a number line and jumping back from 81 to 46.

Mental addition and subtraction (I)

➜ pages 38–40

1. a) 12 + 5 = 17, 22 + 5 = 27, 32 + 5 = 37, 52 + 5 = 57
92 + 5 = 97, 72 + 5 = 77
b) 27 – 4 = 23, 37 – 4 = 33, 57 – 4 = 53
The final calculation could have answered in a number of ways, e.g.
87 – 4 = 83
97 – 14 = 83
107 – 24 = 83

2. Children should have put a cross by the calculations:
45 + 3 = 47, ?2 + 4 = 38, 26 + 2 = 29, 64 – 3 = 62

3. a) 34 44
54 74
44
b) 62 52
43 23
50

4. a) 84
b) 53
c) 61
d) 33

5. Children should have been able to justify their choice, e.g.

I would choose Poppy's method because the numbers 68 and 75 are close together so it is efficient to use a counting method to find the difference.

Reflect

Answers will vary depending on the calculation and method chosen by each child, e.g.

34 + 4 = 38: I know that 4 + 4 = 8, and 34 is 3 tens more than 4.

34 + 20 = 54: I started with 34 and added 2 tens to get to 54.

79 – 5 = 74: I know that 9 – 5 = 4 so 79 – 5 will be 74.

79 – 55 = 24: I just worked out 79 – 5 = 74, and this answer will be 50 less.

Mental addition and subtraction (2)

➜ pages 41–43

1. 35 25
51 18
56 17
96 13

2. a) To work this out, I can add 20 and then subtract 2.
78 + 20 – 2 = 96.
b) To work this out, I can add 60 and then subtract 1.
26 + 60 – 1 = 85.

3. a) 32
b) 13
c) 41
d) 74

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

I subtracted 1 from each number. This meant that the first number ended in 9 so it was easy to subtract the second number part by part. When you change the numbers in a subtraction by the same amount the difference remains the same.

4. Children should have matched:
35 + 19 ➜ 34 + 20
90 – 55 ➜ 89 – 54
40 – 27 ➜ 39 – 26
47 + 18 ➜ 45 + 20

5. 65 – 39 = 26

Reflect

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

Adding 18: Add 20 and then subtract 2.

Subtracting 19: Subtract 20 and then add 1 back on.

Efficient subtraction

➜ pages 44–46

1. a) 78
b) 17
c) 3

2. a) 41
b) 64
c) 12
d) 0

3. a) 92 – 80 = 12. Tilly has 12 stamps.
b) 71 – 44 = 27 (or possibly 44 + 27 = 71). Marek's score is 27 points.

4. 38 40
39 41

Children should have noticed that the answers increase by 1 (from left to right, by row).

5. No. Maryam's method is not efficient as she has had to do a lot of crossing out.

Children could have suggested several alternatives, e.g.

Find the difference between 76 and 68 by counting up from 68 to 76.

Reflect

Children could have suggested different methods. E.g.

82 – 4 = 78: Start at 82 and count back 2 to 80 and then another 2 to 78.

82 – 75 = 7: Find the difference between 82 and 75 by starting at 75 and jumping up to 82. This involves a jump of 5 from 75 to 80 and then a jump of 2 from 80 to 82, so the answer is 7.

82 – 29 = 53: Work out 82 – 30 = 52 and then add 1 to the answer to get 53.

Solving problems – addition and subtraction

➜ pages 47–49

1. a) 45p
b) 100p – 45p = 55p. He will get 55p change.

2. a) 27
b) 18

3. 27 – 11 = 16 (or possibly 11 + 16 = 27). 16 children like rugby more than tennis.

4. Cooper spends more because the badge costs more than the party blower.

Alternatively, children could have found the totals and written:

Cooper spends more because 47p is more than 32p.

5. Fruit salad 72p, fruit juice 13p.

Reflect

Children could have written any story to represent one of the calculations e.g.

28 + 6 = 34: There are 28 Year 2 children in class but then 6 children from Year 1 join the class for a story. How many children listen to the story?

28 – 6 = 22: There are 28 children in the Year 2 class. 6 children are away with a stomach bug. How many Year 2 children are at school?

Solving problems – multiplication and division

➜ pages 50–52

1. 12

2. 40

3. 6

4. 45

5. 30

Reflect

Children could have written any correct word problem for one of the calculations, e.g.

4 × 10 = 40. It costs £10 for an adult to go to the cinema. How much will it cost for 4 adults?

40 ÷ 10 = 4. A group of adults pay £40 altogether to watch a film in the cinema. Cinema tickets cost £10 for each adult. How many adults are in the group?

Solving problems using the four operations

➜ pages 53–55

1. Different answers are possible, e.g.
10 + 10 = 20, 17 + 3 = 20
15 – 5 = 10, 100 – 90 = 10
4 × 5 = 20, 1 × 20 = 20
30 ÷ 3 = 10, 100 ÷ 10 = 10

2. Zac has 67p left.

3. 25 sweets are left.

4. Tia has 40 m left to swim.

5. There are 3 two pence coins in his other hand.

Reflect

Children could have written any word problem that needs both steps e.g.

There are 18 sweets. Sam and Tomasz share the sweets equally between them. Sam eats 5 of his sweets. How many sweets does Sam have left?

End of unit check

➜ pages 56–57

My journal

First I work out that, since there are 10 boxes of 4 oranges, there must be 40 oranges.

Then I see how many 5s there are in 40.

I got the answer 8.

Power play

There are 2 + 2 tens and 6 + 4 ones. So the total is 20 + 20 + 10. They have 50 pieces of bread in total.

Together, they drop 10 + 3 + 7 pieces, which makes 20 pieces. 50 – 20 = 30. In total, 30 pieces are left now.

The 5 birds each get an equal share of 30. Share 30 out, 1 group of 5 at a time. You can do this 6 times, so there are 6 pieces for each bird.

Or: 30 ÷ 5 = 6

3 × 6 = 18

3 of the birds get 18 pieces altogether.

Unit 13: Time

Telling and writing time to the hour and the half hour

➜ pages 58–60

1. Children should have matched:
half past 2 ➜ 2nd clock
half past 1 ➜ 4th clock
2 o'clock ➜ 1st clock
9 o'clock ➜ 3rd clock

2. It is half past 8.
It is 3 o'clock.
It is half past 4.

3. Children should have drawn hands as follows:

half past 11: minute hand pointing to 6, hour hand half way between 11 and 12

8 o'clock: minute hand pointing to 12, hour hand pointing to 8

half past 6: minute hand pointing to 6, hour hand half way between 6 and 7

1 o'clock: minute hand pointing to 12, hour hand pointing to 1

4. Sam has mixed up the hour hand and the minute hand.

5. The possible answers are: 1 o'clock, 3 o'clock, 5 o'clock, 7 o'clock, 9 o'clock, 11 o'clock.

Reflect

Children could have completed the sentences in different ways, e.g.

An o'clock time always has the minute hand pointing to 12.

A half past time always has the minute hand pointing to 6.

Telling the time to the quarter hour

➜ pages 61–63

1. Children should have coloured the following quarter of the clock:
quarter past 11: between 12 and 3
quarter to 5: between 9 and 12

2. Children should have matched:
quarter past 2 ➜ 2nd clock
quarter to 11 ➜ 4th clock
quarter past 7 ➜ 1st clock
half past 2 ➜ 3rd clock

3. a) quarter past 5
b) quarter to 3
c) quarter to 5

4. Children should have drawn hands as follows:

quarter past 6: minute hand pointing to the 3, hour hand just past the 6

quarter past 8: minute hand pointing to the 3, hour hand just past the 8

quarter to 10: minute hand pointing to the 9, hour hand just before the 10

quarter to 4: minute hand pointing to the 9, hour hand just before the 4

5. Malik has drawn the minute hand pointing to the 3, which shows a 'quarter past' time not a 'quarter to' time. The minute hand should be pointing to the 9. The hour hand should be just before the 2.

6. Quarter past a time means that it is quarter of an hour after that o'clock time.

Half past a time means that it is half an hour after that o'clock time.

Quarter to a time means that it is quarter of an hour before that o'clock time.

Reflect

The fourth clock shows quarter to 6. This is because the minute hand is pointing to the 3 and the hour hand is just before the 6.

Telling time to 5 minutes

➜ pages 64–66

1. Children should have matched:
1st picture ➜ twenty past 3
2nd picture ➜ ten past 5
3rd picture ➜ ten to 7
4th picture ➜ twenty-five past 8

2. Children should have drawn hands:

five past 6: minute hand pointing to 1

ten to 4: minute hand pointing to 10

twenty-five past 10: minute hand pointing to 5

twenty-five to 11: minute hand pointing to 7

3. a) 2nd bus (circled)
b) 1st bus (circled)
c) twenty to 1

4. 10.

Children could have described how they know in different ways, e.g.

I know that the minute hand moves from one marked number to another in 5 minutes. The minute hand points to 12 at an o'clock time, so the minute hand points to 11 at five to an hour and it points to 10 at ten to an hour.

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

There are 60 minutes in an hour. 35 and 25 total 60. So, thirty-five minutes past one hour is the same as twenty-five minutes to the next hour.

An analogue clock would be read as 25 to 8 while a digital clock would be read as 7.35. These are both the same time.

Reflect

Children could have explained how they found the answer in different ways, e.g.

I know that the minute hand points to the 12 at an o'clock time. I know that the minute hand moves from one marked number to another in 5 minutes. I counted round the numbers clockwise from 12 in 5s and at worked out that, at twenty past, the minute hand will point to the number 4.

Minutes in an hour

→ pages 67–69

1. 65

2. Children should have shaded the whole hour on one clock and 25 minutes on the other.

3. a) Children should have shaded the whole hour on one clock and 15 minutes on the other. The film lasts for 75 minutes.
b) Children should have shaded the whole hour on one clock and 30 minutes on the other. The film lasts for 1 hour and 30 minutes.

4. Children should have written a time between 60 and 77 minutes, e.g. 61 minutes, 65 minutes or 1 hour and 10 minutes.

Reflect

There are 60 minutes in one hour. Children could have given different explanations for how they know, e.g.

Each space between two numbers on the clock represents 5 minutes and there are 12 of them to make 1 hour. If I count 12 fives I get to 60.

Finding durations of time

→ pages 70–72

1. 50 minutes, 55 minutes, 40 minutes

2. 35 minutes

3. 25 minutes

4. Children should have drawn 10 minutes past 11 on the first clock and half past 11 on the second. The spelling test was 20 minutes long.

5. Children could have suggested any times with a difference of 35 minutes, e.g.

6 o'clock and twenty-five to 7, or ten to 4 and twenty-five past 4.

Reflect

The journey took 25 minutes. Children could have described their method in different ways. E.g.

I set the hands to show 5 minutes past 8 on a clock and then moved the minute hand clockwise, counting up in 5s as the hand passed each number until it said half past 8. I counted 25 minutes by the time I reached half past 8.

I know that half an hour is the same as 30 minutes so half past 8 is the same as 30 minutes past 8. I know that 5 + 25 = 30 so knew that it would take 25 minutes to get from 5 minutes past 8 to half past 8.

Comparing durations of time

→ pages 73–75

1. 2, 3, Dino Drama is longer.

2. 2 hours and 10 minutes is less than 2 hours and 35 minutes. The Sports Afternoon is shorter.

3. Mia's cake takes longer to bake. Children could have explained how they knew in different ways, e.g.

I used the clocks and worked out that Mia's cake takes 50 minutes to bake but Hamza's cake only takes 40 minutes.

4. The partner's time was longer.

5. Children could have suggested any times after 3 o'clock.

Reflect

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

I need to count up from the start time to the finish time for each activity. I counted up in 5 minute intervals.
I found that the tennis took 50 minutes and the rugby took 55 minutes, so the rugby took longer.

Finding the end time

➜ pages 76–78

1. Twenty-five minutes to 4. If children completed the clock face, they should have drawn the minute hand at 7 and the hour hand between 3 and 4 (just past half way).
2. Children should have shaded the sector of the middle clock from the number 5 clockwise to the number 12. They should have drawn the hands on to the right-hand clock to show 7 o'clock.

   Their walk ended at 7 o'clock.
3. Children should have drawn the hands on the left-hand clock to show twenty minutes past 4. They should have shaded the sector of the middle clock from the number 4 clockwise to the number 8. They should have drawn the hands on to the right-hand clock to show twenty minutes to 5.

   The helicopter lands at twenty minutes to 5.
4. Children should have drawn the hands on the first clock to show ten minutes to 9 and on the second clock to show quarter to 9.

   Kasim arrives earlier.
5. Children could have suggested any times between quarter past 4 and 5 o'clock.

Reflect

Children could have described their method in different ways. E.g.

I would make the start time on a clock and then move the minute hand clockwise, counting in jumps of 5 minutes until I reach the length of time of the activity. Then I would look at the clock to see what time the activity would end.

Finding the start time

➜ pages 79–81

1. The spelling test started at ten past 2.
2. Children should have shaded the sector of the middle clock from the number 7 anticlockwise to the number 4. They should have drawn the hands on to the right-hand clock to show twenty past 8.

   The cartoon started at twenty past 8.
3. Children should have shaded the sector of the middle clock from the number 8 anticlockwise to the number 2. They should have drawn the hands on to the right-hand clock to show ten past 5.

   The bus journey started at ten past 5.
4. Children should have drawn hands on the first clock to show ten past 9 and on the second clock to show quarter past 9.

   Joe started reading first.
5. Children could have suggested any times between ten past 3 and twenty-five past 3.

Reflect

Children could have described their method in different ways, e.g.

I would make the end time on a clock and then move the minute hand anticlockwise, counting in jumps of 5 minutes until I reach the time that the activity took. Then I would look at the clock to see what time the activity must have started.

Hours in a day

➜ pages 82–84

1. Children should have matched up times as follows:
   1st column, 1st clock ➜ 2nd column, 4th clock
   1st column, 2nd clock ➜ 2nd column, 3rd clock
   1st column, 3rd clock ➜ 2nd column, 2nd clock
   1st column, 4th clock ➜ 2nd column, 1st clock
2. Saturday, 9:30
3. The paint will be dry at twenty past 1 on Friday.

   At half past 2 on Friday afternoon, you **can** sit on the bench.
4. She will be allowed to eat a biscuit on Tuesday morning at quarter past 10.

   She **cannot** eat a biscuit.
5. Possible answers are: 12 o'clock, 1 o'clock, 10 o'clock, 11 o'clock, 12 o'clock, 1 o'clock, 10 o'clock, 11 o'clock. Astrid is right.

Reflect

Astrid has forgotten that the hour hand goes around the clock twice in one day.

There are 48 hours in 2 days.

End of unit check

➜ pages 85–86

My journal

Children could have answered the questions in more than one way. E.g.

I know the time is twenty-five minutes past 6 because the hour hand is just past the 6 and the minute hand is pointing to the 5, which means 5 lots of 5 minutes after 6 o'clock.

I know the time is twenty minutes to 3 because the hour hand is pointing nearly to the 3 and the minute hand is pointing to the 8, which means 5 jumps of 5 minutes to 3 o'clock.

Power puzzle

Children should have selected:

twenty past 4, twenty to 5, 5 o'clock, twenty past 5, forty minutes past 5, 6 o'clock, twenty minutes past 6, twenty minutes to 7, 7 o'clock

Unit 14: Weight, volume and temperature

Comparing mass

➜ pages 87–89

1. lighter, heavier, heavier

2. square > triangle, triangle > star (or triangle > star, square > triangle)

3. a) missing numbers from left to right: 2, $\frac{1}{2}$, 5
b) triangular prism, sphere

4. Children should have numbered the items from left to right: 2, 1, 3.

Reflect

The statements mean:

The tin is heavier than the bag (or the bag is lighter than the tin).

The box is lighter than the bag (or the bag is heavier than the box).

This means that the tin is heavier than the box (or the box is lighter than the tin).

Measuring mass in grams (1)

➜ pages 90–92

1. 15, 40

2. Children should have found three of the following five combinations:
25 g + 25 g
25 g + 10 g + 10 g + 5 g
25 g + 10 g + 5 g + 5 g + 5 g
10 g + 10 g + 10 g + 10 g + 5 g + 5 g
10 g + 10 g + 10 g + 5 g + 5 g + 5 g + 5 g

3. a) 40, 55. The pear has a mass of 32 g.
b) Children should have drawn the needle pointing to 95 g.

4. a) The mass of 10 cubes should be double the mass of 5 cubes.
b) The actual measurement of 15 cubes should be three times the mass of 5 cubes.

Reflect

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

Rav needs to place the cheese on the scales and read off the measurement the arrow points to.

Alia needs to estimate how much cheese will have a mass of 30 g, cutting off her estimate. She needs to weigh the piece she has cut off and then add more to or remove pieces from this until the scales show 30 g.

Measuring mass in grams (2)

➜ pages 93–95

1. Missing numbers:
a) clockwise round the scale: 700 g, 800 g, 900 g
b) from left to right along the scale: 0 g, 500 g, 1000g (or 1 kg)

2. 100 g, 400 g, 1000 g (or 1 kg)

3. a) 100, 300, 700
b) Children should have drawn needles pointing at the following masses: 400g, 600 g, 0 g (1000 g)

4. 200, 250. Bag A is heavier.

Reflect

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

The black-spotted guinea pig weights just over 600 g. The golden guinea pig weights just under 600 g. This means that the black-spotted guinea pig is heavier than the golden guinea pig but they both have a mass of 600 g when given to the nearest 100 g.

Measuring mass in kilograms

➜ pages 96–98

1. a) 3 kg, 15 kg, 30 kg
b) hedgehog < dog, dog > badger, fox < dog

2. Children should have drawn arrows pointing to:
a) 8 kg, 12, kg, 20 kg
b) 28 kg, 32 kg, 20 kg

3. Children should have circled:
2 kg, 20 g, 200 g

4. From lightest to heaviest: B, C, A

Reflect

Children could have chosen many different objects to complete the sentences, e.g.

A pen and a ruler each have a mass of less than 1 kg.

A large cake and a litre of orange juice each have a mass of approximately 1 kg.

A small dog has a mass of approximately 10 kg.

Comparing volume

➜ pages 99–101

1. more, more, less

2. B, A, C

3. 2, 10, 5

4. Children should have matched:
A (half filled) < 10 cups
B (filled) = 10 cups
C (half filled) > 10 cups
D (three-quarters filled) > 10 cups

5. There are 11 spoonfuls of rice left in the packet.

Reflect

Children could have suggested different methods, e.g.

You could compare the weights of each container of rice using scales.

You could pour rice from one container into another, having emptied the second container. If the rice from the first container will not all fit then the first container holds more rice. If the rice fits with space left over then the second container holds more rice. You will need to test each container against other containers until you are sure of the order.

Measuring volume in millilitres (I)

➜ pages 102–104

1. a) 50 ml
b) 70 ml
c) 10 ml
d) 5 ml

2. Children should draw the level of water:
a) 20 ml: 2nd line from bottom
b) 90 ml: 2nd line from top
c) 20 ml: 20 ml mark
d) 90 ml: 90 ml mark

3. a) 20 ÷ 5 = 4 teaspoons
b) 40 ÷ 5 = 8 teaspoons

4. a) 40
b) Children should have drawn a mark to show 30 ml (3rd line from bottom)

5. 40, 50, 70

Reflect

Children could have suggested different methods, e.g.

Fill up a teaspoon and put the liquid in a container. Do this 4 times altogether and you will have 20 ml because each teaspoon holds 5 ml.

Pour liquid into a measuring jug until it reaches the 20 ml mark.

Measuring volume in millilitres (2)

➜ pages 105–107

1. Missing numbers from top to bottom
a) 1000 ml (or 1 litre), 900 ml, 800 ml
b) 800 ml, 400 ml, 200 ml

2. a) 400
b) 700
c) 300

3. a) D
b) B, C (either way round); some children may also write D or E, as with these jugs Kasim would have enough liquid and there would be some left over.

4. a) 700 ml is 500 ml and 200 ml added together, so Jack could fill both bottles and then he will have 700 ml altogether.
b) The simplest solution is that Kat could fill the 200 ml bottle and pour it into the jug four times.

Some children may also work out that Kat could start by filling the 500 ml bottle, then use it to fill the 200 ml bottle. 500 subtract 200 is 300, so there would be 300 ml left in the big bottle, which Kat would then pour into the jug. Kat would then refill the 500 ml bottle and empty this into the jug. 300 add 500 is 800, so this gives her the 800 ml she needs.

Reflect

Children should have matched the bottle to 250 ml, the cup to 110 ml, and the bucket to 700 ml.

Children should have used their previous experience of these objects and their relative capacities to support their decisions, e.g.

If you pour the liquid from a bottle into a cup, you can usually fill up a cup and still have some liquid left. So, a bottle is likely to have a larger capacity than a cup.

It would take several bottles to fill a bucket, a bucket is likely to have a larger capacity than a bottle.

Measuring volume in litres

➜ pages 108–110

1. 8, 15, 29

2. a) B: 40 – 10 = 30 l
C: 25 – 10 = 15 l
D: 30 – 10 = 20 l
b) A, C, 3

3. Children should have circled: 5 l, 250 ml, 100 l

4. a) 7 subtract 4 is 3, so Ollie could fill the 7 l bucket and then pour water into the 4 l bucket until it is full. This would leave him with 3 l in the big bucket.
b) Ollie could fill the 4 l bucket and pour this into the 7 l bucket. If he fills the 4 l bucket again and pours water into the 7 l bucket, he will only be able to pour in 3 l until it is full because 4 l and 3 l make 7 l. So, he will have 1 l left in the small bucket.

Reflect

Children could have written many different things, e.g.

I have learned that 1000 ml is the same as 1 litre.

I have learned how to read measuring jugs.

I have learned how to estimate the capacity of containers.

Measuring temperature using a thermometer

➜ pages 111–113

1. a) 25 °C
b) 19 °C
c) 20 °C
d) 23 °C

2. Warmest to Coolest: 11 °C, 8 °C, 4 °C, 2 °C or B, A, C, D

3. Check the accuracy of children's drawings, which should show the following temperatures:

Paris 23 °C, Warsaw 25 °C, London 14 °C, Madrid 28 °C, Lisbon 30 °C, Rome 29 °C

4. Madrid is 5 degrees warmer than Paris.
Warsaw is 5 degrees cooler than Lisbon.
Lisbon is 2 degrees warmer than Madrid, or Warsaw is 2 degrees warmer than Paris.

5. Children could have written different answers, e.g.
London is 9 degrees cooler than Paris.
Lisbon is 1 degree warmer than Rome.

Reflect

Children should have estimated any reasonable spring or summer temperature, e.g.

I estimate that the temperature is 25 °C because the sun is shining so it looks like it is a hot day.

I estimate that the temperature is 20 °C because I think it is spring because of the flowers and it is sunny so it is quite a warm spring day.

Reading thermometers

➜ pages 114–116

1. Children should have drawn lines up to:
a) the top mark
b) the 5th mark from the bottom
c) the 3rd mark from the bottom

2. Children should have ticked the middle thermometer.

3. Children should have ticked:
a) 2nd thermometer
b) 1st thermometer
c) 1st thermometer
d) 1st thermometer

4. Children should have matched:
Beach ➜ 30 °C
Fridge ➜ 4 °C
Pan ➜ 90 °C
Autumn day ➜ 10 °C

Reflect

Children could have explained how they read the scales on a thermometer in different ways. E.g.

I start by working out the value of each space between the marks. I work out whether each space is worth 1 degree, 2 degrees, 5 degrees, 10 degrees or 20 degrees by counting up in equal steps (of 1, 2, 5, 10 or 20) from zero along the marks and seeing which count matches the next given temperature. Once I know what each space is worth I can use this and the marked temperatures to work out what temperature the thermometer is showing.

End of unit check

➜ pages 117–118

My journal

Children could have completed the statements in more than one way, e.g.

First I work out the mass of B which is 10 + 10 – 5, or 15 kg.

Then I notice that 3 lots of A are the same as B so A is 15 ÷ 3, or 5 kg.

Next I notice that 5 lots of A equal B + C, so C must be 25 – 15, or 10 kg.

Power puzzle

Children should have noted that a jug containing 0 ml of water weighs the same as the jug, a jug containing 100 ml of water weighs 100 g more than the mass of the jug, a jug containing 200 ml weighs 200 g more and so on. This should help them to realise that 1 ml of water weighs 1 g.