

Autumn Block 2

Addition and subtraction

Small steps

Step 1

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

Step 2

Add up to two 4-digit numbers – no exchange

Step 3

Add two 4-digit numbers – one exchange

Step 4

Add two 4-digit numbers – more than one exchange

Step 5

Subtract two 4-digit numbers – no exchange

Step 6

Subtract two 4-digit numbers – one exchange

Step 7

Subtract two 4-digit numbers – more than one exchange

Step 8

Efficient subtraction

Small steps

Step 9

Estimate answers

Step 10

Checking strategies

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

Notes and guidance

In Year 3, children explored adding and subtracting 1s, 10s and 100s to/from any 3-digit number, including using a mental strategy when crossing a multiple of 10 or 100

In this small step, children recap this learning and extend their understanding to dealing with 4-digit numbers and adding and subtracting multiples of 1,000. The focus is on mental rather than written strategies, which are covered later in the block.

It is important to explore the effect of either adding or subtracting a multiple 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 identify the incorrect place value column, particularly if they are using plain counters in a place value chart, for example $3,469 - 300 = 469$ or $3,439$
- Confusion may arise with zero as a placeholder.
- Children may find crossing the next or previous multiple challenging.

Key questions

- If you know $2 + 4 = 6$, what else do you know?
- How will you partition _____? Why?
- Will the value in the ones/tens/hundreds/thousands column increase or decrease? By how much?
- Which place value columns have changed/stayed the same? Why?
- What is the inverse of subtracting 300?

Possible sentence stems

- The next/previous multiple of 10/100/1,000 is _____
- I can partition _____ into _____ and _____ because ...
- The value of the _____ column will increase/decrease by _____

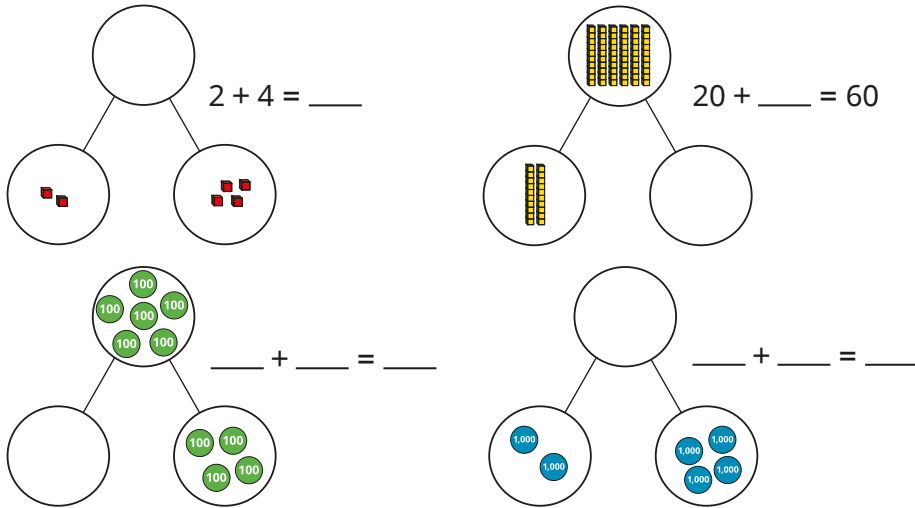
National Curriculum links

- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

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

Key learning

- Complete the part-whole models and number sentences.



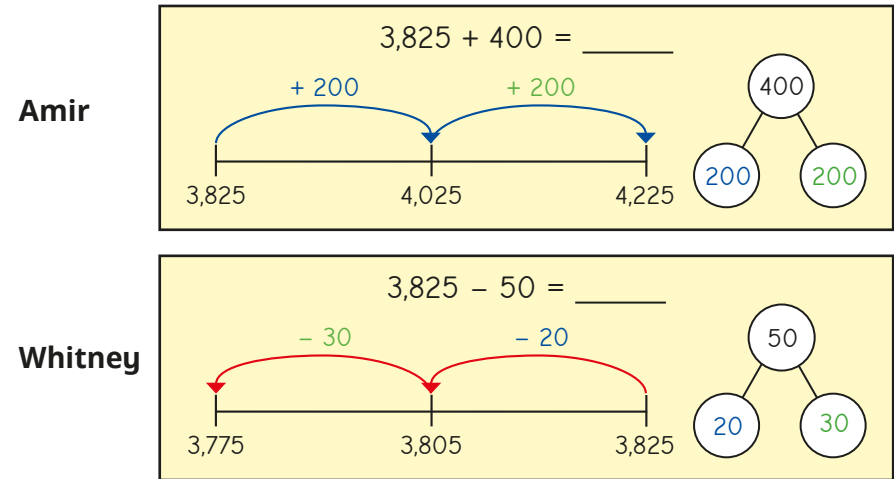
What do you notice?

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

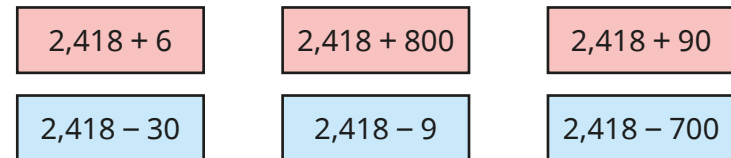
- ▶ $1,364 + 3 = \underline{\quad}$
- ▶ $1,364 + 30 = \underline{\quad}$
- ▶ $1,364 + 300 = \underline{\quad}$
- ▶ $1,364 + 6,000 = \underline{\quad}$
- ▶ $1,364 - 1 = \underline{\quad}$
- ▶ $1,364 - 60 = \underline{\quad}$
- ▶ $1,364 - 200 = \underline{\quad}$
- ▶ $1,364 - 1,000 = \underline{\quad}$

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

- Amir and Whitney are using number lines to add and subtract.



Use this method to work out the calculations.



- There are 1,286 patients and doctors in a hospital.

300 patients leave after being treated.

Another 90 patients arrive.

7 doctors leave.

How many patients and doctors are in the hospital now?

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

Reasoning and problem solving



If I add or subtract a multiple of 10, the only place value columns that might change are the tens and hundreds.



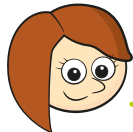
Ron is partially correct. However, the thousands may also change, e.g.
 $1,983 + 30 = 2,013$

Do you agree with Ron?
 Explain your reasons.

Rosie is finding the missing number in _____ - 300 = 2,895



Rosie has subtracted 300 from the answer rather than using the inverse.



$2,895 - 300 = 2,595$

What mistake has Rosie made?
 Work out the missing number.

3,195

Here is a number on a place value chart.



Th	H	T	O
●	●● ●● ●● ●●	●● ●● ●● ●● ●	●●

I am going to add two counters to a column and then remove one counter from a column.



What number could Tiny have now?

multiple possible answers, e.g.
 2,892, 3,792,
 3,882, 3,891
 1,092

Add up to two 4-digit numbers – no exchange

Notes and guidance

In Year 3, children used the formal written method to add two 2- or 3-digit numbers, with up to two exchanges. In this block, that learning is extended to include 4-digit numbers. In this small step, they add 3- or 4-digit numbers with no exchanges, using concrete resources as well as the formal written method.

The numbers being added together may have a different number of digits, so children need to take care to line up the digits correctly. Even though there will be no exchanging, the children should be encouraged to begin adding from the ones column. When working within each column, ask, “Do you have enough ones/tens/hundreds to make an exchange?” This will prepare them for future small steps where exchanging will be necessary.

Things to look out for

- Children may not line up the digits in the place value columns correctly.
- Children may assume they should start adding from left to right. Be careful as this may appear to be a good strategy given there are no exchanges required in this small step.
- Children may not use zero as a placeholder when there are no hundreds, tens or ones.

Key questions

- How can you represent the question using base 10?
- How can you put these numbers into a place value chart?
- Does it matter which columns you add together first?
- Do you have enough ones/tens/hundreds to make an exchange?
- What do you write in the tens column if there are no tens?

Possible sentence stems

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

National Curriculum links

- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Add up to two 4-digit numbers - no exchange

Key learning

- Use counters and a place value chart to work out $3,256 + 2,532$

Th	H	T	O
1,000 1,000	100 100	10 10	1 1
1,000		10 10	1 1
		10	1 1

Th	H	T	O
3	2	5	6
+	2	5	3
<hr/>			
<hr/>			

+

Th	H	T	O
1,000 1,000	100 100	10 10	1 1
	100 100	10	
	100		

- Complete the additions.

	Th	H	T	O
	4	1	3	5
+	2	6	1	4
<hr/>				
<hr/>				

	Th	H	T	O
	3	1	4	2
+		5	3	7
<hr/>				
<hr/>				

	Th	H	T	O
	5	0	8	1
+	3	7	0	4
<hr/>				
<hr/>				

	Th	H	T	O
	2	7	0	6
+		1	0	3
<hr/>				
<hr/>				

- Fill in the missing numbers.

1,052	5,945

	3,194	405

- Work out the missing numbers.

	Th	H	T	O
	4		6	
+	2	5		1
<hr/>				
		7	8	9

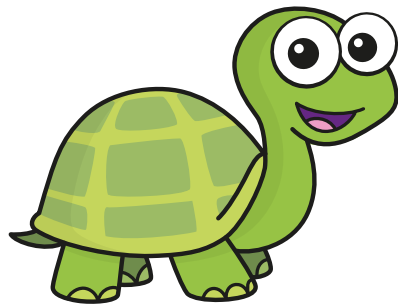
- Tommy walks 3,420 m.
Eva walks 356 m.
How far do they walk altogether?

Add up to two 4-digit numbers – no exchange

Reasoning and problem solving

Tiny works out $1,234 + 345$

The answer is 4,684



1,579

What mistake has Tiny made?
What is the correct answer?



Dani and Aisha are raising money for charity.



Dani raises £2,304 and Aisha raises £1,695

How much money have they raised altogether?

Scott and Tom are also raising money for charity.

So far, Scott has raised £1,423 and Tom has raised £121 more than Scott.

How much have Scott and Tom raised altogether?

Scott \longleftrightarrow 121

Tom

Compare methods with a partner.



£3,999

£2,967

(Tom: £1,544)

Add two 4-digit numbers – one exchange

Notes and guidance

Building on the previous small step, children now add two 4-digit numbers with one exchange in any column. In Year 3, they explored 3-digit addition with up to two exchanges, so they should be familiar with the process.

The numbers can be made using concrete manipulatives such as place value counters in a place value chart, alongside the formal written method. When discussing where to start an addition, it is important to use language such as begin from the “smallest value column” rather than the “ones column” to avoid any misconceptions when decimals are introduced later in the year. After each column is added, ask, “Do you have enough ones/tens/hundreds to make an exchange?” This question will be an important one in this small step, as the children do not know which column will be the one where an exchange is needed.

Things to look out for

- Children may not line up the digits in the place value columns correctly.
- Children may not add up from the smallest value column, and so will not be able to exchange correctly.
- Children may not use zero as a placeholder when there are no hundreds, tens or ones.

Key questions

- How many thousands/hundreds/tens/ones are there altogether?
- What is _____ more than _____?
- Does it matter which columns you add together first?
- Do you have enough ones/tens/hundreds to make an exchange?
- When exchanging 10 hundreds, where do you put the thousand?

Possible sentence stems

- _____ ones added to _____ ones is equal to _____ ones.
- _____ added to _____ is equal to _____
- I have _____ hundreds, so I do/do not need to make an exchange.
- I can exchange 10 _____ for 1 _____

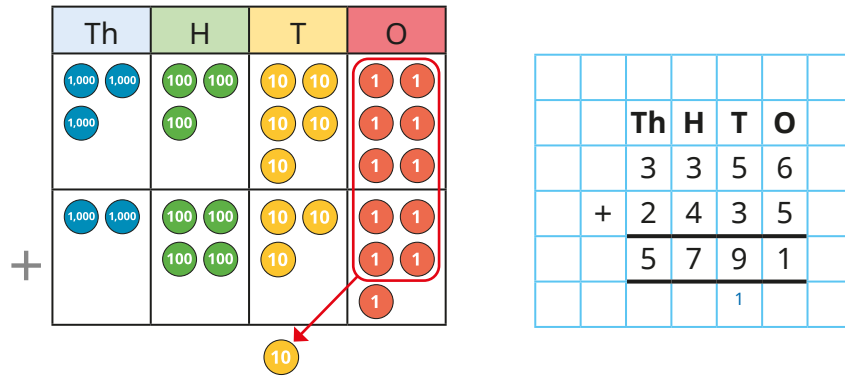
National Curriculum links

- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Add two 4-digit numbers – one exchange

Key learning

- Kim uses counters to find the total of 3,356 and 2,435



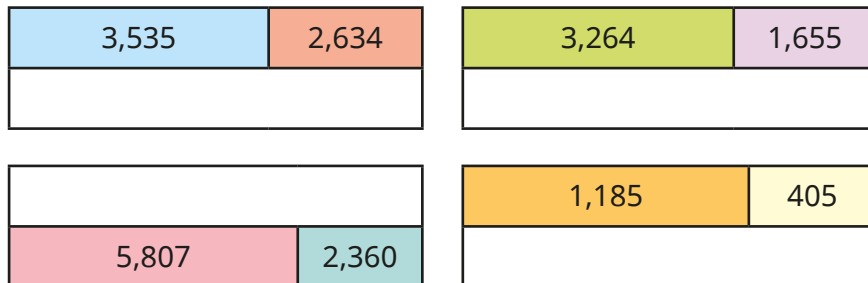
Use Kim's method to work out the additions.

3,356 + 2,437

3,356 + 2,473

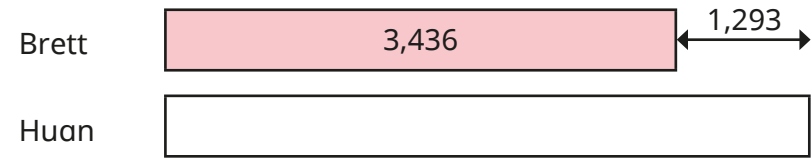
3,356 + 2,743

- Complete the bar models.

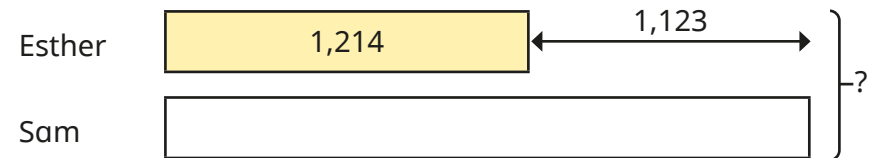


- Find the sum of 6,825 and 1,344

- Brett has 3,436 marbles.
Huan has 1,293 more marbles than Brett.
How many marbles does Huan have?



- Esther has 1,214 stickers.
Sam has 1,123 more stickers than Esther.
How many stickers do they have altogether?



- Eva has 1,434 pennies.
Tom has 1,158 more pennies than Eva.
How many pennies does Tom have?

Add two 4-digit numbers – one exchange

Reasoning and problem solving

Tiny completes this addition.

	Th	H	T	O
	4	0	8	6
+	1	5	3	2
	5	5	1	9
				1

5,618

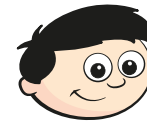
What mistake has Tiny made?
Find the correct answer.

What is the missing 4-digit number?

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

2,554

Dexter adds a 4-digit number to a 2-digit number.



The answer is 9,090

	Th	H	T	O
+				
	9	0	9	0

What could Dexter's numbers be?

multiple possible answers, e.g.

$$9,025 + 65$$

$$9,040 + 50$$

$$8,991 + 99$$

Add two 4-digit numbers – more than one exchange

Notes and guidance

Building on the previous small step, children now add two 4-digit numbers with more than one exchange.

The numbers are made using place value counters in a place value chart alongside the formal written method. The addition begins from the smallest value column. After each column is added, ask, “Do you have enough ones/tens/hundreds to make an exchange?” This question is important at every stage as there will be more than one exchange to make. With more than one exchange, it is important to model the correct place to write the number exchanged and to add it to the next column.

Things to look out for

- Children may not line up the digits in the place value columns correctly, especially the digits created by exchanging.
- Children may forget to add from the smallest value column first.
- 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

- How many ones/tens/hundreds/thousands are there in total?
- What is _____ more than _____?
- Does it matter which columns you add together first?
- Do you have enough ones/tens/hundreds to make an exchange?
- How can you make an exchange in more than one column in the same addition?

Possible sentence stems

- _____ ones added to _____ ones is equal to _____ ones.
- _____ plus _____ plus the 1 that I exchanged from the last column is equal to _____
- I have _____ hundreds/tens/ones, so I do/do not need to make an exchange.

National Curriculum links

- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Add two 4-digit numbers – more than one exchange

Key learning

- Nijah uses place value counters to help her work out $4,673 + 1,518$

Th	H	T	O
4	6	7	3
+	1	5	1
<hr/>			
6	1	9	1
1			1

Use Nijah's method to work out the additions.

Th	H	T	O
3	2	7	5
+	6	1	5
<hr/>			

Th	H	T	O
5	9	3	4
+	2	2	4
<hr/>			

Th	H	T	O
1	7	7	2
+	2	2	5
<hr/>			

- Complete the additions.

$4,507 + 1,648$

$4,507 + 674$

$4,507 + 95$

- Jack uses place value counters to work out $1,945 + 1,257$

Th	H	T	O
1	9	4	5
+	1	2	5
<hr/>			
3	2	0	2
1	1	1	

Use Jack's method to work out the additions.

$4,893 + 1,758$

$3,546 + 1,794$

$2,305 + 1,896$

- White Rose FC are playing a football match against Red Rose Rovers.
2,438 fans come to watch White Rose FC.
1,765 fans come to watch Red Rose Rovers.
How many fans come to watch the match altogether?

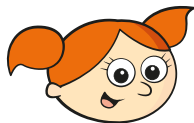
Add two 4-digit numbers – more than one exchange

Reasoning and problem solving

Alex is working out this addition.

	Th	H	T	O
	1	3	6	4
+	1	2	3	7
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I think there will be only one exchange in this calculation because only $4 + 7$ is greater than 9



Is Alex correct?
Explain how you know.



No

Teddy works out $3,218 + 1,354$



	Th	H	T	O
	3	2	1	8
+	1	3	5	4
<hr/>				
			2	

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

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

Rosie and Mo each have some points on a computer game.
Mo has 599 fewer points than Rosie.
Mo has 4,278 points.
How many points do they have altogether?

9,155

Subtract two 4-digit numbers – no exchange

Notes and guidance

In Year 3, children used the formal written method to subtract two 2- or 3-digit numbers with up to two exchanges. In this block, that learning is extended to include 4-digit numbers. In this small step, children subtract up to a 4-digit number from a 4-digit number with no exchanges, using concrete resources as well as the formal written method.

Even though there is no exchanging, children should subtract from the smallest value column first. Before subtracting each column, ask, “Do you have enough ones/tens/hundreds to subtract _____?” If not, an exchange is needed.

Encouraging children to subtract from the “smallest value column” first, rather than referring to it as the “ones column”, will avoid a misconception when decimals are introduced later in the year.

Things to look out for

- When using concrete resources, children may make both numbers, then remove the second one, leaving the first number unchanged.
- Children may not line up the digits in the place value columns correctly, especially when the numbers have different numbers of digits.

Key questions

- How can you show this question using place value counters?
- What is _____ less than _____?
- Does it matter which column you subtract first?
- Do you need to make an exchange?
- Do you have enough ones/tens/hundreds to subtract _____?

Possible sentence stems

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

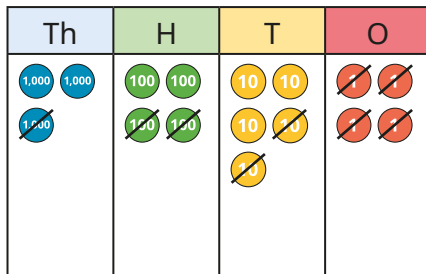
National Curriculum links

- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Subtract two 4-digit numbers - no exchange

Key learning

- Dora uses place value counters to work out $3,454 - 1,224$

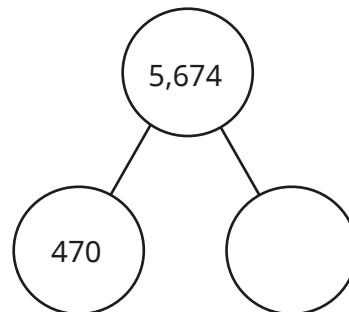
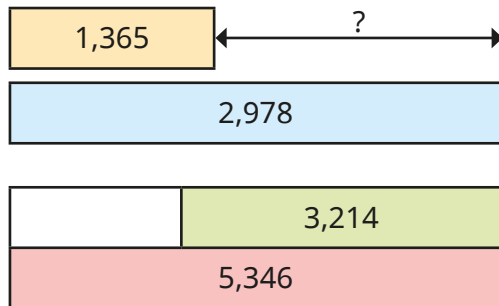


	Th	H	T	O
	3	4	5	4
-	1	2	2	4
	2	2	3	0

Use Dora's method to work out the subtractions.

$4,572 - 2,341$	$7,462 - 7,151$	$6,582 - 582$	$2,348 - 235$
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- Find the missing numbers.



- Use bar models to help you answer each question.

There are 3,597 boys and girls in a school.
2,182 are boys.
How many girls are there?

Car A travels 7,653 miles per year.
Car B travels 5,612 miles per year.
How much further does car A travel than car B per year?

- The mass of a bag of sand is 3,576 g.
1,250 g of sand is poured from the bag.
What is the mass of the bag of sand now?
- Whitney and Amir are at the fair.
At each stall, they can win tickets.

Whitney: I won 3,486 tickets.

Amir: I won 1,413 fewer tickets than Whitney.

How many tickets did Amir win?

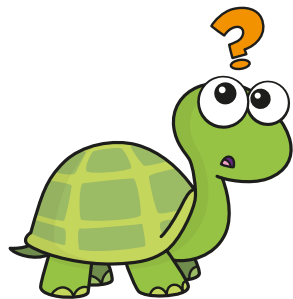
Subtract two 4-digit numbers – no exchange

Reasoning and problem solving

Tiny is working out $3,426 - 1,213$ using place value counters.

Tiny keeps getting 3,426 as the answer.

Th	H	T	O
1,000 1,000	100 100	10 10	1 1
1,000	100 100		1 1
			1 1
1,000	100 100	10	1 1



Explain Tiny's mistake.

Work out the correct answer.

2,213

Fill in the missing digits.

	Th	H	T	O
	9	9	9	9
-			8	
		3		

Compare answers with a partner.

Can you find any more?

for example:

$$9,999 - 3,685 = 6,314$$

$$9,999 - 1,680 = 8,319$$

The mass of a box is 2,479 g.

A teddy bear is 1,305 g lighter than the box.



What is the total mass of the teddy bear and the box?

3,653 g

Subtract two 4-digit numbers – one exchange

Notes and guidance

Building on the previous small step, children subtract up to 4-digit numbers, with one exchange. In Year 3, children subtracted 2- and 3-digit numbers with up to two exchanges.

It is important that children complete the formal written method alongside any concrete manipulatives to support understanding.

Before subtracting each column, ask, “Do you have enough ones/tens/hundreds to subtract _____?” If not, then an exchange is needed.

For this small step, the exchange could take place from the tens, hundreds or thousands, but there is only one exchange per calculation.

Things to look out for

- Children may not line up the digits in the place value columns correctly, especially when the numbers have different numbers of digits.
- Children may find the difference between the two digits in a column instead of subtracting the second digit from the first in order to avoid an exchange, for example $1 - 3$ becomes $3 - 1$

Key questions

- What is _____ less than _____?
- Does it matter which column you subtract first?
- Do you need to make an exchange?
- How can you subtract two numbers if one of them has fewer digits than the other?

Possible sentence stems

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

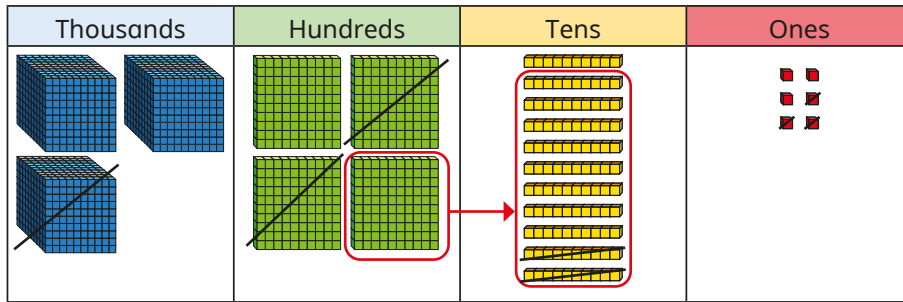
National Curriculum links

- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Subtract two 4-digit numbers - one exchange

Key learning

- Rosie uses base 10 to work out $3,416 - 1,223$



	Th	H	T	O
	3	4	1	6
-	1	2	2	3
	2	1	9	3

Use Rosie's method to help you work out the subtractions.

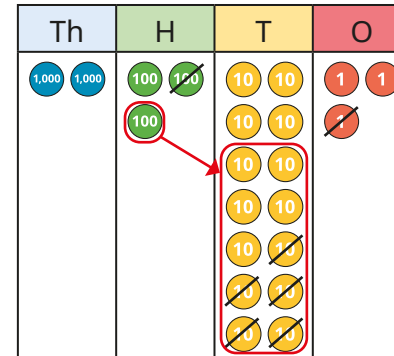
$4,256 - 1,139$	$3,758 - 1,825$	$2,547 - 1,452$
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What is the same and what is different about these subtractions?

- Find the missing numbers.



- Ron uses place value counters to work out $2,343 - 151$



	Th	H	T	O
	2	3	4	3
-		1	5	1
	2	1	9	2

Use place value counters to help you work out the subtractions.

$5,383 - 291$	$3,157 - 523$	$9,458 - 86$
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- Use bar models to help you complete the questions.

Mrs Trent has £3,544
She spends £1,225
How much money does she have left?

Mrs Khan has £1,745
She has £1,239 more than Mr Khan.
How much money does Mr Khan have?

Subtract two 4-digit numbers – one exchange

Reasoning and problem solving

1,235 people go on a school trip.

There are 1,179 children and 27 teachers.

The rest are parents.

How many parents are there?

Explain your method to a partner.



29 parents

Find the missing numbers.

$$\underline{\quad\quad} - 1,345 = 4\underline{\quad}6$$

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?



1,841 (and 9)

1,751 (and 0)

10 possible answers

For each answer, both numbers go up by 10

The subtraction has exactly one exchange.



	Th	H	T	O
	5	6	3	2
-				

What could the missing numbers be if the exchange is in the tens column?

What if the exchange was in another column?

Talk about it with a partner.



various possible answers, e.g.
2,351 and 3,281

various possible answers, e.g.
3,810 and 1,822

Subtract two 4-digit numbers – more than one exchange

Notes and guidance

In this small step, children subtract up to 4-digit numbers with more than one exchange, using the written method of column subtraction.

Children perform subtractions involving two separate exchanges (for example, from the thousands and from the tens) as well as those with two-part exchanges (for example, from the thousands down to the tens if there are no hundreds in the first number). To support understanding, continue solving these subtractions alongside the concrete resources of base 10 and place value counters.

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 for children if they are unsure what each digit represents or where to put it.

Things to look out for

- Children may not line up the digits in the place value columns correctly.
- When exchanging a number, children may put the 1 in the incorrect place.
- 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

- Does it matter which column you subtract first?
- Do you need to make an exchange?
- 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?
- Which column can you exchange from?

Possible sentence stems

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

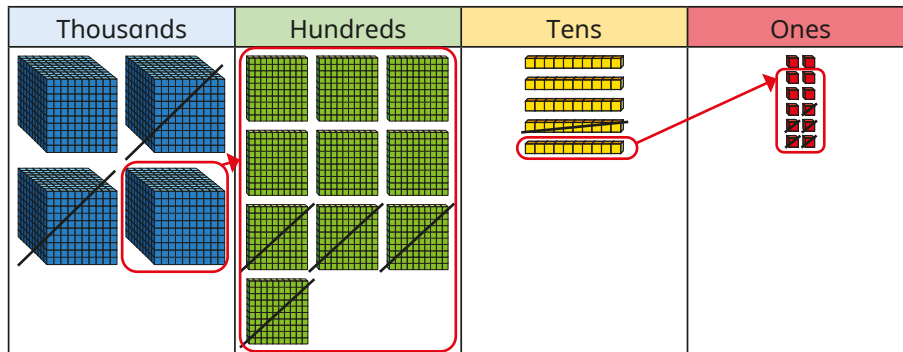
National Curriculum links

- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Subtract two 4-digit numbers – more than one exchange

Key learning

- Tommy uses base 10 to help him work out $4,052 - 2,415$



	Th	H	T	O
	3 4	10	4 5	12
-	2	4	1	5
	1	6	3	7

Use Tommy's method to work out the subtractions.

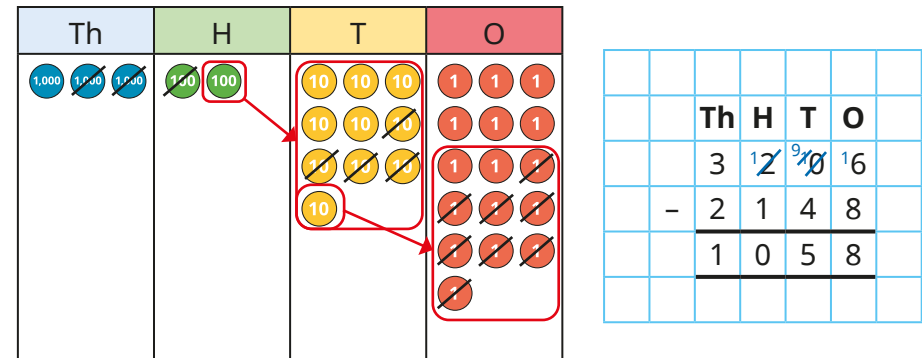
$5,783 - 844$	$6,737 - 759$	$8,252 - 6,560$
---------------	---------------	-----------------

- Mr Jones paid £8,562 for his car.

Mrs Smith paid £6,729 for her car.

How much more did Mr Jones pay for his car than Mrs Smith paid for hers?

- Aisha works out $3,206 - 2,148$ using place value counters.



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

Use Aisha's method to work out the subtractions.

$2,356 - 1,427$	$1,205 - 398$	$2,037 - 889$	$2,037 - 1,589$
-----------------	---------------	---------------	-----------------

- A shop has 8,435 magazines.

It sells 367 in the morning and 579 in the afternoon.

How many magazines are left?

8,435		
367	579	

Explain how you found the answer.

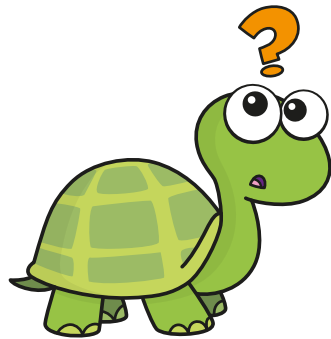
Is there more than one way to solve this problem?

Subtract two 4-digit numbers – more than one exchange

Reasoning and problem solving

Tiny has worked out $3,035 - 1,074$

	Th	H	T	O
	2 3	0	3	5
-	1	0	7	4
	1	0	6	1



Do you agree with Tiny?
Explain your answer.



No

There were 2,114 visitors to a museum on Saturday.



650 more people visited the museum on Saturday than on Sunday.

Altogether, how many people visited the museum over the two days?

What do you need to do first to solve the problem?

3,578

Work out $2,114 - 650$ for the number of visitors on Sunday.

Find the missing 4-digit number.

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

2,753

How did you find the answer?
Is there more than one way?



Efficient subtraction

Notes and guidance

Having explored both mental and written methods of subtraction in this block, the purpose of this small step is to encourage children to make choices about which method is most appropriate for a given calculation. Children can often become reliant on formal written methods, so it is important to explicitly highlight where mental strategies or less formal jottings can be more efficient.

Children explore the concept of constant difference, where adding or subtracting the same amount to/from both numbers in a subtraction means that the difference remains the same, for example $2,832 - 1,999 = 2,833 - 2,000$ or $400 - 193 = 399 - 192$. 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 understanding of this concept.

Things to look out for

- Children may be overly reliant on formal written methods and use them when alternative strategies are more appropriate.
- Children may not adjust both numbers in the subtraction.

Key questions

- Which method do you find easiest? Why?
- Which method is most efficient?
- Can you work this out mentally?
- What does “difference” mean?
- What does the arrow represent? What do you notice about all the arrows?
- Why does adding/subtracting _____ to/from each number make the calculation easier?

Possible sentence stems

- The jump to the next multiple of _____ is _____
- If I add/subtract _____ to/from both numbers, the difference will be the same.

National Curriculum links

- Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate

Efficient subtraction

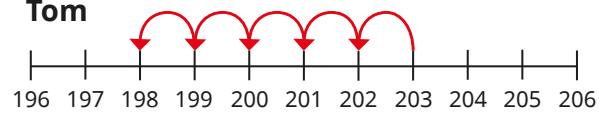
Key learning

- Kim, Tom and Huan are working out $203 - 198$

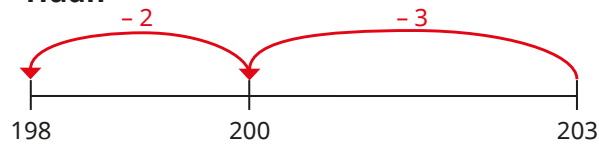
Kim

		H	T	O
		1 2	9 0	1 3
-	1	9	8	
	0	0	5	

Tom



Huan



Whose method do you prefer? Why?

Which is the most efficient method?

Use your preferred method to complete the subtractions.

$9,807 - 9,792$

$809 - 15$

$3,876 - 1,400$

$4,204 - 2,417$

Did you use the same method each time?

- Complete each subtraction.

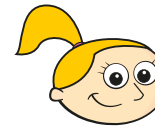
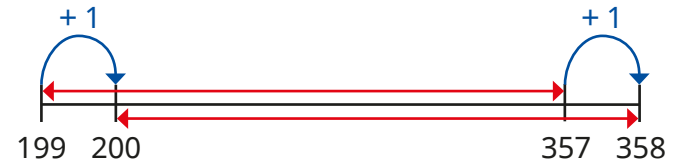
What do you notice?

What stays the same?

What changes?

$6 - 3 = \underline{\quad}$	
$5 - 2 = \underline{\quad}$	
$4 - 1 = \underline{\quad}$	

- Eva is working out $357 - 199$



If I add or subtract the same amount from both numbers, the difference will be the same.

$358 - 200 = 158,$
so $357 - 199 = 158$

Use Eva's method to work out the subtractions.

$3,487 - 999$

$4,407 - 1,399$

$7,643 - 5,098$

- Complete the subtractions.

$300 - 176$

$4,000 - 3,180$

$6,001 - 3,065$

Compare methods with a partner.

Efficient subtraction

Reasoning and problem solving

Dexter is working out $4,387 - 134$



Those numbers are not close together, so I need to use the column method.

	Th	H	T	O
	4	3	8	7
-		1	3	4
<hr/>				

Do you agree with Dexter?

Explain your reasons.

What other methods could Dexter use?

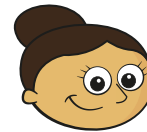


No

Dexter could have used a number line.

As there are no exchanges, he could have done the subtraction mentally.

Dora is working out $500 - 287$



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

	H	T	O
	4	9	9
-	2	8	7
<hr/>			
	2	1	2

What mistake has Dora made?

What is the correct answer?

How else could you work out $500 - 287$?

Dora needed to subtract 1 from both numbers.

213

e.g. $499 - 287 = 212$,
 $212 + 1 = 213$
 number lines

Estimate answers

Notes and guidance

In Year 3, children explored the idea of estimating without explicitly using the language of rounding. Now that children have covered rounding in Autumn Block 1, they are familiar with the language of “rounding to the nearest _____”. In this small step, children estimate by rounding to the nearest ten, hundred and thousand. Number lines are a useful representation to support this understanding.

Discuss why estimates are important, particularly in real-life situations such as population statistics. They 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. It is important to discuss whether an actual answer will be greater or less than an estimate. For example, $333 + 524$ may be estimated as $300 + 500$, and the precise answer will be greater than the estimate because both the numbers were rounded to the previous multiple.

Things to look out for

- Children may find it difficult to decide which multiple to round to.
- 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?
- Which calculation is easier/quicker to perform? Why?
- Why do we use estimates?
- Is the estimate less than or greater than the actual answer? Why?

Possible sentence stems

- _____ is closer to _____ than _____
- So _____ rounded to the nearest _____ is _____
- The estimate will be _____ than the actual answer because ...

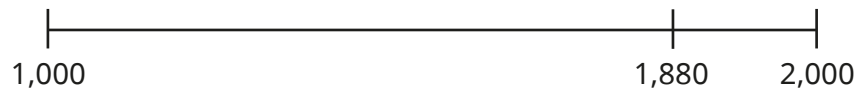
National Curriculum links

- Estimate and use inverse operations to check answers to a calculation

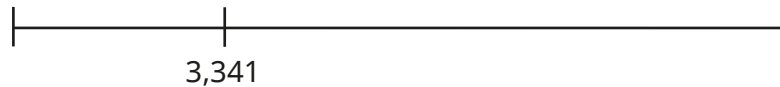
Estimate answers

Key learning

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



1,880 rounded to the nearest thousand is _____



3,341 rounded to the nearest thousand is _____

Use the rounded amounts to estimate $3,341 - 1,880$

Use column subtraction to work out the actual answer.

- Write $<$ or $>$ to complete the statements.

$436 \bigcirc 400$

$327 + 436 \bigcirc 327 + 400$

$3,838 \bigcirc 4,000$

$8,000 - 3,838 \bigcirc 8,000 - 4,000$

$1,132 \bigcirc 1,100$

$4,000 - 1,132 \bigcirc 400 - 1,100$

What do you notice?

- Annie and Tommy are estimating the answer to $3,219 + 5,624$

Annie: I am going to estimate by rounding each number to the nearest thousand.

Tommy: I am going to round to the nearest hundred because I will still be able to add those numbers in my head.


Use Annie and Tommy's methods to estimate the answer.
 Now work out the actual answer using column addition.
 Whose estimate was more accurate? Why?


- Mrs Lee has £5,000 in her bank account.
 A TV costs £1,328
 A car costs £3,889
 Estimate whether Mrs Lee can afford to buy both the television and the car.
 Does your answer change if you round to a different amount?


Estimate answers

Reasoning and problem solving

The children are estimating the answer to $4,502 - 1,414$

 $4,000 - 1,000 = 3,000$
 Jack

 $4,500 - 1,400 = 3,100$
 Ron

 $5,000 - 1,000 = 4,000$
 Sam

Ron and Sam

Sam's

Ron's

Which children have rounded correctly?

What mistake has been made?

Whose calculation was easiest?

Whose estimate was most accurate?



The estimated answer to a calculation is 3,400



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

What could the original calculation be?

multiple possible answers, e.g.

$$2,343 + 1,089$$

$$4,730 - 1,304$$

Roll a 6-sided dice eight times.

Write each number in one of the boxes.

Now work out your addition.

	Th	H	T	O
+				

Compare answers as a class.

Compete against a partner. Who can get an answer closest to 5,000?

Checking strategies

Notes and guidance

In this small step, children explore the inverse relationship between addition and subtraction. From learning in earlier years, children know that addition and subtraction are inverse operations and they should also be aware that addition is commutative and subtraction is not.

Bar models and part-whole models are useful representations to help establish families of facts that can be found from one calculation. Children use inverse operations to check the accuracy of their calculations, rather than simply redoing the same calculation and potentially repeating the same error.

Estimations can be used alongside inverse operations as an alternative checking strategy.

Things to look out for

- Children may subtract a part from a part rather than a part from the whole, for example writing $240 - 130$ as the inverse of $240 + 130$
- When asked to check an answer, children may just repeat the same calculation instead of using the inverse operation.

Key questions

- What are the parts? What is the whole?
- Given one fact, what other facts can you write?
- What does “inverse” mean?
- What is the inverse of add/subtract _____?
- Is addition/subtraction commutative?

Possible sentence stems

- The inverse of _____ is _____
- If _____ is a part and _____ is a part, then _____ is the whole.
- If _____ is the whole and _____ is a part, then _____ is the other part.
- To check I have added/subtracted _____ correctly, I need to _____

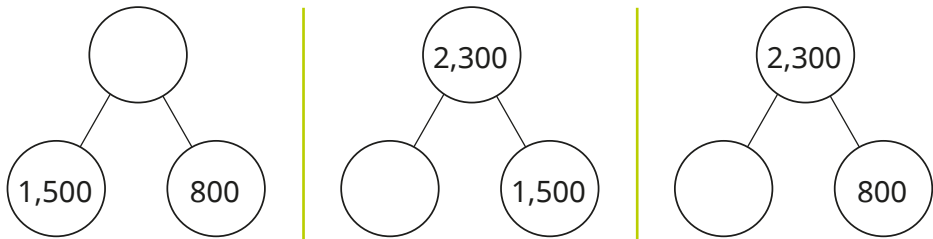
National Curriculum links

- Estimate and use inverse operations to check answers to a calculation

Checking strategies

Key learning

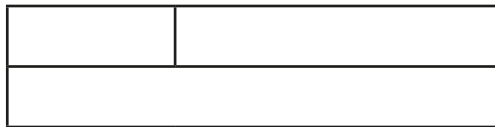
- Complete the part-whole models and number sentences.



$1,500 + 800 = \underline{\hspace{2cm}}$
 $2,300 - 1,500 = \underline{\hspace{2cm}}$
 $2,300 - 800 = \underline{\hspace{2cm}}$

How could you check your answers?

- Complete the bar model for $3,582 - 2,236 = 1,346$



Use the bar model to write the fact family.

- Which subtractions can be used to check the addition $1,574 + 3,432 = 5,006$?

$5,006 - 3,432$
 $5,006 - 1,574$
 $3,432 - 1,574$
 $1,574 - 5,006$

- Which additions can be used to check the subtraction $3,265 - 823 = 2,442$?

$3,265 + 823$
 $823 + 2,442$
 $3,265 + 2,442$
 $2,442 + 823$

- Use an inverse operation to check each calculation.

How many different inverse calculations can you do for each?

		Th	H	T	O
		4	5	1	9
	+		7	2	3
		5	2	4	2
		1		1	

		Th	H	T	O
		3	4 ¹	6	4
	-	1	4	8	4
		2	0	8	0

- Dani has answered a problem.

Mr Rose has £2,358 in his bank account.
 He spends £1,209 on a family holiday.
 How much does he have left? £ 1,049

Estimate to check Dani's answer.

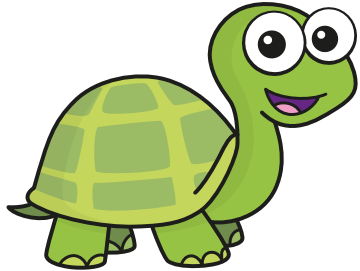
Now use an inverse calculation to check if Dani's answer is correct.

Checking strategies

Reasoning and problem solving

$$627 + \square = 943$$

I think the answer is 1,570



Show by estimating that Tiny has made a mistake.

What mistake has Tiny made?

Find the correct answer.

Complete an inverse operation to check your answer.



various possible estimates, e.g.

$$600 + 300 = 900$$

$$900 - 600 = 300$$

$$627 + 316 = 943$$

Tiny is completing some statements.

Check Tiny's answers.

Do you need to work out the answers or can an estimate help you decide whether Tiny is correct?

$$55 + 28 = \square - 13$$

$$55 - 28 = 13 + \square$$

$$28 + \square > 55 - 13$$

$$28 + 13 < 55 - \square$$

Find the correct answers.

Is there more than one possible answer for any of the statements?



Compare strategies as a class.

96

14

any number greater than 14

any number between 0 and 13