Autumn Block 2

Addition and subtraction

Small steps

Step 1	Add and subtract 1s, 10s, 100s, 1,000s
Step 2	Add 1s, 10s, 100s across a boundary
Step 3	Subtract 1s, 10s, 100s across a boundary
Step 4	Make connections
Step 5	Add up to two 4-digit numbers – no exchange
Step 6	Add up to two 4-digit numbers – across a 10
Step 7	Add up to two 4-digit numbers – across a 100
Step 8	Add up to two 4-digit numbers – across a 1,000

Small steps

Step 9	Add numbers with a different number of digits
Step 10	Subtract up to two 4-digit numbers – no exchange
Step 11	Subtract up to two 4-digit numbers – across a 10
Step 12	Subtract up to two 4-digit numbers – across a 100
Step 13	Subtract up to two 4-digit numbers – across a 1,000
Step 14	Subtract numbers with a different number of digits
Step 15	Complements to 100 and 1,000
Step 16	Estimate answers

Small steps

Step 17	Inverse operations
Step 18	Efficient methods

Add and subtract 1s, 10s, 100s, 1,000s

Notes and guidance

In Key Stage 1, children mentally added and subtracted 1s and 10s to and from a 2-digit number. In this small step, this skill is developed and extended to include adding and subtracting 100s and 1,000s to and from 3-digit and 4-digit numbers. The focus is on mental rather than written strategies, which are covered later in the block.

Year 3 children begin by using base 10 within a place value chart to explore the effect of adding or subtracting 1s, 10s, 100s or 1,000s. Once they are secure with this representation, they should move to using place value counters. Year 4 children should be familiar with a range of representations and could be encouraged to explore the effect of adding or subtracting multiples of 1, 10, 100 or 1,000 by discussing which columns always, sometimes and never change. For example, when adding a multiple of 100, the ones and tens never change, the hundreds always change and the thousands sometimes change, depending on the need to make an exchange.

Things to look out for

- Children may add or subtract in the incorrect place value column, particularly if they are using plain counters in a place value chart, for example 3,469 – 300 = 469 or 3,439

Key questions

- How many ones/tens/hundreds/thousands are you adding/subtracting?
- Which place value columns have changed/stayed the same? Why?
- If you know 2 + 4 = 6, what else do you know?

Possible sentence stems

- The ones/tens/hundreds/thousands column will increase/decrease by _____

Single age small step links

- Add and subtract 1s (Y3)
- Add and subtract 10s (Y3)
- Add and subtract 100s (Y3)

- Add and subtract 1s, 10s, 100s, 1,000s (Y4)

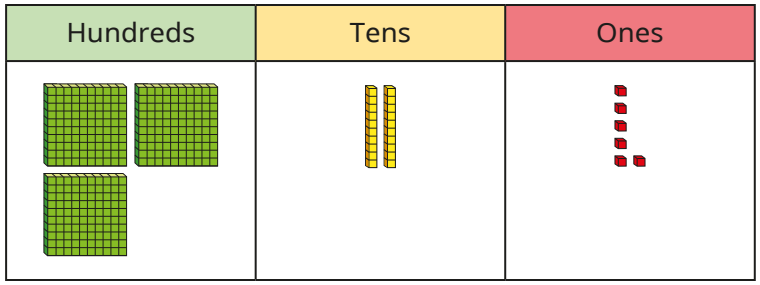
National Curriculum links

- Add and subtract numbers mentally, including: a 3-digit number and ones; a 3-digit number and tens; a 3-digit number and hundreds (Y3)

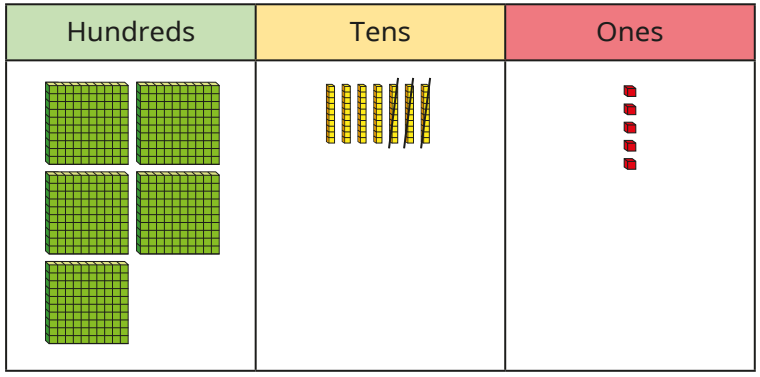
Add and subtract 1s, 10s, 100s, 1,000s

Key learning

- Use the place value chart to help you work out 326 + 2



- Dani uses a place value chart and base 10 to work out 575 – 30

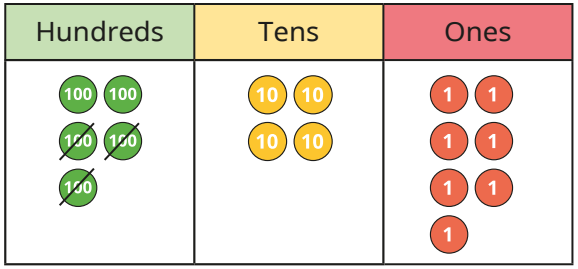


Use Dani's method to work out the subtractions.

575 – 60	472 – 30	472 – 70

What do you notice?

- Huan uses place value counters and a chart to work out 547 – 300



Use Huan's method to work out the subtractions.

547 – 200	647 – 300	647 – 600

What do you notice?

- Use a place value chart to help you complete the number sentences.
  - 2,452 + 4 = _____
  - 2,452 – 1 = _____
  - 2,452 + 40 = _____
  - 2,452 – 30 = _____
  - 2,452 + 400 = _____
  - 2,452 – 400 = _____
  - 2,452 + 4,000 = _____
  - 2,452 – 1,000 = _____

What do you notice? What stays the same and what changes?

Add and subtract 1s, 10s, 100s, 1,000s

Reasoning and problem solving

Fill in the missing digits.

5_6 + 20 = 596

_03 + 300 = 703

613 – _00 = 113

576 + 20 = 596

403 + 300 = 703

613 – 500 = 113

Write <, > or = to complete the statements.

623 + 20 ◯ 623 + 50

493 – 100 ◯ 493 + 100

3,052 – 2,000 ◯ 52 + 1,000

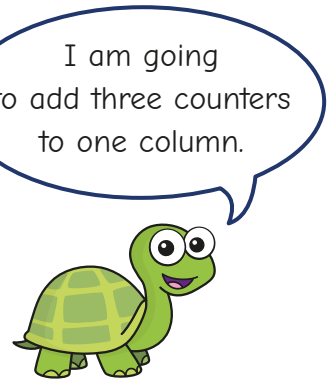
<

<

=

Here is a number on a place value chart.

Th	H	T	O
●● ●●	●● ●● ●●		●●



What number could Tiny have now?

7,602

4,902

4,632

4,605

Add 1s, 10s, 100s across a boundary

Notes and guidance

In this small step, children mentally add 1s, 10s and 100s across a boundary. Year 3 children may begin by adding to a 3-digit number before progressing to 4-digit numbers.

Children need to be fluent in number bonds to 10 and number bonds within 100, for example flexibly partitioning 70 into 40 and 30 to work out 560 + 70

Number lines are a vital representation to model the process of jumping to and from the next multiple of 10, 100 and 1,000, alongside a part-whole model to support flexibly partitioning the number. Place value charts and counters can also help.

Discuss which columns always, sometimes and never change when adding a multiple of 1, 10 or 100. For example, when adding a multiple of 100, the ones and tens never change, the hundreds always change, and the thousands sometimes change.

Things to look out for

- Children may find it difficult to add 1s or 10s over a ten or hundred boundary.
- Children may need support to flexibly partition a number.

Key questions

- What is the next multiple of 10/100/1,000 after _____?
- How do you need to partition _____? Why?
- Which columns have changed/stayed the same?

Possible sentence stems

- The next multiple of 10/100/1,000 is _____
- _____ can be partitioned into _____ and _____
- I need to add _____ to cross the next 10/100/1,000, and then add _____

Single age small step links

- Add 1s across a 10 (Y3)
- Add 10s across a 100 (Y3)

- Add and subtract 1s, 10s, 100s and 1,000s (Y4)

National Curriculum links

- Add and subtract numbers mentally, including: a 3-digit number and ones; a 3-digit number and tens; a 3-digit number and hundreds (Y3)

Add 1s, 10s, 100s across a boundary

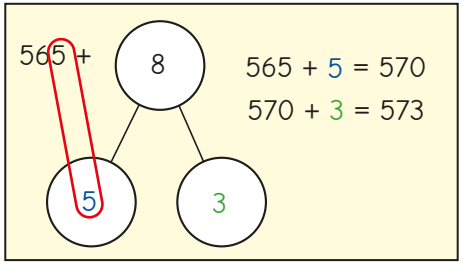
Key learning

- Work out the additions.

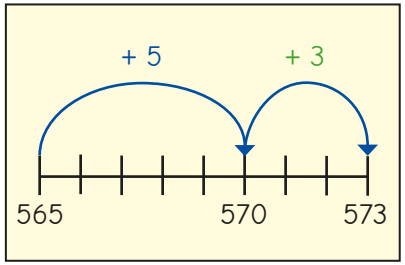
416 + 1	416 + 2	416 + 3	416 + 4	416 + 5

- Rosie and Amir are working out 565 + 8

Rosie



Amir



Use your preferred method to work out the additions.

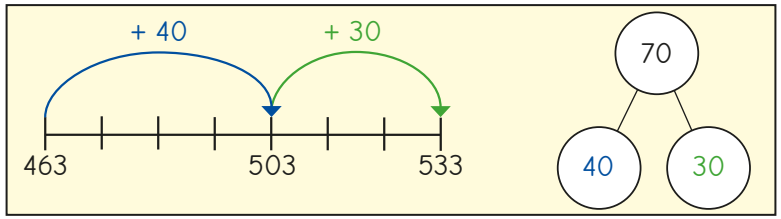
238 + 9	658 + 5	594 + 8	1,415 + 7

- Use a place value chart and counters to help you complete the number sentences.

  - 238 + 1 = _____
  - 238 + 40 = _____
  - 238 + 600 = _____
  - 238 + 3 = _____
  - 238 + 80 = _____
  - 238 + 900 = _____

What do you notice? What stays the same and what changes?

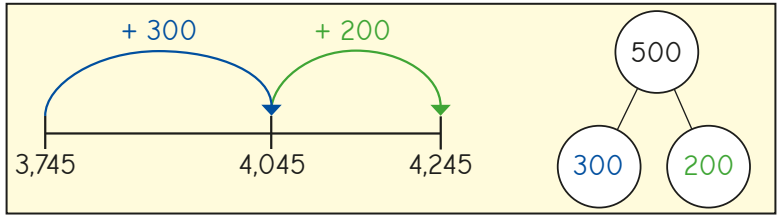
- Scott is working out 463 + 70



Use Scott's method to work out the additions.

258 + 60	134 + 80	1,689 + 50	90 + 345

- Aisha is working out 3,745 + 500



Use Aisha's method to work out the additions.

2,516 + 8	2,516 + 700	2,516 + 90

- Find the missing numbers.

  - 357 + _____ = 363
  - 5,854 + _____ = 5,944
  - 357 + _____ = 417
  - 5,854 + _____ = 6,454

Add 1s, 10s, 100s across a boundary

White Rose MATHS

Reasoning and problem solving

Which additions are harder to work out?

235 + 3	507 + 8
495 + 60	3,415 + 50
3,362 + 4,000	1,384 + 900

Talk about your answer with a partner.

multiple possible answers, e.g. 507 + 8, 495 + 60 and 1,384 + 900 because they cross a boundary

Is the statement always true, sometimes true or never true?

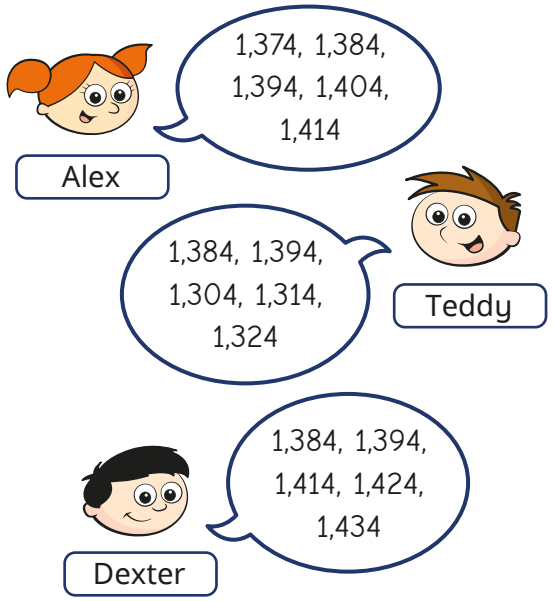
> When you add a multiple of 100 to a number, the only place value column that changes is the hundreds.

Explain your answer.

sometimes true

Alex, Teddy and Dexter are working out 1,374 + 50 by counting on in 10s.

They have each made a different mistake.



What mistakes have they made?

What is the correct answer?

Alex has included 1,374, the start number.

Teddy has not counted into the next hundred correctly.

Dexter has missed 1,404

1,424

Subtract 1s, 10s, 100s across a boundary

Notes and guidance

In this small step, children use mental/informal strategies to subtract 1s, 10s and 100s across a boundary. Year 3 children may begin by focusing on subtracting from a 3-digit number before progressing to 4-digit numbers.

Children need to be fluent in number bonds to 10, multiples of 10 and multiples of 100 to allow them to efficiently and flexibly partition numbers to subtract from 3-digit or 4-digit numbers, for example using 50 = 30 + 20 to work out 730 – 50

Number lines are a useful representation to model jumping back to the previous multiple of 10, 100 and 1,000, alongside a part-whole model to support flexibly partitioning the number. Place value charts and counters can also help.

Discuss which columns always, sometimes and never change when subtracting a multiple of 1, 10, 100 or 1,000. For example, when subtracting a multiple of 10, the ones never change, the tens always change, and the hundreds and thousands sometimes change.

Things to look out for

- Children may struggle with numbers with placeholders.
- Children may struggle to flexibly partition numbers.

Key questions

- How do you need to partition _____? Why?
- Which columns have changed/stayed the same?
- What is the multiple of 10/100/1,000 before _____?

Possible sentence stems

- The previous multiple of 10/100/1,000 before _____ is _____
- _____ can be partitioned into _____ and _____
- I need to subtract _____ to get to the previous multiple of 10/100, then subtract _____ more.

Single age small step links

- Subtract 1s across a 10 (Y3)
- Subtract 10s across a 100 (Y3)
- Add and subtract 1s, 10s, 100s and 1,000s (Y4)

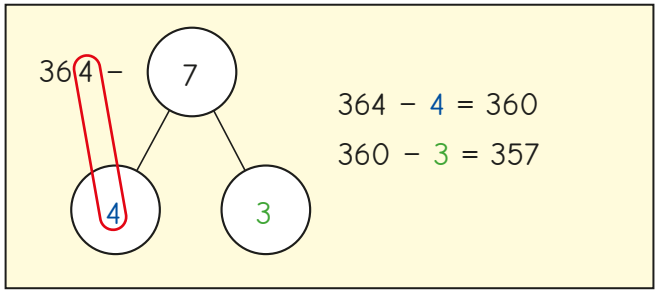
National Curriculum links

- Add and subtract numbers mentally, including: a 3-digit number and ones; a 3-digit number and tens; a 3-digit number and hundreds (Y3)

Subtract 1s, 10s, 100s across a boundary

Key learning

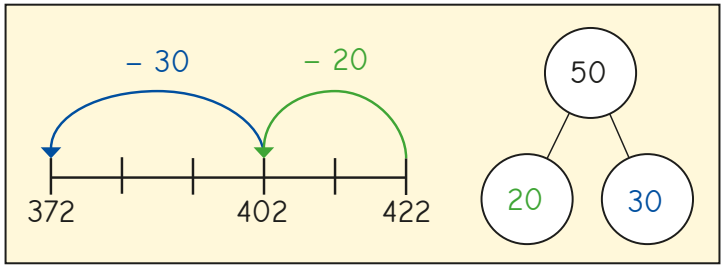
- Filip is working out 364 – 7



Use Filip's method to work out the subtractions.

243 – 9	581 – 6	128 – 9	835 – 7

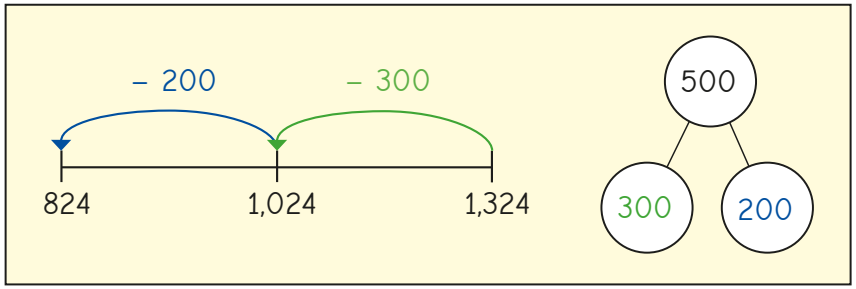
- Esther is working out 422 – 50



Use Esther's method to work out the subtractions.

515 – 40	364 – 80	128 – 70	835 – 60

- Jack is using a number line to work out 1,324 – 500



Use Jack's method to work out the calculations.

4,532 – 800	1,028 – 700	2,516 – 900

- Use the place value chart to work out the subtractions.

Th	H	T	O
4	8	7	5

4,875 – 3	4,875 – 600	4,875 – 40
4,875 – 7	4,875 – 900	4,875 – 80

What do you notice?

- 1,378 people attend a cricket match.

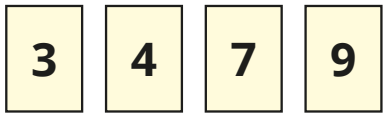
  700 people support the home team.

  How many people support the away team?

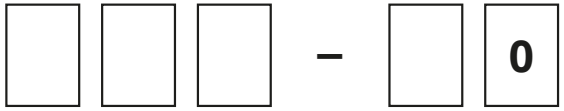
Subtract 1s, 10s, 100s across a boundary

Reasoning and problem solving

Here are some digit cards.



Use the digit cards to complete the subtraction in as many different ways as you can.



How many times did you need to cross a 100?

Talk about it with a partner.

12 solutions include crossing a 100

12 solutions do not include crossing a 100

Write **always**, **sometimes** or **never** to complete the sentences.

When I subtract a multiple of 10 from a 3-digit number, the ones column _____ changes.

When I subtract a multiple of 10 from a 3-digit number, the tens column _____ changes.

When I subtract a multiple of 10 from a 4-digit number, the thousands and hundreds columns _____ change.

When I subtract a multiple of 100 from a 4-digit number, the tens column _____ changes.

never

always

sometimes

never

Make connections

Notes and guidance

In this small step, children consolidate what they have learnt so far in this block by adding and subtracting 1s, 10s, 100s and 1,000s to and from up to 4-digit numbers, including crossing a ten, hundred or thousand boundary.

The focus is to develop number sense through explicitly exploring connections between calculations. For example, if children know that 4 + 8 = 12, then they also know that 12 – 4 = 8, 120 – 40 = 80 and 40 + 80 = 120. To support children in seeing these links, it is useful to use language such as "4 ones plus 8 ones is equal to 12 ones, so 4 tens plus 8 tens is equal to 12 tens."

It is vital that children have a strong understanding of the fact that 10 ones are equal to 1 ten, 10 tens are equal to 1 hundred and 10 hundreds are equal to 1 thousand. Year 3 children begin by using base 10 within a place value chart, whereas Year 4 children may use place value counters to support their understanding.

Things to look out for

- Children may lack the place value knowledge of 10 ones = 1 ten, 20 ones = 2 tens, 10 tens = 1 hundred, and so on.

Key questions

- How many ones/tens/hundreds are equal to 1 ten/hundred/thousand?
- What is the jump from _____ to the next/previous multiple?
- If you know _____ + _____ = _____, what else do you know?
- Which method do you prefer? Which is more efficient?

Possible sentence stems

- _____ ones + _____ ones = _____ ones,
  so _____ ones – _____ ones = _____ ones.
- _____ ones + _____ ones = _____ ones,
  so _____ tens + _____ tens = _____ tens.

Single age small step links

- Make connections (Y3)
- N/A

National Curriculum links

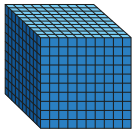
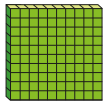
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction (Y3)

Make connections

White Rose MATHS

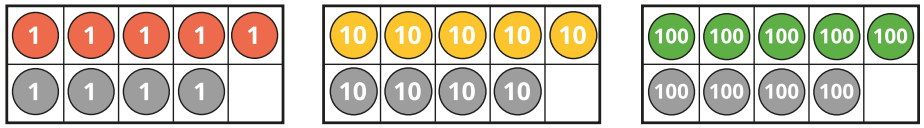
Key learning

- Use base 10 to help you complete the sentences.

 = 1 thousand  = 1 hundred  = 1 ten = 1 one

  - 1 ten = _____ ones
  - 2 tens = _____ ones
  - 1 hundred = _____ tens
  - 2 hundreds = _____ tens
  - 1 thousand = _____ hundreds
  - 2 thousands = _____ hundreds

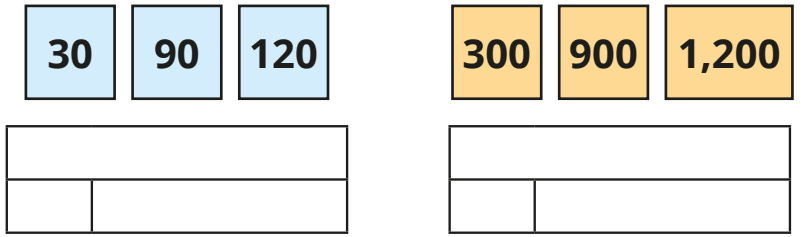
- Complete the addition sentences.



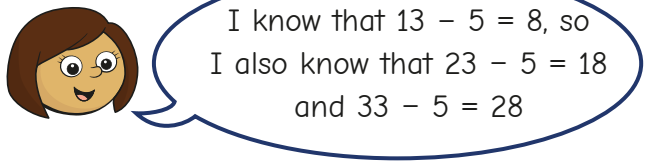
  - 5 ones + 4 ones = _____ ones — 5 + 4 = _____
  - 5 tens + 4 tens = _____ tens — 50 + 40 = _____
  - 5 hundreds + 4 hundreds = _____ hundreds — 500 + 400 = _____

What do you notice?

- Use the number cards to complete the bar models.

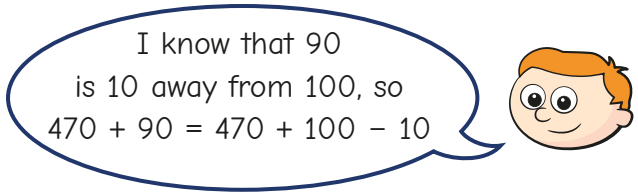


Write the fact family for each bar model.

- 

Use Kim's fact to work out the subtractions.

130 − 50	1,300 − 800	5,300 − 800	73 − 5

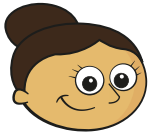
- 

Use Ron's method to work out the calculations.

476 + 90	47 + 9	470 − 90	4,700 − 900

Make connections

Reasoning and problem solving



7 + 6 = 13, so
70 + 60 = 113

Is Dora correct?

Explain your answer.

No

Which number sentence is incorrect?

4 + 7 = 11	110 = 40 + 70
11 ones − 4 ones = 7 ones	
1,100 − 700 = 400	70 − 40 = 110
700 + 400 = 1,100	

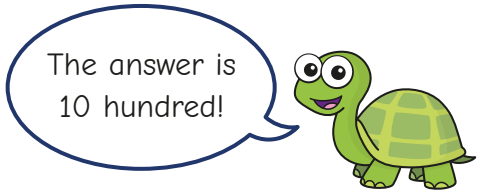
Write the correct sentence.

70 – 40 = 110

110 – 70 = 40 or
110 – 40 = 70

Tiny is working out the addition.

700 + 300



What has Tiny done well?

How could Tiny's answer be improved?

Tiny has found the correct number of hundreds, but 10 hundred is equal to 1,000

What could the missing number be?

463 + 60 < 519 + ☐ < 634 – 80

Find all the possible solutions.

any number between 5 and 34

Add up to two 4-digit numbers – no exchange

Notes and guidance

In this small step, children use formal written methods for addition. This is the first time that Year 3 children have been introduced to the formal written method, so take time to ensure that they are confident using this strategy.

By the end of this step, children will be able to use the formal written method to add two numbers with up to four digits. Year 3 children should spend time focusing on adding 3-digit numbers, whereas Year 4 children will be familiar with the formal written method and should focus on adding 4-digit numbers.

Base 10 and place value counters in place value charts should be used alongside the written method. No exchanges take place in this step, but it is a good idea to ask, "Do you have enough ones/tens to exchange for a ten/hundred?" as this will support learning in future steps.

Things to look out for

- Children may not line up the digits correctly.
- Children may start adding from the column with the greatest value, i.e. work from left to right. This will work in this step, but should be avoided as it will not work when exchanges are required.

Key questions

- Does it matter which columns you add together first?
- Do you have enough ones/tens to make an exchange?
- What do you put in the tens column if there are no tens?

Possible sentence stems

- I have _____ ones, so I do/do not need to make an exchange.
- _____ ones added to _____ ones is equal to _____ ones.
- _____ added to _____ is equal to _____

Single age small step links

- Add two numbers (no exchange) (Y3)
- Add up to two 4-digit numbers – no exchange (Y4)

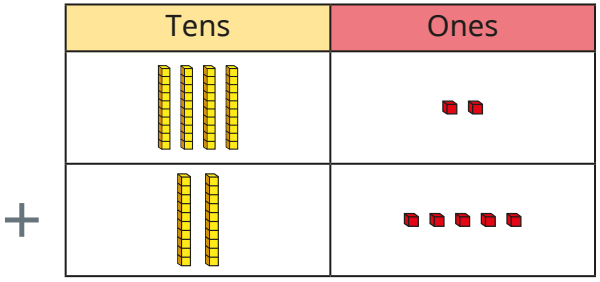
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (Y3)
- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate (Y4)

Add up to two 4-digit numbers – no exchange

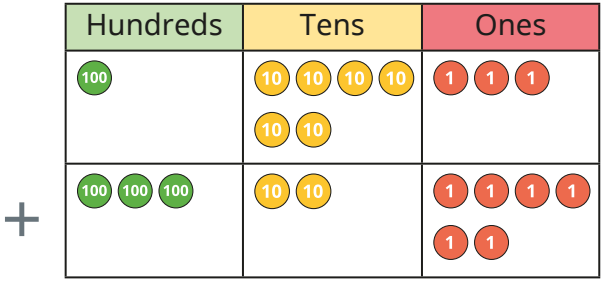
Key learning

- Find the sum of 42 and 25



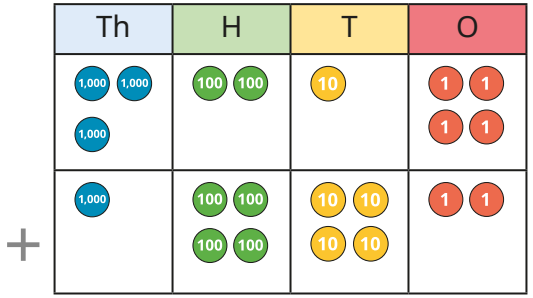
	T	O
	4	2
+	2	5

- Find the sum of 163 and 326



	H	T	O
	1	6	3
+	3	2	6

- Use counters and a place value chart to work out 3,214 + 1,442



	Th	H	T	O
	3	2	1	4
+	1	4	4	2

- Work out the additions.

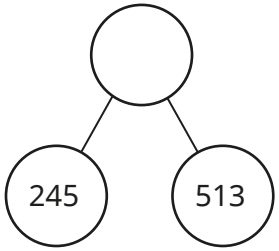
	Th	H	T	O
		1	4	5
+		6	1	4

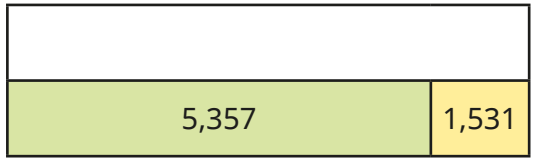
	Th	H	T	O
	7	6	5	2
+	1	2	3	7

	Th	H	T	O
		6	3	2
+		1	3	6

	Th	H	T	O
	5	7	3	1
+	1	2	5	6

- Fill in the missing numbers.

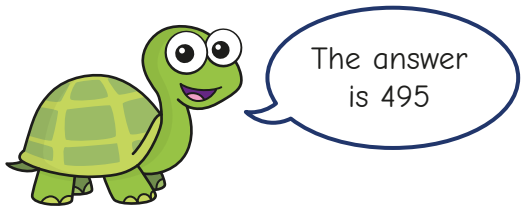




Add up to two 4-digit numbers – no exchange

Reasoning and problem solving

Tiny is working out 3,042 + 1,053



Explain Tiny's mistake.

What is the correct answer?

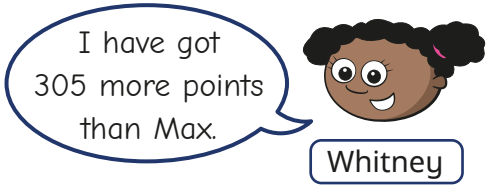
4,095

Work out the missing digits.

		H	T	O	
		5		8	
	+		6	1	
		9	7		

1, 4, 9

Max and Whitney are playing a game.



How many points do they have altogether?

Max 

Whitney

4,985

Add up to two 4-digit numbers – across a 10

Notes and guidance

In this small step, children again add up to two 4-digit numbers, but now with exchanges into the tens: when the ones are added together, they will (sometimes) total more than 9

Start with both numbers made using base 10 or place value counters in a place value chart. When discussing where to start an addition, it is important to use language such as the "smallest value column" rather than the "ones column", to avoid any misconceptions when decimals are introduced. The use of manipulatives helps children to understand that if they have 10 or more ones, they can exchange them for a ten, which is then added to the tens column.

Year 3 children should first exchange using base 10 in a place value chart alongside the formal written calculation, as it will help them to understand the value of the 1 that has been added to the tens column in the written method.

Things to look out for

- Children may not add up from the smallest value column, so will not be able to exchange correctly.
- Children may forget to add the ten that has been exchanged for 10 ones.

Key questions

- Which column's numbers do you need to add together first?
- Do you have enough ones to make an exchange?
- Where do you put the ten that you made from exchanging 10 ones in your model?
- How can you show this in your written calculation?

Possible sentence stems

- I can exchange _____ ones for _____ ten and _____ ones.

Single age small step links

- Add two numbers (across a 10) (Y3)
- Add two 4-digit numbers – one exchange (Y4)

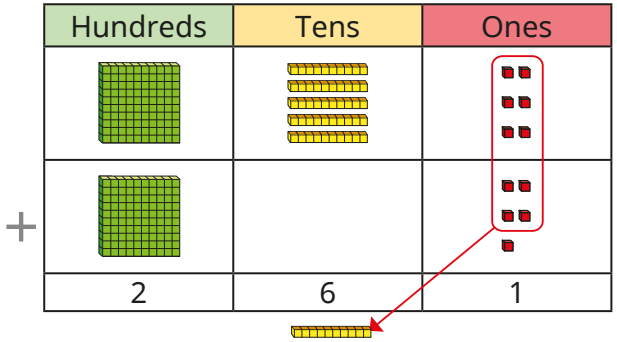
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (Y3)
- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate (Y4)

Add up to two 4-digit numbers – across a 10

Key learning

- Mo is using base 10 to work out 156 + 105

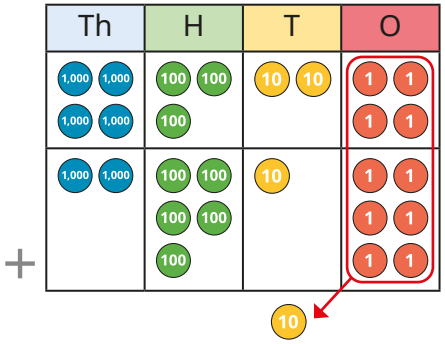


		H	T	O
		1	5	6
+		1	0	5
		2	6	1
			1	

Use Mo's method to work out the additions.

256 + 315 | 458 + 124 | 528 + 256

- Annie is using counters to find the total of 4,324 and 2,516



		Th	H	T	O
		4	3	2	4
+		2	5	1	6
		6	8	4	0
				1	

Use Annie's method to work out the additions.

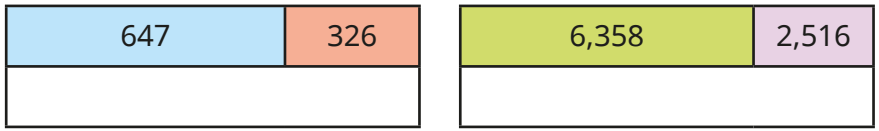
3,458 + 2,435 | 4,567 + 2,406 | 5,382 + 2,609

- Use base 10 or place value counters to help you work out the additions.

		H	**T**	**O**
		5	6	8
+		1	2	6

		Th	**H**	**T**	**O**
		5	4	0	3
+		4	2	7	8

- Complete the bar models.



- Find the sum of 7,159 and 2,534

- Mr Patel runs 5,435 m on Monday.

  He runs 2,525 m on Tuesday.

  How far does Mr Patel run altogether?

Add up to two 4-digit numbers – across a 10

Reasoning and problem solving

Jo is working out 128 + 614

		H	T	O	
		1	2	8	
	+	6	1	4	
		7	3	12	

Explain Jo's mistake.

What is the correct answer?

742

Huan completes the addition.

		Th	H	T	O	
		2	0	7	8	
	+	5	6	1	5	
		7	6	8	4	
					1	

What mistake has Huan made?

Find the correct answer.

7,693

Mrs Fisher has £4,238 in her bank account.

Mr Fisher has £1,106 more than Mrs Fisher.

How much money do they have altogether?

£9,582

What is the missing 4-digit number?

		Th	H	T	O	
	+	5	3	0	5	
		8	7	8	3	

3,478

Add up to two 4-digit numbers – across a 100

Notes and guidance

In this small step, children now add two numbers where they need to exchange 10 tens for 1 hundred.

As with the previous step, start with both numbers made using base 10 or place value counters. As before, establish that children need to begin adding in the ones column, working from right to left. After each column is added, ask, "Do you have enough ones/tens to make an exchange?" Seeing 10 tens physically swapped for 1 hundred, alongside the formal written method, will deepen children's understanding.

The main focus is on exchanging into the hundreds column, however Year 4 children will be exposed to calculations that also require an exchange from the ones to the tens column.

Things to look out for

- Children may write 1 (the 1 hundred from exchanging 10 tens) in the incorrect column.
- Children may not realise that two digits that look as though they will not total enough to make an exchange could do so once an exchange has happened, for example 5 + 4 plus an extra 1 exchanged from the previous column.

Key questions

- Which column's numbers do you need to add together first?
- Do you have enough ones/tens to make an exchange?
- Where do you put the hundred that you made from exchanging 10 tens?

Possible sentence stems

- _____ tens + _____ tens = _____ tens
- I can exchange _____ tens for _____ hundred and _____ tens.

Single age small step links

- Add two numbers (across a 100) (Y3)
- Add two 4-digit numbers – more than one exchange (Y4)

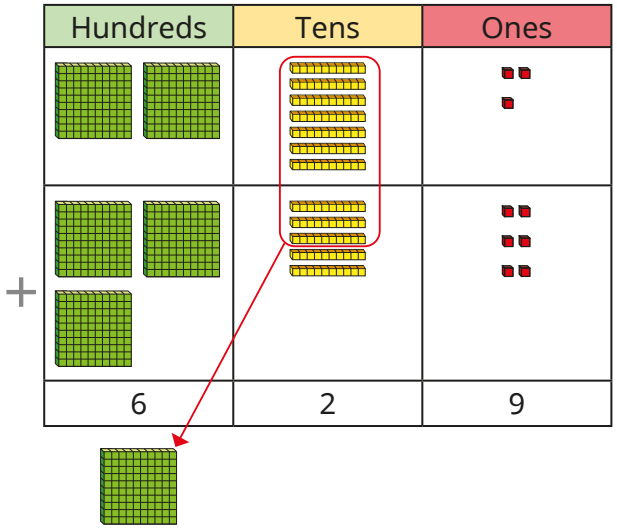
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (Y3)
- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate (Y4)

Add up to two 4-digit numbers – across a 100

Key learning

- Alex is using base 10 to work out 273 + 356



	H	T	O
	2	7	3
+	3	5	6
	6	2	9
	1		

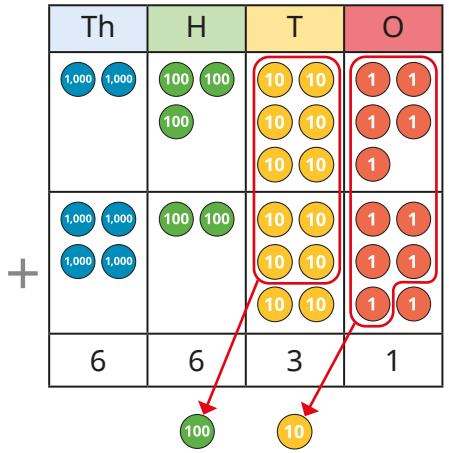
Use Alex's method to work out the additions.

	H	T	O
	3	8	2
+	2	4	5

	H	T	O
	4	2	1
+	3	9	7

	H	T	O
	4	8	3
+	3	7	6

- Amir is using place value counters to work out 2,365 + 4,266



	Th	H	T	O
	2	3	6	5
+	4	2	6	6
	6	6	3	1
		1	1	

Use Amir's method to work out the additions.

	Th	H	T	O
	2	3	8	7
+	1	2	4	4

	Th	H	T	O
	8	2	5	5
+	1	6	7	9

- School A has 1,386 pencils.

  School B has 3,245 pencils.

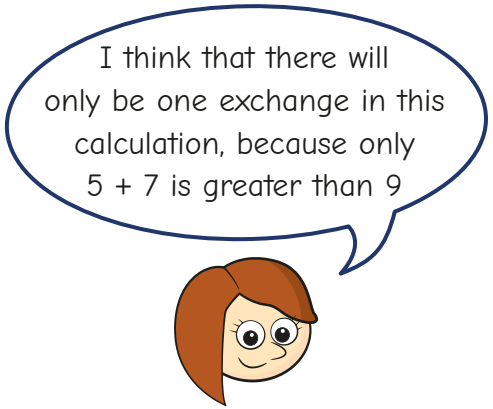
  How many pencils do the schools have altogether?

Add up to two 4-digit numbers – across a 100

Reasoning and problem solving

Rosie is working out the addition.

		Th	H	T	O	
		2	4	8	5	
	+	3	2	1	7	



Is Rosie correct?

Explain how you know.

No

Scott works out 456 + 126

		H	T	O	
		4	6	6	
	+	1	6	2	
		2			

How do you know that Scott's answer cannot be correct?

When adding two 1-digit numbers together, the greatest digit that can be carried over is 1

What could the missing digits be?

		H	T	O	
		5		2	
	+	3		7	
		9		9	

Explain your answer.

multiple possible answers, e.g.

5, 6, 1

8, 4, 2

Add up to two 4-digit numbers – across a 1,000

Notes and guidance

In this small step, children build on the previous two steps, now adding two numbers where they need to exchange 10 hundreds for 1 thousand.

Children should identify similarities and differences between this and the previous steps. Year 3 children may recap adding two 3-digit numbers before adding two 4-digit numbers.

As with the previous steps, start with both numbers using base 10 or place value counters, completing the calculation alongside. Again, establish that children need to begin adding in the ones column, working from right to left. After adding each column, ask whether they need to make an exchange. The main focus is on exchanging into the thousands column, however Year 4 children will be exposed to calculations that require more than one exchange.

Things to look out for

- Children may forget to add the thousand that has been exchanged for 10 hundreds.
- If two exchanges are needed, children may struggle to know what each digit they have "carried" represents.

Key questions

- Which column's numbers do you need to add together first?
- Do you have enough hundreds to make an exchange?
- Where do you put the thousand that you made from exchanging 10 hundreds?

Possible sentence stems

- I can exchange _____ hundreds for _____ thousand and _____ hundreds.

Single age small step links

- Add two numbers (across a 100) (Y3)
- Add two 4-digit numbers – more than one exchange (Y4)

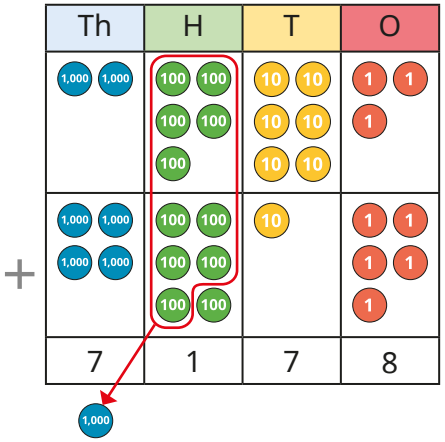
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (Y3)
- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate (Y4)

Add up to two 4-digit numbers – across a 1,000

Key learning

- Teddy is using place value counters to work out 2,563 + 4,615



	Th	H	T	O
	2	5	6	3
+	4	6	1	5
	7	1	7	8
	1			

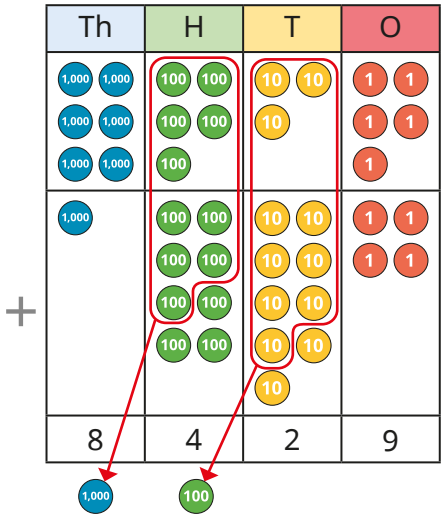
Use Teddy's method to work out the additions.

	H	T	O
	4	9	2
+	3	5	4

	H	T	O
	6	7	2
+	4	1	5

	Th	H	T	O
	3	7	2	3
+	5	4	7	5

- Esther is using place value counters to work out 6,535 + 1,894



	Th	H	T	O
	6	5	3	5
+	1	8	9	4
	8	4	2	9
	1	1		

Use Esther's method to work out the additions.

4,821 + 3,546	7,539 + 1,652	6,508 + 2,798

- Work out the additions.

5,623 + 3,756	7,905 + 1,739	6,947 + 2,558

- Mr Trent runs 5,495 m in 1 hour.

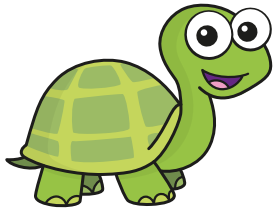
  Mrs Smith runs 3,987 m in 1 hour.

  How far have they run altogether?

Add up to two 4-digit numbers – across a 1,000

Reasoning and problem solving

Tiny has completed an addition.



		Th	H	T	O	
		4	7	2	5	
	+	2	8	6	3	
		6	5	8	8	

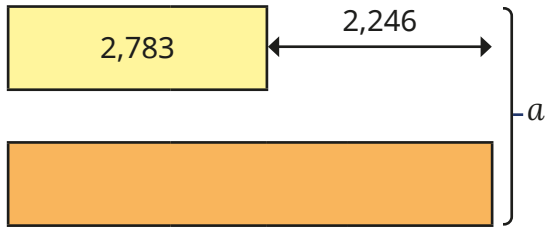
Is Tiny correct?

Explain your answer using base 10 or place value counters.

No

Tiny has not included the thousand exchanged for 10 hundreds.

Find the value of a.



7,812

What could the missing digits be?

		Th	**H**	**T**	**O**	
		4	3	0		
	+	1	7		4	
			1	0	0	

6, 9, 6

Add numbers with a different number of digits

Notes and guidance

Children should now be confident with the formal written method of addition of numbers with up to four digits and making exchanges, where appropriate. In this small step, they add numbers with a different number of digits. Year 3 children should spend more time focusing on adding 2-digit and 3-digit numbers, whereas Year 4 children should progress quickly to adding 2-/3-digit numbers and 4-digit numbers.

The different sizes of numbers can sometimes confuse children, especially when lining up the digits in place value columns. Some children may find it helpful to write a zero placeholder in the absence of any thousands or hundreds.

As before, start with the written calculation alongside concrete representations. When forming the number with fewer digits with concrete resources, ensure that children do not assume that the greatest digit goes in the greatest place value column.

Things to look out for

- Children may not line up the numbers correctly.
- Children may be confused by a zero or no digit in any place value column.

Key questions

- How could you represent this question using base 10/place value counters?
- How do you know if you need to make an exchange?
- What could you write in the thousands/hundreds column if there are no thousands/hundreds?

Possible sentence stems

- I put _____ in the _____ column because ...

Single age small step links

- Add 2-digit and 3-digit numbers (Y3)
- Add two 4-digit numbers – more than one exchange (Y4)

National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (Y3)
- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate (Y4)

Add numbers with a different number of digits

Key learning

- Use base 10 to work out the additions.

Hundreds	Tens	Ones
+		

		H	T	O	
		1	4	8	
+			3	5	

Th	H	T	O
+			

		Th	H	T	O	
		3	6	1	4	
+			5	2	3	

- Work out the additions.

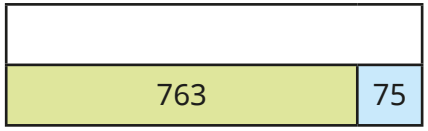
627 + 91	875 + 65	872 + 3,516	6,487 + 715

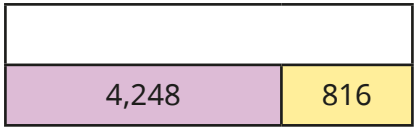
- Jo has 423 cm of ribbon.

  Her teacher gives her another 82 cm of ribbon.

  What total length of ribbon does Jo have now?

- Complete the bar models.





- Ms Rose has £4,294 and Mr Lee has £956

  How much money do they have altogether?

- Nijah scores 974 points in a game.

  Scott scores 82 points more than Nijah.

  How many points do they score altogether?

Add numbers with a different number of digits

Reasoning and problem solving

Tiny is working out 472 + 35

$$\begin{array}{r} 4\ 7\ 2 \\ +\ 3\ 5 \\ \hline 8\ 2\ 2 \\ \hline 1 \end{array}$$

What mistake has Tiny made?

Work out the correct answer.

507

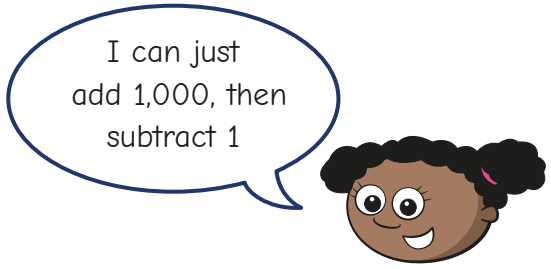
Kim, Ron and Dora are playing a game.

- Kim scores 1,815 points.
- Ron scores 523 points more than Kim.
- Dora scores 52 points more than Ron.

How many points do they score altogether?

6,543

Whitney is working out 5,812 + 999



Is Whitney correct?

Does this always work for adding 999?

How could Whitney use this method to add 998?

Use Whitney's method to work out the additions.

6,472 + 999

4,385 + 998

3,047 + 98

Yes

add 1,000, then subtract 2

7,471

5,383

3,145

Subtract up to two 4-digit numbers – no exchange

Notes and guidance

In this small step, children explore subtraction of two numbers with up to four digits without an exchange. Year 3 children should spend time focusing on subtracting 3-digit numbers, whereas Year 4 children will be familiar with the formal written method and should focus on subtracting 4-digit numbers.

It is important that children continue to work with concrete resources alongside the formal written method. When using concrete resources, the key difference with subtraction is that they do not need to make the number they are subtracting, but instead physically remove it from the representation of the number they are subtracting from. There are no exchanges in this step, but it is still worth asking, "Do you need to make an exchange?" in order to support future learning where exchanges are required.

Children should subtract from the "smallest value column" first, rather than referring to it as the "ones column" to avoid a misconception when decimals are introduced.

Things to look out for

- When using concrete resources, children may make both numbers, then remove the second one, leaving the first number unchanged.

Key questions

- What numbers do you need to make before you can subtract?
- Does it matter which column you subtract first?
- Does it matter which number you write at the top when using the column method for subtraction?

Possible sentence stems

- _____ ones/tens/hundreds subtract _____ ones/tens/hundreds is equal to _____

Single age small step links

- Subtract two numbers (no exchange) (Y3)
- Subtract two 4-digit numbers – no exchange (Y4)

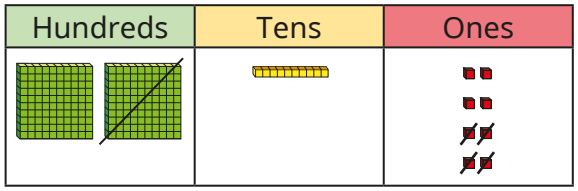
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (Y3)
- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate (Y4)

Subtract up to two 4-digit numbers – no exchange

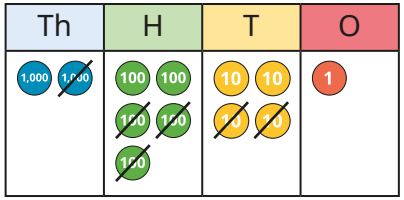
Key learning

- Work out 218 – 104



		H	T	O
		2	1	8
	–	1	0	4

- Work out 2,541 – 1,320



		Th	H	T	O
		2	5	4	1
	–	1	3	2	0

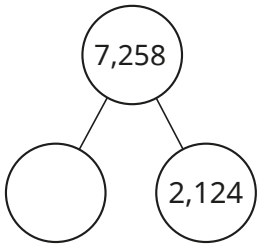
- Work out the subtractions.

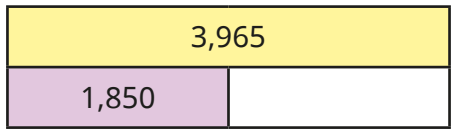
		H	T	O
		5	9	8
	–	3	7	6

		Th	H	T	O
		8	2	3	4
	–	5	2	2	2

		Th	H	T	O
		3	0	6	3
	–	2	0	5	0

- Work out the missing numbers.





- The mass of a bag of potatoes is 6,250 g.

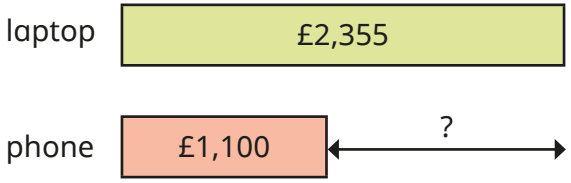
  3,100 g of potatoes are used from the bag.

  What is the mass of the bag of potatoes now?

- A laptop costs £2,355

  A phone costs £1,100

  How much more money does the laptop cost than the phone?



What is the total cost of the laptop and the phone?

Subtract up to two 4-digit numbers – no exchange

Reasoning and problem solving

What could the missing digits in the subtraction be?

		Th	H	T	O	
		9		7	2	
	–	7		3	1	
		2	3	4	1	

Find all the possible answers.

What is the pattern for the two missing digits?

Explain your answer.

9, 6

8, 5

7, 4

6, 3

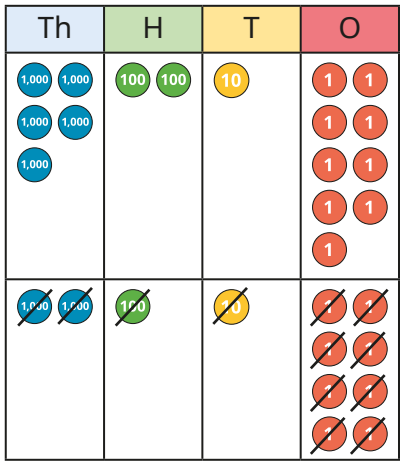
5, 2

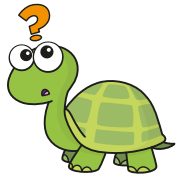
4, 1

3, 0

Tiny is using place value counters to work out 5,219 – 2,118

Tiny thinks that the answer is 5,219





Explain Tiny's mistake.

Work out the correct answer.

3,101

Subtract up to two 4-digit numbers – across a 10

Notes and guidance

In this small step, children again subtract numbers with up to 4-digits, but now with exchanges.

As with previous steps, start with base 10 or place value counters alongside the written calculation. Establish that, for subtraction, children only need to make the number being subtracted from, completing the formal written method alongside to support understanding. For each calculation, prompt them to think about whether they need to make an exchange, and why.

Year 4 children will be more familiar with exchanging and will have experience of exchanging with numbers up to four digits. They should be given the opportunity to apply their understanding in different contexts.

Things to look out for

- When using concrete resources, children may create both numbers and simply remove the second number, leaving the original number unchanged.
- Children may find the difference between two digits instead of subtracting the second digit from the first.
- When no tens are left in a number due to an exchange, children may not know what to put in the tens column.

Key questions

- How do you show an exchange using base 10/place value counters/the written method?
- How do you know if you need to make an exchange?

Possible sentence stems

- I can/cannot subtract _____ ones/tens/hundreds from _____ ones/tens/hundreds, so I do/do not need to make an exchange.
- I need to exchange 1 ten for _____ ones.

Single age small step links

- Subtract two numbers (across a 10) (Y3)
- Subtract two 4-digit numbers – one exchange (Y4)

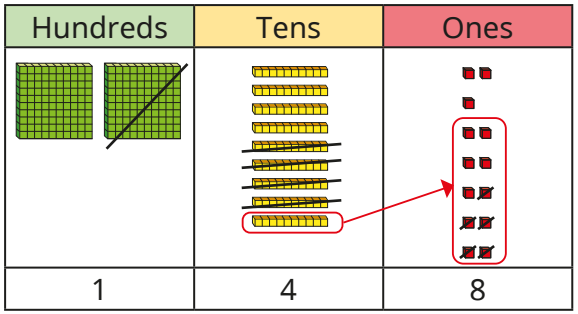
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (Y3)
- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate (Y4)

Subtract up to two 4-digit numbers – across a 10

Key learning

- Dani uses base 10 to work out 293 – 145



	H	T	O
	2	~~8~~ 9	~~1~~ 3
–	1	4	5
	1	4	8

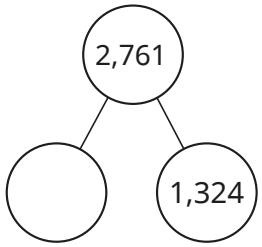
Use Dani's method to work out the subtractions.

	H	T	O
	4	6	1
–	2	2	5

	H	T	O
	5	8	6
–	1	2	7

	Th	H	T	O
	5	6	3	0
–	1	4	1	9

- Find the missing numbers.



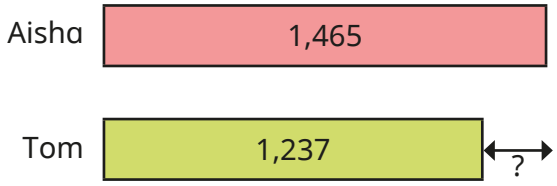
4,790	
1,429	

- Aisha and Tom are playing a game.

  Aisha scores 1,465 points.

  Tom scores 1,237 points.

  How many more points has Aisha scored than Tom?



  How many points have they scored in total?

- What are the missing digits?

	H	T	O
	6	~~3~~ 4	~~1~~ 3
–	2	1	
	4	2	8

	Th	H	T	O
	4	1	8	
–	1	0	1	2
	3	1	6	9

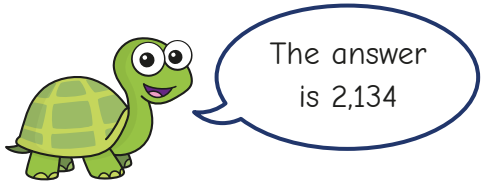
	Th	H	T	O
	8	8	5	
–	1	2		6
	7	6	4	6

Subtract up to two 4-digit numbers – across a 10

Reasoning and problem solving

Tiny is working out 4,233 – 2,107

		Th	H	T	O	
		4	2	3	3	
	–	2	1	0	7	
		2	1	3	4	



What mistake has Tiny made?

What is the correct answer?

Tiny has subtracted the 3 from the 7 in the ones column, instead of exchanging 1 ten for 10 ones.

2,126

5,342 people visit the zoo on Monday.

- There are 1,217 children under 5 years of age.
- There are 1,119 children aged 5 years or older.
- The rest are adults.

How many adults visit the zoo?

Explain your method to a partner.

free for children aged under 5

£1 for children aged 5 and older

£2 for adults

How much money was spent on tickets?

3,006

£7,131

Subtract up to two 4-digit numbers – across a 100

Notes and guidance

In this small step, children use the formal written method to subtract two numbers with up to four digits, exchanging 1 hundred for 10 tens and/or 1 ten for 10 ones. Year 3 children may begin by subtracting 3-digit numbers whereas Year 4 children should focus on subtracting 4-digit numbers.

This is Year 3 children's first experience of subtraction across a 100. They use base 10 and place value counters to represent calculations alongside the written method. It may also be the first time that they have seen multiple subtraction exchanges in the same calculation and extra care should be taken when modelling this.

Avoid subtracting from a number with no tens (causing an exchange from the hundreds down to the ones), as this is covered later in the block.

Things to look out for

- When using concrete resources, children may create both numbers and simply remove the second number, leaving the original number unchanged.
- Children may find the difference between the two digits in a column instead of subtracting the second digit from the first, for example 1 – 3 becomes 3 – 1

Key questions

- How can you show this question using base 10/place value counters/the written method?
- How do you know if you need to make an exchange?

Possible sentence stems

- I can/cannot subtract _____ ones/tens/hundreds from _____ ones/tens/hundreds, so I do/do not need to make an exchange.
- I need to exchange 1 hundred for _____ tens.

Single age small step links

- Subtract two numbers (across a 100) (Y3)
- Subtract two 4-digit numbers – one exchange (Y4)

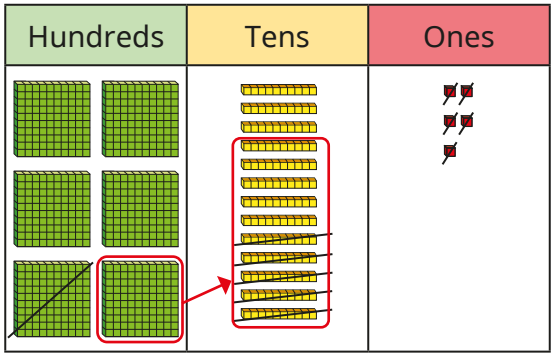
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (Y3)
- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate (Y4)

Subtract up to two 4-digit numbers – across a 100

Key learning

- Max uses base 10 to work out 635 – 155



	H	T	O
	$^{5}\not{6}$	$^{1}3$	5
–	1	5	5
	4	8	0

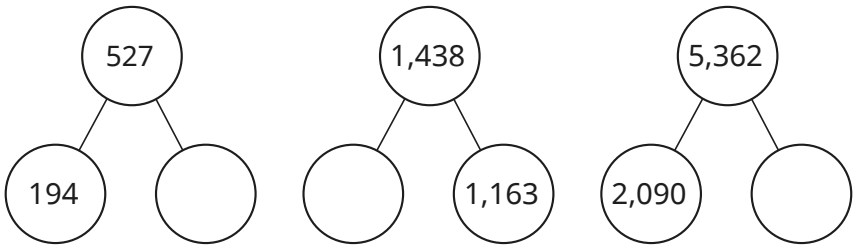
Use Max's method to work out the subtractions.

	H	T	O
	7	2	4
–	2	3	2

	H	T	O
	6	0	2
–	1	4	1

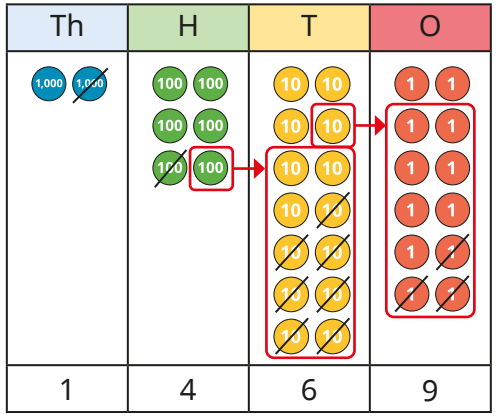
	Th	H	T	O
	3	4	5	8
–	2	2	6	2

- Complete the part-whole models.



- Jo uses place value counters to work out 2,642 – 1,173

She needs to make two exchanges.



	Th	H	T	O
	2	$^{5}\not{6}$	$^{13}\not{4}$	$^{1}2$
–	1	1	7	3
	1	4	6	9

Use Jo's method to work out the subtractions.

6,481 – 1,395

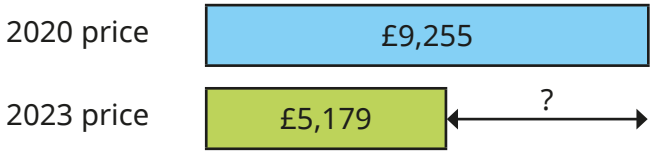
5,550 – 4,168

7,314 – 5,226

- In 2020, Mrs Patel bought a car for £9,255

In 2023, she sold the car for £5,179

What is the difference in the value of the car from 2020 to 2023?



Subtract up to two 4-digit numbers – across a 100

Reasoning and problem solving

Is the statement true or false?

In this calculation, there will be 4 hundreds in the answer because 9 hundreds subtract 5 hundreds is equal to 4 hundreds.

Hundreds	Tens	Ones
100 100 100 100 100 100 100 100 100	10 10	1 1 1 1 1 1

		H	T	O	
		9	2	6	
	–	5	4	1	

Explain your answer.

False

Annie, Mo and Tommy are playing a game.

I have 4,633 points. I have 1,215 more points than Mo.

Annie

I have 2,129 more points than Tommy.

Mo

How many points does Tommy have?

1,289

Subtract up to two 4-digit numbers – across a 1,000

Notes and guidance

In this small step, children use the formal written method to subtract two numbers with up to four digits. The main focus is to exchange from the thousands column, although some calculations may include exchanges in other columns and multiple exchanges. Year 3 children may recap subtracting two 3-digit numbers before subtracting two 4-digit numbers.

Start with base 10 and place value counters representing the calculations alongside the written method to support understanding.

When completing the written method, it is vital that children are careful with where they put the digits, especially those that have been exchanged. Two-part exchanges can be confusing if they are unsure what each digit represents or where to put it. Give Year 4 children the opportunity to solve problems in different contexts, for example with measures or money.

Things to look out for

- When exchanging a number, children may put the 1 in the incorrect column.
- When exchanging over two columns, children may exchange directly from, for example, hundreds down to ones and miss out the exchange to tens.

Key questions

- How can you subtract two numbers if one of them has fewer digits than the other?
- If you cannot exchange from the tens/hundreds, what do you need to do?

Possible sentence stems

- I can/cannot subtract _____ ones/tens/hundreds from _____ ones/tens/hundreds, so I do/do not need to make an exchange.

Single age small step links

- N/A

- Subtract two 4-digit numbers – more than one exchange (Y4)

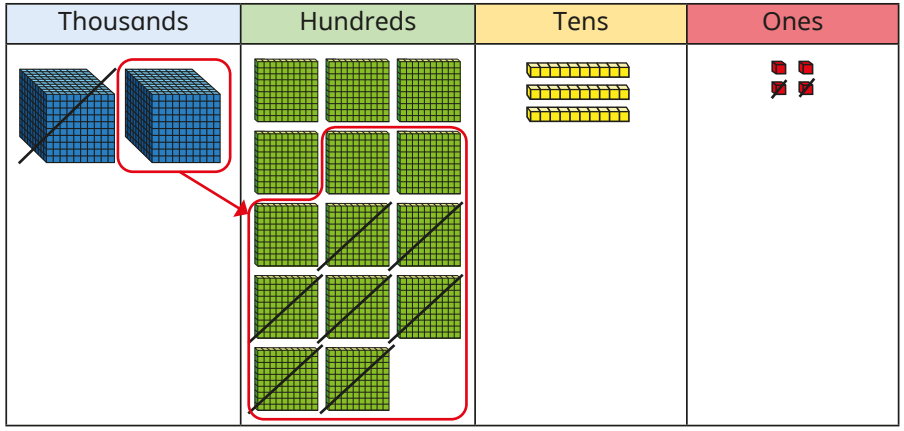
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (Y3)
- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate (Y4)

Subtract up to two 4-digit numbers – across a 1,000

Key learning

- Eva is using base 10 to work out 2,434 – 1,702



	Th	H	T	O
	~~2~~	4	3	4
–	1	7	0	2
		7	3	2

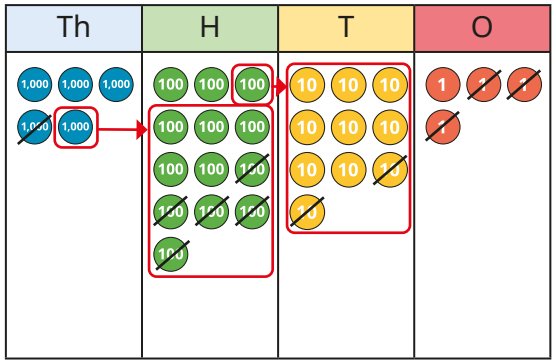
Use Eva's method to work out the subtractions.

	Th	H	T	O
	2	7	9	4
–	1	8	2	3

	Th	H	T	O
	5	3	1	8
–	1	4	0	5

	Th	H	T	O
	6	8	5	2
–	1	9	4	1

- Jack is using place value counters to work out 5,304 – 1,523



	Th	H	T	O
	~~5~~	~~13~~	10	4
–	1	5	2	3
	3	7	8	1

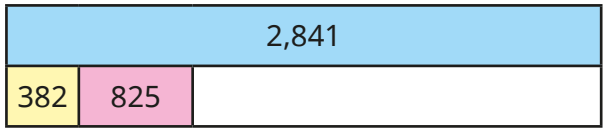
Use Jack's method to work out the subtractions.

7,136 – 2,507	2,379 – 1,499	5,075 – 2,284

- A shop has 2,841 plants.

  382 plants are sold in the morning and 825 in the afternoon.

  How many plants are left?



Explain how you found the answer.

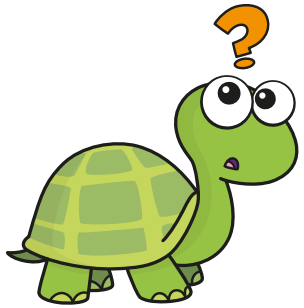
Is there more than one way to solve this problem?

Subtract up to two 4-digit numbers – across a 1,000

Reasoning and problem solving

Tiny has worked out 3,406 – 1,108

		Th	H	T	O
		3	~~4~~ 3	0	16
	−	1	1	0	8
		2	2	0	8



Do you agree with Tiny?

Explain your answer.

No

Find the missing 4-digit number.

		Th	H	T	O
	+	1	8	5	1
		4	3	4	2

How did you find the answer?

Is there more than one way?

2,491

Huan, Rosie and Alex are playing a game.

Huan has 3,384 points. He has 1,226 points more than Rosie.

Rosie has 1,792 points more than Alex.

How many points does Alex have?

366

Subtract numbers with a different number of digits

Notes and guidance

Children should now be confident with the formal written method of subtraction for numbers with up to four digits and making exchanges, where appropriate. In this small step, they subtract numbers with a different number of digits. Year 3 children spend more time focusing on subtracting 2-digit and 3-digit numbers, while Year 4 children should progress quickly to subtracting 2-/3- digit numbers and 4-digit numbers.

The different sizes of numbers can sometimes confuse children, especially when lining up the digits in place value columns. Some children may find it helpful to write a zero placeholder for the start of the shorter number. Start by using base 10 and place value counters to represent the calculations alongside the written method. At each step of the subtraction, children should be asking whether they need to make an exchange.

Things to look out for

- Children may not line up the digits in the place value columns correctly.
- When exchanging over two columns, children may exchange directly from, for example, hundreds down to ones and miss out the exchange to tens.

Key questions

- How do you know which columns to put the digits in?
- How do you know if you need to make an exchange?
- What could you write in the hundreds column if there are no hundreds?

Possible sentence stems

- I can/cannot subtract _____ ones/tens/hundreds from _____ ones/tens/hundreds, so I do/do not need to make an exchange.

Single age small step links

- Subtract a 2-digit number from a 3-digit number (Y3)

- N/A

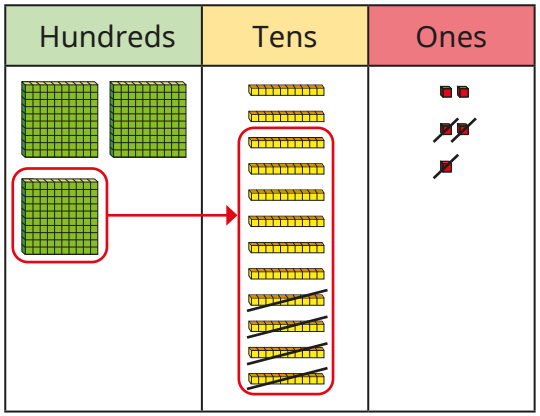
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (Y3)
- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate (Y4)

Subtract numbers with a different number of digits

Key learning

- Scott is using base 10 to work out 325 – 43

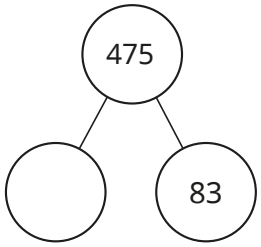


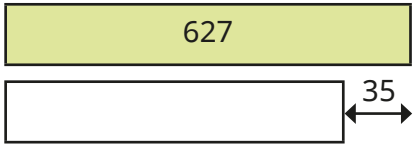
	H	T	O
	~~2~~3	1~~2~~	5
–		4	3
	2	8	2

Use Scott's method to work out the subtractions.

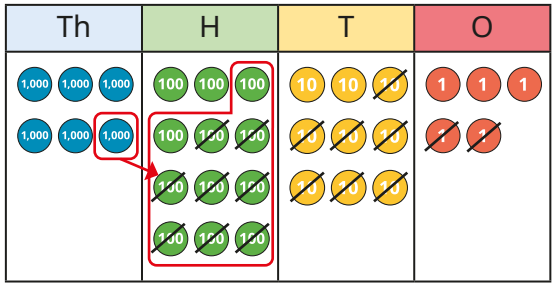
738 – 46 | 584 – 56 | 723 – 48

- Find the missing numbers.





- Whitney is using place value counters to work out 6,295 – 872



	Th	H	T	O
	~~5~~	1~~2~~	9	5
–		8	7	2
	5	4	2	3

Use Whitney's method to work out the subtractions.

2,936 – 351 | 5,119 – 348 | 2008 – 49

- Write <, > or = to compare the number sentences.

4,985 ◯ 5,600 – 999

2,240 + 350 ◯ 2,240 – 350

4,355 – 252 ◯ 4,355 – 152

6,295 – 1,864 ◯ 6,295 – 864

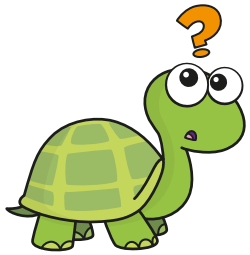
Explain how you compared the number sentences.

Subtract numbers with a different number of digits

Reasoning and problem solving

Tiny is working out 4,627 – 351

		Th	H	T	O	
		4	6	2	7	
	–	3	5	1		
		1	1	1	7	



Explain Tiny's mistake.

Find the correct answer.

4,276

Find the missing numbers.

_____ – 2,312 = 5_3

What is the greatest number that could go in the first space?

What is the smallest?

How many possible answers could you have?

What is the pattern between the numbers?

What method did you use?

2,905 (and 9)

2,815 (and 0)

ten possible answers

The 4-digit number increases by 10 and the digit increases by 1 each time.

2,625 people are at a theme park.

285 of the people work at the theme park.

There are 963 adult visitors.

The rest are children.

How many children are there?

Explain your method to a partner.

1,377

Complements to 100 and 1,000

Notes and guidance

In this small step, children focus on fluently finding complements to 100 and 1,000. Year 3 children should become confident in finding complements to 100 before moving on to complements to 1,000

A common misconception when finding a complement to 100 is to think that the ones digits bond to 10 and the tens digits bond to 100, which leads to a total of 110 rather than 100, for example 36 + 74. Using a hundred square can help children to avoid this misconception and to identify that they actually need to find a bond to 10 and a bond to 90. A number line can also support the development of efficient mental strategies to find complements to 100. Children can then use these strategies to find complements to 1,000, which is a skill that Year 4 children should focus on in this step.

This small step provides a good opportunity to recap prior learning on money and measures, specifically the facts that there are 100p in £1 and 1,000 m in 1 km.

Things to look out for

- Children may find bonds to 10, 100 and 1,000 and then add them together, leading to a total of 1,110

Key questions

- How many squares are there altogether? How do you know?
- How many full rows of each colour are there?
- What do you notice about the row with both colours in it?
- What do you notice about the total of the hundreds/tens/ones?
- What is the jump to the next multiple of 10/100?

Possible sentence stems

- I add _____ to get to the next 10, then _____ to get to 100, then _____ to get to 1,000
  This means that _____ is the complement to 100/1,000 of _____

Single age small step links

- Complements to 100 (Y3)
- N/A

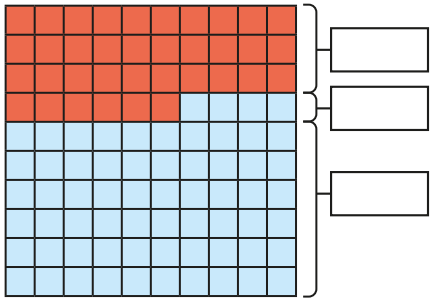
National Curriculum links

- Add and subtract numbers mentally, including: a 3-digit number and ones; a 3-digit number and tens; a 3-digit number and hundreds (Y3)

Complements to 100 and 1,000

Key learning

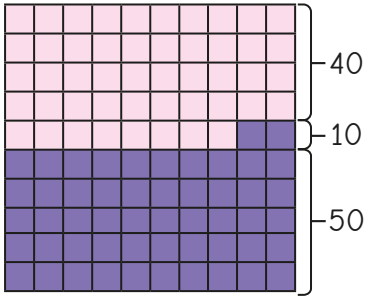
- Fill in the totals for the hundred square.

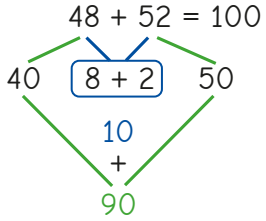


Use the hundred square to complete the number sentence.

36 + 64 = _____ + _____ + _____ = _____

- Esther is using a hundred square to show that 48 + 52 = 100



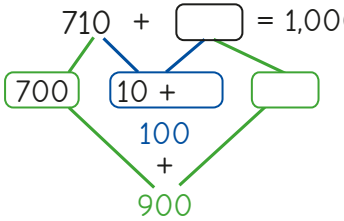


Use Esther's method to show that the total of each addition is 100

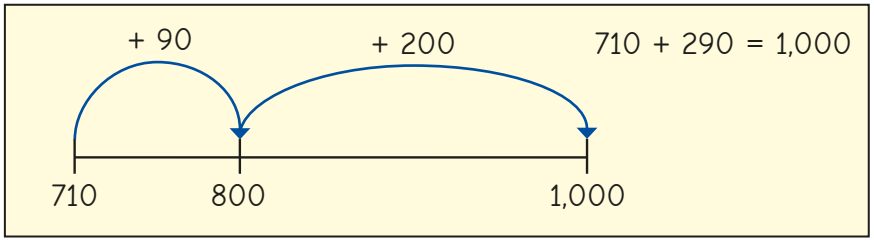
65 + 35	18 + 82	33 + 67

- Amir is finding the complement of 710 to 1,000

Complete Amir's workings.



Sam is using a number line to find the complement of 710 to 1,000



Whose method do you prefer?

Use that method to find the complement of 360 to 1,000

- Complete the complements to 100

▶ 74 + 2__ ▶ 65 + __5 ▶ __8 + 32

Complete the complements to 1,000

▶ 740 + __60 ▶ 650 + __5__ ▶ 8__8 + __32

What do you notice?

Complements to 100 and 1,000

Reasoning and problem solving

Tiny is working out the complement of 153 to 1,000

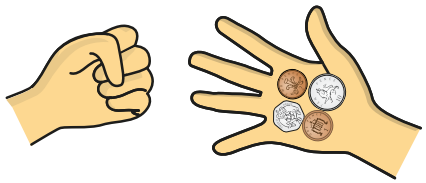
3 and 7 is a bond to 10 50 and 50 is a bond to 100 100 and 900 is a bond to 1,000 So, the answer is 957

Explain Tiny's mistake.

Find the correct answer.

847

Teddy has £1 in total in his hands.



What coins could be in his closed hand?

Is there more than one possibility?

multiple possible answers, e.g.

50p, 5p, 5p, 2p, 2p, 2p, 1p

The coins must total 67p.

Sort the additions into the table.

90 + 10	64 + 46	87 + 23	72 + 28
94 + 6	64 + 36	55 + 55	48 + 62

Bond to 100	Not a bond to 100

Explain your thinking to a partner.

Create your own calculations for a partner to sort into this table.

Bond to 1,000	Not a bond to 1,000

bonds to 100: 90 + 10, 72 + 28, 94 + 6, 64 + 36

not bonds to 100: 64 + 46, 87 + 23, 55 + 55, 48 + 62

Estimate answers

Notes and guidance

In this small step, children estimate by rounding to the nearest 10, 100 and 1,000

From the previous block, children are familiar with using the language of "rounding to the nearest _____".

Discuss the importance of estimating, particularly in real-life situations. Estimations allow us to quickly and easily get an idea of what an answer should be near to, or if an already calculated answer is appropriate. Year 4 children should consider whether an actual answer will be greater or less than an estimate. For example, 133 + 504 may be estimated as 130 + 500, but the precise answer will be greater than the estimate because the actual numbers from the calculation are both greater than the multiples they were rounded to.

Things to look out for

- Children may find it difficult to decide which multiple to round to.
- Children may not always use the most appropriate values when estimating.
- Children may find it difficult to work out whether an estimate will be greater or less than the actual answer.

Key questions

- What multiple of 10/100/1,000 comes before _____ and after _____?
- Where would _____ be on this number line?
- Which multiple is _____ closer to?
- Is the estimate less than or greater than the actual answer? How do you know?

Possible sentence stems

- _____ is closer to _____ than _____
- The estimate is _____ than the actual answer because ...

Single age small step links

- Estimate answers (Y3)
- Estimate answers (Y4)

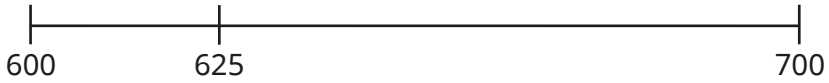
National Curriculum links

- Estimate the answer to a calculation and use inverse operations to check answers (Y3)
- Estimate and use inverse operations to check answers to a calculation (Y4)

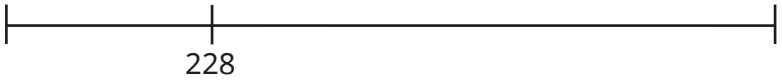
Estimate answers

Key learning

- Use the number lines to help you complete the sentences.



625 rounded to the nearest hundred is _____



228 rounded to the nearest hundred is _____

Use the rounded amounts to estimate 625 – 228

Use column subtraction to work out the actual answer.

- Work out the calculations.
  - 20 + 50
  - 24 + 47
  - 400 + 300
  - 389 + 334
  - 4,000 – 2,000
  - 4,300 – 2,100
  - 4,341 – 2,108

In each set, which calculation was easiest to work out?

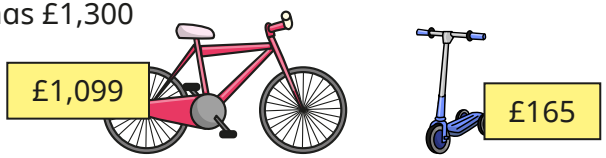
- Kim is estimating the answer to 1,238 – 197

1,238 is close to 1,200
197 is close to 200
1,200 – 200 = 1,000

Use Kim's method to estimate the answers to the calculations.

2,882 – 301 | 1,017 – 424 | 7,285 – 6,304

- Dr Trent has £1,300



Estimate whether Dr Trent can afford to buy both the bicycle and the scooter.

- Write < or > to complete the statements.

272	◯	200	384 + 272	◯	384 + 200
4,926	◯	5,000	9,000 – 4,926	◯	9,000 – 5,000
1,568	◯	1,500	2,000 – 1,568	◯	2,009 – 1,500

What do you notice?

Estimate answers

Reasoning and problem solving

Tiny is estimating the answer to 1,672 – 480

1,000 – 400 = 600

Find a better estimate.

Work out 1,672 – 480

Which estimate is closer to the exact answer?

1,700 – 500 = 1,200

1,192

1,700 – 500 = 1,200

The estimated answer to a calculation is 6,700

The numbers in the calculation were rounded to the nearest hundred for the estimate.

What could the calculation be?

multiple possible answers, e.g.

5,231 + 1,512

8,298 – 1,628

Roll a 6-sided dice seven times.

Write each number in one of the boxes.

		Th	H	T	O
	+				

Estimate the answer to your calculation.

Now work out your addition.

Compete against a partner.

Who can get an answer closest to 4,000?

Compare answers as a class.

Inverse operations

Notes and guidance

In this small step, children explore the inverse relationship between addition and subtraction and how both relate to the part-whole structure.

In addition to part-whole models, bar models are useful for highlighting these relationships. It is important to draw children's attention to the fact that they can perform two different subtractions as the inverse to an addition, due to addition's commutative property, but there is only one possible addition as the inverse to a subtraction.

Building on the previous small step, where children began to look at strategies to check answers using estimation, they can now use inverse operations as another method of checking, rather than simply redoing the same calculation and potentially repeating the same error.

Things to look out for

- Children may mix up the wholes and the parts.
- Children may subtract a part from a part, rather than a part from the whole.
- When asked to check an answer, children may just repeat the same calculation instead of using the inverse operation.

Key questions

- What does "inverse" mean?
- What is the inverse of add/subtract?
- What does "commutative" mean?
- Is addition/subtraction commutative?
- What estimate could you use to check?

Possible sentence stems

- To check that I have added/subtracted _____ correctly, I need to ...

Single age small step links

- Inverse operations (Y3)
- Checking strategies (Y4)

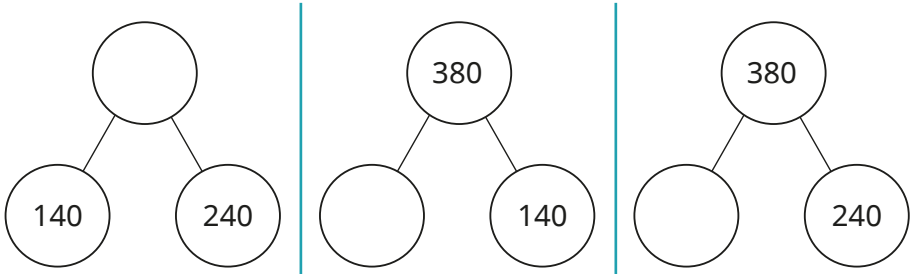
National Curriculum links

- Estimate the answer to a calculation and use inverse operations to check answers (Y3)
- Estimate and use inverse operations to check answers to a calculation (Y4)

Inverse operations

Key learning

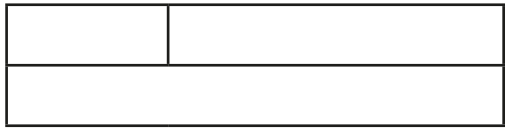
- Complete the part-whole models and number sentences.



140 + 240 = _____ 380 – 140 = _____ 380 – 240 = _____

How could you check your answers?

- Complete the bar model for 6,573 – 2,136 = 4,437



Use the bar model to write the fact family.

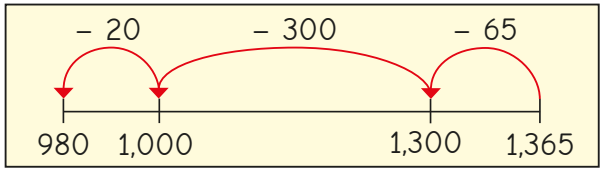
- Which calculations can be used to check the addition 3,683 + 1,208 = 4,891?

4,891 – 3,683	3,683 – 1,208	4,891 + 1,208	4,891 – 1,208

- Which calculations can be used to check the subtraction 6,429 – 2,261 = 4,168?

6,429 – 4,168	4,168 + 2,261	2,261 + 4,168	6,429 + 2,261

- Whitney uses a number line to work out 1,365 – 385



What addition could Whitney do to check her answer?

- Dexter has answered a problem.

Mr Jones has £1,872 in his bank account.
He spends £789 on a family holiday.
How much does he have left? £ 1,183

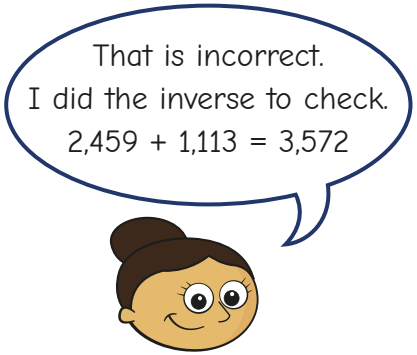
What estimate could Dexter use to check his answer?

Use an inverse calculation to check if Dexter's answer is correct.

Inverse operations

Reasoning and problem solving

Filip is working out the answer to 2,459 – 1,346 and gets the answer 1,113



What mistake has Dora made?

Complete an inverse operation to check that Filip's answer is correct.

What estimate could Dora and Filip use to check their answers?

Dora added the whole and a part, instead of adding the two parts, 1,346 and 1,113

1,346 + 1,113 = 2,459 or 1,113 + 1,346 = 2,459

2,500 – 1,300 = 1,200

Here are some calculations.

1,400 + 500	1,384 – 1,256	1,300 – 700	1,256 – 548
700 + 500	1,879 – 1,384	1,879 – 495	1,900 – 500
548 + 708	550 + 700	708 + 548	1,261 + 1,749

Which calculations can be used to check 1,384 + 495?

Which calculations can be used to check 1,256 – 708?

What could the other calculations be used to check?

check for 1,384 + 495:

1,400 + 500, 1,879 – 1,384, 1,879 – 495, 1,900 – 500

check for 1,256 – 708:

1,300 – 700, 1,256 – 548, 700 + 500, 548 + 708, 550 + 700, 708 + 548

Efficient methods

Notes and guidance

This small step provides the opportunity to bring together all the learning from this block. Children make decisions about what operation and what method is appropriate to solve a problem, including both mental and written strategies.

Children can often become over-reliant on formal written methods, so it is important to explicitly highlight where mental strategies or less formal jottings can be more efficient.

Word problems, including multi-step problems, can be used to assess whether children are able to successfully identify the correct operation and information to use. Bar models can support children in this process, encouraging them to think about what is the whole and what are the parts.

Year 4 children should explore the concept of constant difference. This can help make potentially tricky subtractions with multiple exchanges much simpler, sometimes even becoming calculations that can be performed mentally. Number lines can support the understanding of this concept.

Things to look out for

- Children may select the incorrect operation.
- Children may use written methods when mental methods would be more appropriate.

Key questions

- Which operation do you need to use?
- Can you use a mental method or do you need to use a written one? Which method is more efficient?
- What does "difference" mean?
- Why does adding/subtracting to/from each number make the calculation easier?

Possible sentence stems

- If I add/subtract _____ to/from both numbers, the difference will be the same.

Single age small step links

- Make decisions (Y3)
- Efficient subtraction (Y4)

National Curriculum links

- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction (Y3)
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why (Y4)

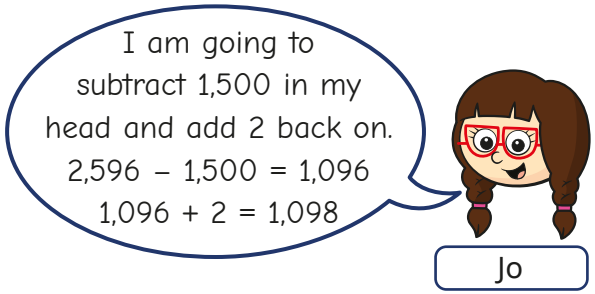
Efficient methods

Key learning

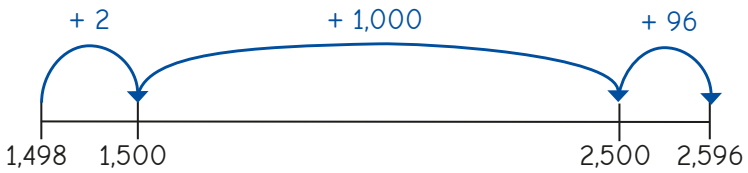
- Ron, Jo and Amir are working out 2,596 – 1,498

Ron

		Th	H	T	O	
		2	~~5~~ 4	~~9~~ 18	6	
	–	1	4	9	8	
		1	0	9	8	



Amir



2 + 1000 + 96 = 1,098

Whose method do you prefer? Why?

Which is the most efficient method?

Use your preferred method to work out the subtractions.

8,603 – 8,598	712 – 14	5,932 – 2,300	6,105 – 4,537

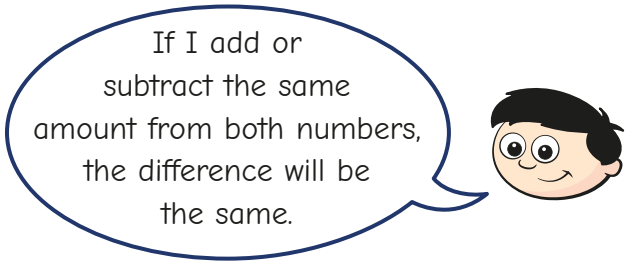
Did you use the same method each time?

- A machine packs 589 boxes on Saturday.

  Another 1,230 boxes are packed on Sunday.

  How many boxes are packed altogether?

- Dexter is working out 476 – 199



477 – 200 = 277

476 – 199 = 277

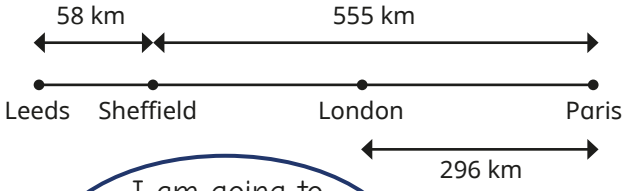
Use Dexter's method to work out the calculations.

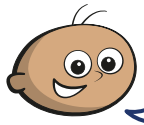
376 – 99	3,487 – 999	6,000 – 1,486	8,525 – 4,021

Efficient methods

Reasoning and problem solving

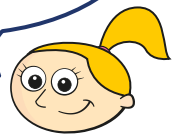
Tommy, Eva and Jack want to find the distance from Leeds to London.





Tommy: I am going to use the written method to do 58 + 555 and then subtract 296

Jack: I need to add 58, 555 and 296 together.



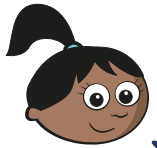
Eva: I can use mental strategies to subtract 296 from 555 first, and then add 58

Whose method is incorrect?

What is the distance from Leeds to London?

Jack | 317 km

Sam is working out 600 – 287



I could subtract 1 to make my calculation easier, as I will not need to make any exchanges.

		H	T	O	
		5	9	9	
	–	2	8	7	
		3	1	2	

What mistake has Sam made?

What is the correct answer?

How else could you work out 600 – 287?

Sam needed to subtract 1 from both numbers.

313

e.g. 599 – 287 = 312, 312 + 1 = 313

Use a number line.