

Maths Calculation Policy

Reviewed September 2021

www.voyage-education.org



In Year 1, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships. Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Represent and use number bonds and related subtraction facts within 20
- Add one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving addition (+) and equals (=) signs
- Solve one-step problems that involve addition using concrete objects and pictorial representations, and missing number problems such as 7 = ? + 3

Non-statutory requirements:

- Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, 9 + 7 = 16; 16 - 7 = 9; 7 = 16 - 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.
- Pupils combine and increase numbers, counting forwards and backwards.
- They discuss and solve problems in familiar practical contexts, including using quantities.
 Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.

Concrete

Combining two parts to make a whole.









N.B. A range of objects and other manipulatives should also be used here e.g. teddies, stones, counters, sticks.

Counting on - *using cubes, numicon, bead strings etc.*

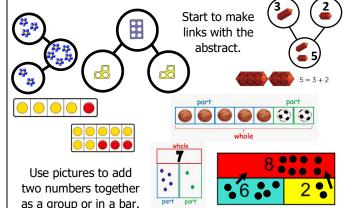
Start with the larger number then count on using the

smaller number 1 by 1 to find the answer.

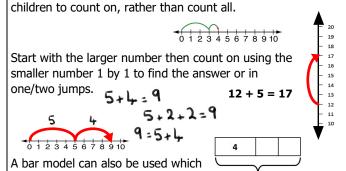
As you progress here, start to make links with the pictorial.

Pictorial

Combining two parts to make a whole.



Counting on - use a numberline which encourages the



Abstract

Combining two parts to make a whole.



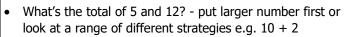
5 is a part, 2 is a part and the whole is 7.

Use the part whole diagram to move towards the abstract.

$$3 + 7 = 10$$
 $9 = 8 + 1$

Counting on - the abstract number line:

- What is 5 more than 9?
- What is the sum of 5 and 5?
- What's the total of 12 and 3?



Place the larger number in your head and count on with the smaller number to find your answer.

Lead on to questions such as this:

• 5 + ? = 8 What do we add to 5 to make 8?

Key Vocabulary:

add, addition, more, plus, increase, sum, total, altogether, difference, same as, equals, sign, units/ones, inverse, how many more to make ...?, is the same as, combine, exchange

encourages children to count on.



Look at the previous learning and recap where appropriate.

In Year 1, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships. Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

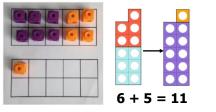
- Represent and use number bonds and related subtraction facts within 20
- Add one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving addition (+) and equals (=) signs
- Solve one-step problems that involve addition using concrete objects and pictorial representations, and missing number problems such as 7 = ? + 3

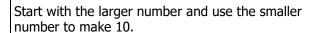
Non-statutory requirements:

- Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, 9 + 7 = 16; 16 - 7 = 9; 7 = 16 - 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.
- Pupils combine and increase numbers, counting forwards and backwards.
- They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.

Concrete

Regrouping to make 10 - using ten frames, counters/cubes, Base 10 or using Numicon.



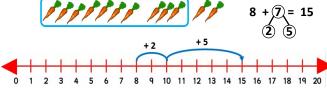


Pictorial

Regrouping to make 10 - children to draw the ten



ters/cubes.
Use pictures or a number line. Regroup or partition the smaller number to make 10 e.g. 7 + 5becomes 7 + 3 + 2 = 12.



Abstract

Regrouping to make 10

8 + 6 = 14

If I am at eight, how many more do I need to make 10? How many more do I add on now

Children to develop an understanding of equality e.g.

$$6 + \square = 11$$

$$6 + \Box = 11$$
 $6 + 5 = 5 + \Box$

$$6 + 5 = \square + 4$$

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 2, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships. Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- Add numbers mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit numbers
- Add numbers using concrete objects and pictorial presentations, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three
- · Show that addition of two numbers can be done in any order
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
- · Solve problems with addition using concrete objects and pictorial representations, including those involving numbers, quantities and measures

Non-statutory requirements:

- Pupils extend their understanding of the language of addition and subtraction to include sum and difference.
- Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10: 10 - 7 = 3 and 7 = 10 - 3 to calculate 30 + 70 = 100: 100 - 70= 30 and 70 = 100 - 30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, 5 + 2 +1=1+5+2=1+2+5). This establishes commutativity and associativity of addition.

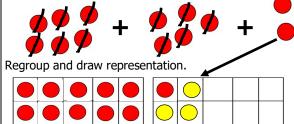
Abstract

 Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

Concrete Adding three single digits Adding three single digits Makes 10

Combine to make 10 first if possible, or bridge 10 then add third digit. 10 and two more makes 12.

Pictorial



Then add the three more (shown in a different colour here). N.B. Children may not need to draw a tens frame here.

Adding three single digits

Combine the two numbers that make/bridge ten then add on the third.

$$4 + 7 + 6 = 10 + 7$$
 $10 = 17$

Before this stage ensure that the children are confident at using a range of manipulatives to add numbers before using a place value grid; they should be confident in grouping tens and ones e.g. 34 + 5 = 39(34 is 3 tens and 4 ones. 4 ones and 5 ones are 9 ones. The total is 3 tens and 9 ones.)

23 + 5No exchange

Step 1:

· Make the calculation.

Step 2:

· Combine all the ones. There are 8 ones.

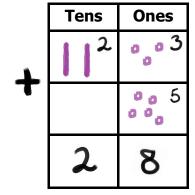
Step 3:

. Move the tens down. There are 2 tens.

Step 4:

• There are 2 tens and 8 ones (28). 23 + 5 = 8

Tens Ones **a a** 23 + 5No exchange



23 + 5No exchange

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 2, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships. Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- Add numbers mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit numbers
- Add numbers using concrete objects and pictorial presentations, including; a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one
- · Show that addition of two numbers can be done in any order
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
- · Solve problems with addition using concrete objects and pictorial representations, including those involving numbers, quantities and measures

Non-statutory requirements:

- Pupils extend their understanding of the language of addition and subtraction to include sum
- Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10: 10 - 7 = 3 and 7 = 10 - 3 to calculate 30 + 70 = 100: 100 - 70 =30 and 70 = 100 - 30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, 5 + 2 + 1 = 1 + 5 + 2= 1 + 2 + 5). This establishes commutativity and associativity of addition.
- Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

Concrete **Pictorial Abstract** 23 + 923 + 923 + 9Tens Ones **Tens** Ones **Exchanging ones Exchanging ones Exchanging ones** Step 1: Make the calculation. Step 2: Combine all the ones. Step 3: • Exchange 10 ones for a 10. The 10 must go in the tens column. Step 4: Combine all the tens. There are 10 ones three tens. Step 5: exchanged There are 3 tens and 2 ones (32). for 1 ten. 23 + 9 = 3234 + 2034 + 2034 + 20Ones Tens Tens Ones Adding multiples of 10 only -Adding multiples of 10 only -Adding multiples of 10 only not bridging a 100 not bridging a 100 not bridging a 100 00 Step 1: **a** Make the calculation. Step 2: Move the ones down. There are 4 or Step 3: • Combine all the tens. There are 5 tens. Step 4: • There are 5 tens and 4 ones (54). 34 + 20 = 54

Key Vocabulary:



Look at the previous learning and recap where appropriate.

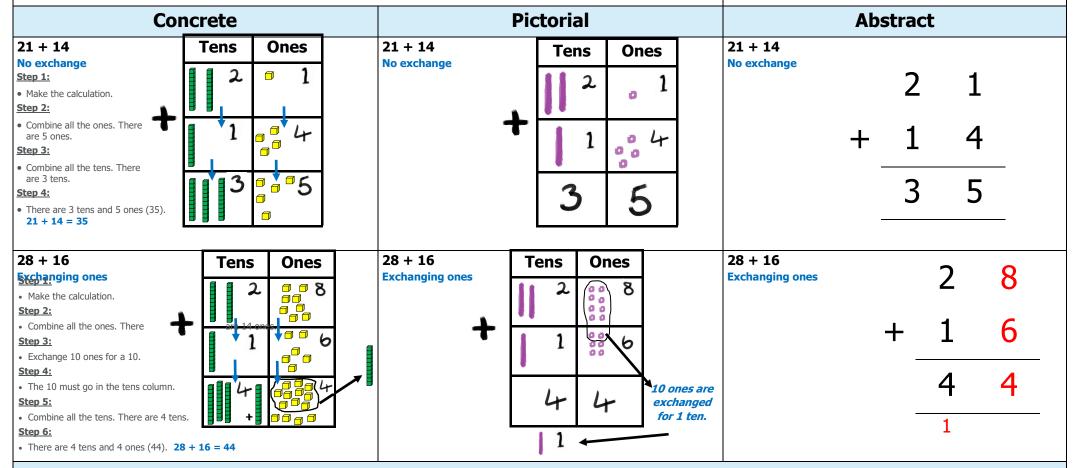
In Year 2, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships. Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- · Add numbers mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit numbers
- Add numbers using concrete objects and pictorial presentations, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-
- · Show that addition of two numbers can be done in any order
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
- · Solve problems with addition using concrete objects and pictorial representations, including those involving numbers, quantities and measures

Non-statutory requirements:

- Pupils extend their understanding of the language of addition and subtraction to include
- Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10; 10 - 7 = 3 and 7 = 10 - 3 to calculate 30 + 70 = 100; 100 - 70= 30 and 70 = 100 - 30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, 5 + 2 + 1= 1 + 5 + 2 = 1 + 2 + 5). This establishes commutativity and associativity of addition.
- Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.



Kev Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

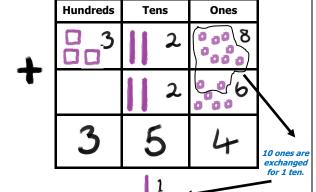
- Add numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds
- Add numbers with up to three digits, using formal written methods of columnar addition
- Estimate the answer to a calculation and use inverse operations to check answers
- Solve problems, including missing number problems, using number facts, place value, and more complex addition.

Non-statutory requirements:

- Practise solving varied addition questions. For mental calculations with two-digit numbers, the answers could exceed 100.
- Use understanding of place value and partitioning, and practise using columnar addition with increasingly large numbers up to three digits to become fluent.

Concrete **Pictorial Abstract** 321 + 14321 + 14321 + 14No exchange No exchange No exchange **Hundreds** Ones Tens Hundreds Tens Ones Step 1: · Position the counters on the grid. Step 2: 10 · Combine the ones. Combine the tens. Combine the hundreds. 04 Step 3: • There are 3 hundreds, 3 tens and 5 ones (335). 321 + 14 = 335 328 + 26328 + 26328 + 26**Exchanging ones Exchanging ones Exchanging ones** Hundreds Tens Ones Step 1: Hundreds Tens Ones · Position the counters on the grid. Step 2:

Combine all the ones. Exchange 10 ones for a 10. The 10 must go in the tens column. Step 4: Combine all the tens. Step 5: Combine the hundreds. Step 6: There are 3 hundreds, 3 tens and 5 ones (335).



	3	2	8
+		2	6
_	3	5	4
_		1	

Key Vocabulary:

321 = 14 = 335



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method. Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Add numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds
- Add numbers with up to three digits, using formal written methods of columnar addition
- Estimate the answer to a calculation and use inverse operations to check answers
- Solve problems, including missing number problems, using number facts, place value, and more complex addition.

Non-statutory requirements:

Exchanging ones and tens

- Practise solving varied addition guestions. For mental calculations with two-digit numbers, the answers could exceed 100.
- Use understanding of place value and partitioning, and practise using columnar addition with increasingly large numbers up to three digits to become fluent.

Concrete Pictorial Abstract 371 + 54371 + 54371 + 54**Hundreds** Tens Ones **Exchanging tens Exchanging tens Exchanging tens** Hundreds **Tens** Ones Step 1: Position the counters on the grid. Step 2: · Combine the ones. Step 3: 0 · Combine the tens. 04 Step 4: 10 tens are • Exchange 10 tens for 100. The 100 exchanged for must go in the hundreds column. 1 hundred. Step 5: · Combine the hundreds. Step 6: There are 4 hundreds, 2 tens and 5 ones. 317 + 54 = 425368 + 44368 + 44

368 + 44

Exchanging ones and tens

Step 1:

· Position the counters on the grid.

Step 2:

 Combine all the ones. Exchange 10 ones for a 10. The 10 must go in the tens column.

Step 3:

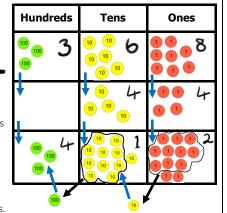
• Combine all the tens. Exchange 10 tens for a 100. The 100 must go in the hundreds column.

Step 5:

· Combine the hundreds.

Step 6:

· There are 4 hundreds, 1 ten and 2 ones. 368 + 44 = 412



Exchanging ones and tens Tens Hundreds Ones 10 tens are exchanged for 1 hundred. 10 ones are exchanged for 1 ten.

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Add numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds
- Add numbers with up to three digits, using formal written methods of columnar addition
- Estimate the answer to a calculation and use inverse operations to check answers
- Solve problems, including missing number problems, using number facts, place value, and more complex addition.

Non-statutory requirements:

- Practise solving varied addition questions. For mental calculations with two-digit numbers, the answers could exceed 100.
- Use understanding of place value and partitioning, and practise using columnar addition with increasingly large numbers up to three digits to become fluent.

Pictorial Concrete Abstract 371 + 224371 + 224371 + 224No exchange No exchange No exchange Hundreds **Tens** Ones **Hundreds** Tens Ones Step 1: · Position the counters on the grid. Step 2: · Combine the ones. Step 3: · Combine the tens. Step 4: 0 Combine the hundreds. Step 5: • There are 5 hundreds, 9 tens and 5 ones. **371** + **224** = **425** 321 + 149321 + 149321 + 149**Exchanging ones Exchanging ones Exchanging ones Hundreds** Tens Ones Step 1: Hundreds Tens Ones · Position the counters on the grid. Step 2: · Combine all the ones. • Exchange 10 ones for a 10. • The 10 must go in the tens column. Step 3: 000 · Combine all the tens. Step 4: · Combine the hundreds. Step 5: • There are 4 hundreds, 7 tens and 10 ones are exchanged 0 ones. 321 + 149 = 412for 1 ten.

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Add numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds
- Add numbers with up to three digits, using formal written methods of columnar addition
- Estimate the answer to a calculation and use inverse operations to check answers
- Solve problems, including missing number problems, using number facts, place value, and more complex addition.

Non-statutory requirements:

- Practise solving varied addition questions. For mental calculations with two-digit numbers, the answers could exceed 100.
- Use understanding of place value and partitioning, and practise using columnar addition with increasingly large numbers up to three digits to become fluent.

Concrete Pictorial Abstract 371 + 278371 + 278371 + 278Hundreds **Tens** Ones **Exchanging tens Exchanging tens** Hundreds **Tens** Ones **Exchanging tens** Step 1: · Position the counters on the grid. Step 2: · Combine the ones. Step 3: 0 0 · Combine the tens. 000 Step 4: O 0 • Exchange 10 tens for 100. The 100 10 tens are must go in the hundreds column. exchanged for 1 hundred. Step 5: a 6 · Combine the hundreds. Step 6: • There are 4 hundreds, 2 tens and 5 ones. 317 + 54 = 425368 + 345368 + 345368 + 345**Exchanging ones and tens Exchanging ones and tens Exchanging ones and tens** Hundreds Tens Ones Step 1: Hundreds **Tens** Ones · Position the counters on the grid. Step 2: Combine all the ones. Exchange 10 ones for a 10. The 10 must go in the tens column. Step 3: Combine all the tens. Exchange 10 tens for a 100. The 100 must go in the hundreds column. Step 4: 10 tens are · Combine the hundreds. exchanged for 1 hundred. Step 5: exchanged • There are 7 hundreds, 1 ten and 3 ones.

Key Vocabulary:

368 + 345 = 713



Look at the previous learning and recap where appropriate.

Throughout Year 4, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Add numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- Estimate and use inverse operations to check answers to a calculation
- Solve addition two-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils continue to practise both mental methods and columnar addition with increasingly large numbers to aid fluency.
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers.

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers. This section is split into stages of progression.

							у р						
234 + 54				STAGE 2 - 6 Exchanging of	239 + 54 ones	•			STAGE 3 - 6 Exchanging	5272 + 54 tens	4		
6	2	3	4		6	2	3	9		6	2	7	2
		5	4	+			5	4	+			5	4
6	2	8	8		6	2	9	3		6	2	2	6
							1				1		
278 + 54 nes and te	ens			STAGE 5 - 6 No exchange	415 + 15	54			STAGE 6 - 6 Exchanging	5415 + 19 ones	54		
6	2	7	8		6	4	1	5		6	4	2	6
		5	4	+		1	5	4	+		1	5	4
6	3	3	2		6	5	6	9	_	6	5	8	0
	1	1										1	
	6 278 + 54 nes and te	6 2 6 2 278 + 54 nes and tens 6 2	6 2 3 5 5 6 2 8 5 5 6 3 3	6 2 3 4 5 4 6 2 8 8 278 + 54 nes and tens 6 2 7 8 5 4 6 3 3 2	STAGE 2 - 6 Exchanging of STAGE 2 - 6 Exchanging of STAGE 2 - 6 Exchanging of STAGE 5 - 6 8 8 8 8 8 8 8 8 8 8 8 8 8	STAGE 2 - 6239 + 54 6 2 3 4 6 5 4 + 6 2 8 8 STAGE 5 - 6415 + 15 No exchange 6 3 3 2 6 4 6	STAGE 2 - 6239 + 54 6 2 3 4	STAGE 2 - 6239 + 54 6 2 3 4 5 4 6 2 8 8 6 2 9 1 278 + 54 nes and tens 6 2 7 8 5 4 6 3 3 2 STAGE 5 - 6415 + 154 No exchange 6 4 1 5 4 6 5 6	STAGE 2 - 6239 + 54 6 2 3 4 5 4 6 2 8 8	6 2 3 4 6 2 3 9 + 54 4 6 2 9 3 4 6 2 7 8 6 4 1 5 4 6 3 3 2 6 5 6 9	STAGE 2 - 6239 + 54 Exchanging ones STAGE 3 - 6272 + 5	STAGE 2 - 6239 + 54 6 2 3 4 6 2 3 9 6 2 4 6 2 8 8	STAGE 2 - 6239 + 54 Exchanging ones STAGE 3 - 6272 + 54 Exchanging tens

Key Vocabulary:



Look at the previous learning and recap where appropriate.

Throughout Year 4, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Add numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- Estimate and use inverse operations to check answers to a calculation
- Solve addition two-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils continue to practise both mental methods and columnar addition with increasingly large numbers to aid fluency.
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers.

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers.

This section is split into stages of progression.

STAGE 7 - 62 Exchanging to		ŀ			STAGE 8 - 6 Exchanging h		4			STAGE 9 - Exchanging				
	6	2	4	5		6	2	2	5		6	2	7	8
+		3	7	4	+		8	7	4	+		3	7	4
-	6	6	1	9		7	0	9	9		6	6	5	2
		1				1						1	1	
STAGE 10 - 6	270 ± 01													
Exchanging of	nes and hu	L4 indreds			STAGE 11 - Exchanging t	6273 + 8 ens and h	64 undreds			STAGE 12 - Exchanging			eds	
Exchanging of	nes and hu	indreds 2	7	8	STAGE 11 - Exchanging t	6273 + 8 ens and h	64 undreds	7	3				eds 2	6
Exchanging of	nes and hu	2 8	7 1	8	STAGE 11 - Exchanging t	ens and h	64 undreds 2	7 6	3 4		ones, tens		2 8	6 4
Exchanging of	6 7	ndreds 2	7 1 9	8 4 2	STAGE 11 - Exchanging t	ens and h	undreds 2	7 6 3	3 4 7		ones, tens		2	6 4 0

Key Vocabulary:



Look at the previous learning and recap where appropriate.

Throughout Year 4, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

STAGE 13 - 6147 + 2352

STAGE 16 - 6547 + 2942

Exchanging hundreds

- · Add numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- Estimate and use inverse operations to check answers to a calculation
- Solve addition two-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

STAGE 15 - 6147 + 2372

Exchanging ones and hundreds

- Pupils continue to practise both mental methods and columnar addition with increasingly large numbers to aid fluency.
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers.

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers. This section is split into stages of progression.

1 4 7 + 2 3 5 2 8 4 9 9

Exchanging t	ens				
	6	1	4	7	
+	2	3	7	2	
-	8	5	1	9	
_		1			
STAGE 18 -	6547 + 2	2724	•		

	6	5	4	7	
+	2	7	2	4	
_	9	2	7	1	
_	1		1		

Key Vocabulary:

add, addition, more, plus, increase, sum, total, altogether, difference, same as, equals, sign, units/ones, inverse, how many more to make ...?, is the same as, combine, exchange

Exchanging ones and tens



Look at the previous learning and recap where appropriate.

Throughout Year 4, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Add numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- Estimate and use inverse operations to check answers to a calculation
- · Solve addition two-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils continue to practise both mental methods and columnar addition with increasingly large numbers to aid fluency.
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers.

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers.

This section is split into stages of progression.

STAGE 19 - 6 Exchanging te	157 + 29 ns and hu	982 Indreds			STAGE 20 - Exchanging	6657 + 2	2984		10910331011	
	6	1	5	7		6	6	5	7	
+	2	9	8	2	+	2	9	8	4	
-	9	1	3	9		9	6	4	1	
-	1	1				1	1	1		

Key Vocabulary:



Look at the previous learning and recap where appropriate.

Throughout Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Add numbers mentally with increasingly large numbers
- Add and whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve addition multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (e.g. 12462 - 2300 = 10162).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers. This costion is culit into stores of myonyosis w

				nis sec	tion is s	spiit into	stages or progression	n.					
Stage 1: 5 digit + 3 digit Suggested order of teaching: • no exchanges • one exchange • two exchanges • three exchanges	+	TTh	Th	H H	T T	O O	Stage 2: 5 digit + Suggested order of no exchanges one exchange two exchanges three exchanges four exchanges	_	Th Th	H H	T T	O O	
Stage 3: 5 digit + 5 digit Suggested order of teaching: no exchanges							Stage 4: 6 digit +	_					

- one exchange
- two exchanges
- three exchanges
- four exchanges

ıın	ın	Н	l	O
· TTh	Th	Н	Т	0

- no exchanges
- one exchange
- two exchanges
- three exchanges

	HTh TTh	Th	Η	Т	0
+			Н	Т	Ο

Key Vocabulary:



Look at the previous learning and recap where appropriate.

Throughout Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Add numbers mentally with increasingly large numbers
- Add and whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve addition multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (e.g. 12462 - 2300 = 10162).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers. This section is split into stages of progression.

					•	3 . 3
Stage 5: 6 digit + 4 d	igit					Stage 6: 6 digit + 5 digit
Suggested order of teac no exchanges	hing:					Suggested order of teaching: • no exchanges
 one exchange two exchanges three exchanges four exchanges 	HTh T	h Th Th	H	T	0	 one exchange two exchanges three exchanges four exchanges five exchanges HTh TTh Th H T O TTh Th H T O
Stage 7: 6 digit + 6 d	igit					

Suggested order of teaching:

- no exchanges
- one exchange
- two exchanges
- three exchanges
- four exchanges
- five exchanges

HTh TTh + HTh TTh Th

Key Vocabulary:



Look at the previous learning and recap where appropriate.

Throughout Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Add numbers mentally with increasingly large numbers
- Add and whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- · Solve addition multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

STAGE 3 - 2.34 + 4.45

STAGE 6 - 2.34 + 0.99

Exchanging tenths and hundredths

- Pupils practise using the formal written methods of columnar addition with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (e.g. 12 462 2300 = 10 162).

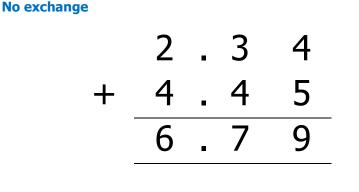
Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers.

This section is split into stages of progression.

STAGE 2 - 2.3 + 1.8

STAGE 5 - 2.34 + 4.8

Exchanging tenths



Key Vocabulary:



Look at the previous learning and recap where appropriate.

Throughout Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

STAGE 7 - 62.3 + 24.4

STAGE 10 - 69.2 + 20.9

Exchanging tenths and ones

- Add numbers mentally with increasingly large numbers
- Add and whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- . Solve addition multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

STAGE 9 - 69.2 + 29

STAGE 12 - 62.34 + 10.48

Place

- Pupils practise using the formal written methods of columnar addition with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (e.g. 12462 - 2300 = 10162).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers. This section is split into stages of progression.

STAGE 8 - 62.9 + 20.7

STAGE 11 - 62.34 + 24

No exchange

Exchanging	ones				Place
	6	9		2	holder needed
+	2	9	•	0	here. Make sure this is
_	6	8		9	addressed through
_	1				teaching.

Exchanging hundredth	15				
	6	2	. 3	4	
+	1	0	. 4	8	
·	8	6	. 8	2	•
-			1		

Key Vocabulary:



Look at the previous learning and recap where appropriate.

Throughout Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Add numbers mentally with increasingly large numbers
- Add and whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- · Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- · Solve addition multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (e.g. 12 462 2300 = 10 162).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers. This section is split into stages of progression.

STAGE 13 - 62.3 + 24.07

Exchanging tenths

STAGE 14 - 62.9 + 1.8

Exchanging hundredths and tenths

STAGE 15 - 2.34 + 4.45

Exchanging hundredths, tenths and ones

STAGE 16 including:

- no exchange
- one exchange
- two exchanges
- three exchanges

O . t

Н

STAGE 17 including:

- no exchange
- one exchange
- two exchanges
- three exchanges

STAGE 18 including:

- no exchange
- one exchange
- two exchanges
- three exchangesfour exchanges

Key Vocabulary:



Look at the previous learning and recap where appropriate.

Throughout Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Add numbers mentally with increasingly large numbers
- Add and whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve addition multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (e.g. 12 462 – 2300 = 10 162).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers.

This section is split into stages of progression.

STAGE 19 including:

- no exchange
- one exchange
- two exchanges
- three exchanges
- four exchanges
- five exchanges

	Th	Н	Т	0	•	t	h
+	Th	Н	Т	0	•	t	h
	Th	Н	T	0		t	h

STAGE 20 including:

- no exchange
- one exchange
- two exchanges
- three exchanges
- four exchanges
- five exchanges

TTh Th	Н	Т	O	•	t
+ TTh Th	Н	Т	0	•	t
TTh Th	Н	Т	0	•	t

Key Vocabulary:



Pupils practise addition for larger numbers, using the formal written methods.

Non-statutory requirements:

Look at the previous learning and recap where appropriate thus developing the Year 5 experiences. Throughout Year 6, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

Perform mental calculations, including with mixed operations and large numbers They undertake mental calculations with increasingly large numbers and more Solve problems involving addition, including multi-step problems in contexts, deciding which operations and methods to use and why complex calculations. Pupils round answers to a specified degree of accuracy, e.g. to the nearest 10, 20, 50 etc., but not to a specified number of significant figures. Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy Solve addition multi-step problems in contexts, deciding which operations and methods to use and why Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and $(2 + 1) \times 3 = 9$. Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals. This section is split into stages of progression. STAGE 1: whole numbers with the same number of places **STAGE 2:** whole numbers with a different number of places **STAGE 3:** decimal numbers with the same number of places No exchange, one exchange, multiple exchanges No exchange, one exchange, multiple exchanges No exchange, one exchange, multiple exchanges E.g. maximum expectation shown below (though can go E.g. maximum expectation shown below though second E.g. maximum expectation shown below (though can go into 10 million) number can be any number up to and into the HTh into 10 million) and only up to thousandths) HTh TTh Th H HTh HTh TTh Th H STAGE 4: decimal numbers with a different number of STAGE 4: decimal numbers with a different number of STAGE 4: decimal numbers with a different number of places places places No exchange, one exchange, multiple exchanges No exchange, one exchange, multiple exchanges No exchange, one exchange, multiple exchanges E.a 1 E.a 2 **E.g 3** HTh TTh Th H Н 0TTh Th Н N.B. you can go up to a million and up to thousandths N.B. you can go up to a million and up to thousandths N.B. you can go up to a million and up to thousandths

Kev Vocabulary:

National Curriculum statutory requirements:



Look at the previous learning and recap where appropriate.

In Year 1, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships. Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Represent and use number bonds and related subtraction facts within 20
- Subtract one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs
- Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as

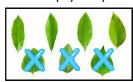
Non-statutory requirements:

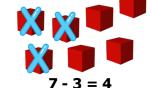
- Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, 9 + 7 = 16; 16 - 7 = 9; 7 = 16 - 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.
- Pupils combine and increase numbers, counting forwards and backwards.
- They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.

Concrete

Taking away by removing objects (within 10)

N.B. Children to physically remove the objects not cross out.





3 less than 7 is 4

7 subtract 3 is 4

A range of objects and other manipulatives should also be used here e.g. teddies, stones, counters, sticks.

As you progress here, start to make links with the pictorial.

Pictorial

Taking away by removing objects (within 10)

Children to draw and cross out representations to show taking





3 less than 8 is 5









Begin to use a bar model to show these representations also.

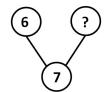




Abstract

Taking away by removing objects (within 10)





Counting back (within 10) - using cubes, numicon, bead strings etc.









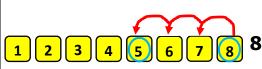






Counting back (within 10) - do this pictorially and through the use a numberline. Counting back in ones.





Counting back (within 10)

Put 9 in your head and count back 4.

What number are you at?

$$9 - 4 = ?$$



Move the beads along the bead string as you count backwards.

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 1, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Represent and use number bonds and related subtraction facts within 20
- Subtract one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs
- Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? -9

Non-statutory requirements:

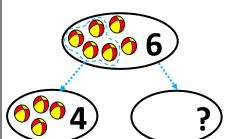
- Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, 9 + 7 = 16; 16 − 7 = 9; 7 = 16 − 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.
- Pupils combine and increase numbers, counting forwards and backwards.
- They discuss and solve problems in familiar practical contexts, including using quantities.
 Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.

Abstract

Concrete

Find a missing part (within 10)

Children separate a whole into parts and understand how one part can be found by subtraction. *(Links to addition.)*



If **6** is the whole and **4** is one of the parts, what is the other part?

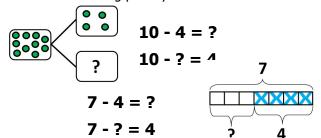
$$6 - 4 = ?$$

Finding a missing part (within 10)

Use pictorial representations to show the part.

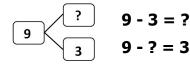
Children represent a whole and a part and understand how to find the missing part by subtraction.

Pictorial

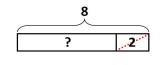


Finding a missing part (within 10)

Children use a part-whole model to support the subtraction to find a missing part.



Make links to addition.

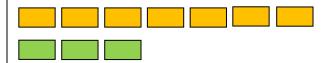






Finding the difference

Arrange the two groups so that the difference between them can be worked out (like a bar model).



7 is 4 more than 3.

3 is 4 less than 7.

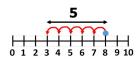
The difference between 7 and 3 is 4.

Finding the difference

Represent objects using sketches or counters to support finding the difference.

The difference between 5 and 3 is 2.

5 is 2 more than 3 and 3 is 2 less than 5.



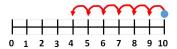
8 - 5 = 3

The difference between 8 and 3 is 5.

8 is 5 more than 3 and 3 is 5 less than 5.

Finding the difference

Children understand 'find the difference' as subtraction.



The difference between 10 and 4 is 6.

$$10 - 6 = 4$$

10 is 6 more than 4 and 4 is 6 less than 10.

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 1, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Represent and use number bonds and related subtraction facts within 20
- Subtract one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs
- Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? -9

Non-statutory requirements:

- Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, 9 + 7 = 16; 16 - 7 = 9; 7 = 16 - 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.
- Pupils combine and increase numbers, counting forwards and backwards.
- They discuss and solve problems in familiar practical contexts, including using quantities.
 Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.

Concrete

Subtraction of one-digit number within 20 (not bridging 10).

Use a bead string, for example, to subtract 1s efficiently.



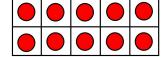
Make links to known number facts e.g.

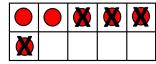
5 - 2 = 3

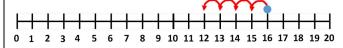
15 - 2 = 13

Subtraction of one-digit number within 20 (not bridging 10).

Pictorial







Make links to known number facts e.g.

6 - 4 = 2

16 - 4 = 12

Abstract

Subtraction of one-digit number within 20 (not bridging 10).

Calculate subtractions using known number facts with confidence e.g.

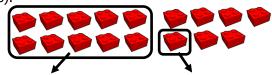
I know 8 - 7 = 1 so I can use this number fact to help me to answer 18 - 7 = ?

I know 10 - 6 = 4 so I can use this number fact to help me to answer 20 - 6 = ?

Use prior learning on subtraction to find the difference to find missing parts with in 20 but not bridging 10.

Subtraction within 20 (10s and 1s)

Use objects to subtract the ten and then the remaining ones e.g. 17 - 11 (consider the arrangement of the objects).



Subtract the 10

Subtract the 1

Subtraction within 20 (10s and 1s)

Draw/use ten frames to represent the efficient method of subtracting 10s and 1s.



Subtract the 10

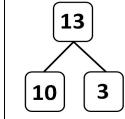


Subtract the 1s

17 - 10 = 7 7 - 1 = 6 17 - 11 = 6 19 - 14 19 - 10 = 9 9 - 4 = 5 19 - 14 = 5

Subtraction within 20 (10s and 1s)

Use a part whole model to support the calculation.



20 - 13

20 - 10 = 10

10 - 3 = 7

20 - 13 = 7

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 1, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships. Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Represent and use number bonds and related subtraction facts within 20
- Subtract one-digit and two-digit numbers to 20, including zero
- Read, write and interpret mathematical statements involving subtraction (–) and equals (=) signs

Non-statutory requirements:

- Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, 9 + 7 = 16; 16 - 7 = 9; 7 = 16 - 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.
- Pupils combine and increase numbers, counting forwards and backwards.
- They discuss and solve problems in familiar practical contexts, including using quantities.

Problems should include the terms: put together, add, altogether, total, take away, distance • Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as between, difference between, more than and less than, so that pupils develop the concept of 7 = ? - 9addition and subtraction and are enabled to use these operations flexibly. **Concrete Pictorial Abstract** Subtraction bridging 10 (using number bonds). Subtraction bridging 10 (using number bonds). Subtraction bridging 10 (using number bonds). Arrange objects into a 10 and some 1s, then split the Represent the calculation using tens frames and number Use a part-whole model to support the method e.g. 15 - 8 subtracting number into parts using knowledge of lines e.g. 16 - 9 number bonds e.g. 14 - 7 With 9, I can take away the 6 and then the 3. 7 is 4 and 3 Subtract 3 Subtract 6 I can take away the 4 and then the 3. 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 **15** 14 - 7 = 716 - 9 = 7

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 2, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- Subtract numbers mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers
- Subtract numbers using concrete objects and pictorial presentations, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers
- Show that subtraction of two numbers cannot be done in any order
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
- · Solve problems with subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures

Non-statutory requirements:

- Pupils extend their understanding of the language of addition and subtraction to include sum and difference.
- Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3+7=10; 10-7=3 and 7=10-3 to calculate 30+70=100; 100-70=30 and 70=100-30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, 5+2+1=1+5+2=1+2+5). This establishes commutativity and associativity of addition.
- Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

Concrete Pictorial Abstract

Before this stage ensure that the children are confident at using a range of manipulatives to subtract numbers before using a place value grid; they should be confident in grouping tens and ones e.g. 27 - 5 = 22 (27 is 2 tens and 7 ones. 7 ones subtract 2 ones are 5 ones. The total is 2 tens and 5 ones.)

38 - 5 No exchange

Step 1:

Position the Base 10 on the grid (top row).

Step 2

 Ones column (8 ones subtract 5 ones). Move down 5 ones from the top to the middle row and then subtract them away. Move the remaining 3 ones down from the top to the bottom row.

Step 3

• **Tens** column (3 tens subtract 0 tens). Move down 3 tens from the top row to the bottom row.

Step 4

• There are 3 tens and 3 ones (33). 38 - 5 = 33

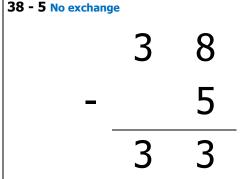
	Tens		•)ne	S
		3			8
•				5	
		3	a	a	3

Ones

6

Tens

20 F				
38 - 5 No exchange	Te	ens		Ones
	11		- 9	8 k 0 2 k 0
-				5
	1	7	₹	



52 - 6 Exchanging 10s

Step 1

Position the base 10 on the grid (top row).

Step 2

Ones column (2 ones subtract 6 ones) - there needs to be an exchange here. Go to the tens column and exchange 1 ten for 10 ones. Add the 10 ones to the ones (top row) - you now have 12 ones. You have 4 tens left in the tens column - cross out the 5 and change to a 4 to show this.

Step 3:

 Ones column - now move down 6 counters from the top to the middle row and then subtract them away.
 Move the remaining 4 counters down from the top to the bottom row.

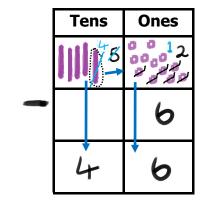
Step 4:

 Tens column (3 tens subtract 0 tens) - move down 4 tens from the top row to the bottom row.

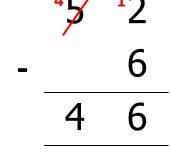
Step 5:

• There are 4 tens and 6 ones (46). **52 - 6 = 46**

52 - 6 Exchanging 10s



52 - 6 Exchanging 10s



Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 2, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- Subtract numbers mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers
- Subtract numbers using concrete objects and pictorial presentations, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers
- Show that subtraction of two numbers cannot be done in any order
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
- Solve problems with subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures

Non-statutory requirements:

- Pupils extend their understanding of the language of addition and subtraction to include sum and difference.
- Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10; 10 7 = 3 and 7 = 10 3 to calculate 30 + 70 = 100; 100 70 = 30 and 70 = 100 30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, 5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5). This establishes commutativity and associativity of addition.
- Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

Concrete Pictorial Abstract

Before this stage ensure that the children are confident at using a range of manipulatives to subtract numbers before using a place value grid; they should be confident in grouping tens and ones e.g. 27 - 5 = 22 (27 is 2 tens and 7 ones. 7 ones subtract 2 ones are 5 ones. The total is 2 tens and 5 ones.)

59 - 27 No exchange

Step 1:

Position the counters on the grid (top row).

Step 2:

 Ones column (9 ones subtract 7 ones) - move down 7 ones from the top to the middle row and then subtract them away. Move the remaining 2 ones down from the top to the bottom row.

Step 3:

 Tens column (5 tens subtract 2 tens) - move down 2 tens from the top row to the middle row and then subtract them away. Move the remaining 3 tens down from the top to the bottom row.

Step 4

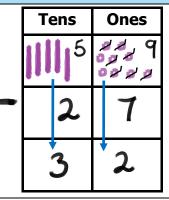
• There are 3 tens and 2 ones (32). **59 - 27 = 32**

Tens	Ones	
5	9)
2	7	
3	2	

Ones

Tens

59 - 27 No exchange



59 - 27 No exchange

73 - 29 Exchanging 10s

Step 1

• Position the counters on the grid (top row).

Step

Ones column (3 ones subtract 9 ones) - there needs to be an exchange here. Go to the tens column and exchange 1 ten for 10 ones. Add the 10 ones to the ones (top row) - you now have 13 ones. You have 6 tens left in the tens column - cross out the 7 and change to a 4 to show this.

Step 3:

 Ones column - now move down 9 counters from the top to the middle row and then subtract them away.
 Move the remaining 4 counters down from the top to the bottom row.

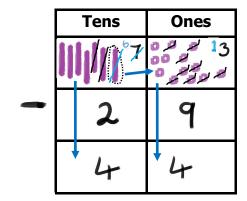
Step 4:

• Tens column (6 tens subtract 2 tens) - move down 2 tens from the top row to the middle row and then subtract them away. Move the remaining 4 tens down from the top to the bottom row.

Step 5:

• There are 4 tens and 4 ones (44). 73 - 29 = 44

73 - 29 Exchanging 10s



73 - 29 Exchanging 10s

- 2 9 4 4

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds
- Subtract numbers with up to three digits, using formal written methods of columnar subtraction
- Estimate the answer to a calculation and use inverse operations to check answers

Concrete

Solve problems, including missing number problems, using number facts, place value, and more complex subtraction.

Non-statutory requirements:

- Practise solving varied subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.
- Use understanding of place value and partitioning, and practise using columnar subtraction with increasingly large numbers up to three digits to become fluent.

346 - 24 No exchange

Step 1:

 Position the counters on the grid (top row). Step 2:

 Ones column (6 ones subtract 4 ones) move down 4 ones from the top to the middle row and then subtract them away. Move the remaining 2 ones down from the top to the bottom row.

Step 3:

• Tens column (4 tens subtract 2 tens) - move down 2 tens from the top row to the middle row and then subtract them away. Move the remaining 2 tens down from the top to the bottom row.

Step 4:

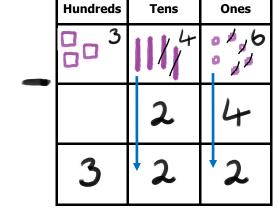
 Hundreds column (3 hundreds subtract 0 hundreds) - move the 3 hundreds down into the bottom row.

Step 5: I

 There are 3 hundreds, 2 tens and 2 ones (322). **346 - 24 = 322**

Hundreds **Tens** Ones

346 - 24 No exchange



Pictorial

Abstract

346 - 24 No exchange

6		3	4	6
•	-		2	4
,		3	2	2

342 - 25 Exchanging tens

Step 1:

· Position the counters on the grid (top row). Step 2:

• Ones column (2 ones subtract 5 ones) - there needs to be an exchange here. Go to the tens column and exchange 1 ten for 10 ones. Add the 10 ones to the ones (top row) you now have 12 ones. You have 3 tens left in the tens column - cross out the 4 and change to a 3 to show this.

Step 3:

Ones column - now move down 5 counters from the top to the middle row and then subtract them away. Move the remaining 7

Hundreds Tens Ones

342 - 25 Exchanging tens

	Hundreds	Tens	Ones
-	300	11134	0 00 12 0 0
		2	5
	3	1	7

342 - 25 Exchanging tens

	3	7	- 2
-		2	5
	3	1	7

counters down from the top to the bottom row. Step 4:

• Tens column (3 tens subtract 2 tens) - move down 2 tens from the top row to the middle row and then subtract them away. Move the remaining 1 ten down from the top to the bottom row.

Hundreds column (3 hundreds subtract 0 hundreds) - move the 3 hundreds down into the bottom row.

• There are 3 hundreds, 1 ten and 7 ones (317). **342 - 25 = 317**

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds
- Subtract numbers with up to three digits, using formal written methods of columnar subtraction

Concrete

- Estimate the answer to a calculation and use inverse operations to check answers
- Solve problems, including missing number problems, using number facts, place value, and more complex subtraction.

Hundreds

Non-statutory requirements:

 Practise solving varied subtraction guestions. For mental calculations with two-digit numbers, the answers could exceed 100.

Abstract

• Use understanding of place value and partitioning, and practise using columnar subtraction with increasingly large numbers up to three digits to become fluent.

346 - 74 Exchanging hundreds

Step 1:

Position the counters on the grid (top row).

Step 2:

Ones column (6 ones subtract 4 ones) - move down 4 ones from the top to the middle row and then subtract them away. Move the remaining 2 ones down from the top to the bottom row.

Step 3:

• Tens column (4 tens subtract 7 tens) - there needs to be an exchange here. Go to the hundreds column and exchange 1 hundred for 10 tens. Add the 10 tens to the tens (top row) - you now have 14 tens. You have 2 hundreds left in the hundreds column cross out the 3 and change to a 2 to show this.

Step 4:

Tens column - move down 7 tens from the top row to the middle row and then subtract them away. Move the remaining 7 tens down from the top to the bottom row.

 Hundreds column (2 hundreds subtract 0 hundreds) move the 2 hundreds down into the bottom row.

Step 6:

• There are 2 hundreds, 7 tens and 2 ones (272). 346 - 74 = 272

Hundreds		Tens	Ones	
100	23 100	10 10 10 10 10 10 10 10 10 10 10 10 10 1	S	
		7	4	
100	2	10 10 10 10 10	2	

1	346 - 74 E	xchanging hu	nc	lreds
		Hundreds		Tei
		²³		//
				7
•				

Tens Ones

321 + 46 Exchanging tens and hundreds

Pictorial

346 - 74 Exchanging hundreds

321 + 46 Exchanging tens and hundreds

Step 1:

• Position the counters on the grid (top row).

Step 2:

• Ones column (1 one subtract 6 ones) - there needs to be an exchange here. Go to the tens column and exchange 1 ten for 10 ones. Add the 10 ones to the ones (top row) - you now have 11 ones. You have 2 tens left in the tens column - cross out the 2 and change to a 1 to show this.

Step 3:

• Tens column (1 tens subtract 4 tens) - there needs to be an exchange here. Go to the hundreds column and exchange 1 hundred for 10 tens. Add the 10 tens to the tens (top row) you now have 11 tens; show this by adding a 1 to the existing 1 to make 11. You now have 2 hundreds left in the tens column - cross out the 3 and change to a 2 to show this.

Step 4:

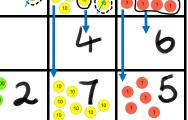
• Tens column (11 tens subtract 4 tens) - move down 4 tens from the top row to the middle row and then subtract them away. Move the remaining 7 tens down from the top to the hottom row.

Step 5:

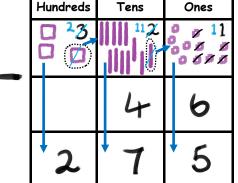
• Hundreds column (2 hundreds subtract 0 hundreds) - move the 2 hundreds down into the bottom row.

There are 2 hundreds, 7 tens and 5 ones (275). 321 + 46 = 275

Ones



Tens



321 + 46 Exchanging tens and hundreds

	43	72	1
_		4	6



Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

• Subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds

Ones

Ones

• Subtract numbers with up to three digits, using formal written methods of columnar subtraction

Hundreds

Hundreds

• Estimate the answer to a calculation and use inverse operations to check answers

Concrete

• Solve problems, including missing number problems, using number facts, place value, and more complex subtraction.

Tens

Tens

Non-statutory requirements:

- Practise solving varied subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.
- Use understanding of place value and partitioning, and practise using columnar subtraction with increasingly large numbers up to three digits to become fluent.

Abstract

876 - 354 No exchange

Step 1:

- Position the counters on the grid (top row). **Step 2:**
- Ones column (6 ones subtract 4 ones) move down 4 ones from the top to the middle row and then subtract them away. Move the remaining 2 ones down from the top to the bottom row.

Step 3:

 Tens column (7 tens subtract 5 tens) move down 5 tens from the top row to the middle row and then subtract them away.
 Move the remaining 2 tens down from the top to the bottom row.

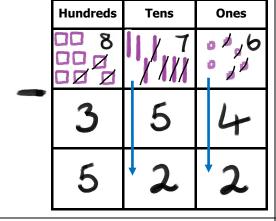
Step 4:

 Hundreds column (8 hundreds subtract 3 hundreds) - move down 3 hundreds from the top row to the middle row and then subtract them away. Move the remaining 5 hundreds down from the top to the bottom row.

Stop E

• There are 5 hundreds, 2 tens and 2 ones (522). **876—354 = 522**

876 - 354 No exchange



Pictorial

876 - 354 No exchange

	8	7	6
_	3	5	4
	5	2	2

873 - 349 Exchanging tens

Step 1:

- Position the counters on the grid (top row).
 Step 2:
- Ones column (3 ones subtract 9 ones) there needs to be an exchange here. Go to the tens column and exchange 1 ten for 10 ones. Add the 10 ones to the ones (top row) you now have 13 ones. You have 6 tens left in the tens column cross out the 7 and change to a 6 to show this.

Step 3:

Tens column (6 tens subtract 4 tens) move down 4 tens from the top row to the
middle row and then subtract them away. Move
the remaining 2 tens down from the top to the
bottom row.

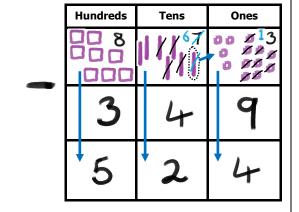
Step 4:

 Hundreds column (8 hundreds subtract 3 hundreds) - move the 3 hundreds from the top row to the middle row and then subtract them away. Move the remaining 5 hundreds down from the top to the bottom row.

from th

• There are 5 hundreds, 2 tens and 4 ones (524). **873 - 349 = 524**

873 - 349 Exchanging tens



873 - 349 Exchanging tens

	8	6	1 3	
-	3	4	9	
	5	2	4	
			_	

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

817 - 352

643 - 359

Exchanging tens and hundreds

Exchanging hundreds

National Curriculum statutory requirements:

- Subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds
- Subtract numbers with up to three digits, using formal written methods of columnar subtraction

Concrete

- Estimate the answer to a calculation and use inverse operations to check answers
- Solve problems, including missing number problems, using number facts, place value, and more complex subtraction.

Non-statutory requirements:

817 - 352

Exchanging hundreds

- Practise solving varied subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.
- Use understanding of place value and partitioning, and practise using columnar subtraction with increasingly large numbers up to three digits to become fluent.

Abstract

817 - 352

Exchanging hundreds

Step 1

Position the counters on the grid (top row).

Step 2:

 Ones column (7 ones subtract 2 ones) - move down 2 ones from the top to the middle row and then subtract them away Move the remaining 5 ones down from the top to the bottom row.

Step 3:

 Tens column (1 ten subtract 5 tens) - there needs to be an exchange here. Go to the hundreds column and exchange 1 hundred for 10 tens. Add the 10 tens to the tens (top row) - you now have 11 tens. You have 7 hundreds left in the hundreds column - cross out the 8 and change to a 7 to show this.

Step 4:

 Hundreds column (8 hundreds subtract 3 hundreds) - move down 3 hundreds from the top row to the middle row and th subtract them away. Move the remaining 4 hundreds down from the top to the bottom row.

Step 5:

There are 4 hundreds, 6 tens and 5 ones (465). **817 - 352 = 465**

	Hundreds	Tens	Ones
y. n	100 100 100	10 10 10 1 1 10 10 10 10 10 10 10 10	0 0 7
ns : in	3	5	2
e nen	100	10 0	5

	Hundreds	Tens	Ones
			007
_	3	5	2
	4	0	5

Pictorial

	78	1 1	7
-	3	5	2
	4	6	5

643 - 359

Exchanging tens and hundreds

Step 1:

Position the counters on the grid (top row).
 Step 2:

Ones column (3 ones subtract 9 ones) - there needs to be an exchange here. Go to the tens column and exchange 1 ten for 10 ones. Add the 10 ones to the ones (top row) - you now have 13 ones. You have 3 the tens left in the tens column - cross out the 4 and change to a 3 to show this.

Ones column (13 ones subtract 9 ones) - move down 9 ones from the top to the middle row and then subtract them away. Move the remaining 4 ones down from the top to the bottom row.

- Tens column (3 tens subtract 5 tens) there needs to be an exchange here. Go to the hundreds column and exchange 1 hundred for 10 tens.
- Add the 10 tens to the tens (top row) you now have 13 tens. You have 5 hundreds left in the hundreds column - cross out the 6 and change to a 5 to show this.

Step 5:

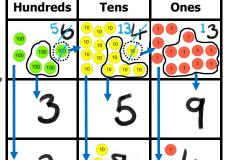
 Tens column (13 tens subtract 5 tens) - move down 5 tens from the top to the middle row and then subtract them away. Move the remaining 8 tens down from the top to the bottom row.

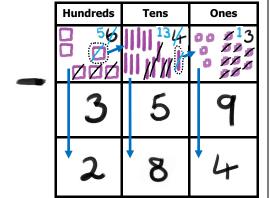
Step 6:

 Hundreds column (5 hundreds subtract 3 hundreds) - move 3 hundreds from the top row to the middle row and then subtract them away. Move the remaining 2 hundreds down from the top to the bottom row.

Step 7:

There are 2 hundreds, 8 tens and 4 ones (284). 643 - 359 = 284





643 - 359 Exchanging tens and hundreds

	Ø	<i>5</i> f	3
-	3	5	9
	2	8	4

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds
- Subtract numbers with up to three digits, using formal written methods of columnar subtraction
- Estimate the answer to a calculation and use inverse operations to check answers
- Solve problems, including missing number problems, using number facts, place value, and more complex subtraction.

Non-statutory requirements:

- Practise solving varied subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.
- Use understanding of place value and partitioning, and practise using columnar subtraction with increasingly large numbers up to three digits

Concrete

803 - 356 Exchanging tens and hundreds with a zero in the tens column

- . Position the counters on the grid (top row). Step 2:
- . Ones column (3 ones subtract 6 ones) there needs to be an exchange here. Go to the tens column, the tens column has a zero so this cannot be exchanged therefore go to the hundreds column and exchange 1 hundred to 10 tens. In the hundreds column cross out the 8 and change to a 7 to show that you have 3 hundreds now.

Step 3:

• Tens column - place the exchanged 10 into the tens column (top row). You now have 10 tens in total. Show this by placing a 1 next to the zero. Now, 1 ten needs exchanging for 10 ones and adding to the ones column. Place a 1 next to the 3 to show that you now have 13 ones. To show that you have exchanged 1 ten from the tens column, cross out the 10 and replace with a 9 to show that you now have 9 tens left in that column

Step 4:

 Ones column (13 ones subtract 6 ones) - move down 6 ones from the top row to the middle row and then subtract them away. Move the remaining 7 ones to the bottom row.

Step 5:

 Tens column (9 tens subtract 5 tens) - move down 5 tens from the top row to the middle row and then subtract them away. Move the remaining 4 tens to the bottom row.

Step 6: • Hundreds column (7 hundreds subtract 3 hundreds) - move 3 hundreds from the top row to the middle row and then subtract them away. Move the remaining 4 hundreds down from the top to the bottom row.

Step 6: • There are 4 hundreds, 4 tens and 7 ones (447). 803 - 356 = 447

Hundreds **Tens** Ones

Tens

Ones

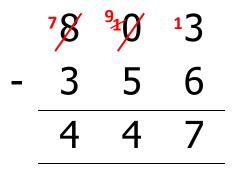
803 - 356 Exchanging tens and hundreds - with a zero in the tens column

Pictorial

Hundreds	Tens	Ones				
		000 13				
o ddd	<i>\\\\\\</i>	1 11				
3	5	6				
4	4	7				

803 - 356 Exchanging tens and hundreds - with a zero in the tens column

Abstract



800 - 349 Echanging tens and hundreds - with a zero in the ones and tens column

Hundreds

· Position the counters on the grid (top row). Step 2:

 Ones column (0 ones subtract 9 ones) - there needs to be an exchange here. Go to the tens column, the tens column has a zero so this cannot be exchanged therefore go to the hundreds column and exchange 1 hundred to 10 tens. In the hundreds column cross out the 8 and change to a 7 to show that you have 7 hundreds now.

Step 3:

. Tens column - place the exchanged 10 into the tens column (top row). You now have 10 tens in total. Show this by placing a 1 next to the zero. Now, 1 ten needs exchanging for 10 ones and adding to the ones column. Place a 1 next to the 0 to show that you now have 10 ones. To show that you have exchanged 1 ten from the tens column, cross out the 1 and the 0 and replace with a 9 to show that you now have 9 tens left in that column.

Step 4:

 Ones column (10 ones subtract 9 ones) - move down 9 ones from the top row to the middle row and then subtract them away. Move the remaining one to the hottom row

Step 5:

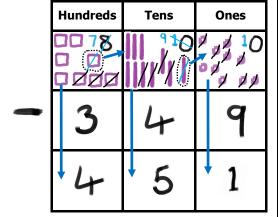
. Tens column (9 tens subtract 4 tens) - move down 4 tens from the top row to the middle row and then subtract them away. Move the remaining 5 tens to the

Step 6:

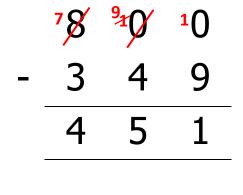
 Hundreds column (7 hundreds subtract 3 hundreds) - move 3 hundreds from the top row to the middle row and then subtract them away. Move the remaining 4 hundreds down from the top to the bottom row

• There are 4 hundreds, 4 tens and 7 ones (447). 800 - 349 = 451

800 - 349 Exchanging tens and hundreds - with a zero in the ones and tens column



800 - 349 Exchanging tens and hundreds - with a zero in the ones and tens column



Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 4, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.
- Estimate and use inverse operations to check answers to a calculation.
- Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Non-statutory requirements:

- Practise both mental methods and columnar subtraction with increasingly large numbers to aid fluency.
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers.

			, 3	·	ia mediodo to doe dila vinyi					appropriate	appropriate operation, working with increasingly harder numbers.						
		Concr	ete				Pictori	al		Abstract							
7186 - 44 No exchange										7326 - 62 Exchanging hundreds							
	7	1	8	6		7	1	<mark>7</mark> 8′	1 6		7	² 3′	1 2	6			
_			4	4	-			6	7	-			6	2			
	7	1	4	2	_	7	1	4	2		7	2	6	4			
7326 - 78 Exchanging tens	and hund	lreds			4857 - 342 No exchange	4857 - 342 No exchange						4857 - 342 Exchanging tens					
	7	23/	112	1 6		4	8	5	7		4	8	4 5	1 7			
_			7	8	-		3	4	2	_		3	4	8			
	7	2	4	8		4	5	1	5		4	5	0	9			
					_					•							

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 4, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.
- Estimate and use inverse operations to check answers to a calculation.
- Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Non-statutory requirements:

- Practise both mental methods and columnar subtraction with increasingly large numbers to aid fluency.
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers.

		4 78 15 7 89 11 8 5 9 2 - 5 6 4 2 6 5 8 6 2									e operation, v	working with it	ncreasingly nar	der numbers.			
	(Concre	te				Pictoria	al	Abstract								
4857 - 592 Exchanging hundi			s		9786 - 5 Exchangii		nd hundred	ds									
	4	⁷ 8′	1 5	7		89	1 1	8	6		9	67	178/	1 6			
_		5	9	2	_		5	6	3	_		5	9	7			
	4	2	6	5		8	6	2	3	-	9	1	8	9			
9786 - 957 Exchanging hundi	reds and t	housands				9786 - 892 Exchanging hundreds and thousands						9757 - 968 Exchanging tens, hundreds and thousands					
	89	1 7	78 /	1 6		89	167	1 8	6		89	16	145	1 7			
_	·	9	5	7	_		8	9	2	_		9	6	8			
	8	8	2	9		8	8	9	4	-	8	7	8	9			
										-							

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 4, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.
- Estimate and use inverse operations to check answers to a calculation.
- Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Non-statutory requirements:

- Practise both mental methods and columnar subtraction with increasingly large numbers to aid fluency.
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers.

solve subtraction two-step problems in contexts, deciding which operations and methods to use and wify.												approp	appropriate operation, working with increasingly harder numbers.							
	(Concret	:e					Pict	orial	Abstract										
6857 - 2542 No exchange							7686 - 3367 Exchanging tens							7684 - 3591 Exchanging hundreds						
	6	8	5	7			7	6	78	1 6			7	56	1 8	4				
-	2	5	4	2		-	3	3	6	7		_	3	5	9	1				
	4	3	1	5		-	4	3	1	9	_		4	0	9	3				
7286 - 2743 Exchanging thou	usands					7235 - 5197 Exchanging tens and hundreds						7265 - 5437 Exchanging tens and thousands								
	67	1 2	8	6			7	12	12/3	1 5			67	1 2	56	1 5				
-	2	7	4	3		_	5	1	9	7		-	5	4	3	7				
	4	5	4	3		_	2	0	3	8			1	8	2	8				
												-								

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 4, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.
- Estimate and use inverse operations to check answers to a calculation.
- Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Non-statutory requirements:

- Practise both mental methods and columnar subtraction with increasingly large numbers to aid fluency.
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers.

		Concr	ete					Picto	rial		Abstract					
7265 - 2984 Exchanging hundreds and thousands						7286 - 35 Exchangin	97 g tens, hi	undreds ar	d thousand	ds	7000 - Exchange	3591 ge includ	ing zeroes			
	6	11/2	1 6	5			67	112	17 8 ′	1 6			6/	910	91	1 0
-	2	9	8	4		_	3	5	9	7		_	3	5	9	1
	4	2	8	1			3	6	8	9	_		3	4	0	9

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally with increasingly large numbers
- Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
- · Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- · Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (for example, $12\ 462 2300 = 10\ 162$).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

STAGE 1 - no exchanges

STAGE 2 - **one exchange** (exchange one of: tens, hundred and thousands - all three to be practiced and successfully accomplished)

STAGE 3 - **two exchanges** (include different combinations of tens, hundreds and thousands - all combinations to be practiced and successfully accomplished)

STAGE 4 - **three exchanges** (tens, hundreds and thousands - to be practiced and successfully accomplished before moving on to the next stage)

TTh Th H T C	TTh	h Th	Н	T	C
--------------	-----	------	---	---	---

- H T O

STAGE 1 - no exchanges

STAGE 2 - **one exchange** (exchange one of: tens, hundred, thousands and ten thousands - all four to be practiced and successfully accomplished)

STAGE 3 - **two exchanges** (include different combinations of tens, hundreds, thousands and ten thousands - all combinations to be practiced and successfully accomplished)

STAGE 4 - **three exchanges** (include different combinations of tens, hundreds, thousands and ten thousands - all combinations to be practiced and successfully accomplished)

STAGE 5 - **four exchanges** (tens, hundreds, thousands and ten thousands - to be practiced and successfully accomplished before moving on to the next stage)

	TTh	Th	Н	Т	0
_		Th	Н	Т	O

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally with increasingly large numbers
- Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
- · Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- · Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (for example, $12\ 462 2300 = 10\ 162$).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

STAGE 1 - r	10 exc	hanges
--------------------	--------	--------

STAGE 2 - **one exchange** (exchange one of: tens, hundred, thousands and ten thousands - all four to be practiced and successfully accomplished

STAGE 3 - **two exchanges** (include different combinations of tens, hundreds, thousands and ten thousands - all combinations to be practiced and successfully accomplished)

STAGE 4 - **three exchanges** (include different combinations of tens, hundreds, thousands and ten thousands - all combinations to be practiced and successfully accomplished)

STAGE 5 - **four exchanges** (tens, hundreds, thousands and ten thousands - to be practiced and successfully accomplished before moving on to the next stage)

	TTh	Th	Н	Т	0
_	TTh	Th	Н	Т	0

STAGE 1 - no exchanges

STAGE 2 - **one exchange** (exchange one of: tens, hundred and thousands - all three to be practiced and successfully accomplished)

STAGE 3 - **two exchanges** (include different combinations of tens, hundreds and thousands - all combinations to be practiced and successfully accomplished)

STAGE 4 - **three exchanges (**tens, hundreds and thousands - to be practiced and successfully accomplished before moving on to the next stage)

HTh	TTh	Th	Н	Τ	O

н т о

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally with increasingly large numbers
- Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- · Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (for example, $12\ 462-2300=10\ 162$).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

STAGE	1 - no	o exc	hang	ze:
-------	--------	-------	------	-----

<u>STAGE 2</u> - one exchange (exchange one of: tens, hundred, thousands and ten thousands - all four to be practiced and successfully accomplished)

<u>STAGE 3</u> - two exchanges (include different combinations of tens, hundreds, thousands and ten thousands - all combinations to be practiced and successfully accomplished)

<u>STAGE 4</u> - three exchanges (include different combinations of tens, hundreds, thousands and ten thousands - all combinations to be practiced and successfully accomplished)

<u>STAGE 5</u> - four exchanges (tens, hundreds, thousands and ten thousands - to be practiced and successfully accomplished before moving on to the next stage)

STAGE 1 - no exchanges

<u>STAGE 2</u> - one exchange (exchange one of: tens, hundred, thousands, ten thousands and hundred thousands - all five to be practiced and successfully accomplished)

<u>STAGE 3</u> - two exchanges (include different combinations of tens, hundreds, thousands, ten thousands and hundred thousands - all combinations to be practiced and successfully accomplished)

<u>STAGE 4</u> - three exchanges (include different combinations of tens, hundreds, thousands, ten thousands and hundred thousands - all combinations to be practiced and successfully accomplished)

<u>STAGE 5</u> - four exchanges (include different combinations of tens, hundreds, thousands, ten thousands and hundred thousands - to be practiced and successfully accomplished)

<u>STAGE 6</u> - five exchanges (tens, hundreds, thousands, ten thousands and hundred thousands - to be practiced and successfully accomplished before moving on to the next stage)

HTh TTh	Th	Н	T	0
	Th	Н	Т	0

HTh TTh Th H T C

TTh Th H T O

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally with increasingly large numbers
- Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (for example, $12\ 462 2300 = 10\ 162$).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

STAGE 1 - no exchanges

STAGE 2 - **one exchange** (exchange one of: tens, hundred, thousands, ten thousands and hundred thousands - all five to be practiced and successfully accomplished)

STAGE 3 - **two exchanges** (include different combinations of tens, hundreds, thousands, ten thousands and hundred thousands - all combinations to be practiced and successfully accomplished)

STAGE 4 - **three exchanges** (include different combinations of tens, hundreds, thousands, ten thousands and hundred thousands - all combinations to be practiced and successfully accomplished)

STAGE 5 - **four exchanges** (tens, hundreds, thousands, ten thousands and hundred thousands - to be practiced and successfully accomplished)

STAGE 6 - **five exchanges** (tens, hundreds, thousands, ten thousands and hundred thousands - to be practiced and successfully accomplished before moving on to the next stage)

HT	h TTh	Th	Н	T	O
- HT	h TTh	Th	Н	Т	0

Ensure that children are confident with exchange when a number includes zeroes e.g:

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally with increasingly large numbers
- Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (for example, 12 462 – 2300 = 10 162).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

STAGE 1 - 6.7 - 4.3 No exchange			STAGE 2 - 6 Exchanging of	.7 - 4.9			STAGE 3 - 5.78 No exchange	- 2.54			
	6.	7		5 6	. 17			5	. 7	8	
-	4 .	3	_	4	. 9		_	2	. 5	4	
	2 .	4		1	. 8	_	_	3	. 2	4	_
STAGE 4 - 5.78 - 2.59 Exchanging tenths			STAGE 5 - 5 Exchanging of				STAGE 6 - 5.38 Exchanging tenth		es		
5	. 67	1 8		45	. 17	8		45	. 123/	1 8	
- 2	. 5	9	_	2	. 9	4	-	4	. 8	9	
3	. 1	9		2	. 8	4		0	. 4	9	_

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally with increasingly large numbers
- Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
- · Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- · Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (for example, 12 462 – 2300 = 10 162).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

STAGE 7 - 65	7 - 24 4 1	lo evchand	۵۱			TAGE 8		-			progress		- 0 - 65	.7 - 28.2 (evchan	aina te	anc)	
STAGE 7 - 03)./ - ZT.T \	o excitating	C)			HAGE 0	03.7	24.5 (0	.xcriarigii	ng ones) 	SIAGE	_ 9 - 03	.7 - 20.2 (CACHAIT	girig to	113)	
	6	5	•	7				6	45	•	1 7			56	:	¹ 5	•	7
-	2	4	•	4		-		2	4	•	9	_	-	2		8	•	2
	4	1	•	3				4	0	•	8	_		4		7	•	5
STAGE 10 - 6	5.7 + 28.9	(exchang	ing on	es and tens)	S	STAGE 1:	L - 75.7	8 + 30.	14 (no e	exchang	e)	STAGE	12 - 7	75.72 + 34	l.05 (e	exchan	ging te	nths)
	56	¹ ₄ 5⁄		1 7			7	5	•	7	8			7	5	•	67	1 2
_	2	8	•	9		-	3	0	•	1	4		-	3	4	ı	0	5
	3	6		8		_	4	2		8	4		_	4	1	•	6	7
<u> </u>																		

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally with increasingly large numbers
- Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
- · Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- · Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (for example, 12 462 – 2300 = 10 162).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

	13 - 75. ging ones		95					14 - 75 ging tens		.14			STAGE 15 - 75.78 - 34.94 Exchanging tenths and ones
	7	45		1 7	8			67	1 5		7	8	7 ⁴ 5 . ¹ ₆ 7 ¹ 1
_	3	4		9	5		_	3	6	•	1	4	- 3 4 . 9 4
	4	0		8	3	_		3	9		6	4	4 0 . 7 7
	16 - 75.0 ging ones							17 - 75. ging tent					STAGE 18 - 75.18 + 36.39 Exchanging tenths, ones and tens
	⁶ 7	¹ 45		1 0	8			⁶ 7	1 5	•	2 3	1 2	67 ¹ 45 ¹ 01 ¹ 8
_	3	9		5	4		_	3	6	•	1	9	- 3 6 . 3 9
	3	5		5	4			3	9	•	1	3	3 8 . 7 9
	an hulawa												

Key Vocabulary:



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Subtract numbers mentally with increasingly large numbers
- Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
- · Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Non-statutory requirements:

- Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.
- They practise mental calculations with increasingly large numbers to aid fluency (for example, 12 462 – 2300 = 10 162).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals. This section is split into stages of progression.

STAGE 19 including:

no exchange one exchange two exchanges three exchanges

STAGE 17 including:

no exchange one exchange two exchanges three exchanges four exchanges

O t

STAGE 18 including:

no exchange one exchange two exchanges three exchanges four exchanges

Th H T O . t

STAGE 19 including:

no exchange one exchange two exchanges three exchanges four exchanges five exchanges

STAGE 20 including:

no exchange
one exchange
two exchanges
three exchanges
four exchanges
five exchanges

STAGE 21: once secure, children to be taught to subtract decimal numbers (up to six-digits) with a different number of places (including exchanges) e.g. 65.7 - 24, 80.73 - 9.9, 2365 - 824.93

Th H

Place holders needed here (see 0s below).

Ensure this is addressed when teaching columnar subtraction.

Key Vocabulary:



Look at the previous learning and recap where appropriate thus developing Year 5 experiences.

Throughout Year 6, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method. If

National Curriculum statutory requirements:

- Perform mental calculations, including with mixed operations and large numbers
- Solve problems involving subtraction
- Solve subtraction multi-step problems in contexts, deciding which operations and methods
- . Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Use their knowledge of the order of operations to carry out calculations involving the four operations

Non-statutory requirements:

- Pupils practise addition for larger numbers, using the formal written methods.
- They undertake mental calculations with increasingly large numbers and more complex calculations.
- Pupils round answers to a specified degree of accuracy, e.g. to the nearest 10, 20, 50 etc., but not to
 a specified number of significant figures.
- Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9.

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

STAGE 1 - whole numbers with the same number of STAGE 2 - whole numbers with a different num-**STAGE 3** - decimal numbers with the same number of ber of places: no exchange, one exchange, multiple **places:** no exchange, one exchange, multiple exchanges **places:** no exchange, one exchange, multiple exchanges exchanges E.g. maximum expectation shown below (though can E.g. maximum expectation shown below (though E.g. maximum expectation shown below go into 10 million) can go into 10 million) HTh TTh Th H M HTh TTh Th H STAGE 4 - decimal numbers with a different STAGE 4 - decimal numbers with a different STAGE 4 - decimal numbers with a different number of **number of places:** no exchange, one exchange, multiple **number of places:** no exchange, one exchange, mul**places:** no exchange, one exchange, multiple exchanges exchanges tiple exchanges **E.g 3** E.g 1 E.g 2 HTh TTh Th H T O . t HTh TTh Th H T O . t TTh Th H 0 TTh Th H O . t TTh Th H T O . t N.B. you can go up to a million and up to N.B. you can go up to a million and up to thousandths N.B. you can go up to a million and up to

Key Vocabulary:

thousandths

egual to, take, less, leaves, take away, less than, the difference, subtract, minus, fewer, decrease, '7 take away 3, the difference is four'

thousandths

Multiplication - Year 1 Calculation Policy



In Year 1, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of
the teacher

Non-statutory requirements:

- Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.
- They make connections between arrays, number patterns, and counting in twos, fives and tens.

Concrete Pictorial Abstract

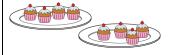
Recognising and making equal and unequal groups.







Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal.





Recognising and making equal and unequal groups.

Children draw and represent equal and unequal groups.









Recognising and making equal and unequal groups.

Describe equal groups

This is 3 equal groups of 4

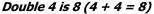
(4 and 4 and 4)

Doubling

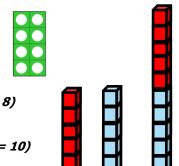
Use manipulatives to show how to double a number.







Double 5 is 10 (5 + 5 = 10)



Doubling

Draw doubles using a range of representations.





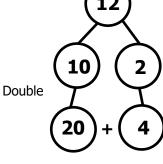
Double 6 is 12 (6 + 6 = 12)

Doubling

$$5 + 5 = ?$$

$$14 = 7 + 7$$

Partition a number and then double each part before recombining.



Double 12 is 24.

Key Vocabulary:

Multiplication - Year 1 Calculation Policy



In Year 1, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support
of the teacher

Non-statutory requirements:

- Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.
- They make connections between arrays, number patterns, and counting in twos, fives and tens.

Recognising and making equal groups (repeated addition).



Concrete

There are 5 equal groups with 3 in each group.

$$3 + 3 + 3 + 3 + 3 = 15$$



There are 4 equal groups with 4 in each group.

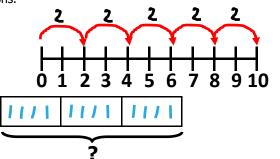
4 + 4 + 4 + 4 = 15

Children can begin to relate this to multiplication if ready.

Recognising and making equal groups (repeated addition).

Pictorial

Use pictorial representations including numberlines to solve calculations.



Abstract

Recognising and making equal groups (repeated addition).

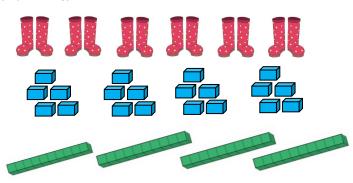
$$4 + 4 + 4 = 12$$

$$3 lots of 4 = 12$$

$$3 \times 4 = 12$$

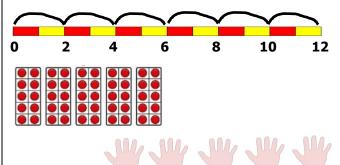
Counting in multiples of 2, 5 and 10.

Count in multiples supported by concrete objects placed into equal groups (skip counting)



Counting in multiples of 2, 5 and 10.

Use a numberline and other pictorial presentations to support counting in multiples.



Counting in multiples of 2, 5 and 10.

Count in multiples of number aloud.

Write sequences with multiples of numbers.

Write the missing numbers in the sequence.

2, 4, 6, 8, 10, 12, 14, 16, 18, 20

5, 10, 15, 20, 25, 30

Key Vocabulary:

Multiplication - Year 2 Calculation Policy



Look at the previous learning and recap where appropriate.

Pictorial

Create arrays to illustrate commutativity using a

In Year 2, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships. Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- · Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in

Non-statutory requirements:

- Pupils use a variety of language to describe multiplication and division.
- Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.
- Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, $40 \div 2 = 20$, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, $4 \times 5 = 20$ and $20 \div 5 = 4$).

Concrete

Create arrays to illustrate commutativity using a range of concrete objects.

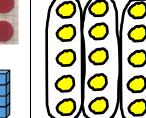


Children should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer. Make links to repeated addition.

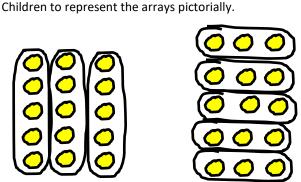








range of concrete objects.



Create arrays to illustrate commutativity using a range of concrete objects.

Abstract

Children to be able to use an array to write a range of calculations e.g.

$$10 = 2 \times 5$$

$$5 \times 2 = 10$$

$$2 + 2 + 2 + 2 + 2 = 10$$

$$10 = 5 + 5$$

Building on from Year 1, learn the $\times 2$, $\times 5$ and $\times 10$ table facts.

Develop an understanding of how to unitise groups of 2, 5 and 10 and learn corresponding times-table facts.





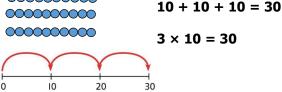


Groups of 10 ... 10, 20, 30

 $3 \times 10 = 30$

Building on from Year 1, learn the ×2, ×5 and ×10 table facts.

Understand how to relate counting in unitised groups and repeated addition with knowing key times-table facts

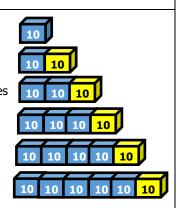


Building on from Year 1, learn the $\times 2$, $\times 5$ and ×10 table facts.

Understand how the times-tables increase and contain patterns.

$$5 \times 10 = 50$$

$$6 \times 10 = 60$$



Key Vocabulary:

Multiplication - Year 3 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

Tens

10

Ones

 Solve problems, including missing number problems, involving multiplication, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Non-statutory requirements:

- Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.
- Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (for example, $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).
- Pupils develop reliable written methods for multiplication, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication
- Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?

Pictorial Concrete Abstract 13 x 3 Two-digit by one-digit (no exchange into tens) 13 x 3 Two-digit by one-digit (no exchange into tens) 13 x 3 Two-digit by one-digit (no exchange into tens) Expanded short multiplication first. Either Base 10 or place value counters can be used here. Tens Ones Step 1: Ones Ones Tens Tens Partition the 13 into 10 and 3 and write these 10 3 10 numbers on the grid in the correct columns. Place the number that you are multiplying the 13 by at the side (see the 3 on the diagram). **a a** 0 Step 2: ø Χ Use concrete resources to represent the 10 and 3 O and position them in the grid at the top. 0 0 Step 3: 13 is being multiplied by 3 so you need three **a** rows of 13 in total. Add two more rows of 13 using O the concrete resources. You now have 3 lots of 13. **1** (3×10) Step 4: Count up all the ones - you have 9 in total. 9 9 O Write this number on the grid. Step 5: 9 · Count up all the tens - you have 30 in total. Write this number on the grid. 9 Step 6: Add the two totals together (30 + 9). 13 x 3 = 39 14 x 4 Two-digit by one digit (exchange into tens) 14 x 4 Two-digit by one digit (with exchange into tens) 14 x 4 Two-digit by one digit (exchange into tens) Tens

· Partition the 14 into 10 and 4 and write these numbers on the grid in the correct columns. Place the number that you are multiplying the 14 by at the side (see the 4 on the diagram).

Step 2:

• Use concrete resources to represent the 10 and 4 and position them in the grid at the top.

Step 3:

• 14 is being multiplied by 4 so you need four rows of 14 in total. Add three more rows of 14 using the concrete resources. You now have 4 lots of 14.

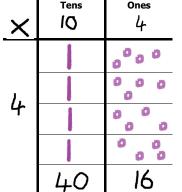
. Count up all the ones - you have 16 in total Write this number on the grid.

Step 5:

 Count up all the tens - you have 40 in total. Write this number on the grid.

Step 6:

- Model that the 16 can be partitioned into one 10 and 6 ones, the ten here can be exchanged into the tens column.
- Add the two totals together (40 + 16). 14 x 4 = 56



Expanded short multiplication first.

	1	4	
X		4	
+	1	6	(4 x 4)
1	4	0	(4 x 10)
	5	6	_
			_

Kev Vocabulary:

double, times, multiplied by, the product of, groups of, lots of, 'is equal to' 'is the same as'

10

a a

a

0

o

ø

16

ø **a a a**

a

Multiplication - Year 3 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- Solve problems, including missing number problems, involving multiplication, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Non-statutory requirements:

- Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.
- Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (for example, $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).
- Pupils develop reliable written methods for multiplication, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication.
- Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?

22 x 4 Two-digit by one-digit (no exchange into tens)

Either Base 10 or place value counters can be used here.

Step 1:

· Partition the 22 into 20 and 2 and write these numbers on the grid in the correct columns. Place the number that you are multiplying the 22 by at the side (see the 4 on the diagram).

Concrete

Step 2:

· Use concrete resources to represent the 20 and 2 and position them in the grid at the top.

Step 3:

• 22 is being multiplied by 4 so you need four rows of 22 in total. Add three more rows of 22 using the concrete resources. You now have 4 lots of 22.

Step 4:

. Count up all the ones - you have 8 in total. Write this number on the grid.

Step 5:

. Count up all the tens - you have 80 in total. Write this number on the grid.

Step 6:

Add the two totals together (80 + 8). 22 x 4 = 88

×	Tens 20	Ones	×	Tens 20	Ones
		• •		10 10	1 1
1.		9	1.	10 10	1 1
4		•	4	10 10	1 1
		9		10 10	1 1
	80	8		80	8

Tens

30

Ones

Pictorial 22 x 4 Two-digit by one-digit (no exchange into tens)

×	Tens 20	Ones
		0 0
		0 0
4		0 0
		0 0
	80	8

Abstract 22 x 4 Two-digit by one-digit (no exchange into tens)

Expanded short multiplication alongside compact short multiplication.

	2	2			2	2
X		4	_	X		4
+		8	(4×2)	_	8	8
•	8	0	(4 x 20)	_		
	8	8	<u>-</u>			

30 x 8 Two-digit by one digit (exchange into tens)

Step 1:

· Partition the 38 into 30 and 8 and write these numbers on the grid in the correct columns. Place the number that you are multiplying the 38 by at the side (see the 4 on the diagram) Step 2:

Use concrete resources to represent the 30 and 8 and position them in the grid at the top.

. 38 is being multiplied by 4 so you need four rows of 38 in total. Add three more rows of 38 using the concrete resources. You now have 4 lots of 38

These three steps apply to expanded short multiplication:

Step 4:

 Count up all the ones - you have 32 in total. Write this number on the grid. Step 5:

 Count up all the tens - you have 120 in total. Write this number on the grid Step 6:

Add the two total together (120 + 32). 38 x 8 = 152

These three steps apply to expanded short multiplication:

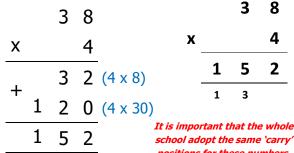
- · Combine all the ones. You have 32 ones. Exchange 30 ones for 3 tens and move these across to the 10s column Step 5: . Combine all the tens (in addition to the 3 tens exchanged in previous step). You have 15 tens. Exchange 10 tens to 1 hundred and move this
- There should now be 1 hundred (in the hundreds column) 5 tens (in the tens column) and 2 ones (in the ones column).

38 x 4 Two-digit by one digit (exchange into tens)

×	30	Ones 8
		0000
4		0000
ዣ		0000
		0000
	120	32

38 x 4 Two-digit by one digit (exchange into tens).

Expanded short multiplication first alongside compact short multiplication.



positions for these numbers.

Key Vocabulary:

Multiplication - Year 4 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 4, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Recall multiplication and division facts for multiplication tables up to 12×12
- · Recognise and use factor pairs and commutativity in mental calculations
- Use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1 and multiplying together three numbers
- · Multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer
 scaling problems and harder correspondence problems such as n objects are connected to m objects

Non-statutory requirements:

- Pupils practise recalling and using multiplication tables and related division facts to aid fluency.
- Pupils practise mental methods and extend this to three-digit numbers to derive facts, (e.g. 600 ÷ 3 = 200 can be derived from 2 x 3 = 6).
- Pupils are fluent in the formal written method of short multiplication with exact answers.
- Pupils write statements about the equality of expressions (e.g. use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations e.g, 2 × 6 x 5 = 10 x 6 = 60.
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

STAGE 1: 324 x 2 Three-digit by one-digit (no exchange)

Base 10 or place value counters can be used here if needed.

Both methods for multiplication are shown below - most pupils should move to the compact method once secure with the expanded.

STAGE 2: 323 x 5 Three-digit by one-digit (with exchange)

Base 10 or place value counters can be used here (if needed).

It is important that the whole school adopt the same 'carry' positions for these numbers.

Key Vocabulary:

Multiplication - Year 5 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- · Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- Know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
- · Multiply and divide numbers mentally drawing upon known facts
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- · Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- · Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- · Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- · Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

Non-statutory requirements:

- Pupils practise and extend their use of the formal written methods of short multiplication. They apply all the
 multiplication tables and related division facts frequently, commit them to memory and use them confidently
 to make larger calculations.
- They use and understand the terms factor, multiple and prime, square and cube numbers.
- Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and meters.
- Distributivity can be expressed as a(b + c) = ab + ac.
- They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example, 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 92 x 10).
- Pupils use and explain the equals sign to indicate equivalence, including in missing number problems (for example, 13 + 24 = 12 + 25; 33 = 5 x ?).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

STAGE 1: 3124 x 6 Four-digit by a one-digit (with exchange)
Base 10 or place value counters can be used here if needed.

The children should now be secure with the compact method, however some children may still be working on the expanded method initially.

It is important that the whole school adopt the same 'carry' positions for these numbers. STAGE 2: 42 x 17 Two-digit by a two-digit (with exchange)

The children should look at the expanded method here to develop an understanding of the method.

Only when the children are secure,

should they be moved on to the compact method.

Explain the importance of the zero here.
We add a zero because we are multiplying by the tens digit.

Key Vocabulary:

Multiplication - Year 5 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- · Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- · Know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
- Multiply and divide numbers mentally drawing upon known facts
- · Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- · Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- · Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates

Non-statutory requirements:

- Pupils practise and extend their use of the formal written methods of short multiplication. They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.
 - They use and understand the terms factor, multiple and prime, square and cube numbers.
- Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by
 multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000
 in converting between units such as kilometres and meters.
- Distributivity can be expressed as a(b + c) = ab + ac.
- They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example, 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 92 x 10).
- Pupils use and explain the equals sign to indicate equivalence, including in missing number problems (for example, 13 + 24 = 12 + 25; 33 = 5 x ?).

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals.

This section is split into stages of progression.

STAGE 3: 534 x 16 Three-digit by a two-digit (with exchange)

The children should look at the expanded method first to develop an understanding of the calculation.

uiatio	n.	5	3	4	
X			1	6	
-			2	4	(6 x 4)
		1	8	0	(6 x 30)
	3	0	0	0	(6 x 500)
+			4	0	(10×4)
		3	0	0	(10×30)
	5	0	0	0	(10 x 500)
					_

It is important that the whole school adopt the same 'carry' positions for these numbers.

Only when the children are secure, should they be moved on to the compact method.

STAGE 4: 3234 x 18 Four-digit by a two-digit

		3	2	3	4	
X				1	8	
				3	2	(8 x 4)
			2	4	0	(8 x 30)
		1	6	0	0	(8 x 200)
	2	4	0	0	0	(8 x 3000)
+				4	0	(10×4)
			3	0	0	(10 x 30)
		2	0	0	0	(10 x 200)
	3	0	0	0	0	(10 x 3000)
	5	8	2	1	2	_
		1	1			

If the children are secure with the compact method, move straight on to this.

Key Vocabulary:

Multiplication - Year 6 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 6, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Identify common factors, common multiples and prime numbers
- · Perform mental calculations, including with mixed operations and large numbers
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Solve problems involving the four operations
- · Use their knowledge of the order of operations to carry out calculations involving the four operations

Non-statutory requirements:

- Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division.
- They undertake mental calculations with increasingly large numbers and more complex calculations.
- Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.
- Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not
 to a specified number of significant figures.
- Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$.
- · Common factors can be related to finding equivalent fractions.

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals, in particular place value counters may be beneficial here.

Once the children are secure with multiplying whole numbers (up to 4 digits by two-digits) move on to decimal numbers.

STAGE 1: 16.2 x 4 Up to tenths multiplied by a one-digit number

No exchange initially.

Only when the children are secure, should they be moved on to the compact method.

Once the children are secure with multiplying whole numbers (up to 4 digits by two-digits) move on to decimal numbers.

STAGE 2: 36.23 x 3 Up to hundredths multiplied by a one-digit number

Only when the children are secure, should they be moved on to the compact method.

Key Vocabulary:

Multiplication - Year 6 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 6, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Identify common factors, common multiples and prime numbers
- · Perform mental calculations, including with mixed operations and large numbers
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Solve problems involving the four operations
- · Use their knowledge of the order of operations to carry out calculations involving the four operations

Non-statutory requirements:

- Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal
 written methods of columnar addition and subtraction, short and long multiplication, and short and
 long division.
- They undertake mental calculations with increasingly large numbers and more complex calculations.
- Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.
- Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures.
- Pupils explore the order of operations using brackets; for example, $2 + 1 \times 3 = 5$ and $(2 + 1) \times 3 = 9$.
- Common factors can be related to finding equivalent fractions.

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals, in particular place value counters may be beneficial here.

STAGE 3: 16.2 x 4 Up to tenths multiplied by a two-digit number. No exchange initially.

STAGE 4: 26.21 x 23 Up to hundredths multiplied by a two-digit number. No exchange initially.

		2	6 •	2	1						
Х		2	3	_	_			2	6 •	2	1
			0 •	0	3	(3 x 0.01) X	(2	3.		
			0 •	6		(3 x 0.2)		₁ 7	8.	6	3
		1	8 •	0	0	(3×6)	₁ 5	2	4.	2	0
		6	0 •	0	0	(3 x 20)					
•			0 •	2	0	(20×0.01)	6	0	2	8	3
•			4 •	0	0	(20 x 0.2)	1	1			
•	1	2	0 •	0	0	(20 x 6)					
•	4	0	0 •	0	0	(20 x 20) se	Only w ecure, sho		he child ney be n		
•	6	0	2 •	8	3	_	the	compa	act met	hod.	
•	1	1				_					

Key Vocabulary:

double, times, multiplied by, the product of, groups of, lots of, 'is equal to' 'is the same as'

compact method.

Division - Year 1 Calculation Policy



In Year 1, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

Pictorial

National Curriculum statutory requirements:

Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of
the teacher

Non-statutory requirements:

- Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.
- They make connections between arrays, number patterns, and counting in twos, fives and tens.

Abstract

Concrete

Grouping

Learn to make equal groups from a whole and find how many equal groups of a certain size can be made. Sort a whole set people and objects into equal groups.



There are 10 children altogether. There are 2 in each group. There are 5 groups.

Children to group using a range of objects.

Grouping

Represent a whole and work out how many equal groups.



There are 10 in total.
There are 5 in each group.
There are 2 groups.



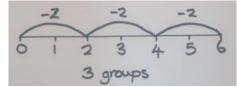
This can also be shown in a bar.

Grouping

Children should be encouraged to show simple bar representations.

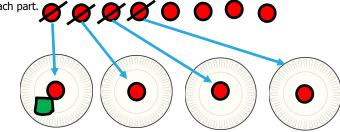


Children may relate this to counting back in steps of 2, 5 or 10, using an abstract number line to represent the equal groups that have been subtracted.



Sharing

Share a set of objects into equal parts and work out how many are in



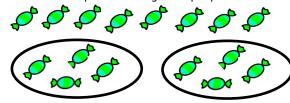


I have 10 cubes, can you share them equally between two groups?

Can also begin to relate to fractions.

Sharing

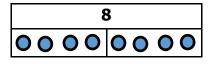
Sketch or draw to represent sharing into equal parts.



I have shared 8 sweets between two groups. I have four in each group.

Children can also use a bar model to show understanding.

Can also begin to relate to fractions.



Sharing

6 shared equally between two groups is?

Share 9 buns between 3 people.

Key Vocabulary:

share, group, divide, divided by, half, 'is equal to', 'is the same as'

Division - Year 2 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 2, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Non-statutory requirements:

- Pupils use a variety of language to describe multiplication and division.
- Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.
- Pupils work with a range of materials and contexts in which multiplication and division
 relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated
 addition. They begin to relate these to fractions and measures (for example, 40 ÷ 2 = 20, 20
 is a half of 40). They use commutativity and inverse relations to develop multiplicative
 reasoning (for example, 4 × 5 = 20 and 20 ÷ 5 = 4).

Pictorial Concrete Abstract Sharing equally **Sharing equally Sharing equally** Start with a whole and share into equal parts, one at a time. Continue to represent the objects shared into equal parts using a bar Use a bar model to support understanding of the division. model to demonstrate understaning. 12 shared equally between 2 people. They get 6 each. 20 shared into 5 equal parts. There are 4 in each part. 15 Start to understand how this also Relate this to the relevant division statement. relates to grouping. To share equally between 3 people, take a group of 3 $18 \div 2 = 9$ (Relate to multiplication facts also) and give 1 to each person. Keep going They get 5 each. until all the objects have been shared. **Grouping equally Grouping equally** Grouping equally $12 \div 3 = 4$ Consolidate how to make equal groups from a whole using a Begin to understand the $28 \div 7 = ?$ relationship between range of manipulatives. and the division $12 \div 4 = 3$ statements. Divide 28 into 7 groups. How many are in each group? 20 14 divided into 2 equal groups. There are 7 in each group. $12 \div 6 = 2$? $20 \div 5 = ?$ $12 \div 2 = 6$ $5 \times ? = 20$ Understand how to relate division by grouping to repeated subtraction. 12 divided into groups of 3. $12 \div 3 = 4$ There are 4 groups.

Key Vocabulary:

share, group, divide, divided by, half, 'is equal to', 'is the same as'

Division - Year 2 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 2, children should be encouraged to use the CPA approach to embed their understanding of number and their relationships.

Where possible the concrete, pictorial and abstract should be shown alongside each other so that the children can make links between the way the calculation can be represented.

National Curriculum statutory requirements:

- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Non-statutory requirements:

- Pupils use a variety of language to describe multiplication and division.
- Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.
- Pupils work with a range of materials and contexts in which multiplication and division relate
 to grouping and sharing discrete and continuous quantities, to arrays and to repeated
 addition. They begin to relate these to fractions and measures (for example, 40 ÷ 2 = 20, 20
 is a half of 40). They use commutativity and inverse relations to develop multiplicative
 reasoning (for example, 4 × 5 = 20 and 20 ÷ 5 = 4).

Concrete Pictorial Abstract Division within arrays Use arrays to make division calculations. Division within arrays Write calculations for multiplication and division using related facts. 12 + 3 = 4 12 + 4 = 3 3 × 4 = 12 4 × 3 = 12 Children divide their array to make groups and show inverse. 12 ÷ 3 = 4 12 ÷ 4 = 3			is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, $4 \times 5 = 20$ and $20 \div 5 = 4$).
Use arrays to make division calculations. Write calculations for multiplication and division using related facts. $12 \div 3 = 4$ $12 \div 4 = 3$ $3 \times 4 = 12$ $4 \times 3 = 12$ Children divide their array to make groups and show inverse. $12 \div 3 = 4$ $12 \div 4 = 3$	Concrete	Pictorial	Abstract
	Use arrays to make division calculations.	Children divide their array to make groups and sh	Write calculations for multiplication and division using related facts. $12 \div 3 = 4$ $12 \div 4 = 3$ $3 \times 4 = 12$ $4 \times 3 = 12$ How inverse.

Key Vocabulary:

share, group, divide, divided by, half, 'is equal to' 'is the same as'

Division - Year 3 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

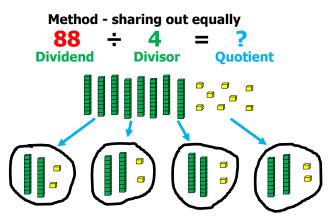
- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Non-statutory requirements:

- Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.
- Pupils develop efficient mental methods, for example, using commutativity and associativity (e.g. $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (e.g. using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (e.g. $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).
- Pupils develop reliable written methods for multiplication, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication.
- Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling
 contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected
 to n objects (for example, 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).

Concrete and then pictorial - sharing

STAGE 1: 88 \div 4 Two-digit by one-digit (no exchange of the tens) developing the concept of sharing. Use base 10 or place value counters here. The language that you use is important.



When 88 is shared equally into 4 groups.

There is 22 in each group.

How many we begin with

How many in each group

$$88 \div 4 = 22$$
How many we share between

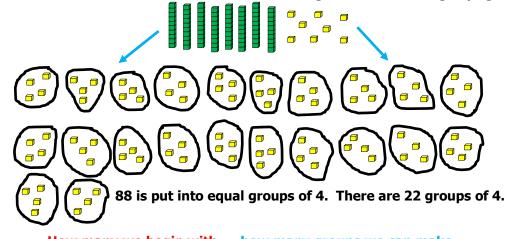
This can be presented pictorially through drawing simple representations.

Concrete and then pictorial - grouping

STAGE 1: 88 \div 4 Two-digit by one-digit (no exchange of the tens) developing the concept of equal grouping. Use base 10 or place value counters here. The language that you use is important.

Method - grouping
How many amounts of 4 are in 88?

Here children need to know that 10s can be exchanged for 1s to enable grouping



How many we begin with how many groups we can make $\div 4 = 22$

How many in each group

It is important that children understand that grouping in 1s is less efficient than grouping in 10s when working with larger dividends but they need to rehearse both as it will deepen their understanding of place value as well as the commutativity of multiplication. With 80 ÷ 4, children need to recognise that 20 groups of 4 ones (20 x 4) is equivalent to 2 groups of 4 tens (2 x 40).

Kev Vocabulary:

share, group, divide, divided by, half, 'is equal to', is the same as'

Division - Year 3 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Non-statutory requirements:

- Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.
- Pupils develop efficient mental methods, for example, using commutativity and associativity (e.g. 4 × 12 × 5 = 4 × 5 × 12 = 20 × 12 = 240) and multiplication and division facts (e.g. using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (e.g. 30 × 2 = 60, 60 ÷ 3 = 20 and 20 = 60 ÷ 3).
- Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).

Pictorial Concrete Abstract STAGE 2: 69 ÷ 3 Two-digit by one-digit when there is no **STAGE 2:** 69 ÷ 3 Two-digit by one-digit when there is no STAGE 2: Two-digit by one-digit when there is no exchange of tens. Use base 10 or place value counters here. exchange of tens. exchange of tens. Using a place value grid helps to prepare the chn for the more formal written methods in Year 4. Use knowledge of the multiplication tables and the earlier methods at this stage, to complete questions where there is no exchange. Step 4: There are Step 2: There are 3 groups of 3 ones 2 groups of 3 tens The children should not be calculating using the short method in 9 ones. in 6 tens. of division. E.g. 84 ÷ 4 $68 \div 2$ **Tens Tens** Ones Ones $66 \div 3$

$69 \div 3 = 23$

Step 1: How

many groups of 3

tens are there in 6 tens?

Key Vocabulary:

share, group, divide, divided by, half, 'is equal to', is the same as'

Step 3: How many

groups of 3 ones are

in 9 ones?

Division - Year 3 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Non-statutory requirements:

- Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.
- Pupils develop efficient mental methods, for example, using commutativity and associativity (e.g. $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (e.g. using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (e.g. $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).
- Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).

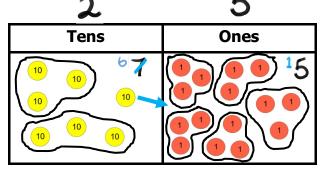
Abstract

Concrete

STAGE 3: 75 \div 3 Two-digit by one-digit when you have to exchange a ten for ones Use base 10 or place value counters here. Using a place value grid helps to prepare the chn for the more formal written methods in Year 4.

> **Step 2:** Two groups of 3 tens in 7 **Step 5:** There are five groups of 3 tens with 1 ten left over.

ones in 15 ones.

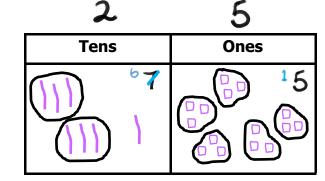


Step 1: How many groups of 3 tens are there in 7 tens?

Step 4: How many groups of 3 ones are in 15 ones?

Step 3: I can exchange the 1 ten left over for 10 ones so now I have 15 ones to put into 3 groups. **STAGE 3: 75 ÷ 3** Two-digit by one-digit when you have to exchange a ten for ones

Pictorial



STAGE Two-digit by one-digit when you have to exchange a ten for ones

Use knowledge of the multiplication tables and the earlier methods at this stage, to complete questions where there is an exchange.

The children should not be calculating using the short method of division.

E.a. 91 ÷ 7 96 ÷ 8 $81 \div 3$ $84 \div 6$

$75 \div 3 = 25$

Key Vocabulary:

share, group, divide, divided by, half, 'is equal to', 'is the same as'

Division - Year 4 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 3, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

is no exchange of tens.

National Curriculum statutory requirements:

- Recall multiplication and division facts for multiplication tables up to 12 × 12
- Recognise and use factor pairs and commutativity in mental calculations
- Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Non-statutory requirements:

- Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.
- Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example $600 \div 3 = 200$ can be derived from $2 \times 3 = 6$).
- Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers.
- Pupils write statements about the equality of expressions (for example, use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, $2 \times 6 \times 5 = 10 \times 6 = 60$.

Concrete STAGE 1: 84 ÷ 4 Two-digit by one-digit when there is no exchange of

tens. Use base 10 or place value counters here. Using a place value grid helps to prepare the childrenn for the more formal written methods in Year 4.

Step 2: There are 2 groups of 4 tens in 8 tens.

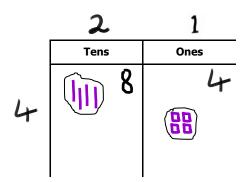
Step 4: There is 1 group of 4 ones in 4 ones tens.

L	
Tens	Ones
10 10 10 10	1 1 1

Step 1: How many groups of 4 tens are there in 8 tens? $75 \div 3 = 25$

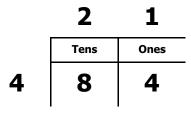
Step 3: How many groups of 4 ones are in 4 ones?

Pictorial STAGE 1: 84 ÷ 4 Two-digit by one-digit when there



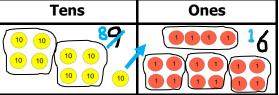
Abstract

STAGE 1: 84 ÷ 4 Two-digit by one-digit when there is no exchange of tens.



STAGE 2: 96 \div 4 Two-digit by one-digit with exchange of tens.

Step 5: There are Step 2: Two groups of 4 tens in 9 tens with 1 ten left over. four groups of 4 ones in 15 ones.



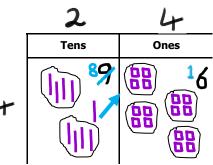
Step 1: How many groups of 4 tens are there in 9 tens?

 $96 \div 4 = 24$

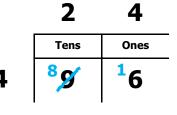
Step 3: I can exchange the 1 ten **Step 4:** How many groups of 4 left over for 10 ones so now I have 16 ones to put into 4

ones are in 16 ones?

STAGE 2: 96 ÷ 4 Two-digit by one-digit with exchange of tens.



STAGE 2: 96 ÷ 4 Two-digit by one-digit with exchange of



Key Vocabulary:

share, group, divide, divided by, half, 'is equal to' 'is the same as'

Division - Year 4 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 4, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Recall multiplication and division facts for multiplication tables up to 12 × 12
- Recognise and use factor pairs and commutativity in mental calculations
- Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Non-statutory requirements:

- Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.
- Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6).
- Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers.
- Pupils write statements about the equality of expressions (for example, use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, $2 \times 6 \times 5 = 10 \times 6 = 60$.

Concrete					Pictorial			Abstract			
AGE	3: 124 ÷ 4 Three	e-digit by one-digit in	cluding an exchange.	STAG	E 3: 124 ÷ 4 Thr	ee-digit by one-digit	including an exchange.	STAGE 3: 124 ÷ 4 Three-digit by one-digit includi exchange.			-digit including
_	0	3	1		0	3	1				
	Hundreds	Tens	Ones		Hundreds	Tens	Ones		0	3	1
+	2	10 10 1 2	4	4			4		Tens		Ones
	100	10 10 10 10 10 10						4	1	¹ 2	4
24 -	÷ 4 = 31			,							

Key Vocabulary:

share, group, divide, divided by, half, 'is equal to' 'is the same as'

Division - Year 5 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 5, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Divide numbers mentally drawing upon known facts
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign

Tens

Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple ratios.

Hundreds

Non-statutory requirements:

- Pupils practise and extend their use of the formal written methods of short division. They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.
- Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (for example, $98 \div 4 =$ (for example, $98 \div$ $4 = \frac{98}{4} = 24 \text{ r } 2 = 24^{1}/_{2} = 24.5 \approx 25$).

Concrete

1275 ÷ 4 Four-digit number divided by a one-digit number. Use place value counters.

Thousands

Step 1:

• Position the counters on the grid.

. Thousands column - there are no groups of four thousands in 1000 (write this at the top of the column). Exchange the 1000 for 10 hundreds and add them to the hundreds column.

Step 3:

• Hundreds column - you now have 12 hundreds. There are three groups of 4 hundreds in 1200 (write this at the top of the column).

Step 4:

• Tens column - there is one group of four tens in

50 (write this at the top of the column). You have 1 ten left over. Exchange the 10 for 10 ones and add them to the ones column.

• Ones column - you now have 17 ones. There are 4 groups of of 4 ones in 17 (write this at the top of the column). You have 1 left over, this gives a remainder of 1. Add this to the top of the column.

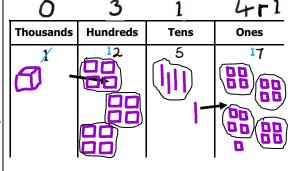
Step 6:

Step 5:

• $1257 \div 4 = 314 \text{ r } 1$

Pictorial

1275 ÷ 4 Four-digit number divided by a one-digit number



1275 ÷ 4 Four-digit number divided by a one-digit number

Abstract

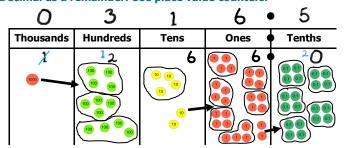
Interpreting remainders depending on the context.

E.g. 1: 1257 cakes are put into boxes of 4. How many boxes are filled? How many cakes, if any, are not put in boxes? 314 boxes are filed with 4 cakes. 1 cakes is left over and not put in a box.

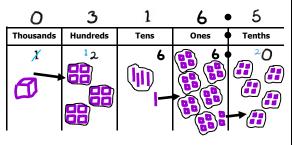
Ones

- E.g. 2: 1257 large cakes are shared equally between 4 schools. How many cakes does each school get? Each school will get 314 cakes with 1 cake left over. I need to divide this cake into 4 equal parts. Using my knowledge of division, I know that $1 \div 4$ can alo be written as $\frac{1}{4}$. Each school will get 314 and a quarter cakes.
- E.q. 3: A ribbon is 1275m. It is cut into 4 equal lengths. How long is each piece of ribbon? (see below)

1276 ÷ 4 Decimal as a remainder. Use place value counters.



1276 ÷ 4 Decimal as a remainder.



1276 ÷ 4 Decimal as a remainder.

Key Vocabulary:

share, group, divide, divided by, half, 'is equal to', 'is the same as'

Division - Year 6 Calculation Policy



Look at the previous learning and recap where appropriate.

In Year 6, children should be encouraged to consider whether they can calculate mentally, with or without jottings before using a written method.

National Curriculum statutory requirements:

- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions or by rounding as appropriate for context
- Divide numbers up to 4 digits by a two-digit number sing the formal written method of short division where appropriate, interpreting remainders according to the context
- Use written division methods in cases where the answer has up to two decimal places
- Solve problems involving addition, subtraction, multiplication and division
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Non-statutory requirements:

- Larger numbers, using formal methods division of short and long division
- They undertake mental calculations with increasingly large numbers and more complex calculations.
- Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.
- Pupils round answers to a specified degree of accuracy, for example, to the nearest 120, 20, 50 etc but not to a specified number of significant figures
- Pupils are introduced to the division of decimal numbers by one-digit whole number, initially, in practical contexts involving measures and money. They recognise division calculations as the inverse of multiplication.

Some children may still need the CPA approach, please see earlier work, especially when dealing with larger numbers or decimals, in particular place value counters may be beneficial here.

This section is split into stages of progression.

STAGE 1: To divide numbers up to 4-digits by 11 or 12.

N.B. Depending on the context of the problem the pupils should be able to represent the remainder as a decimal or a fraction.

STAGE 2: To divide decimal numbers by a one-digit number (no remainders).

STAGE 3: To divide a two-digit number by a two-digit whole number using the formal written method of long division (pupils can use jottings; begin with friendly numbers and no remainders).

 $\mbox{N.B.}$ Depending on the context of the problem the pupils should be able to interpret the remainder.

STAGE 4: To divide a three-digit number by a two-digit whole number using the formal written method of long division (pupils can use jottings here; begin with friendly numbers and no remainders).

STAGE 5: To divide a four-digit number by a two-digit whole number using the formal written method of long division (pupils can use jottings here; begin with friendly numbers and no remainders).

divide decimal numbers by a two-digit whole number using the formal written

STAGE 6: To

formal written method of long division (pupils can use jottings here; begin with friendly numbers and no

		2	1 • 0	2	
14	2	9	4 • 2	8	_
-	2	8	0 • 0	0	(20 x 14)
	0	1	4 • 2	8	_
-		1	4 • 0	0	(1 x 14)
		0	0 • 2	8	_
		0	0 _ 2	8	(0.02 x 14)
		0	0 • 0	8	=

Key Vocabulary:

share, group, divide, divided by, half, 'is equal to', 'is the same as'