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