

Calculation Policy



Addition



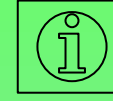
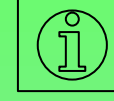
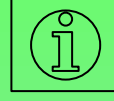
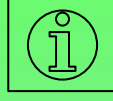
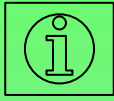
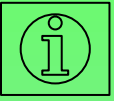
Subtraction



Multiplication



Division



	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition	Finding 1 more by counting. Find the total number of items in two groups by counting all of them. Counting up to 20.	Combining two parts to make a whole: part whole model. Starting at the bigger number and counting on. Regrouping to make 10.	Adding three single digits. Column method- no regrouping.	Column method-regrouping. (up to 3 digits)	Column method-regrouping. (up to 4 digits)	Column method-regrouping. (with more than 4 digits). (Decimals – with the same amount of decimal places).	Column method-regrouping. (Decimals-with different amounts of decimal places).

Topic: Addition & Subtraction



Early Years Foundation Stage

Stem sentence/ Maths talk

4 is a part, 3 is a part, 7 is the whole. , One more than ___ is ___. Adding one more to ___ gives us ___. Adding two to an odd number gives us the next odd number. Adding two to an even number gives the next even number. When 0 is added to any number, the number remains unchanged. Doubling a whole number always gives an even number.

Children in Reception will:

- Count objects, actions and sounds

- Subitise

- Link the numeral with its number value

- Count beyond ten

- Compare numbers

- Understand the 'one more/ one less' relationship between consecutive numbers.

- Explore the composition of numbers to 10

- Automatically recall number bonds 0-5 and some to 10

Early Learning Goals

- Have a deep understanding of numbers to 10, including the composition of each number

- Subitise (recognize quantities without counting) up to 5.

- Automatically recall (without reference to rhymes. Counting or other aids) numbers bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts

Notes / Vocabulary

Concrete

Pictorial

Abstract

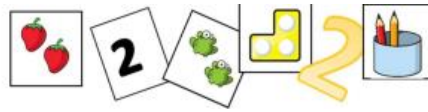
Start with 1, 2, 3
Then 4 & 5 including 0
6, 7, 8 Then 9 & 10
Use in continuous provisions and outdoor provisions.

Representing

Children use concrete objects which they can count or subitise.



Children can match picture cards to abstract numbers for 1, 2, 3



Children can mark make and start to recognise the abstract to the concrete and pictorial.

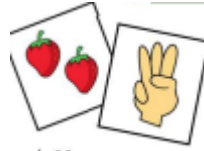
Children begin to understand that as we count each number is 1 more than the number before.
Use stories and songs which count on and back.

Comparing

Use loose parts for children to build their own one more/one less patterns.



Use picture card games. Asking the children to pick a card and see who has more and who has less.

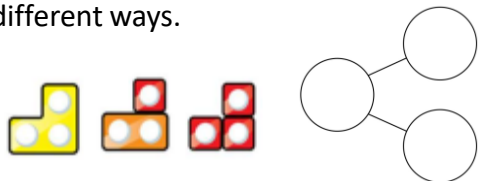


Ordering numbers based on matching the pictorial with the abstract. Can combine the two.

Introduce the idea that all numbers are made up of smaller numbers

Composition

Use concrete resources and part-whole models to show that 3 can be made in different ways.



Picture representations represented in different ways



Introducing the concept of + and =
 $1 + 2 = 3$
 $2 + 1 = 3$

Topic: Addition

Year 1



Stem sentence/ Maths talk

- 4 is a part, 3 is a part, 7 is the whole.
- One more than ___ is ___.
- Adding one more to ___ gives us ___.
- Adding two to an odd number gives us the next odd number.
- Adding two to an even number gives the next even number.
- When 0 is added to any number, the number remains unchanged.
- Doubling a whole number always gives an even number.

Year group objectives

To read, write and interpret mathematical statements involving +, - and =

To represent and use number bonds and related facts subtraction facts within 20.

To add and subtract one-digit and two-digit numbers to 20, including zero.

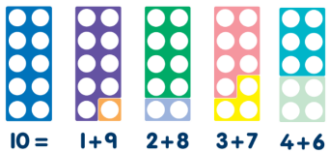
To solve one-step problems that involve addition and subtraction, using concrete object, pictorial representations, and missing number problems such as $7 = ? - 9$

Notes / Vocabulary

Parts, whole, addition, sum, total, addition add, more, and make, sum, total altogether.

Fact Families establishing that
 $3 + 4 = 7$
 $4 + 3 = 7$
 $7 = 4 + 3$
 $7 = 3 + 4$

Number bonds, tens frame, numicon,



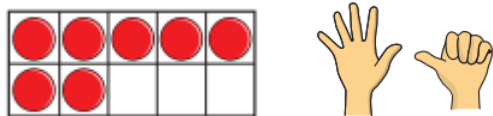
Concrete

Identifying parts and wholes (using a range of different resources).



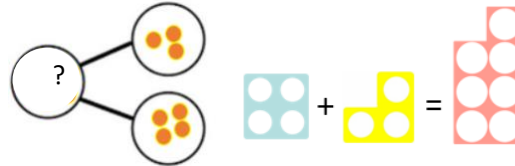
Important for children to find different combinations for making parts and wholes within a set number of resources.

Systematic number bonds to 10



Use tens frames, counters, cubes, numicon, fingers etc. Include zero.

Pictorial

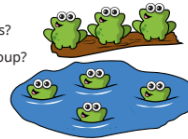


Here are some frogs.

- ▶ Can you see two groups of frogs?
- ▶ How many frogs are in each group?
- ▶ Complete the sentences.

_____ is a part.
 _____ is a part.

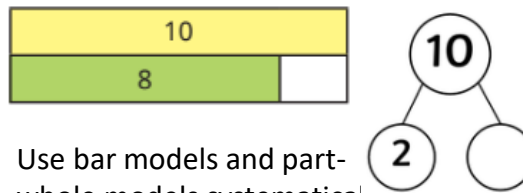
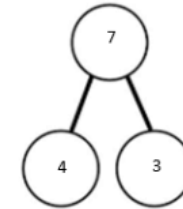
The whole is _____



Abstract

$4 + 3 = 7$ ($7 = 4 + 3$)
 4 is a part, 3 is a part
 7 is the whole.

$3 + 4 = 7$ ($7 = 3 + 4$)
 3 is a part, 4 is a part
 7 is the whole.



Use bar models and part-whole models systematically.



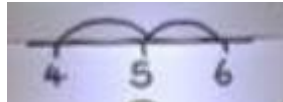
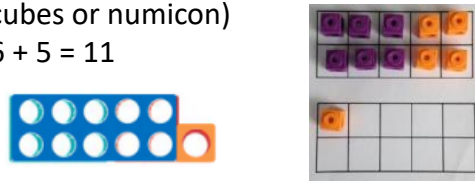
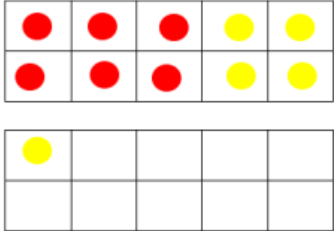
- $0 + \underline{\quad} = 10$
- $1 + \underline{\quad} = 10$
- $2 + \underline{\quad} = 10$
- $3 + \underline{\quad} = 10$
- $4 + \underline{\quad} = 10$
- $5 + \underline{\quad} = 10$
- $10 = 5 + \underline{\quad}$
- $10 = 6 + \underline{\quad}$
- $10 = 7 + \underline{\quad}$
- $10 = 8 + \underline{\quad}$
- $10 = 9 + \underline{\quad}$
- $10 = 10 + \underline{\quad}$

Show statements with equal signs in different places

Topic: Addition



Year 1

<p>Adding more, counting on, jumps, number line.</p>	<p>Adding more (use cubes, counters, numicon)</p> 	<p>Use a bar model to encourage the children to count on.</p> 	<p>Using an abstract number line</p>  <p>What is 2 more than 4? What is the sum of 2 and 4? What is the total of 2 and 4? $4 + 2 = 6$</p>
<p>Numicon, tens frame</p> <p>Use application of number bond facts to support. If I know that $5 + 5 = 10$, then I know that $6 + 5 = 11$. 11 is one more than 10.</p>	<p>Addition up to 20 (by using a tens frames and counters, cubes or numicon)</p> <p>$6 + 5 = 11$</p> 	<p>Children to draw counters within the tens frame.</p> 	<p>Children to develop understanding of equality.</p> <p>$6 + \underline{\quad} = 11$ $11 = 5 + \underline{\quad}$ $6 + 5 = 5 + \underline{\quad}$ $6 + 5 = \underline{\quad} + 4$</p> <p>Use missing values to pattern seek $11 = 6 + 5$, $11 = 7 + 4$, $11 = 8 + 3$, $11 = 9 + 2$</p>

Example arithmetic questions

$3 + 5 = \underline{\quad}$ $2 + 8 = \underline{\quad}$ $12 + 5 = \underline{\quad}$

$\underline{\quad} = 1 + 8$ $\underline{\quad} = 14 + 3$ $\underline{\quad} = 20 + 0$

<h3>Year group objectives</h3>
<p>To read, write and interpret mathematical statements involving +, - and =</p>
<p>To represent and use number bonds and related facts subtraction facts within 20.</p>
<p>To add and subtract one-digit and two-digit numbers to 20, including zero.</p>
<p>To solve one-step problems that involve addition and subtraction, using concrete object, pictorial representations, and missing number problems such as $7 = ? - 9$</p>

Topic: Addition



Year 2

Stem sentence/ Maths talk

There are ___ and ___ and ___. Altogether there are _____.

When we add three numbers, the total will be the same whichever pair we add first.

If you change the order of the numbers, the sum remains the same.

First I partition the ___, plus ___ is equal to _____. Then _____ plus ___ is equal to 10. ...and then then plus ___ is equal to _____.

___ is one more than _____. ___ is equal to ___ plus one. ___ plus one is equal to _____.

I know that ___ plus ___ is equal to _____.so ___ plus _____ is equal to _____.

Year group objectives

To use concrete objects and pictorial representations, including number, quantities and measure.

To apply increasing knowledge of mental and written methods

To recall and use + and - facts to 20 fluently and derive and use related facts up to 100

To add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

- A two-digit number and ones
- A two-digit number and tens
- 2 two-digit numbers
- 3 one-digit numbers.

To show that addition can be done in any order (commutative) and subtraction cannot.

To recognise and use the inverse relationship between + and - and use this to check calculations and solve missing number problems.

Notes / Vocabulary

Tens, ones, partition, place value, base ten, place value counters.

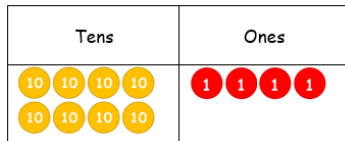
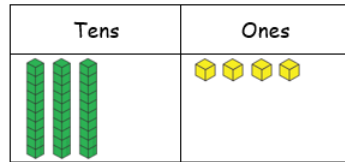
Be explicit with place value when moving onto written methods, including using zero as a place holder.

Formal written methods without regrouping.

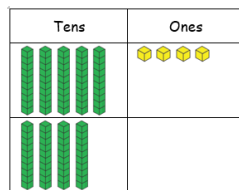
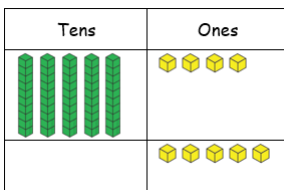
Encourage children to count on mentally and apply knowledge of number bonds.

Concrete

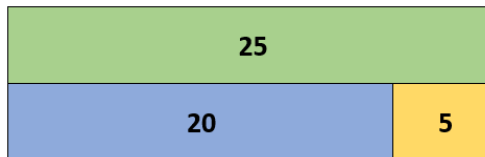
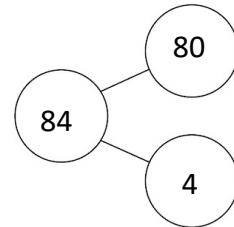
Partitioning two-digit numbers into tens and ones



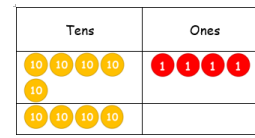
Adding two-digit number and ones and tens



Pictorial



Children can draw their own representations. Embed PV knowledge.



Abstract

$$80 + 4 = 84 \quad 80 + _ = 84$$

$$20 + 5 = 25 \quad 20 + _ = 25$$

Introduce written method adding multiple of ten and ones together.

	T	O
	8	0
+		4
	8	4

Be explicit with PV when explaining.
 0 ones + 4 ones = 4 ones
 8 tens + 0 tens = 8 tens
 8 tens = 80 4 ones = 4
 80 + 4 = 84

$$54 + 5 = _$$

$$54 + 40 = _$$

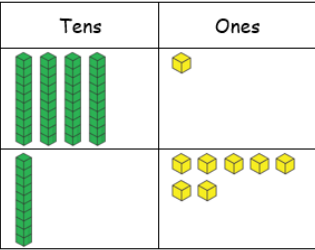
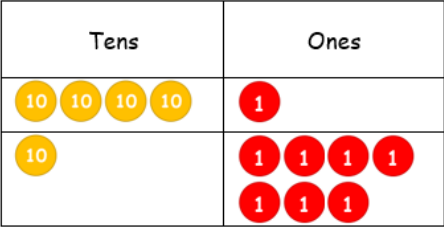
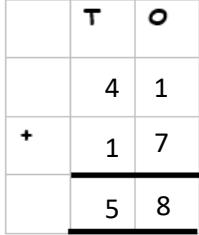

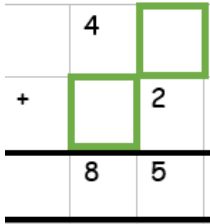

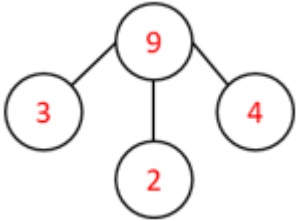
	T	O
	5	4
+		5
	5	9

	T	O
	5	4
+	4	0
	9	4

Topic: Addition



Year 2

<p>Formal written methods without regrouping.</p> <p>Encourage children to count on mentally and apply knowledge of number bonds.</p>	<p>Adding two, two digit numbers</p> 	<p>Children can draw their own frames.</p> 	<p>Explicit when modelling $1 \text{ ones} + 7 \text{ ones} = 8 \text{ ones}$ $4 \text{ tens} + 1 \text{ ten} = 5 \text{ tens}$ $5 \text{ tens} = 50 \quad 8 \text{ ones} = 8$ $50 + 8 = 58$</p> 
<p>Addition, subtraction, opposite, inverse, parts, whole, bar model, place value.</p>	<p>Using inverse to check missing number problems</p>	<p>Use bar model or missing part –whole models</p> 	<p>$30 + \underline{\quad} = 75$ $\underline{\quad} + 22 = 55$ $80 = 40 + \underline{\quad}$ $36 = \underline{\quad} + 16$</p> 
<p>Ones, counters parts, whole, altogether, counting on.</p>	<p>Adding three, one-digit numbers together</p> 		<p>$3 + 2 + 4 = 9$ $4 + 3 + 5 = 12$ Progress to missing numbers $3 + \underline{\quad} + 4 = 9$ $4 + 3 + \underline{\quad} = 12$</p>

Year group objectives

To use concrete objects and pictorial representations, including number, quantities and measure.

To apply increasing knowledge of mental and written methods

To recall and use + and – facts to 20 fluently and derive and use related facts up to 100

To add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

- A two-digit number and ones
- A two-digit number and tens
- 2 two-digit numbers
- 3 one-digit numbers.

To show that addition can be done in any order (commutative) and subtraction cannot.

To recognise and use the inverse relationship between + and – and use this to check calculations and solve missing number problems.

Example arithmetic questions from KS1 SATS

$5 + 10 + 5 = \boxed{\quad}$
 $98 + 4 = \boxed{\quad}$
 $\boxed{\quad} + 8 = 12$
 $5 + 32 = \boxed{\quad}$
 $22 + 22 = \boxed{\quad}$
 $68 + 20 = \boxed{\quad}$

Topic: Addition



Year 3

Stem sentence/ Maths talk

There are ten tens in one hundred.

There are one hundred ones in one hundred.

___ones/tens/hundreds plus/minus ones/tens/hundreds is equal to ___ones/tens/hundreds

If I have ___ones, I can exchange them for ___ten and ___ones.

If I have ___tens, I can exchange them for ___hundred and ___tens

I will exchange 1 hundred for ___tens, then 1 ten for ___ones.

There are ___ hundreds ___tens and ___ones. The answer is _____

Year group objectives

Add whole numbers with up to 3 digits, including using formal written methods

Add numbers mentally including-
3 digit number and ones
3 digit number and tens
3 digit number and hundreds

Estimate the answer to a calculation and use inverse operations to check answer.

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

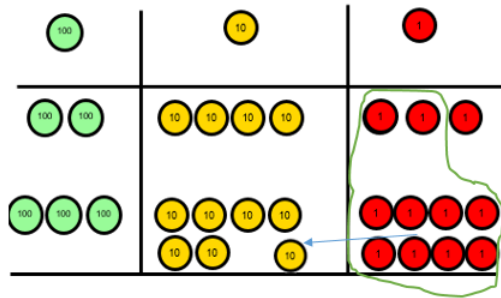
Notes / Vocabulary

addition add, more, and make, sum, total altogether double near double half, halve one more, two more ... ten more ... one hundred more, inverse

Use of place value counters to add HTO + TO, HTO + HTO etc. once the children have had practice, they should be able to apply it to larger numbers and the abstract

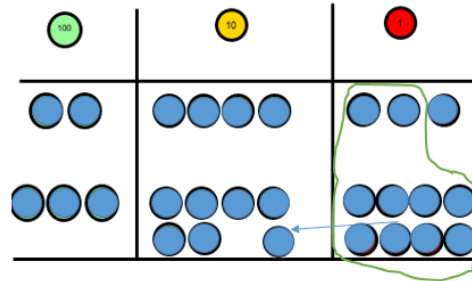
Concrete

Use of place value counters



Pictorial

Use of a place value grid and drawn images



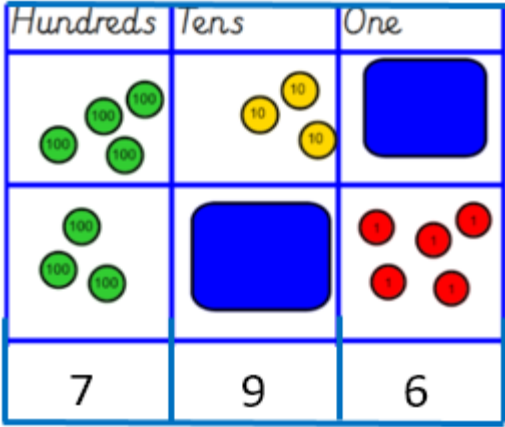
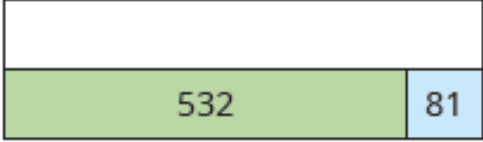
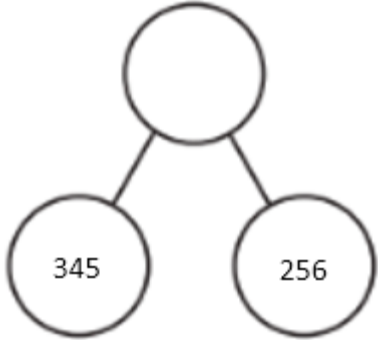
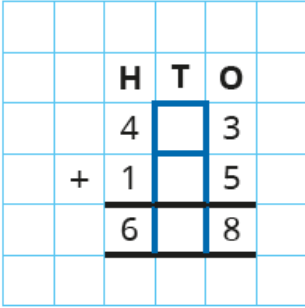
Abstract

$$\begin{array}{r}
 243 \\
 +368 \\
 \hline
 611 \\
 \hline
 1 \quad 1
 \end{array}$$

Topic: Addition



Year 3

Notes / Vocabulary	Concrete	Pictorial	Abstract									
<p>Mental strategies and inverse operations involving fact families. Part whole models to support.</p> <p>Add three numbers together eg $243 + 341 + 98 =$</p>	<p>Use place value counters, or represent pictorially.</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td><i>Hundreds</i></td> <td><i>Tens</i></td> <td><i>One</i></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>9</td> <td>6</td> </tr> </table>	<i>Hundreds</i>	<i>Tens</i>	<i>One</i>				7	9	6	 	<p>What could the missing digits be?</p>  <p>Building up known facts and using them to illustrate the inverse and to check answers: $98 + 18 = 116$ $116 - 18 = 98$ $18 + 98 = 116$ $116 - 98 = 18$</p>
<i>Hundreds</i>	<i>Tens</i>	<i>One</i>										
7	9	6										

Year group objectives
Add whole numbers with up to 3 digits, including using formal written methods
Add numbers mentally including- 3 digit number and ones 3 digit number and tens 3 digit number and hundreds
Estimate the answer to a calculation and use inverse operations to check answer.
Solve addition problems including missing number facts, place value and more complex addition.

<u>Example questions</u>	$710 + 1 =$	$20 + 4 + 4 =$	$134 + 61 =$	$34 + ? = 72$	$\begin{array}{r} 269 \\ + 412 \\ \hline \end{array}$
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Topic: Addition



Year 4

Stem sentence/ Maths talk

There are ten hundreds in one thousand. There are one hundred tens in one thousand. There are one thousand ones in one thousand.

_____ plus _____ plus the 1 that I exchanged from the last column equals _____

When rounding to the nearest thousand, the hundreds digit is the one we need to consider.

When rounding to the nearest hundred, the tens digit is the one we need to consider.

When rounding to the nearest ten, the ones digit is the one we need to consider

Year group objectives

Add whole numbers with up to 4 digits, including using formal written methods.

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

Solve addition 2 step problems in context

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

Notes / Vocabulary

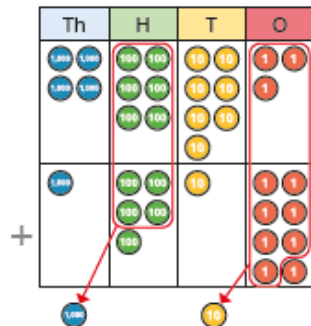
addition add, more, and make, sum, total altogether double near double half, halve one more, two more ... ten more ... one hundred more, inverse

Use of place value counters to add THTO + HTO, THTO + THTO etc. once the children have had practice, they should be able to apply it to larger numbers and the abstract

Addition of decimal numbers in context – using money.

Concrete

Children continue to use dienes or place value counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand.



Include examples that exchange in ones, tens and hundreds and in more than 1 column.

Pictorial

Use of a place value grid and drawn images

th	h	t	ones
600	00	000	00
0		000	000
5	2	9	7

th	h	t	ones
8	5	2	3

Abstract

	Th	H	T	O
	1	9	4	5
+	1	2	5	7
	3	2	0	2

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

Include examples that exchange in ones, tens hundreds and in more than 1 column.

Topic: Addition



Year 4

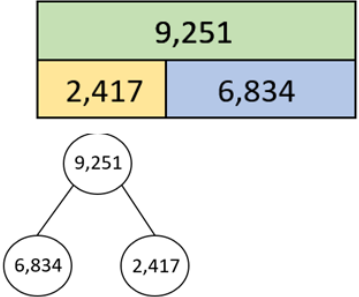

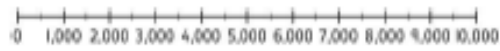

Year group objectives

Add whole numbers with up to 4 digits, including using formal written methods.

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

Solve addition 2 step problems in context

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

Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>Mental strategies and inverse operations involving fact families. Part whole models to support.</p>	<p>Use place value counters or represent pictorially. Use place value equipment on a place value grid to organise thinking. Ensure that children understand how the columns relate to place value and what to do if the numbers are not all 4-digit numbers.</p>		<p>$2,417 + 6,834 = 9,251$ $6,834 + 2,417 = 9,251$ $9,251 - 2,417 = 6,834$ $9,251 - 6,834 = 2,417$</p>
<p>Use rounding and estimating to find answers. Pupils must choose the most efficient method for addition – number lines, mentally or column method. Recognise that questions such as $2001 + 3400$ are solved more efficiently with mental methods rather than column method,</p>	<p>Use place value counters or represent pictorially. Use place value equipment on a place value grid to organise thinking. Ensure that children understand how the columns relate to place value and what to do if the numbers are not all 4-digit numbers.</p>	<p>Bar models may be used to represent additions in problem contexts, and to justify mental methods where appropriate. Eg $799 + 574$</p>  <p>Moving to...</p>	<p>$912 + 6,149 = ?$</p>  <p>I used rounding to work out that the answer should be approximately $1,000 + 6,000 = 7,000$.</p> <p>Rounding and adjusting I chose to work out $574 + 800$, then subtract 1.</p> 

Example questions $3005 + 1000 =$ $2200 + 500 =$ $\underline{\quad} + 110 = 450$
 $3452 + 5230$ $< \text{ or } > \text{ or } =$ $2872 + 7098$

$8998 + 2419 =$

Topic: Addition Year 5



Stem sentence/ Maths talk

The sum of the known parts is equal to the whole.

Ten one thousands make ten thousand.

One hundred hundreds make one thousand.

Ten ten thousands make one hundred thousand.

One hundred one thousands make one hundred thousand.

_____ is the whole so _____ and _____ are the parts.

The sum of the known parts is equal to the whole

Year group objectives

Add whole numbers with more than 4 digits, including using formal written methods

Add numbers mentally with increasingly large numbers

Use rounding to check answers to calculations and determine, in the context of problems, levels of accuracy

Solve addition multi-step problems in contexts, deciding which operations and methods to use and why

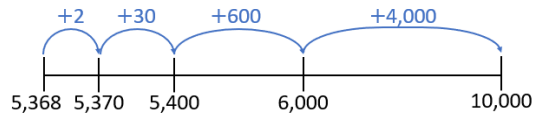
Notes / Vocabulary

addition add, more, and make, sum, total altogether double near double half, halve one more, two more ... ten more ... one hundred more inverse

Concrete

Use place value counters or represent pictorially.
Use place value equipment on a place value grid to organise thinking.
Ensure that children understand how the columns relate to place value and what to do if the numbers are not all 4-digit numbers.

Pictorial



Abstract

$$\begin{array}{r} 85683 \\ +45978 \\ \hline 131661 \\ \hline 1111 \end{array}$$


	£	1	7	3	2	0
+	£		6	0	0	9
	£	3	4	8	7	1
	£	5	8	2	0	0
		1	1	1	1	

	3	1	0	5	3
+	0	5	7	2	6
	3	6	7	7	9

Topic: Addition



Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract	Year group objectives																																			
Starting to add decimals but only when each number has the same number of decimal places	 <p>Counters will support pupils with the process of exchanging. It will also help with discussions around language 'tenths' 'hundredths'.</p>	<table border="1" data-bbox="963 354 1488 596"><thead><tr><th>Ones</th><th>Tenths</th><th>Hundredths</th></tr></thead><tbody><tr><td>1 1 1</td><td>0.1 0.1 0.1</td><td>0.01 0.01 0.01</td></tr><tr><td>1 1</td><td>0.1 0.1 0.1</td><td>0.01</td></tr></tbody></table> <p>1</p>	Ones		Tenths	Hundredths	1 1 1	0.1 0.1 0.1	0.01 0.01 0.01	1 1	0.1 0.1 0.1	0.01	<table border="1" data-bbox="1538 354 1854 568"><tbody><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>3</td><td>.</td><td>6</td><td>5</td></tr><tr><td>+</td><td>2</td><td>.</td><td>4</td><td>1</td></tr><tr><td></td><td>6</td><td>.</td><td>0</td><td>6</td></tr><tr><td></td><td>1</td><td></td><td></td><td></td></tr></tbody></table> $\begin{array}{r} 436.4 \\ + 59.8 \\ \hline 495.2 \\ 11 \end{array}$							3	.	6	5	+	2	.	4	1		6	.	0	6		1				<p>Add whole numbers with more than 4 digits, including using formal written methods</p> <p>Add numbers mentally with increasingly large numbers</p> <p>Use rounding to check answers to calculations and determine, in the context of problems, levels of accuracy</p> <p>Solve addition multi-step problems in contexts, deciding which operations and methods to use and why</p>
Ones	Tenths	Hundredths																																					
1 1 1	0.1 0.1 0.1	0.01 0.01 0.01																																					
1 1	0.1 0.1 0.1	0.01																																					
	3	.	6	5																																			
+	2	.	4	1																																			
	6	.	0	6																																			
	1																																						

Topic: Addition



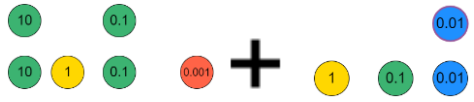
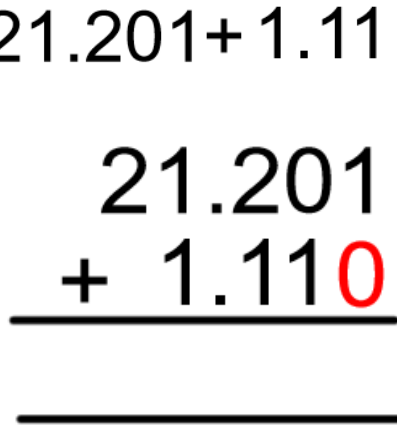
Year 6

Stem sentence/ Maths talk

Addition/ Subtraction General

If one addend is increased by an amount and the other addend is decreased by the same amount, the sum remains the same.

If one addend is changed by an amount and the other addend is kept the same, the sum changes by that amount. If you have increased or decreased the minuend and subtrahend by the same amount, the difference stays the same.

Notes / Vocabulary	Concrete	Pictorial	Abstract																		
<p>addition add, more, and make, sum, total altogether double near double half, halve one more, two more ... ten more ... one hundred more Number with more than 4 digits Decimal numbers with different numbers of decimal places. Multistep problems</p>	<p>4 or more digits add 4 or more digits including different numbers of decimal places.</p> <p>Use of place value counters to add different decimal values</p>  <p>• Vary the number of digits in the number • = sign on the RHS • Balanced equations</p> <p>$247 + 14,699 =$</p> <p>$? = 6.9 + 14.32$</p>	<p>Children can represent the counters like the image below.</p> <table border="1" data-bbox="950 921 1490 1085"> <thead> <tr> <th>T</th> <th>0</th> <th>.</th> <th>t</th> <th>h</th> <th>th</th> </tr> </thead> <tbody> <tr> <td>●</td> <td>●</td> <td></td> <td>●</td> <td>●</td> <td>●</td> </tr> <tr> <td></td> <td>●</td> <td></td> <td>●</td> <td>●</td> <td></td> </tr> </tbody> </table>	T	0	.	t	h	th	●	●		●	●	●		●		●	●		<p>Children must line up the digits in correct place columns. A 0 can be used to fill any empty columns.</p> $21.201 + 1.11$ 
T	0	.	t	h	th																
●	●		●	●	●																
	●		●	●																	

Year group objectives

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Use their knowledge of the order of operations to carry out calculations involving the 4 operations

Perform mental calculations, including with mixed operations and large numbers

Topic: Addition



Year 6

SAT Questions
Arithmetic

$$1,034 + 586 =$$

$$6.1 + 0.3 =$$

$$2.5 + 0.05 =$$

Reasoning

Write the missing number.

One is done for you.

180 $\xrightarrow{\text{is 20 more than}}$ 160

$\xrightarrow{\text{is 20 more than}}$ 237

Write the four missing digits to make this **addition** correct.

$$\begin{array}{cccc} \square & 6 & \square & 8 \\ + & 3 & \square & \square \\ \hline 9 & 0 & 1 & 9 \end{array}$$

Write the missing digits to make the addition correct.

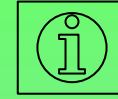
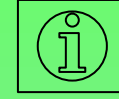
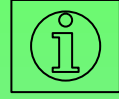
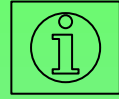
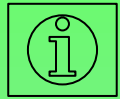
$$\begin{array}{ccc} \square & \square & \square \\ + & \square & \square \\ \hline 9 & 0 & 0 \end{array}$$

Year group objectives

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Use their knowledge of the order of operations to carry out calculations involving the 4 operations

Perform mental calculations, including with mixed operations and large numbers



	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Subtraction	Finding 1 less. Working within 20.	Taking away ones. Counting back. Find the difference. Part whole model. Make 10.	Counting back. Find the difference. Part whole model. Make 10. Column method-no regrouping.	Column method with regrouping (up to 3 digits).	Column method with regrouping (up to 4 digits).	Column method with regrouping. (with more than 4 digits). (Decimals – with the same amount of decimal places).	Column method with regrouping. (Decimals – with different amounts of decimal places).

874 – 523 becomes

$$\begin{array}{r}
 874 \\
 - 523 \\
 \hline
 351
 \end{array}$$

Answer: 351

932 – 457 becomes

$$\begin{array}{r}
 \begin{array}{ccc} 8 & 12 & 1 \end{array} \\
 \begin{array}{r}
 \cancel{9} \cancel{3} 2 \\
 - 457 \\
 \hline
 475
 \end{array}
 \end{array}$$

Answer: 475

932 – 457 becomes

$$\begin{array}{r}
 \begin{array}{ccc} 1 & 1 & \end{array} \\
 \begin{array}{r}
 932 \\
 - \cancel{4} \cancel{5} 7 \\
 \begin{array}{ccc} 5 & 6 & \end{array} \\
 \hline
 475
 \end{array}
 \end{array}$$

Answer: 475

Topic: Subtraction



Year 1

Stem sentence/ Maths talk

_____ is the whole. _____ is a part, _____ is a part and _____ is a part.



Year group objectives

read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs

represent and use number bonds and related subtraction facts within 20

add and subtract one-digit and two-digit numbers to 20, including 0

solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$

Notes / Vocabulary

Children develop the core ideas that underpin all calculation. They begin by connecting calculation with counting on and counting back, but they should learn that understanding wholes and parts will enable them to calculate efficiently and accurately, and with greater flexibility. They learn how to use an understanding of 10s and 1s to develop their calculation strategies, especially in addition and subtraction.

Concrete

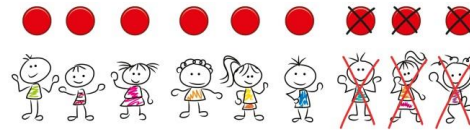
Children arrange objects and remove to find how many are left.



1 less than 6 is 5.
6 subtract 1 is 5.

Pictorial

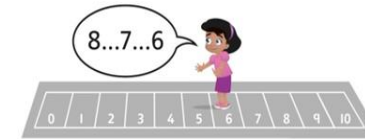
Children draw and cross out or use counters to represent objects from a problem.



$9 - \square = \square$
There are \square children left.

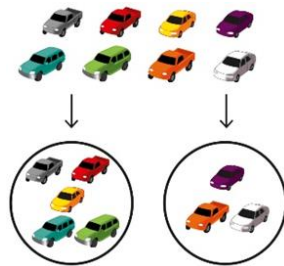
Abstract

Children count back to take away and use a number line or number track to support the method.



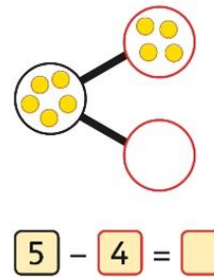
$9 - 3 = 6$

Children separate a whole into parts and understand how one part can be found by subtraction.



$8 - 5 = ?$

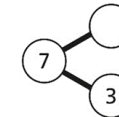
Children represent a whole and a part and understand how to find the missing part by subtraction.



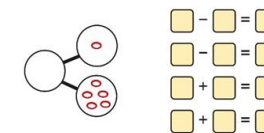
$5 - 4 = \square$

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

$7 - 3 = ?$



Children develop an understanding of the relationship between addition and subtraction facts in a part-whole model.



Topic: Subtraction



Year 1


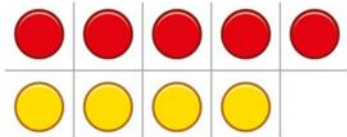
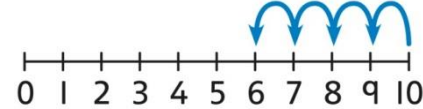


Year group objectives

read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs

represent and use number bonds and related subtraction facts within 20

add and subtract one-digit and two-digit numbers to 20, including 0

solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$

Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>More than Less than Difference Efficient</p>	<p>Arrange two groups so that the difference between the groups can be worked out.</p>  <p>8 is 2 more than 6. 6 is 2 less than 8. The difference between 8 and 6 is 2</p>	<p>Represent objects using sketches or counters to support finding the difference.</p>  <p>$5 - 4 = 1$ The difference between 5 and 4 is 1</p>	<p>Children understand 'find the difference' as subtraction.</p>  <p>$10 - 4 = 6$ The difference between 10 and 6 is 4.</p>
	<p>Understand when and how to subtract 1s efficiently.</p> <p>Use a bead string to subtract 1s efficiently.</p>  <p>$5 - 3 = 2$ $15 - 3 = 12$</p>	<p>Understand when and how to subtract 1s efficiently.</p>  <p>$5 - 3 = 2$ $15 - 3 = 12$</p>	<p>Understand how to use knowledge of bonds within 10 to subtract efficiently.</p> <p>$5 - 3 = 2$ $15 - 3 = 12$</p>

Topic: Subtraction



Year 1

Year group objectives

read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs

represent and use number bonds and related subtraction facts within 20

add and subtract one-digit and two-digit numbers to 20, including 0

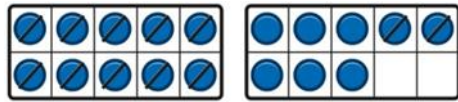
solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$

Notes / Vocabulary

Concrete

For example: $18 - 12$

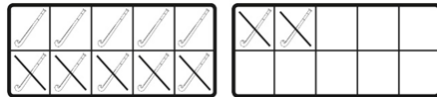
Use ten frames to represent the efficient method of subtracting 12.



First subtract the 10, then subtract 2.

For example: $12 - 7$

Arrange objects into a 10 and some 1s, then decide on how to split the 7 into parts.



7 is 2 and 5, so I take away the 2 and then the 5.

Pictorial

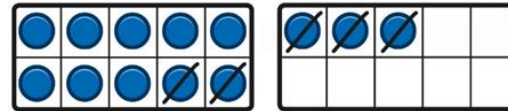
For example: $18 - 12$

Subtract 12 by first subtracting the 10, then the remaining 2.



First subtract the 10, then take away 2.

Represent the use of bonds using ten frames.

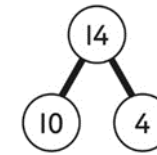


For $13 - 5$, I take away 3 to make 10, then take away 2 to make 8.

Abstract

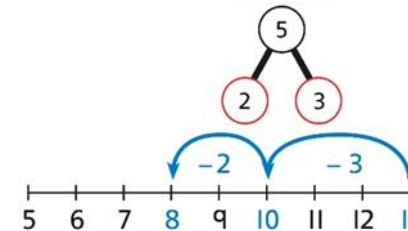
Use a part-whole model to support the calculation.

$$\begin{aligned} 19 - 14 \\ 19 - 10 = 9 \\ 9 - 4 = 5 \\ \text{So, } 19 - 14 = 5 \end{aligned}$$



Use a number line and a part-whole model to support the method.

$$13 - 5$$



Topic: Subtraction



Year 2

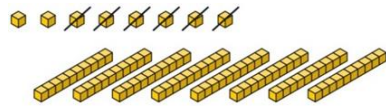
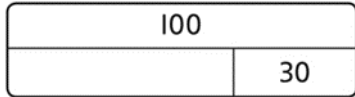
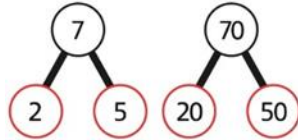
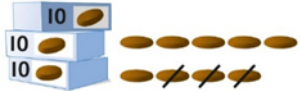
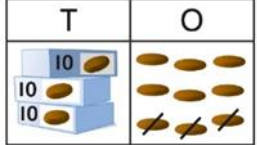
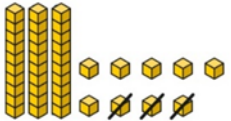
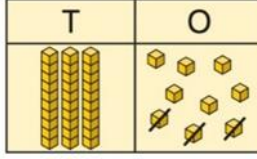
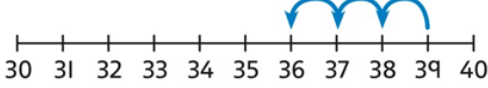
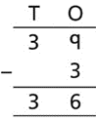
Stem sentence/ Maths talk

I need to subtract _____ to get to 10
 I can partition _____ into _____ and _____
 I need to subtract _____ more.
 _____ less than _____ is _____

When subtracting, the answer will be _____ than the number I start with.

_____ + _____ = 10, so 10 - _____ = _____

If 10 - _____ = _____, then _____ - _____ = _____

Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>The use of concrete resources such as ten frames and counters, base 10 and Rekenreks can support children in choosing the most efficient way to partition the 1-digit number they are subtracting and can also aid their understanding. Other representations, such as number lines for representing calculations and part-whole models for partitioning, are also useful throughout. All of these will support children as they start to move towards a mental strategy for subtracting across a 10.</p>	<p>Use known number bonds and unitising to subtract multiples of 10.</p>  <p>8 tens subtract 6 tens is 2 tens. So, 8 tens subtract 6 tens is 2 tens.</p>	<p>Use known number bonds and unitising to subtract multiples of 10.</p>  <p>$10 - 3 = 7$ So, 10 tens subtract 3 tens is 7 tens.</p>	<p>Use known number bonds and unitising to subtract multiples of 10.</p>  <p>7 tens subtract 5 tens is 2 tens. $70 - 50 = 20$</p>
	<p>Subtract the 1s. This may be done in or out of a place value grid.</p>  	<p>Subtract the 1s. This may be done in or out of a place value grid.</p>  	<p>Subtract the 1s. Understand the link between counting back and subtracting the 1s using known bonds.</p> <p>$9 - 3 = 6$ $39 - 3 = 36$</p>  

Year group objectives

solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures

applying their increasing knowledge of mental and written methods

recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and 1s

a two-digit number and 10s
 2 two-digit numbers
 adding 3 one-digit numbers

show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot

recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Topic: Subtraction



Year 2

Year group objectives

solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures

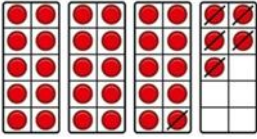
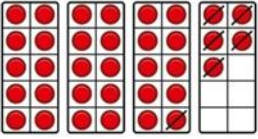
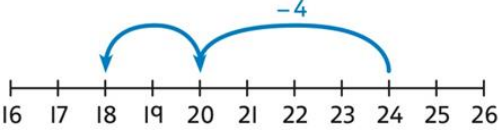
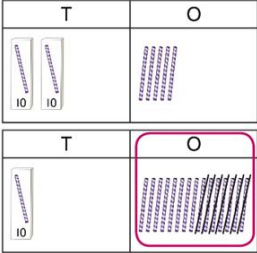
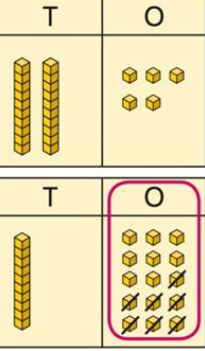
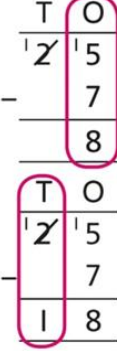
applying their increasing knowledge of mental and written methods

recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and 1s
a two-digit number and 10s
2 two-digit numbers
adding 3 one-digit numbers

show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot

recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Notes / Vocabulary	Concrete	Pictorial	Abstract
	<p>Bridge 10 by using known bonds and tens frames.</p>  <p>$35 - 6$ I took away 5 counters, then 1 more.</p>	<p>Use pictorial representations of the same concept.</p> 	<p>Bridge 10 by using known bonds.</p> <p>$24 - 6 = ?$ $24 - 4 - 2 = ?$</p> 
	<p>Exchange 1 ten for 10 ones. This may be done in or out of a place value grid with base 10.</p> 		

Topic: Subtraction

Year 2



Year group objectives

solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures

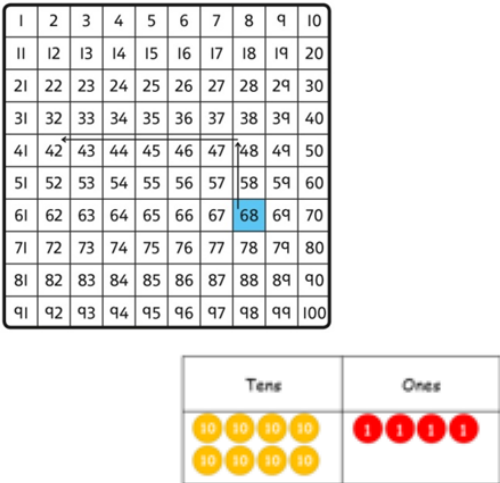
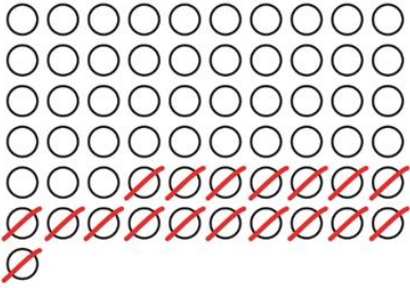
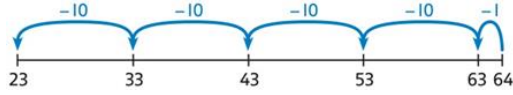
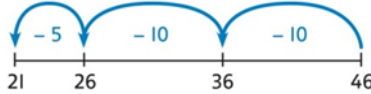
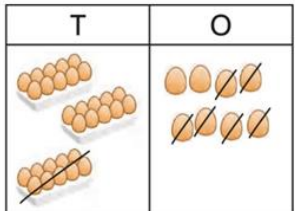
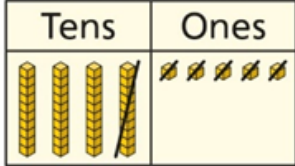
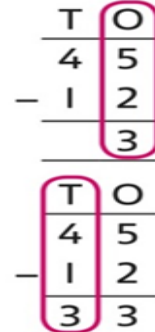
applying their increasing knowledge of mental and written methods

recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and 1s
a two-digit number and 10s
2 two-digit numbers
adding 3 one-digit numbers

show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot

recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Notes / Vocabulary	Concrete	Pictorial	Abstract
	<p>Subtract the 10s and the 1s. This can be represented on a 100 square with counters.</p> 	<p>Subtract by taking away.</p> <p>$61 - 18$ I took away 1 ten and 8 ones.</p> 	<p>This can be represented on a number line.</p>  <p>$64 - 41 = ?$</p> <p>$64 - 1 = 63$ $63 - 40 = 23$ $64 - 41 = 23$</p>  <p>$46 - 20 = 26$ $26 - 5 = 21$ $46 - 25 = 21$</p>
	<p>Use real objects if available. Subtract the 1s. Then subtract the 10s. This may be done in or out of a place value grid.</p>  <p>$38 - 16 = 22$</p>	<p>Subtract the 1s. Then subtract the 10s.</p> 	<p>Using column subtraction, subtract the 1s. Then subtract the 10s.</p> 

Topic: Subtraction

Year 2



Year group objectives

solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures

applying their increasing knowledge of mental and written methods

recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and 1s
a two-digit number and 10s
2 two-digit numbers
adding 3 one-digit numbers

show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot

recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Notes / Vocabulary	Concrete	Pictorial	Abstract																																																																																						
	<p>Use base 10 to explore the exchange. 45 - 27 = ?</p> <table border="1" data-bbox="338 432 568 561"> <tr><th>Tens</th><th>Ones</th></tr> <tr><td></td><td></td></tr> </table> <table border="1" data-bbox="338 596 568 725"> <tr><th>Tens</th><th>Ones</th></tr> <tr><td></td><td></td></tr> </table> <table border="1" data-bbox="338 761 568 889"> <tr><th>Tens</th><th>Ones</th></tr> <tr><td></td><td></td></tr> </table> <table border="1" data-bbox="338 925 568 1053"> <tr><th>Tens</th><th>Ones</th></tr> <tr><td></td><td></td></tr> </table>	Tens	Ones			Tens	Ones			Tens	Ones			Tens	Ones			<p>Exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s.</p> <table border="1" data-bbox="1238 454 1467 582"> <tr><th>Tens</th><th>Ones</th></tr> <tr><td></td><td></td></tr> </table> <table border="1" data-bbox="1238 618 1467 746"> <tr><th>Tens</th><th>Ones</th></tr> <tr><td></td><td></td></tr> </table> <table border="1" data-bbox="1238 782 1467 911"> <tr><th>Tens</th><th>Ones</th></tr> <tr><td></td><td></td></tr> </table> <table border="1" data-bbox="1238 946 1467 1075"> <tr><th>Tens</th><th>Ones</th></tr> <tr><td></td><td></td></tr> </table>	Tens	Ones			Tens	Ones			Tens	Ones			Tens	Ones			<p>Using column subtraction, exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s.</p> <p>45 - 27 = ? ? + 27 = 45</p> <table border="0" data-bbox="1905 446 2020 575"> <tr><td></td><td>T</td><td>O</td></tr> <tr><td></td><td>4</td><td>5</td></tr> <tr><td>-</td><td>2</td><td>7</td></tr> <tr><td colspan="3"><hr/></td></tr> </table> <table border="0" data-bbox="1905 604 2020 732"> <tr><td></td><td>T</td><td>O</td></tr> <tr><td></td><td>3 4</td><td>15</td></tr> <tr><td>-</td><td>2</td><td>7</td></tr> <tr><td colspan="3"><hr/></td></tr> </table> <table border="0" data-bbox="1905 761 2020 889"> <tr><td></td><td>T</td><td>O</td></tr> <tr><td></td><td>3 4</td><td>15</td></tr> <tr><td>-</td><td>2</td><td>7</td></tr> <tr><td colspan="3"><hr/></td></tr> <tr><td></td><td></td><td>8</td></tr> </table> <table border="0" data-bbox="1905 918 2020 1046"> <tr><td></td><td>T</td><td>O</td></tr> <tr><td></td><td>3 4</td><td>15</td></tr> <tr><td>-</td><td>2</td><td>7</td></tr> <tr><td colspan="3"><hr/></td></tr> <tr><td></td><td>1</td><td>8</td></tr> </table>		T	O		4	5	-	2	7	<hr/>				T	O		3 4	15	-	2	7	<hr/>				T	O		3 4	15	-	2	7	<hr/>					8		T	O		3 4	15	-	2	7	<hr/>				1	8
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Topic: Subtraction



Year 3

Stem sentence/ Maths talk

There are ten tens in one hundred.

There are one hundred ones in one hundred.

___ones/tens/hundreds plus/minus ones/tens/hundreds is equal to ___ones/tens/hundreds

If I have ___tens, I can exchange them for ___ones.

If I have ___hundreds, I can exchange them for ___tens and ___ones

I will exchange 1 hundred for ___tens, then 1 ten for ___ones.

There are ___hundreds ___tens and ___ones. The answer is _____

Year group objectives

Subtract numbers with up to 3 digits using formal written methods.

Subtract numbers mentally including –
3 digit number and ones
3 digit number and tens
3 digit number and hundreds

Estimate the answer to a calculation and use inverse operations to check answer.

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

Notes / Vocabulary

Subtraction, difference total altogether, half, halve, one less, two less ... ten less ... one hundred less, inverse
Note: stress importance of 'difference' as subtraction language
Use of place value counters to subtract HTO + TO, HTO + HTO etc. once the children have had practice, they should be able to apply it to larger numbers and the abstract

Concrete

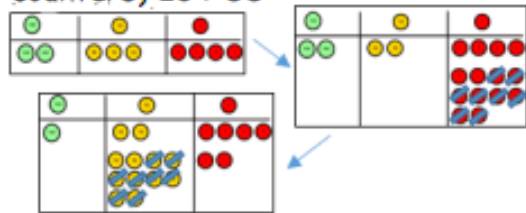
Without regrouping

Work out $769 - 147$



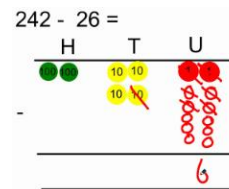
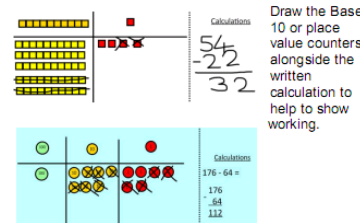
With regrouping

Column method (using place value counters) $234 - 88$



Pictorial

Once the children have had practice with the concrete, they should be able to apply it to any subtraction. Like the other pictorial representations, children to represent the counters.



Abstract



Subtract numbers with up to 3 digits using formal written methods.

Subtract numbers mentally including –
3 digit number and ones
3 digit number and tens
3 digit number and hundreds

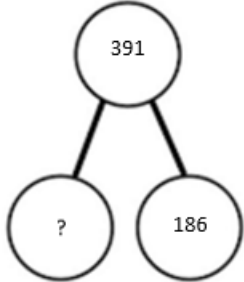
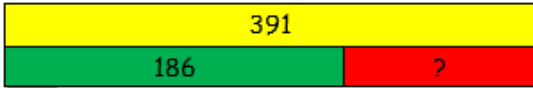
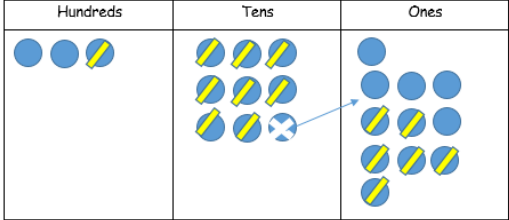
Estimate the answer to a calculation and use inverse operations to check answer.

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

Topic: Subtraction



Year 3

Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>Mental strategies and inverse operations involving fact families. Part whole models to support.</p>	<p>Use place value counters, or represent pictorially.</p>	 	<p>What's the calculation? What's the answer?</p>  $\begin{array}{r} 39\ \square \\ - \square\square 6 \\ \hline \square 0 5 \end{array}$ <p>Building up known facts and using them to illustrate the inverse and to check answers: $116 - 18 = 98$ $98 + 18 = 116$ $116 - 98 = 18$ $18 + 98 = 116$</p>

Year group objectives

Subtract numbers with up to 3 digits, including using formal written methods

Subtract mentally including-
3 digit number and ones
3 digit number and tens
3 digit number and hundreds

Estimate the answer to a calculation and use inverse operations to check answer.

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

<p><u>Example questions</u></p>	$600 - 1 =$	$231 - 100 =$	$973 - 19 =$	$500 - ? = 350$	$\begin{array}{r} 726 \\ - 419 \\ \hline \end{array}$
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Topic: Subtraction



Year 4

Stem sentence/ Maths talk

There are ten tens in one hundred.

There are one hundred ones in one hundred.

___ones/tens/hundreds plus/minus ones/tens/hundreds is equal to ___ones/tens/hundreds

If I have ___tens, I can exchange them for ___ones.

If I have ___hundreds, I can exchange them for ___tens and ___ones

I will exchange 1 hundred for ___tens, then 1 ten for ___ones.

There are ___hundreds ___tens and ___ones. The answer is _____

Year group objectives

Subtract numbers with up to 3 digits using formal written methods.

Subtract numbers mentally including –
3 digit number and ones
3 digit number and tens
3 digit number and hundreds

Estimate the answer to a calculation and use inverse operations to check answer.

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

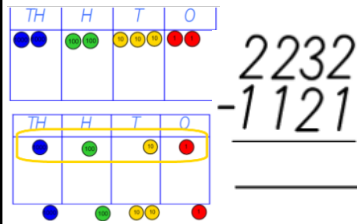
Notes / Vocabulary

Subtraction, difference total altogether, half, halve, one less, two less ... ten less ... one hundred less, one thousand less, inverse

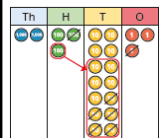
Note: stress importance of 'difference' as subtraction language
Use of place value counters to subtract
THTU – TU and THTU – HTU before moving to THTU – THTU and the abstract.

Pupils to move to multiple exchanges

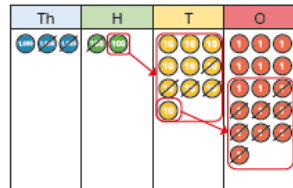
Concrete



$$2343 - 151$$



$$3206 - 2148$$



Make exchanges across more than one column where there is a zero as a place holder.

Pictorial

Use place value grids to support
 $3572 - 1221 =$



$$2951 - 2543 =$$



Abstract

$$2754 - 1568 = 1186$$

$$\begin{array}{r} 2754 \\ - 1568 \\ \hline 1186 \end{array}$$

Use of decimals in context (money)

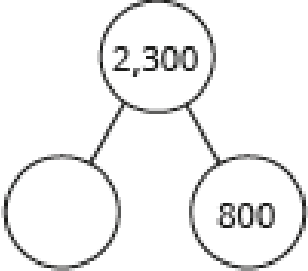
$$\begin{array}{r} 843.15 \\ - 24.7 \\ \hline 818.8 \end{array}$$

Include examples that exchange in ones, tens hundreds and in more than 1 column.

Topic: Subtraction



Year 4

Notes / Vocabulary	Concrete	Pictorial	Abstract																		
<p>Mental strategies and inverse operations involving fact families. Part whole models to support.</p> <p>Pupils must choose the most efficient method for addition – number lines, mentally or column method. Recognise that questions such as $5623 - 1200$ can be solved more efficiently with mental methods rather than column method.</p>	<p>Use place value counters, or represent pictorially.</p>	<div style="text-align: center;">  </div> <p>Use inverses to check calculations</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">$2,853 + 309 = 3,162$</div> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td></td><td></td><td>3</td><td>1</td><td>6</td><td>2</td></tr> <tr><td></td><td></td><td>-</td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> </div>			3	1	6	2			-										<p>Children complete subtractions involving decimals which are presented in word problem format. They use zeros for place holders and know that decimal points should line up under each other.</p> <p>Bella spends £2.56 in the shop out of her £5 note pocket money. How much change will she receive?</p> <p>Checking word problems by using inverse</p> <div style="border: 1px solid #add8e6; padding: 5px; margin-top: 10px;"> <p>Mr Rose has £2,358 in his bank account. He spends £1,209 on a family holiday. How much does he have left? £ 1,049</p> </div>
		3	1	6	2																
		-																			

Year group objectives
Subtract numbers with up to 3 digits using formal written methods.
Subtract numbers mentally including – 3 digit number and ones 3 digit number and tens 3 digit number and hundreds
Estimate the answer to a calculation and use inverse operations to check answer.
Solve subtraction problems including missing number facts, place value and more complex subtraction.

<u>Example questions</u>	$250 - 25 - 25 =$	$9000 - 500 =$	$700 - ? = 280$
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5,018
- 2,046

Topic: Subtraction



Year 5

Stem sentence/ Maths talk

If a known whole is split into three parts and we know the value of two of them, we can find the missing part.

The whole minus the two main parts is equal to the missing part.

If we know the value of the whole and all but one of the parts, we can find the missing part.

The more we subtract, the less we are left with.

The less we subtract, the more we are left with

I can exchange one _____ for ten _____

The minuend is the whole. The subtrahend is a part. The difference is a part.

Year group objectives

Subtract whole numbers with more than 4 digits, including using formal written methods

Subtract numbers mentally with increasingly large numbers

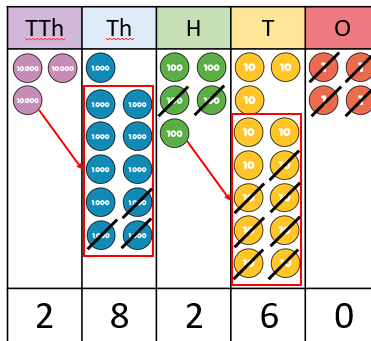
Use rounding to check answers to calculations and determine, in the context of problems, levels of accuracy

Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why

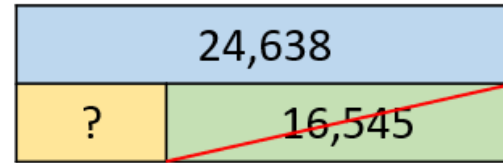
Notes / Vocabulary

how many more to make ...? how many more is ... than ...? how much more is ...?
 subtract take away
 exchange how many are left/left over?
 how many have gone?
 one less, two less, ten less ... one hundred less
 how many fewer is ... than ...? how much less is ...? difference
 between inverse

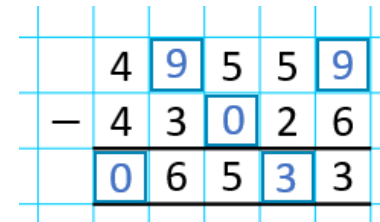
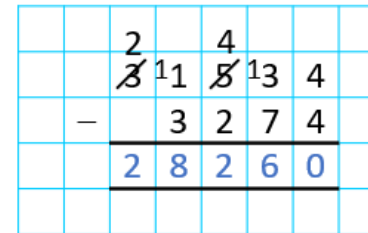
Concrete



Pictorial



Abstract



Topic: Subtraction



Year 5

Year group objectives

Subtract whole numbers with more than 4 digits, including using formal written methods

Subtract numbers mentally with increasingly large numbers

Use rounding to check answers to calculations and determine, in the context of problems, levels of accuracy

Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Notes / Vocabulary

Starting to subtract decimals but only when each number has the same number of decimal places

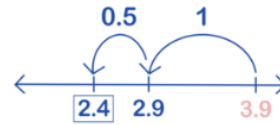
Concrete

Counters will help with place value grids.



Thousands	Hundreds	Tens	Ones	Decimal point	Tenths	Hundredths
1000s	100s	10s	1s	.	$\frac{1}{10}$ s 0.1s	$\frac{1}{100}$ s 0.01s

Pictorial



$$3.9 - 1 = 2.9$$

$$2.9 - 0.5 = 2.4$$

375.5	
?	14.3

Abstract

$$\begin{array}{r} 801.7 \\ - 245.3 \\ \hline 556.4 \end{array}$$

$$\begin{array}{r} 843.5 \\ - 24.7 \\ \hline 818.8 \end{array}$$

Example questions

$10,348 - 458 =$

$123\,502 - 98\,624 =$

$$\begin{array}{r} 36\,342 \\ - 27\,838 \\ \hline \end{array}$$

$980\,000 - 450\,000 =$

$23\,005 - ? = 21\,006$

Topic: Subtraction

Year 6



Stem sentence/ Maths talk

For a question where the whole is split into three parts and two of the values are known. The sum of the two known parts plus the missing part is equal to the whole. For a question where the whole is split into three parts and two of the values are known. The whole minus the two known parts is equal to the missing parts.

Year group objectives

solve problems involving addition, subtraction, multiplication and division

solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

perform mental calculations, including with mixed operations and large numbers

Notes / Vocabulary

how many more to make ...?
 how many more is ... than ...?
 how much more is ...?
 subtract
 take away
 how many are left/left over?
 how many have gone?
 one less, two less, ten less ... one hundred less
 how many fewer is ... than ...?

- Vary the number of digits in the number
- Missing boxes
- Balanced equations

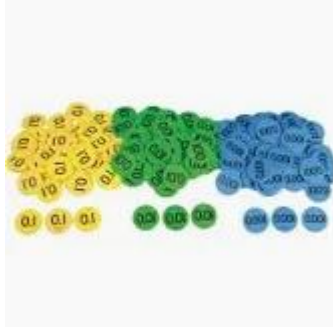
$$15.743 - 214.9 =$$

$$? - 200 = 2,307$$

Concrete

Use place value resources with a place value grid to help pupils explore the process of subtracting and exchanging.

Thousands	Hundreds	Tens	Ones	Tenths
2	5	7	3	0
1	4	6	2	0



Pictorial

487.3	
?	2.9

Abstract

$$\begin{array}{r} 21 \\ 57.30 \\ - 6.08 \\ \hline 51.22 \end{array}$$

$$\begin{array}{r} 2911 \\ 3031.8 \\ - 1867.3 \\ \hline 1164.5 \end{array}$$

Topic: Subtraction

Year 6



Example SAT questions

Arithmetic

$$50,000 - 500 =$$

$$12 - 6.01 =$$

A pack of paper has 150 sheets.

4 children each take 7 sheets.

How many sheets of paper are left in the packet?

Reasoning

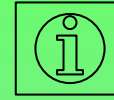
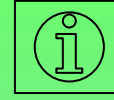
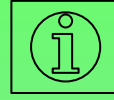
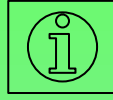
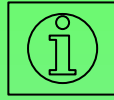
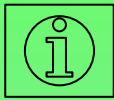
Show your method

Year group objectives

solve problems involving addition, subtraction, multiplication and division

solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

perform mental calculations, including with mixed operations and large numbers



	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication		Doubling. Counting in multiples. Arrays (with support).	Doubling. Counting in multiples. Repeated addition. Arrays –showing commutative multiplication.	Counting in multiples. Repeated addition. Arrays-showing commutative multiplication. Grid method.	Column multiplication. (2 and 3 digit multiplied by 1 digit).	Column multiplication. (Up to 4 digit numbers multiplied by 1 or 2 digits).	Column multiplication. (Up to 4 digit numbers multiplied by a 2 digit number).

Short multiplication

24 × 6 becomes

$$\begin{array}{r} 24 \\ \times 6 \\ \hline 144 \\ \hline 2 \end{array}$$

Answer: 144

342 × 7 becomes

$$\begin{array}{r} 342 \\ \times 7 \\ \hline 2394 \\ \hline 21 \end{array}$$

Answer: 2394

2741 × 6 becomes

$$\begin{array}{r} 2741 \\ \times 6 \\ \hline 16446 \\ \hline 42 \end{array}$$

Answer: 16 446

Long multiplication

24 × 16 becomes

$$\begin{array}{r} 24 \\ \times 16 \\ \hline 240 \\ 144 \\ \hline 384 \end{array}$$

Answer: 384

124 × 26 becomes

$$\begin{array}{r} 124 \\ \times 26 \\ \hline 2480 \\ 744 \\ \hline 3224 \\ \hline 11 \end{array}$$

Answer: 3224

124 × 26 becomes

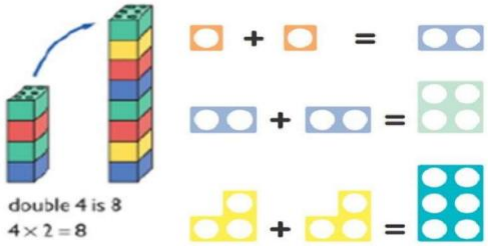

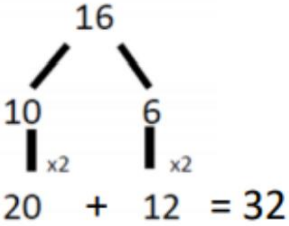
$$\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ \hline 11 \end{array}$$

Answer: 3224



Topic: Multiplication



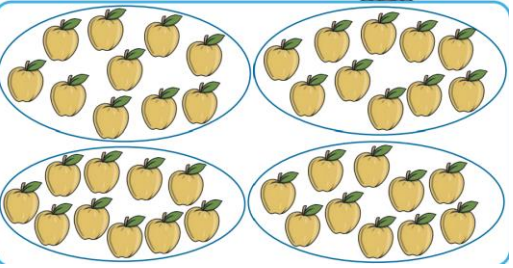
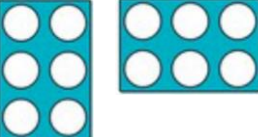

Year 1

<p><u>Stem sentence</u> Equal groups/ unequal groups</p> <p>There are (number) groups/lots/sets of (number/ item). <i>There are 3 groups of 5 cars.</i></p> <p>This is not (number) groups/lots/sets of (number/ item) as they are not equal groups. <i>This is not 2 groups of 10 sweets, as they are not equal groups.</i></p>	<p>Arrays</p> <p>In this array, there is/ are (number/ item) in each row. There is/ are (number) rows of (number/ items). <i>In this array, there are 5 oranges in each row. There are 6 rows of 5 oranges.</i></p> <p>In this array, there is/ are (number/ item) in each column. There is/ are (number) columns of (number/ item). <i>In this array, there are 10 cookies in each column. There are 3 columns of 10 cookies.</i></p>	<p>Double</p> <p>Double (number) is (number). <i>Double 5 is 10.</i></p> <p>Twice as much as (number) is (number). • <i>Twice as much as 5 is 10</i></p>	<p>Year group objectives</p> <p>To understand multiplication is related to doubling and combining groups of the same size (repeated addition)</p>	
<p>Notes / Vocabulary</p>	<p>Concrete</p>	<p>Pictorial</p>		<p>Abstract</p>
<p>Double Twice as much Odd Even Equal groups Groups of Lots of repeated addition</p>	<p>Children will double using concrete resources such as base 10, pv counters and numicon.</p> 	<p>Draw pictures to show how to double numbers</p> <p>Double 4 is 8</p> 	<p>Children will learn to partition a number and then double each part before recombining it back together.</p> 	<p>Counting in multiples (2s, 5s, 10s) including making equal groups and counting the total</p> <p>To 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.</p>

Topic: Multiplication



Year 1

<p>Equal groups</p> <p>Increase</p> <p>Decrease</p> <p>Skip Counting</p> <p>Multiples</p> <p>Grouping</p>	  <p>Children count the total in all of the equal groups and recognise patterns.</p>	<p>Children will verbally say the numbers aloud as they count to demonstrate their understanding.</p> 	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>2, 4, 6, 8, 10</p> <p>5, 10, 15, 20, 25, 30</p>
<p>Understanding arrays</p> <p>Children see that 2 groups of 3 and 3 groups of 2 will both give a total of 6.</p>	 <p>Children will use concrete objects to describe 2 groups of 3 and 3 groups of 2.</p>	<p>Children will draw their own representation of arrays or use pictures to show their understanding.</p> <p>2 groups of 4</p> <p>4 groups of 2</p> 	<p>2 groups of 5</p> <p>6 groups of 10</p> <p>Children will use knowledge of skip counting and arrays to calculate answers.</p>

Year group objectives


To understand multiplication is related to doubling and combining groups of the same size (repeated addition)

Counting in multiples (2s, 5s, 10s) including making equal groups and counting the total

To 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.


Example Questions

How many fingers are there altogether?



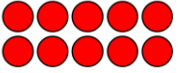
_____ + _____ + _____ = _____

How many children are there altogether?



_____ + _____ + _____ = _____


Fill in the numbers to describe the array.




_____ + _____ = _____

_____ + _____ + _____ + _____ + _____ = _____


Complete.



Double _____ is _____



Double _____ is _____



Double _____ is _____



Year 2 Topic: Multiplication

Stem sentence

There are ____ equal groups with ____ in each group.
There are _____ altogether.

There are 2 equal groups with 3 in each group.
There are 2 3s.
 3 + 3 = 6

----x ---- =

----lots of ---- =

Year group objectives

Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

Calculate mathematical statements for multiplication and write them using the multiplication (x) and equals (=) signs

Children will be able to represent a multiplication calculation using an array. Children will also understand that multiplication can be carried out in any order (commutative)

Notes / Vocabulary

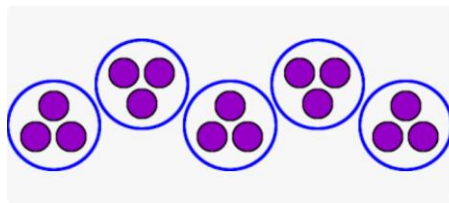
Equal groups, multiply, repeated addition, multiplication symbol, lots of, arrays, commutative, 2,3,5 and 10 times table.

Children will start to understand that multiplying by 2 is doubling. They may see that when multiplying by an even number the answer will be even but can be odd or even when multiplying by an odd number.

Concrete

Children make equal groups for the 2,3,5 and 10 times tables with concrete resources and skip count. Link this to the x 'groups of' 'lots of' symbol.

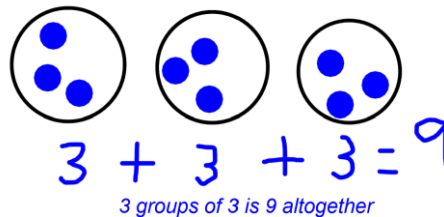
5 groups of 3 equals 15
5 multiplied by 3 equals 15
5 lots of 3 equals 15



Doubling will be understood by using concrete resources for two equal groups and calculating through counting, skip counting or repeated addition.

Pictorial

Children can draw groups to support working out and either count totals, use repeated addition or skip count.



Abstract

Children can recall the 2,3,5 and 10 times tables through memory or by counting up in steps. Children may write down the numbers to support themselves. 0,5,10,15,.....

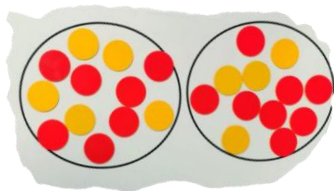
Topic: Multiplication

Year 2



Children will understand what a multiplication sentence represents. They will be able to understand that 3×5 and 5×3 will look different in terms of groups and number in groups but will produce the same total.

Children can use counters, cubes or any other suitable resources to make multiplication sentences.
Make 2 groups of 12 or 2×12



Children will use pictures or draw their own to support understanding.



$$6 \text{ lots of } 5 = 30$$

$$6 \text{ multiplied by } 5 = 30$$

$$6 \times 5 = 30$$

Children will be able to calculate mathematical statements for multiplication and show these using \times and $=$ signs.

How much money does Ron have?



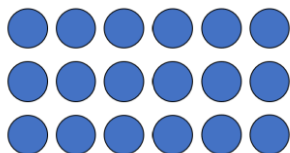
Complete the multiplication.

$$\square \times \square = \square$$

Ron has p.

It important that children understand the different calculations in an array e.g. 4×5 and 5×4 despite the totals being the same

Children will use concrete resources such as counters to make arrays and calculate the multiplication sentences that this generates recognising that the totals are the same.



Children can draw an array to represent a multiplication calculation. They can group to show that multiplication is commutative.

Multiplication	Array 1	Array 2
3×8		

Children can use their preferred method of multiplication when calculating multiplications e.g. a pupil may choose to swap 8×5 for 5×8 and use the 5 times tables as they will understand that it will produce the same total.

$$9 \times 3 = \quad 3 \times 9 =$$

$$12 \times 2 = \quad 2 \times 12 =$$

Year group objectives

Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

Calculate mathematical statements for multiplication and write them using the multiplication (\times) and equals ($=$) signs

Children will be able to represent a multiplication calculation using an array. Children will also understand that multiplication can be carried out in any order (commutative)

KS1 Example Questions

$$2 \times 7 = \square$$

22



A wall has 5 bricks in each row.

How many bricks are there in 6 rows?

8 children are eating plums.

Each child eats 2 plums.



How many plums do they eat altogether?

$$10 \times 5 = \square$$

Topic: Multiplication

Year 3



Stem sentence

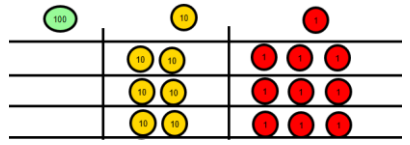
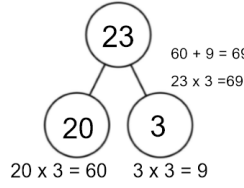
There are equal groups with in each group. There are ____ altogether.
 There are ____ lots of ____
 The groups are equal because ____
 ____ hundreds multiplied by ____ is equal to ____ tens multiplied by ____ is equal to ____ ones multiplied by ____ is equal to ____
 ____ multiplied by ____ is equal to ____
 Four is double two, so ____ fours is double ____ twos. etc
 ____ times four is equal to double ____ times two etc
 For every one group of ____, there are two groups of ____

Year group objectives

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 2 digit X 1 digit, using mental and progressing to formal written methods

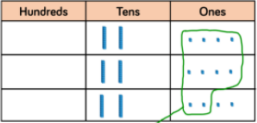
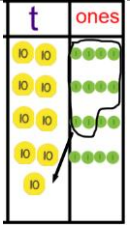
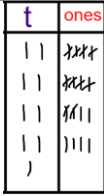
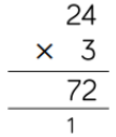

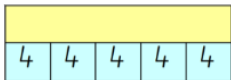
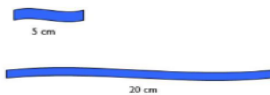
Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Notes / Vocabulary	Concrete	Pictorial	Abstract																				
<p>multiplication multiply multiplied by multiple, repeated addition doubling array inverse</p> <p>Extended practical and pictorial methods looking at X as repeated addition and partitioning prior to pupils tackling written methods</p>	<p>Represent multiplication as repeated addition</p> <table border="1" data-bbox="445 835 675 978"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr><td>● ●</td><td>● ●</td></tr> <tr><td>● ●</td><td>● ●</td></tr> <tr><td>● ●</td><td>● ●</td></tr> <tr><td>● ●</td><td>● ●</td></tr> </tbody> </table> <p>No exchange</p> 	Tens	Ones	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	<p>Representing the counters pictorially</p> <table border="1" data-bbox="1159 1085 1439 1278"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr><td>✓ ✓</td><td>● ● ●</td></tr> <tr><td>✓ ✓</td><td>● ● ●</td></tr> <tr><td>✓ ✓</td><td>● ● ●</td></tr> <tr><td>6</td><td>9</td></tr> </tbody> </table>	Tens	Ones	✓ ✓	● ● ●	✓ ✓	● ● ●	✓ ✓	● ● ●	6	9	<p>Show link to multiplication</p> $\square + \square + \square + \square = \square$ $\square \times \square = \square$ <p>Part whole models to expose structure</p>  <p>If appropriate, moving towards formal written methods.</p> $\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$
Tens	Ones																						
● ●	● ●																						
● ●	● ●																						
● ●	● ●																						
● ●	● ●																						
Tens	Ones																						
✓ ✓	● ● ●																						
✓ ✓	● ● ●																						
✓ ✓	● ● ●																						
6	9																						

Topic: Multiplication

Year 3



Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>Deines and base 10 can be used alongside pictorial methods. Move towards formal written methods if appropriate.</p>	<p>Exchanging Deins or place value counters</p>  	<p>Use of place value grid and drawn images</p> 	<p> $\begin{array}{r} 24 \\ / \quad \backslash \\ 20 \quad 4 \end{array}$ $4 \times 20 = 80 \quad 4 \times 4 = 16$ $80 + 16 = 96$ $4 \times 24 = 96$ </p> <p>If appropriate, use of formal written methods</p> 
<p>Mental strategies and inverse operations involving fact families. Part whole models to support.</p> <p>Pupils to begin tackling correspondence and scaling problems.</p>	<p>Use place value counters, or represent pictorially.</p>	<p>Bar models can be used to help solidify multiplication tables knowledge</p>   <p>___ x ___ = ___</p> <p>Children develop their understanding of correspondence and scaling problems.</p> <p>Scaling: e.g. Find a ribbon that is 4 times as long as the blue ribbon</p> 	<p>Children use symbols to stand for unknown numbers to complete equations using inverse operations:</p> <p> $\square \times 5 = 20$ $3 \times \triangle = 18$ $\square \times \bigcirc = 32$ </p>

Year group objectives
<p>Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables</p>
<p>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including 2 digit X 1 digit, using mental and progressing to formal written methods</p>
<p>Solve problems, including missing number problems, involving multiplication and positive integer scaling problems and correspondence problems in which n objects are connected to m objects.</p>

Example questions: $7 \times 3 =$ $\underline{\quad} \times 5 = 25$ $4 \times \underline{\quad} = 16$

Topic: Multiplication

Year 4



Stem sentence

The product of _____ and _____ tens multiplied by is equal to _____
 _____ ones multiplied by is equal to _____
 _____ multiplied by is equal to _____
 _____ tens and _____ ones multiplied by _____ is equal to _____

Year group objectives

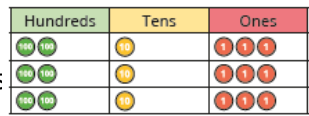
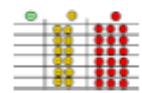
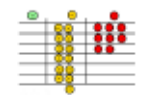


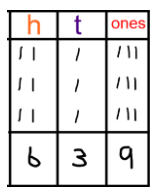
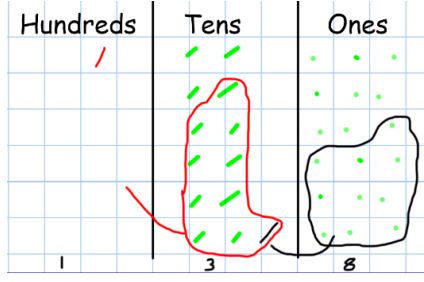
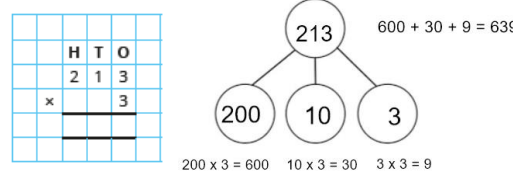
Recall multiplication and division facts for tables up to 12×12

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

Recognise and use factor pairs and commutativity in mental calculations

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.

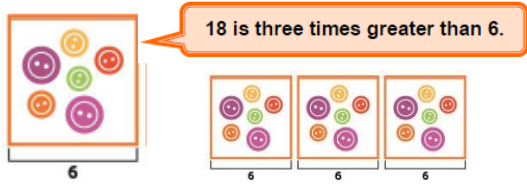




Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>Multiplication, multiply multiplied by, multiple, factor groups, doubling array, inverse, remainder, factor, factor pairs, product, commutative</p> <p>Pupils build on learning in Y3 by moving towards multiplying 3 digit by 1 digit with exchanges</p>	<p>No exchange Use of place value counters or Deins</p>  <p>Exchange 6×23</p> <p>Step 1: get 6 lots of 23</p>  <p>Step 2: 6×3 is 18. Can I make an exchange? Yes! Ten ones for one ten...</p>  <p>Step 3: 6×2 tens and my extra ten is 13 tens. Can I make an exchange? Yes! Ten tens for one hundred...</p>  <p>Step 4: what do I have in each column?</p> 	<p>Representing counters pictorially</p>  	 <p>Part whole models to expose structure</p> <p>$200 \times 3 = 600$ $10 \times 3 = 30$ $3 \times 3 = 9$</p> <p>$600 + 30 + 9 = 639$</p> <p>Variation within fluency</p> <p>eg Find the product of 6 and 23</p> <p>_____ = 6×23</p> $ \begin{array}{r} 6 \times 23 = \\ 23 \\ \times 6 \\ \hline 138 \\ 11 \end{array} $

Topic: Multiplication

Year 4



Notes / Vocabulary	Concrete	Pictorial	Abstract																								
<p>Mental strategies and inverse operations.</p> <p>Correspondence and scaling problems</p>	<p>Use place value counters, or represent pictorially.</p> <p>A dressmaker has 6 buttons. He needs 3 times as many. How many does he need?</p> 	<p>What do you notice about the bar model?</p> 	<p>A sunflower is 5 times taller than a daisy. The daisy is 8 cm tall. How tall is the sunflower?</p> <p>Missing number problems</p> <table border="1" data-bbox="1541 678 1732 921"> <tr><td></td><td>2</td><td>6</td></tr> <tr><td>x</td><td></td><td>4</td></tr> <tr><td>1</td><td></td><td>4</td></tr> <tr><td></td><td>2</td><td></td></tr> </table> <table border="1" data-bbox="1796 678 2051 921"> <tr><td></td><td>?</td><td>6</td><td>1</td></tr> <tr><td>x</td><td></td><td></td><td>3</td></tr> <tr><td></td><td>7</td><td>8</td><td>3</td></tr> </table> <p>Find the missing numbers.</p> <p>a) $22 \times \square = 88$ b) $_1 \times \square = 124$</p>		2	6	x		4	1		4		2			?	6	1	x			3		7	8	3
	2	6																									
x		4																									
1		4																									
	2																										
	?	6	1																								
x			3																								
	7	8	3																								

Year group objectives

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 2 digit X 1 digit, using mental and progressing to formal written methods

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

Example questions

$5 \times 6 =$

$34 \times 1 =$

$5 \times 3 \times 5 =$

	2	4
x		4

	3	4	4
x			4

Topic: Multiplication



Year 5

Stem sentence/ Maths talk

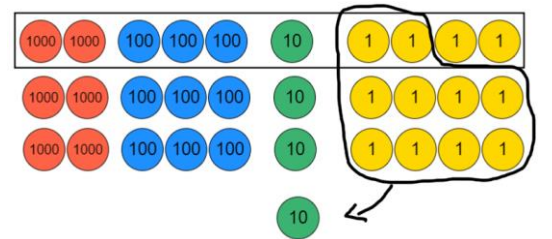
Explain the steps followed when using this multiplication method. Look at the numbers in each question, can they help you estimate which answer will be the largest? Explain why there is a 9 in the thousand's column. Why do we write the larger number above the smaller number? What links can you see between these questions? How can you use these to support your answers?

Notes / Vocabulary

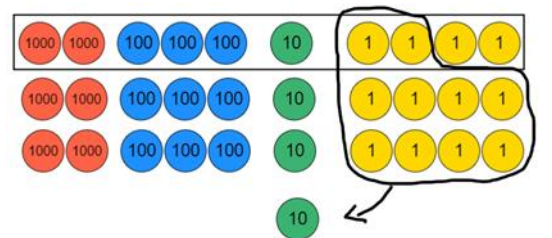
multiplication multiply multiplied by multiple, factor groups of times product once, twice, three times ... ten times repeated addition doubling array inverse multiplication table multiplication fact square, squared cube, cubed commutative associative distributive

Long multiplication with . Exchange below the line.

Concrete



Use place value counters to show exchanging.



Use place value counters to show exchanging.

Pictorial

x	2000	300	10	4
3	2000	300	10	4
	2000	300	10	4
	2000	300	10	4

x	2000	300	40	2	
20	40000	6000	800	40	46840
					+
1	2000	300	40	2	2342
					47182

Abstract

$$\begin{array}{r} 2314 \\ \times \quad 3 \\ \hline 6942 \end{array}$$

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

Year group objectives

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

Multiply and divide numbers mentally drawing upon known facts

Multiply and divide whole numbers and decimals by 10, 100 and 1000

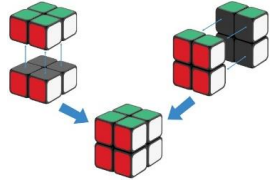
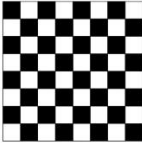
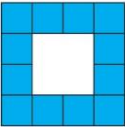
Solve problems involving multiplication and division including using their knowledge of factors, multiples, squares and cubes

Solve problems involving addition, subtraction, multiplication and division and combination of these including understanding the means of the equals sign

Topic: Multiplication



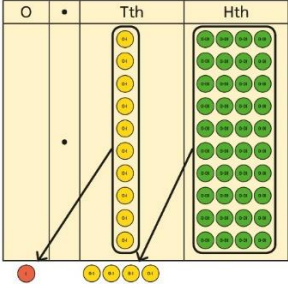
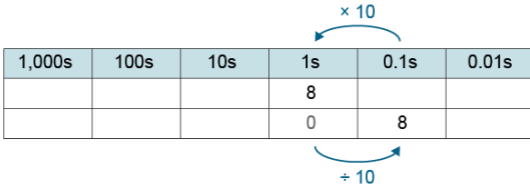
Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract	Year group objectives
<p>Use facts to multiply mentally.</p> <p>Use factors to multiply mentally.</p> <p>Use properties of distributive rules to multiply mentally</p>	<p>Use cubes or counters to explore the meaning of 'square numbers'.</p> <p><i>25 is a square number because it is made from 5 rows of 5.</i></p> <p>Use cubes to explore cube numbers.</p>  <p>8 is a cube number.</p>	<p>Use images to explore examples and non-examples of square numbers.</p> <p>$8 \times 8 = 64$ $8^2 = 64$</p>  <p><i>12 is not a square number, because you cannot multiply a whole number by itself to make 12.</i></p> 	<p>$25 \times 23 = 25 \times 20 + 25 \times 3$ $= 500 + 75$ $= 575$</p> <p>$2 \times 6 \times 5 = 2 \times 5 \times 6$ $= 10 \times 6$ $= 60$</p> <p>$80 \times 70 = 8 \times 7 \times 10 \times 10$ $= 56 \times 100$ $= 5600$</p> <p>$36 \times 20 = 36 \times 2 \times 10$ $= 72 \times 10$ $= 720$</p>	<p>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</p> <p>Multiply and divide numbers mentally drawing upon known facts</p> <p>Multiply and divide whole numbers and decimals by 10, 100 and 1000</p> <p>Solve problems involving multiplication and division including using their knowledge of factors, multiples, squares and cubes</p> <p>Solve problems involving addition, subtraction, multiplication and division and combination of these including understanding the means of the equals sign</p>

Topic: Multiplication



Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>Place value sliders are a good way of showing digits moving in a place value chart.</p> <p>MUST NOT mention adding or taking of zeros</p>	<p>Use place value equipment to explore and understand the exchange of 10 tenths, 10 hundredths or 10 thousandths.</p> <p>Represent multiplication by 10 as exchange on a place value grid.</p>  <p>$0.14 \times 10 = 1.4$</p>		<p>$8 \div 1 = 8$</p> <p>$8 \div 10 = 0.8$</p> <p>$0.8 \times 1 = 0.8$</p> <p>$0.8 \times 10 = 8$</p>

Year group objectives

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

Multiply and divide numbers mentally drawing upon known facts

Multiply and divide whole numbers and decimals by 10, 100 and 1000


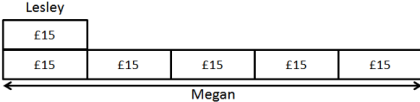
Solve problems involving multiplication and division including using their knowledge of factors, multiples, squares and cubes

Solve problems involving addition, subtraction, multiplication and division and combination of these including understanding the means of the equals sign

Topic: Multiplication



Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>Use bar models to represent problems visually</p>	<p>Notice how each section of the bars in the problem below has a value of 4 and not 1. This many-to-one correspondence, or unitising is important and occurs early, for example in the context of money, where one coin has a value of 2p for example. It is also a useful principle in the modelling of ratio problems.</p> <p>4</p> <p>4 4 4 4 4</p> <p>Peter has 4 books Harry has five times as many books as Peter. How many books has Harry?</p> <p>five times four</p> <p>$4 \times 5 = 20$ Harry has 20 books</p>	<p>Lesley spends £15. Megan spends five times as much as Lesley. How much money does Megan spend?</p> <p>Step 1. </p> <p>Step 2. </p> <p>Step 3. 5 lots of £15 = £75 5 x £15 = £75</p>	<p>$5 \times 15 = \text{£}75$</p>

Year group objectives
<p>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</p>
<p>Multiply and divide numbers mentally drawing upon known facts</p>
<p>Multiply and divide whole numbers and decimals by 10, 100 and 1000</p>
<p>Solve problems involving multiplication and division including using their knowledge of factors, multiples, squares and cubes</p>
<p>Solve problems involving addition, subtraction, multiplication and division and combination of these including understanding the means of the equals sign</p>

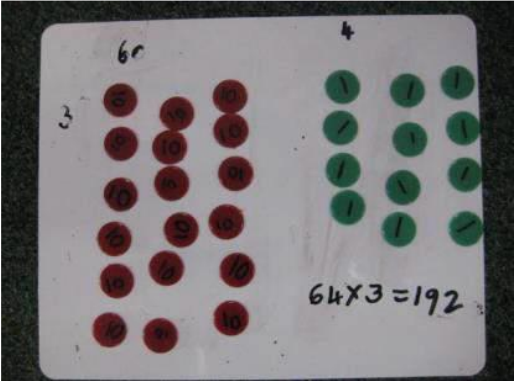
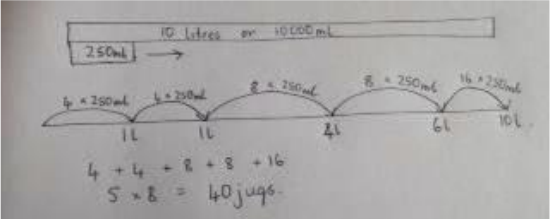
Example questions

$\begin{array}{r} 3216 \\ \times \quad 9 \\ \hline \end{array}$	$\begin{array}{r} 1367 \\ \times \quad 29 \\ \hline \end{array}$	$2 \times 5 \times 3 =$	$60 \times 40 =$	$36.05 \times 10 =$
$6 \times 32 = 6 \times 4 \times \square$	$6 \times 5 \times 4 = 5 \times \square$			
$480 = 8 \times 10 \times \square$				
$72 = 2 \times 6 \times \square$	$\square \times 5 \times \square = 105$		$7 \times \square \times \square = 140$	

Topic: Multiplication

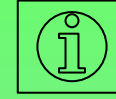
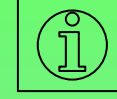
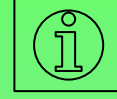
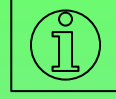
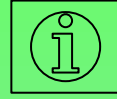
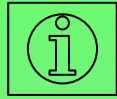


Year 6

Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>When children start to multiply 3d x 3d and 4d x 2d etc, they should be confident with the abstract:</p> <p>factor x factor = product A factor is a whole number, so this wouldn't be appropriate language when multiplying decimals</p> <p>multiplier x multiplicand = product</p> <p>multiplier x multiplicand = product</p>	 <p>A whiteboard showing a concrete representation of 64 x 3 = 192. On the left, there are 64 red beads arranged in two columns of 32. On the right, there are 192 green beads arranged in three columns of 64. The equation 64 x 3 = 192 is written on the board.</p>	<p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>  <p>A pictorial representation of 5 x 8 = 40. It shows a bar model for 10 litres or 10,000ml, divided into 20 segments of 250ml each. A number line below the bar model shows jumps of 4, 4, 8, 8, and 16, totaling 40. The equation 5 x 8 = 40 jugs is written below the number line.</p>	<p>Begin by multiplying the Ones with each of the digits. Children need to be taught that the 0 in the second row is written as a placeholder because we are now multiplying the Tens with each digit.</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 1200 \\ \hline 3224 \end{array}$ <p>Answer: 3224</p>

Year group objectives

- solve problems involving addition, subtraction, multiplication and division
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- perform mental calculations, including with mixed operations and large numbers



	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Division		Sharing objects into groups. Division as grouping.	Division as grouping. Division within arrays.	Division within arrays. Division with a remainder. Short division (2 digit by 1 digit – concrete and pictorial).	Division within arrays. Division with a remainder. Short division (3 digit by 1 digit – concrete and pictorial).	Short division. (Up to 4 digits by a 1 digit number). Interpret remainders approximately for the context).	Short division. Long division (up to 4 digits by a 2 digit number- interpret remainders as whole numbers, fractions or round).

Short division

$98 \div 7$ becomes

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \end{array}$$

Answer: 14

$432 \div 5$ becomes

$$\begin{array}{r} 86 \text{ r}2 \\ 5 \overline{) 432} \end{array}$$

Answer: 86 remainder 2

$496 \div 11$ becomes

$$\begin{array}{r} 45 \text{ r}1 \\ 11 \overline{) 496} \end{array}$$

Answer: $45 \frac{1}{11}$

Long division

$432 \div 15$ becomes

$$\begin{array}{r} 28 \text{ r}12 \\ 15 \overline{) 432} \\ \underline{300} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

Answer: 28 remainder 12

$432 \div 15$ becomes

$$\begin{array}{r} 28 \\ 15 \overline{) 432} \\ \underline{300} \quad 15 \times 20 \\ \underline{132} \\ 120 \quad 15 \times 8 \\ \underline{120} \\ 0 \end{array}$$

$$\frac{12}{15} = \frac{4}{5}$$

Answer: $28 \frac{4}{5}$

$432 \div 15$ becomes

$$\begin{array}{r} 28.8 \\ 15 \overline{) 432.0} \\ \underline{300} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

Answer: 28.8

Topic: Division



Year 1

Stem sentence/ Maths talk _____ apples are shared equally between _____ boxes.

Share the apples equally between the 3 boxes. There are _____ in each group.



The _____ have/have not been shared equally.

I know this because ...

There are _____ altogether.

They are shared equally between _____ groups.

There are _____ in each group.

Year group objectives

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

Notes / Vocabulary

Children first explore this practically using concrete resources and physically sharing them into groups. They should see that each group will then have the same amount. At this stage, children do not need to write number sentences using the division symbol, but they should be encouraged to explain what is happening using the language of division, for example "There are counters shared equally into groups. There are _____ in each group." It may be helpful to explore the similarities and differences between sharing and grouping, once children are confident with the two structures separately. As an extension, children can look at situations where the objects cannot be shared equally and there are some left over.

Concrete

Learn to make equal groups from a whole and find how many equal groups of a certain size can be made.

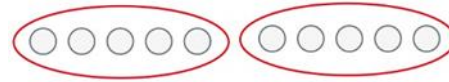
Sort a whole set people and objects into equal groups.



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

Pictorial

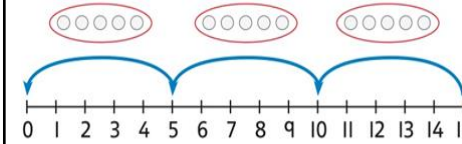
Represent a whole and work out how many equal groups.



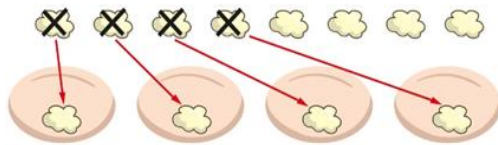
There are 10 in total.
There are 5 in each group.
There are 2 groups.

Abstract

Children may relate this to counting back in steps of 2, 5 or 10.



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



Sketch or draw to represent sharing into equal parts. This may be related to fractions.



10 shared into 2 equal groups gives 5 in each group.

Topic: Division

Year 2

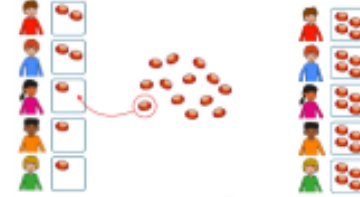


Stem sentence/ Maths talk

_____ are shared equally between _____.
Each child gets _____

_____ divided between _____ is equal to _____ each.

I have twenty conkers and I share them equally between five children. How many conkers does each child have?



Twenty conkers are shared equally between five children.
Each child gets four conkers.

Year group objectives

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 (\times), division (\div) and equals ($=$) signs

show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot

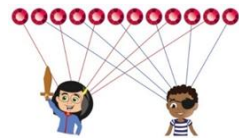
solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Notes / Vocabulary

Equal, sharing, whole, division.

Concrete

Start with a whole and share into equal parts, one at a time.

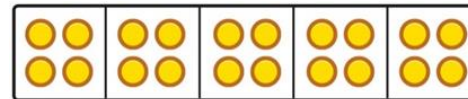


12 shared equally between 2.
They get 6 each.

Start to understand how this also relates to grouping. To share equally between 3 people, take a group of 3 and give 1 to each person. Keep going until all the objects have been shared

Pictorial

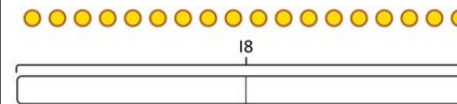
Represent the objects shared into equal parts using a bar model.



20 shared into 5 equal parts.
There are 4 in each part.

Abstract

Use a bar model to support understanding of the division.



$$18 \div 2 = 9$$

Topic: Division

Year 2



Year group objectives

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 (\times), division (\div) and equals (=) signs

show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot

solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Notes / Vocabulary

Grouping, division, multiplication, total.

Concrete

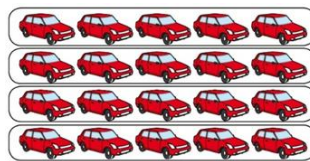
Understand how to make equal groups from a whole.



8 divided into 4 equal groups.
There are 2 in each group

Understand the relationship between multiplication facts and division.

4 groups of 5 cars is 20 cars in total.
20 divided by 4 is 5.



Pictorial

Understand the relationship between grouping and the division statements.

$$12 \div 3 = 4$$



$$12 \div 4 = 3$$



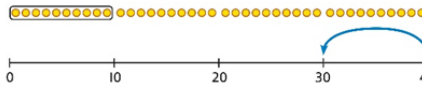
$$12 \div 6 = 2$$



$$12 \div 2 = 6$$

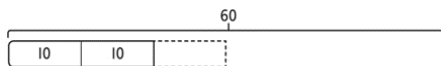


Link equal grouping with repeated subtraction and known times-table facts to support division.



40 divided by 4 is 10.

Use a bar model to support understanding of the link between times-table knowledge and division.

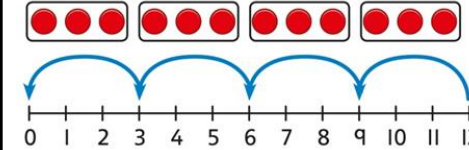


Abstract

Understand how to relate division by grouping to repeated subtraction.

12 divided into groups of 3.
 $12 \div 3 = 4$

There are 4 groups.



There are 4 groups now.

Relate times-table knowledge directly to division.

I know that 3 groups of 10 makes 30, so I know that 30 divided by 10 is 3.

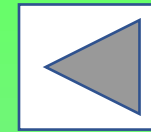
$$3 \times 10 = 30 \quad \text{so} \quad 30 \div 10 = 3$$

$1 \times 10 = 10$
 $2 \times 10 = 20$
 $3 \times 10 = 30$
 $4 \times 10 = 40$
 $5 \times 10 = 50$
 $6 \times 10 = 60$
 $7 \times 10 = 70$
 $8 \times 10 = 80$

I used the 10 times-table to help me.
 $3 \times 10 = 30$.

Topic: Division

Year 3



Stem sentence

___ partitioned into tens and ones is ___ tens and ___ ones.
 ___ divided by ___ is equal to ___
 ___ can be partitioned into ___ and ___ as these numbers are both multiples of ___
 ___ divided by ___ is equal to ___
 There are ___ groups of ___ There are ___ remaining. So $__ \div __ = __ r$

Year group objectives

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.

Notes / Vocabulary

division dividing, divide, divided by, divided into left, left over, remainder grouping, sharing, share, share equally one each, two each, three each ... ten each group in pairs, threes ... tens equal groups of, inverse

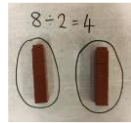
Concrete



$$8 \div 2$$

Dividing as grouping

8 grouped into 2s



$$8 \div 2 = 4$$

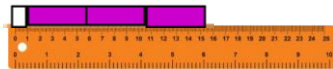
There are 4 groups of 2 in 8

Dividing as sharing

8 shared between 2

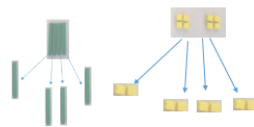
There are 4 in each group

Use of Cuisenaire rods and rulers (using repeated subtraction)



2d divided by 1d using base 10 (no remainders)

Sharing, starting with the tens



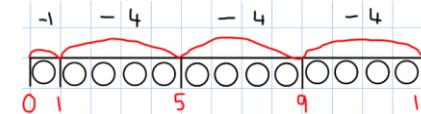
Pictorial



8 shared equally between 2



Abstract



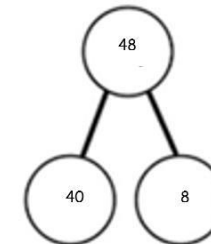
Use of number lines to show repeated subtraction

$$48 \div 4$$

$$4 \text{ tens} \div 4 = 1 \text{ ten}$$

$$8 \text{ ones} \div 4 = 2 \text{ ones}$$

$$10 + 2 = 12$$



Topic: Division

Year 3



Notes / Vocabulary	Concrete	Pictorial	Abstract	Year group objectives
<p>Mental strategies and inverse operations involving fact families. Part whole models to support.</p>		<p>Three friends have 24 coins.</p> <p>We can draw a bar model to show how many coins each one has.</p> <p>How many coins does each one have?</p> $24 \div 3 = 8$	$4 \times 5 = 20$ $5 + 5 + 5 + 5 = 20$ $5 \times 4 = 20$ $4 + 4 + 4 + 4 + 4 = 20$ $20 \div 5 = 4$ $20 - 5 - 5 - 5 - 5 = 0$ $20 \div 4 = 5$ $20 - 4 - 4 - 4 - 4 - 4 = 0$	<p>Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables</p> <p>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</p> <p>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.</p>

Example questions

$$36 \div 4 =$$

$$\underline{\quad} \div 2 = 5$$

There are 24 strawberries in a tub. I share them equally between the 4 people in my family. How many does each person get?

Write <, > or = to complete the statements.

$$48 \div 4 \quad \bigcirc \quad 45 \div 3$$

$$52 \div 4 \quad \bigcirc \quad 42 \div 3$$

Topic: Division

Year 4



Stem sentence

___ ones divided by ___ = ___ ones each

___ I cannot share all of the tens equally, so I need to ...

There are ___ groups of ___ There are ___ remaining. So $__ \div __ = __ r$

___ is a multiple of ___, so when it is divided into groups of ___ there are none left over; there is no remainder.

___ is not a multiple of ___, so when it is divided into groups of ___ there are some left over; there is a remainder.

Year group objectives

Recall multiplication and division facts for tables up to 12×12

Use place value, known and derived facts divide mentally, including: dividing by 1;

Recognise and use factor pairs and commutativity in mental calculations

Solve problems involving integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Notes / Vocabulary

division dividing, divide, divided by, divided into left, left over, remainder grouping sharing, share, share equally one each, two each, three each ... ten each group in pairs, threes ... tens equal groups of inverse

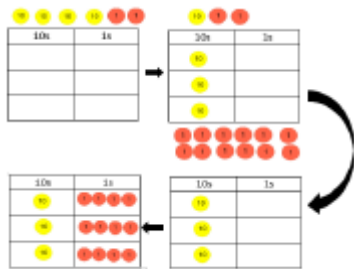
Concrete

Without exchanges 2 digits



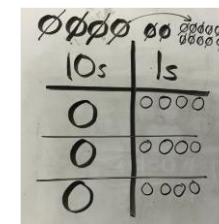
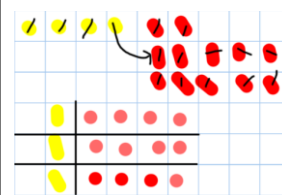
Tens	Ones
●●	●
●●	●
●●	●
●●	●

With exchanges 2 digits

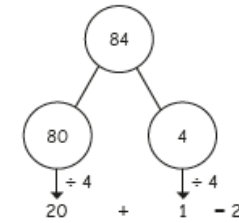


Pictorial

Use place value chart or similar to pictorially share out.

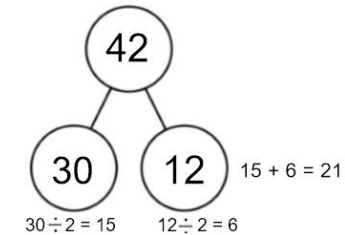


Abstract



Flexible partitioning

$$42 \div 3$$



$$30 \div 3 = 10 \quad 12 \div 3 = 4$$

Topic: Division

Year 4



Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>Pupils progress to dividing 3 digits with remainders</p> <p>Mental strategies and inverse operations involving fact families. Part whole models to support.</p>	<p>With remainders</p> <p>$83 \div 3$</p> <p>3 digits</p> <p>with exchanges</p>	<p>Represent place value counters pictorially</p> <p>$30 \times 4 = 120$</p>	<p>with flexible partitioning</p> <p> $83 \div 3 = 27 \text{ r}2$ $95 \div 4 = 23 \text{ r}3$ </p> <p> $134 \div 4 = 33 \text{ r}2$ $365 \div 6 = 60 \text{ r}5$ </p>

Year group objectives
Recall multiplication and division facts for tables up to 12×12
Use place value, known and derived facts divide mentally, including: dividing by 1;
Recognise and use factor pairs and commutativity in mental calculations
Solve problems involving integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

<p><u>Example questions</u></p> <p>_____</p>	<p>$96 \div 8 =$</p> <p>$__ \div 7 =$</p>	<p>Which of these division calculations have the answer of 3 r 2</p> <p>$23 \div 7$ $17 \div 5$ $32 \div 6$</p> <p>$7 \div 2$ $14 \div 4$ $30 \div 8$</p>	<table border="1"> <thead> <tr> <th>Has a remainder? (Yes or No)</th> </tr> </thead> <tbody> <tr> <td>$48 \div 7$</td> </tr> <tr> <td>$48 \div 8$</td> </tr> <tr> <td>$48 \div 9$</td> </tr> </tbody> </table>	Has a remainder? (Yes or No)	$48 \div 7$	$48 \div 8$	$48 \div 9$	<p>It takes 7 minutes to make a pom-pom. How many complete pom-poms can Malik make in 30 minutes?</p>
Has a remainder? (Yes or No)								
$48 \div 7$								
$48 \div 8$								
$48 \div 9$								

Topic: Division



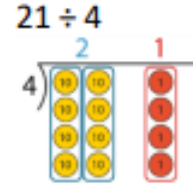
Year 5

Stem sentence/ Maths talk

473 = ___ hundreds + ___ tens + ___ ones.
 ___ hundreds ÷ ___ = ___ **hundred(s)** r ___
 ___ hundred (s).
 ___ hundred(s) + ___ tens = ___ tens
 ___ tens ÷ ___ = ___ **tens** r ___ tens
 ___ tens + ___ ones = ___ ones
 ___ ones ÷ ___ = ___ **ones** r ___ ones
 So
 ___ ÷ ___ = ___ r ___



473 = 4 hundreds + 7 tens + 3 ones.
 4 hundreds ÷ 3 = **1 hundred** r 1 hundred.
 1 hundred + 7 tens = 17 tens
 17 tens ÷ 3 = **5 tens** r 2 tens
 2 tens + 3 ones = 23 ones
 23 ones ÷ 3 = **7 ones** r 2 ones
 So
 473 ÷ 3 = 157r2



Eight tens and four ones divided between four is equal to two tens and one one.
 Each child gets twenty-ones sticks.

Year group objectives

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

Multiply and divide numbers mentally drawing upon known facts

Multiply and divide whole numbers and decimals by 10, 100 and 1000

Solve problems involving multiplication and division including using their knowledge of factors, multiples, squares and cubes

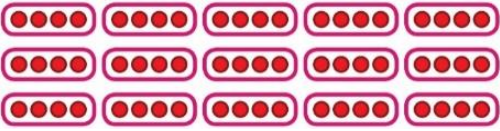
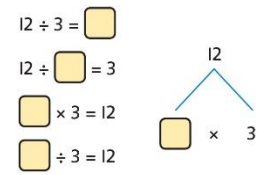
Solve problems involving addition, subtraction, multiplication and division and combination of these including understanding the means of the equals sign

Notes / Vocabulary	Concrete	Pictorial	Abstract
multiply divide column exchange place value share Groups Short division Divisor Dividend	Explore grouping using place value equipment. $268 \div 2 = ?$ <i>There is 1 group of 2 hundreds.</i> <i>There are 3 groups of 2 tens.</i> <i>There are 4 groups of 2 ones.</i> $264 \div 2 = 134$	Use place value equipment on a place value grid alongside short division. The model uses grouping. A sharing model can also be used, although the model would need adapting. Lay out the problem as a short division. <i>There is 1 group of 4 in 4 tens.</i> <i>There are 2 groups of 4 in 8 ones.</i>	Use short division for up to 4-digit numbers divided by a single digit. $3,892 \div 7 = 556$ Use multiplication to check. $556 \times 7 = ?$ $6 \times 7 = 42$ $50 \times 7 = 350$ $500 \times 7 = 3500$ $3,500 + 350 + 42 = 3,892$

Topic: Division



Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>Inverse operations, multiplication, grouping and sharing.</p>	<p>Use equipment to group and share and to explore the calculations that are present.</p> <p><i>I have 28 counters.</i></p> <p><i>I made 7 groups of 4. There are 28 in total.</i></p> <p><i>I have 28 in total. I shared them equally into 7 groups. There are 4 in each group.</i></p> <p><i>I have 28 in total. I made groups of 4. There are 7 equal groups.</i></p>	<p>Represent multiplicative relationships and explore the families of division facts.</p> <p>$60 \div 4 = 15$ $60 \div 15 = 4$</p> 	<p>Represent the different multiplicative relationships to solve problems requiring inverse operations.</p> <p>Understand missing number problems for division calculations and know how to solve them using inverse operations.</p> <p>$22 \div ? = 2$ $22 \div 2 = ?$ $? \div 2 = 22$ $? \div 22 = 2$</p> <p> $12 \div 3 = \square$ $12 \div \square = 3$ $\square \times 3 = 12$ $\square \div 3 = 12$ </p> 

Year group objectives

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

Multiply and divide numbers mentally drawing upon known facts

Multiply and divide whole numbers and decimals by 10, 100 and 1000

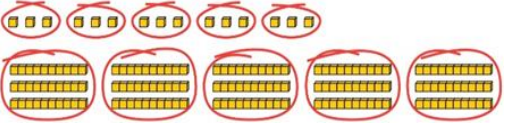
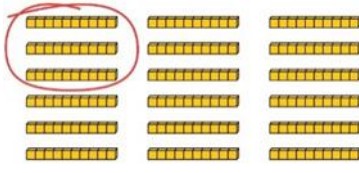
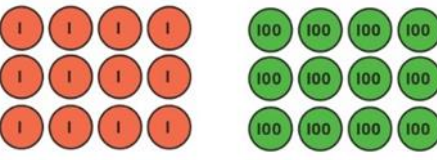
Solve problems involving multiplication and division including using their knowledge of factors, multiples, squares and cubes

Solve problems involving addition, subtraction, multiplication and division and combination of these including understanding the means of the equals sign

Topic: Division



Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract
add subtract decimal tenth hundredth thousandth multiply divide decimal point whole column exchange place value decimal place digit unitising multiples	Use place value equipment to represent known facts and unitising.  15 ones put into groups of 3 ones. There are 5 groups. $15 \div 3 = 5$ 15 tens put into groups of 3 tens. There are 5 groups. $150 \div 30 = 5$	Represent related facts with place value equipment when dividing by unitising.  180 is 18 tens. 18 tens divided into groups of 3 tens. There are 6 groups. $180 \div 30 = 6$  12 ones divided into groups of 4. There are 3 groups. 12 hundreds divided into groups of 4 hundreds. There are 3 groups. $1200 \div 400 = 3$	Reason from known facts, based on understanding of unitising. Use knowledge of the inverse relationship to check. $3,000 \div 5 = 600$ $3,000 \div 50 = 60$ $3,000 \div 500 = 6$ $5 \times 600 = 3,000$ $50 \times 60 = 3,000$ $500 \times 6 = 3,000$

Year group objectives

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

Multiply and divide numbers mentally drawing upon known facts

Multiply and divide whole numbers and decimals by 10, 100 and 1000


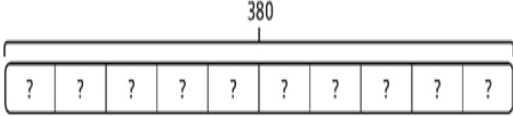
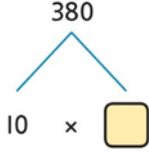
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Topic: Division



Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract								
multiply divide column exchange place value share Groups Short division Divisor Dividend Partition	Use place value equipment to support unitising for division. $3,000 \div 1,000$  3,000 is 3 thousands. $3 \times 1,000 = 3,000$ So, $3,000 \div 1,000 = 3$	Use a bar model to support dividing by unitising. $380 \div 10 = 38$  380 is 38 tens. $38 \times 10 = 380$ $10 \times 38 = 380$ So, $380 \div 10 = 38$ 	Understand how and why the digits change on a place value grid when dividing by 10, 100 or 1,000. <table border="1" data-bbox="1628 472 2048 558"> <thead> <tr> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>2</td> <td>0</td> <td>0</td> </tr> </tbody> </table> $3,200 \div 100 = ?$ 3,200 is 3 thousands and 2 hundreds. $200 \div 100 = 2$ $3,000 \div 100 = 30$ $3,200 \div 100 = 32$ So, the digits will move two places to the right.	Th	H	T	O	3	2	0	0
Th	H	T	O								
3	2	0	0								

Year group objectives

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

Multiply and divide numbers mentally drawing upon known facts

Multiply and divide whole numbers and decimals by 10, 100 and 1000

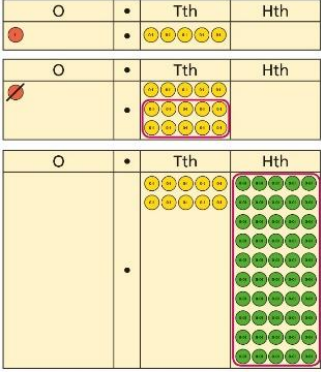
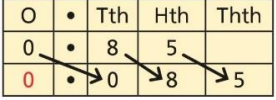
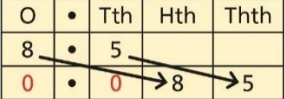
Solve problems involving multiplication and division including using their knowledge of factors, multiples, squares and cubes

Solve problems involving addition, subtraction, multiplication and division and combination of these including understanding the means of the equals sign

Topic: Division



Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract
add subtract decimal tenth hundredth thousandth multiply divide decimal point whole column exchange place value decimal place Digit fraction share	Understand division by 10 using exchange. Use place value counters and place value grids. <i>2 ones are 20 tenths.</i> <i>20 tenths divided by 10 is 2 tenths.</i>	Represent division using exchange on a place value grid.  <p>1.5 is 1 one and 5 tenths. This is equivalent to 10 tenths and 50 hundredths. 10 tenths divided by 10 is 1 tenth. 50 hundredths divided by 10 is 5 hundredths. 1.5 divided by 10 is 1 tenth and 5 hundredths. $1.5 \div 10 = 0.15$</p>	Understand the movement of digits on a place value grid. $0.85 \div 10 = 0.085$  $8.5 \div 100 = 0.085$ 

Year group objectives

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

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Topic: Division

Year 5



Year group objectives

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

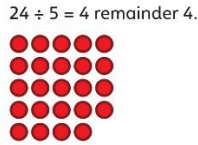
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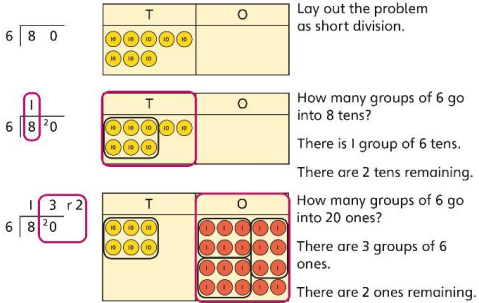
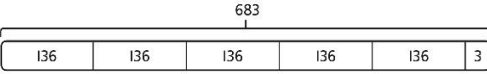
Notes / Vocabulary	Concrete	Pictorial	Abstract
<p>division dividing, divide, divided by, divided into left, left over, remainder grouping sharing, share, share equally one each, two each, three each ... ten each group in pairs, threes ... tens equal groups of inverse</p>	<p>Use equipment to explore the factors of a given number.</p> <p>$24 \div 3 = 8$ $24 \div 8 = 3$ <i>8 and 3 are factors of 24 because they divide 24 exactly.</i></p> <p>$24 \div 5 = 4$ remainder 4.</p> <p>5 is not a factor of 24 because there is a remainder.</p>	<p>Understand that prime numbers are numbers with exactly two factors.</p> <p>$13 \div 1 = 13$ $13 \div 2 = 6 \text{ r } 1$ $13 \div 4 = 4 \text{ r } 1$</p> <p>1 and 13 are the only factors of 13. 13 is a prime number.</p>	<p>Understand how to recognise prime and composite numbers.</p> <p>I know that 31 is a prime number because it can be divided by only 1 and itself without leaving a remainder.</p> <p>I know that 33 is not a prime number as it can be divided by 1, 3, 11 and 33.</p> <p>I know that 1 is not a prime number, as it has only 1 factor.</p>



Topic: Division



Year 5

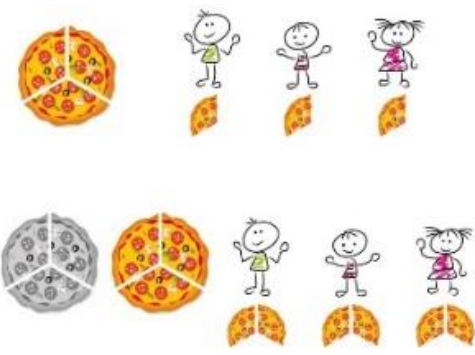

Notes / Vocabulary	Concrete	Pictorial	Abstract
add subtract decimal tenth hundredth thousandth multiply divide decimal point whole column exchange place value decimal place Digit fraction share remainder	Understand remainders using concrete versions of a problem. <i>80 cakes divided into trays of 6.</i> <i>80 cakes in total. They make 13 groups of 6, with 2 remaining.</i> 	Use short division and understand remainders as the last remaining 1s. 	In problem solving contexts, represent divisions including remainders with a bar model. $683 = 136 \times 5 + 3$ $683 \div 5 = 136 \text{ r } 3$ 

Year group objectives
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
Multiply and divide numbers mentally drawing upon known facts
Multiply and divide whole numbers and decimals by 10, 100 and 1000
Solve problems involving multiplication and division including using their knowledge of factors, multiples, squares and cubes
Solve problems involving addition, subtraction, multiplication and division and combination of these including understanding the means of the equals sign

Topic: Division



Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract
add subtract decimal tenth hundredth thousandth multiply divide decimal point whole column exchange place value decimal place Digit fraction share Mixed number Improper fraction Whole number	Use sharing to explore the link between fractions and division. 1 whole shared between 3 people. Each person receives one-third. 	Use a bar model and other fraction representations to show the link between fractions and division.  $1 \div 3 = \frac{1}{3}$	Use the link between division and fractions to calculate divisions. $5 \div 4 = \frac{5}{4} = 1\frac{1}{4}$ $11 \div 4 = \frac{11}{4} = 2\frac{3}{4}$

Year group objectives

Understanding factors and prime numbers

Understanding inverse operations and the link with multiplication, grouping and sharing

Dividing whole numbers by 10, 100 and 1,000

Dividing by multiples of 10, 100 and 1,000

Dividing up to four digits by a single digit using short division

Understanding remainders

Dividing decimals by 10, 100 and 1,000

Understanding the relationship between fractions and division

Topic: Division

Year 6



Stem sentence/ Maths talk

If I multiply the dividend by ____, I must multiply the divisor by ____ for the quotient to stay the same.

Dividend ÷ divisor = quotient.

$$\begin{array}{l} 8 \div 4 = 2 \\ \times 10 \downarrow \quad \times 10 \downarrow \\ 80 \div 40 = 2 \\ \times 10 \downarrow \quad \times 10 \downarrow \\ 800 \div 400 = 2 \end{array}$$

___ is one-tenth the size of ___ so ___ divided by ___ is one tenth the size of ___ divided by ___

___ is one-hundredth the size of ___ so ___ divided by ___ is one hundredth the size of ___ divided by ___

Year group objectives

solve problems involving addition, subtraction, multiplication and division


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 the context

perform mental calculations, including with mixed operations and large numbers


Notes / Vocabulary

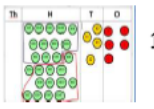
multiply
divide
decimal
decimal place (dp)
recurring decimal
placeholder
place value
tenth
hundredth
thousandth
product
fraction

Concrete

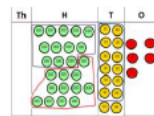
2544 ÷ 12


$$\begin{array}{r} 0212 \\ 12 \overline{)2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 24 \\ \underline{24} \\ 0 \end{array}$$
 How many groups of 12 thousands do we have? None

Exchange 2 thousand for 20 hundreds.

 Exchange the two tens for twenty ones so now we have 24 ones. How many groups of 12 are in 24? 2

How many groups of 12 are in 25 hundreds? 2 groups. Circle them.


$$\begin{array}{r} 02 \\ 12 \overline{)2544} \\ \underline{24} \\ 1 \end{array}$$
 We have grouped 24 hundreds so can take them off and we are left with one.

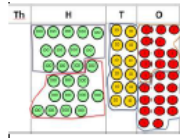
Exchange the one hundred for ten tens so now we have 14 tens. How many groups of 12 are in 14? 1 remainder 2.


$$\begin{array}{r} 021 \\ 12 \overline{)2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 2 \end{array}$$

Pictorial

Children to represent the counters, pictorially and record the subtractions beneath.

Exchange the two tens for twenty ones so now we have 24 ones. How many groups of 12 are in 24? 2



Abstract

Some pupils may find it easier to have a list of multiples alongside the calculation at this point.

$$\begin{array}{r} 0212 \\ 12 \overline{)2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

Expressing remainders in different ways.

$$4 \overline{)1715} \quad \text{answer } 43 \text{ r}3$$

$$\text{answer } 43 \frac{3}{4}$$

$$4 \overline{)1715.30^20} \quad \text{answer } 43.73$$

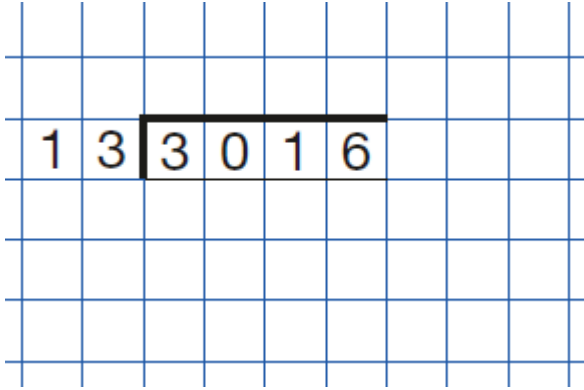
Topic: Division

Year 6



Example SAT questions

Arithmetic

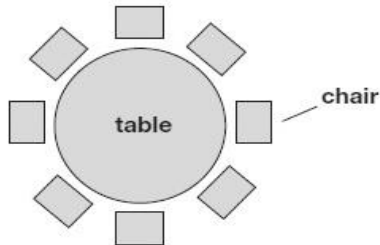


$$21 \overline{)672}$$

Show your method

Reasoning

One table can seat 8 people.



How many tables are needed to seat 40 people?

What is 444 minutes in hours and minutes?

Year group objectives

solve problems involving addition, subtraction, multiplication and division

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 the context

perform mental calculations, including with mixed operations and large numbers