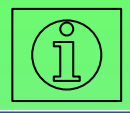
Calculation Policy

- Addition
- Subtraction
- Multiplication
- Division







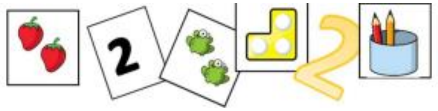
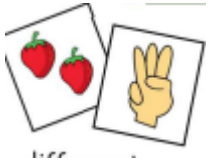
	Early Years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition	Finding 1 more by counting. Find the total number of items in two groups by counting all of them. Counting up to 20.	Combining two parts to make a whole: part whole model. Starting at the bigger number and counting on. Regrouping to make 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.

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

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

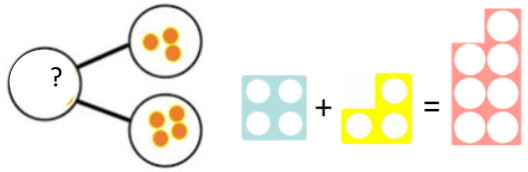
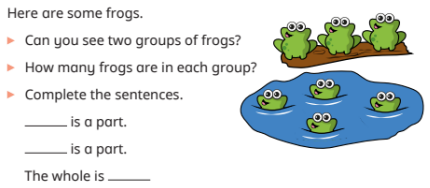
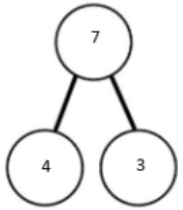
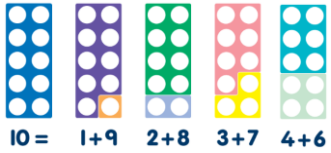
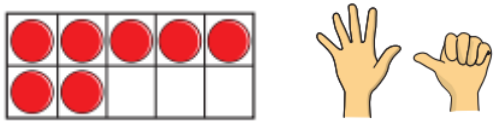
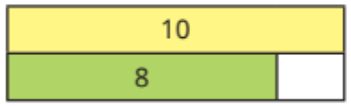
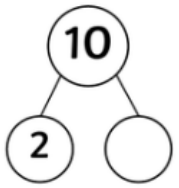
- Have a deep understanding of numbers to 10, including the composition of each number
- Subitise(recognize quantities without counting) up to 5.
- Automatically recall (without reference to rhymes. Counting or other aids) numbers bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts

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.

Notes / Vocabulary	Concrete	Pictorial	Abstract
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	**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.	 	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. 
Number bonds, tens frame, numicon, 	**Systematic number bonds to 10**  Use tens frames, counters, cubes, numicon, fingers etc. Include zero.	 Use bar models and part-whole models systematica.., 	0 + __ = 10 1 + __ = 10 2 + __ = 10 3 + __ = 10 4 + __ = 10 5 + __ = 10 10 = 5 + ___ 10 = 6 + ___ 10 = 7 + ___ 10 = 8 + ___ 10 = 9 + ___ 10 = 10 + ___ Show statements with equal signs in different places

Year group objectives

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

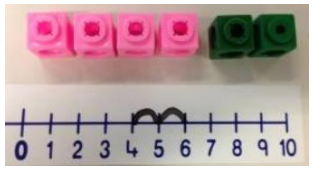
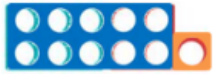
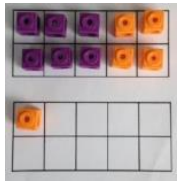
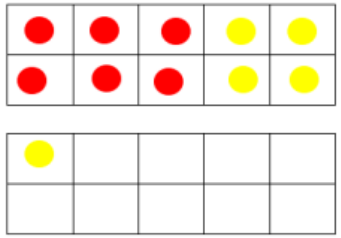
To represent and use number bonds and related facts subtraction facts within 20.

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

Topic: Addition

Year 1

Adding more, counting on, jumps, number line.	**Adding more** (use cubes, counters, numicon)  	Use a bar model to encourage the children to count on.  	Using an abstract number line  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
Numicon, tens frame 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.	**Addition up to 20** (by using a tens frames and counters, cubes or numicon) 6 + 5 = 11  	Children to draw counters within the tens frame. 	Children to develop understanding of equality. 6 + __ = 11 11 = 5 + __ 6 + 5 = 5 + __ 6 + 5 = __ + 4 Use missing values to pattern seek 11 = 6 + 5, 11 = 7 + 4, 11= 8 + 3, 11= 9+2

Example arithmetic questions

3 + 5 = ___ 2 + 8 = ___ 12 + 5 = ____

____ = 1 + 8 ____ = 14 + 3 ____ = 20 + 0

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.

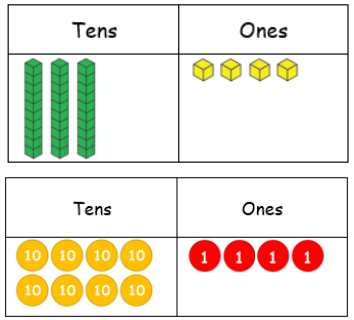
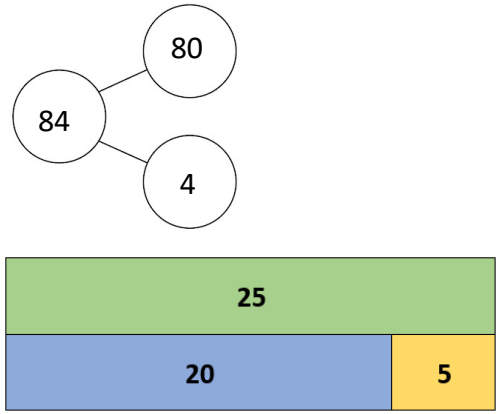
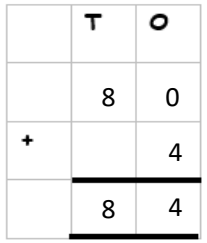
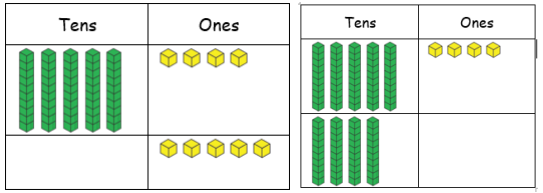
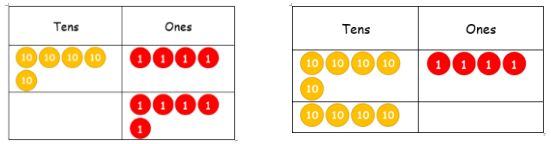
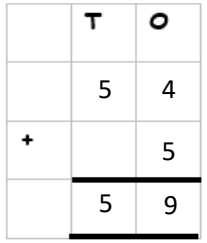
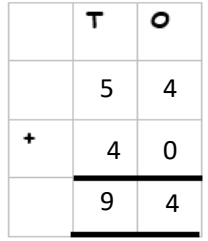
To solve one-step problems that involve addition and subtraction, using concrete object, pictorial representations, and missing number problems such as 7 = ? - 9

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 ___.

Notes / Vocabulary	Concrete	Pictorial	Abstract
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.	**Partitioning two-digit numbers into tens and ones** 		80 + 4 = 84 80 + __ = 84 20 + 5 = 25 20 + __ = 25 Introduce written method adding multiple of ten and ones together.  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
Formal written methods without regrouping. Encourage children to count on mentally and apply knowledge of number bonds.	**Adding two-digit number and ones and tens** 	Children can draw their own representations. Embed PV knowledge. 	54 + 5 = ___  54 + 40 = 

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

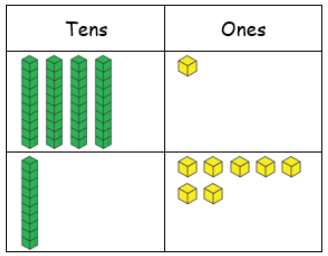
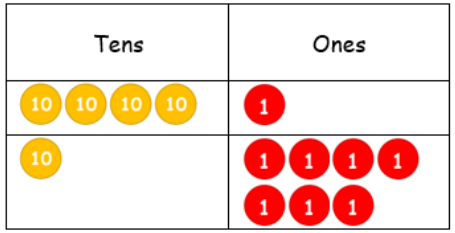
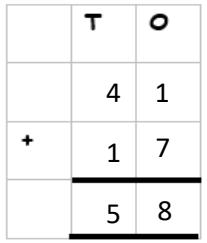
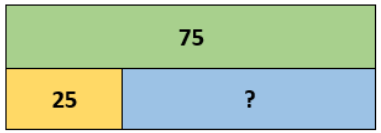
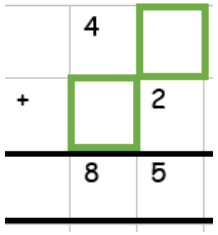
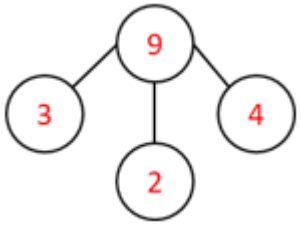
To add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
- A two-digit number and ones
- A two-digit number and tens
- 2 two-digit numbers
- 3 one-digit numbers.

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.

Topic: Addition

Year 2

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

Example arithmetic questions from KS1 SATS

5 + 10 + 5 = ☐

98 + 4 = ☐

☐ + 8 = 12

5 + 32 = ☐

22 + 22 = ☐

68 + 20 = ☐

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.

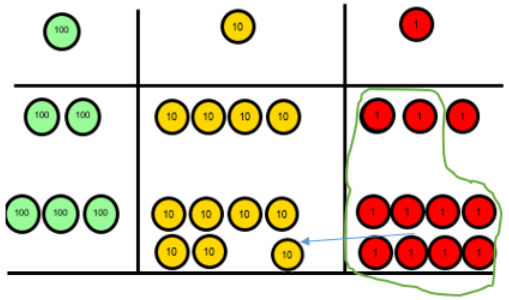
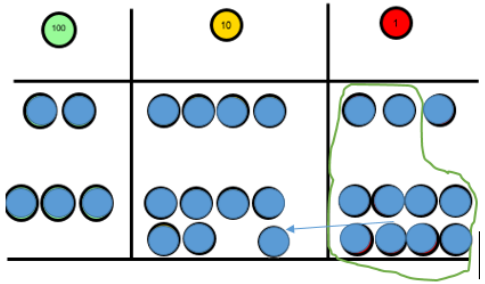
To recognise and use the inverse relationship between + and – and use this to check calculations and solve missing number problems.

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 _____

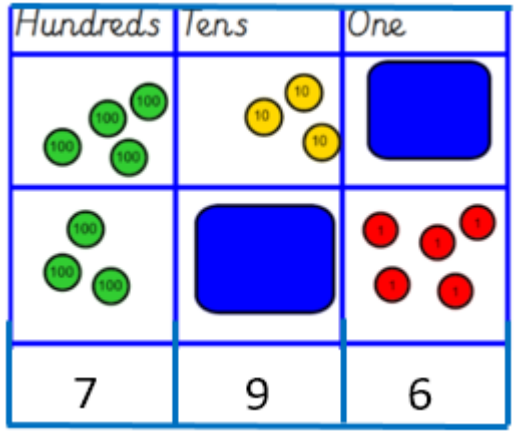
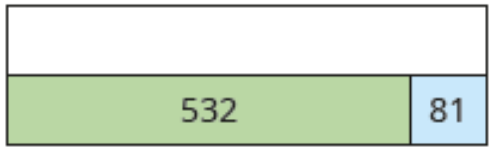
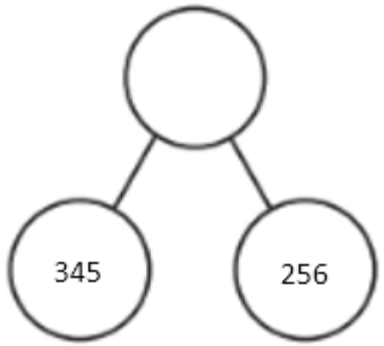
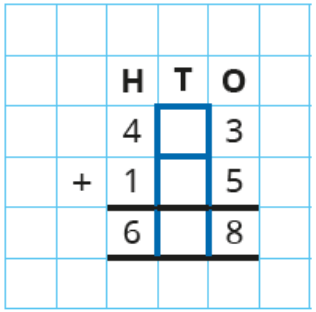
Notes / Vocabulary	Concrete	Pictorial	Abstract
addition add, more, and make, sum, total altogether double near double half, halve one more, two more … ten more … one hundred more, inverse Use of place value counters to add HTO + TO, HTO + HTO etc. once the children have had practice, they should be able to apply it to larger numbers and the abstract	Use of place value counters 	Use of a place value grid and drawn images 	243 +368 611 1 1

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.

Topic: Addition

Year 3

Notes / Vocabulary	Concrete	Pictorial	Abstract
Mental strategies and inverse operations involving fact families. Part whole models to support. Add three numbers together eg 243 + 341 + 98 =	Use place value counters, or represent pictorially. 	 	What could the missing digits be?  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

<u>Example questions</u> 710 + 1 = 20 + 4 + 4 = 134 + 61 = 34 + ? = 72

$$\begin{array}{r} 269 \\ +\ 412 \\ \hline \square \end{array}$$

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.

Topic: Addition

Year 4

Stem sentence/ Maths talk

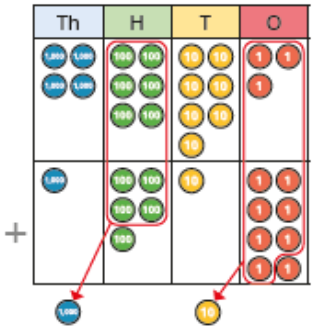
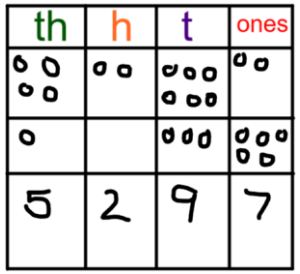
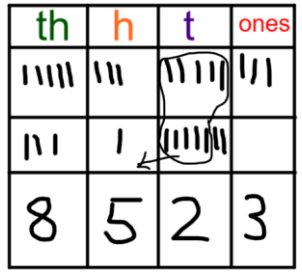
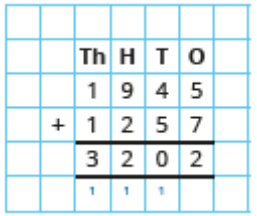
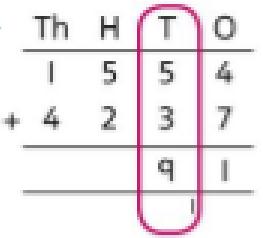
There are ten hundreds in one thousand. There are one hundred tens in one thousand. There are one thousand ones in one thousand.

____ 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

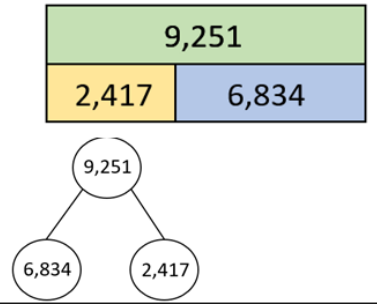
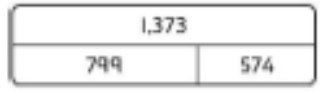
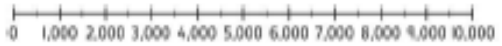
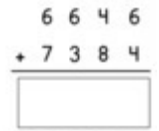
Notes / Vocabulary	Concrete	Pictorial	Abstract
addition add, more, and make, sum, total altogether double near double half, halve one more, two more … ten more … one hundred more, inverse Use of place value counters to add THTO + HTO, THTO + THTO etc. once the children have had practice, they should be able to apply it to larger numbers and the abstract Addition of decimal numbers in context – using money.	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.	Use of a place value grid and drawn images   	  Include examples that exchange in ones, tens hundreds and in more than 1 column.

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.

Topic: Addition

Year 4

Notes / Vocabulary	Concrete	Pictorial	Abstract
Mental strategies and inverse operations involving fact families. Part whole models to support.	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.		$2,417 + 6,834 = 9,251$ $6,834 + 2,417 = 9,251$ $9,251 - 2,417 = 6,834$ $9,251 - 6,834 = 2,417$
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,	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.	Bar models may be used to represent additions in problem contexts, and to justify mental methods where appropriate. **Eg 799 + 574**   Moving to…	912 + 6,149 = ?  I used rounding to work out that the answer should be approximately 1,000 + 6,000 = 7,000. **Rounding and adjusting** I chose to work out 574 + 800, then subtract 1. 

<u>Example questions</u> 3005 + 1000 = 2200 + 500 = ___ + 110 = 450 8998 + 2419 =

3452 + 5230 < or > or = 2872 + 7098

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.

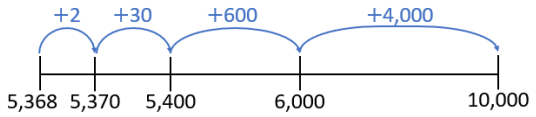
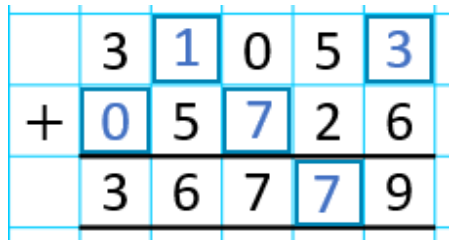
Solve addition 2 step problems in context

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

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

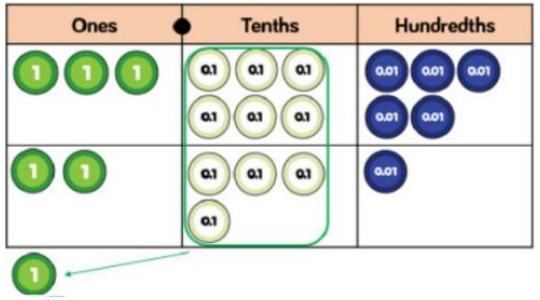
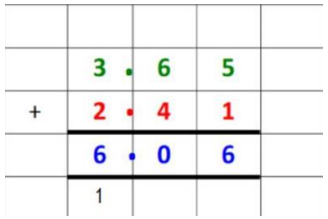
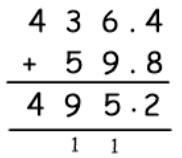
Notes / Vocabulary	Concrete	Pictorial	Abstract
addition add, more, and make, sum, total altogether double near double half, halve one more, two more … ten more … one hundred more inverse	Use place value counters or represent pictorially. Use place value equipment on a place value grid to organise thinking. Ensure that children understand how the columns relate to place value and what to do if the numbers are not all 4-digit numbers.		 

Year group objectives

- Add whole numbers with more that 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

Topic: Addition

Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract
Starting to add decimals but only when each number has the same number of decimal places	 Counters will support pupils with the process of exchanging. It will also help with discussions around language ‘tenths’ ‘hundredths’.		 

Year group objectives

- Add whole numbers with more that 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

Topic: Addition

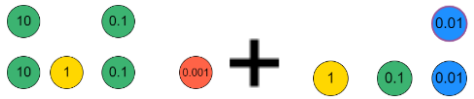
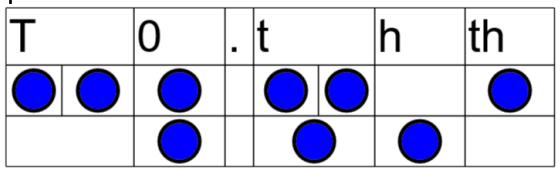
Year 6

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
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	4 or more digits add 4 or more digits including different numbers of decimal places. Use of place value counters to add different decimal values  • Vary the number of digits in the number • = sign on the RHS • Balanced equations 247 + 14,699 = ? = 6.9 + 14.32	Children can represent the counters like the image below.  	Children must line up the digits in correct place columns. A 0 can be used to fill any empty columns. 21.201+1.11 21.201 + 1.110

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 → is 20 more than → 160

□ → is 20 more than → 237

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

	6		8
+ 3		9	
9	0	1	9

Write the missing digits to make the addition correct.

1		1	
+		1	
9	0	0	

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

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

Answer: 351

932 – 457 becomes

$$\begin{array}{r} {\scriptstyle 8\ \ 12\ \ 1} \\ \not{9}\ \not{3}\ 2 \\ -\ 4\ 5\ 7 \\ \hline 4\ 7\ 5 \end{array}$$

Answer: 475

932 – 457 becomes

$$\begin{array}{r} {\scriptstyle \ \ 1\ \ 1} \\ 9\ 3\ 2 \\ -\ \not{4}\ \not{5}\ 7 \\ {\scriptstyle \ \ 5\ \ 6} \\ \hline 4\ 7\ 5 \end{array}$$

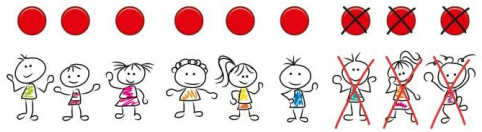
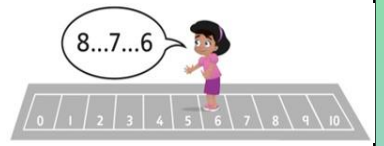
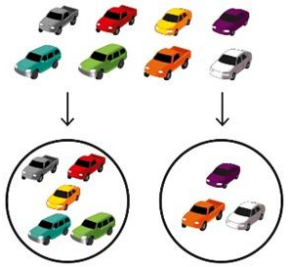
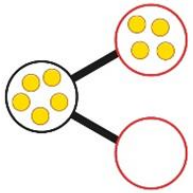
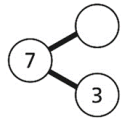
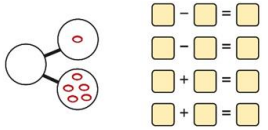
Answer: 475

Topic: Subtraction

Year 1

Stem sentence/ Maths talk

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

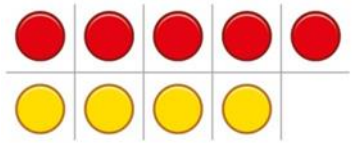
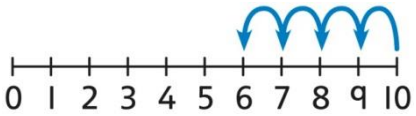
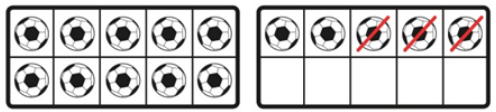
Notes / Vocabulary	Concrete	Pictorial	Abstract
Children develop the core ideas that underpin all calculation. They begin by connecting calculation with counting on and counting back, but they should learn that understanding wholes and parts will enable them to calculate efficiently and accurately, and with greater flexibility. They learn how to use an understanding of 10s and 1s to develop their calculation strategies, especially in addition and subtraction.	Children arrange objects and remove to find how many are left.  1 less than 6 is 5. 6 subtract 1 is 5.	Children draw and cross out or use counters to represent objects from a problem.  9 – ☐ = ☐ There are ☐ children left.	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 = ☐	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. 

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

Topic: Subtraction

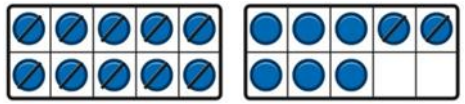
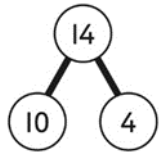
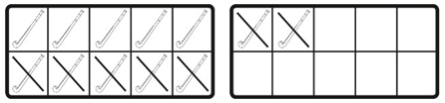
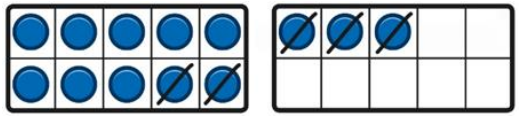
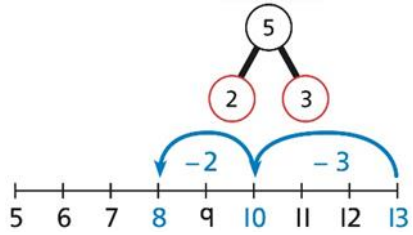
Year 1

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

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

Topic: Subtraction

Year 1

Notes / Vocabulary	Concrete	Pictorial	Abstract
	For example: 18 − 12 Use ten frames to represent the efficient method of subtracting 12.  First subtract the 10, then subtract 2.	For example: 18 − 12 Subtract 12 by first subtracting the 10, then the remaining 2.  First subtract the 10, then take away 2.	Use a part-whole model to support the calculation. 19 − 14 19 − 10 = 9 9 − 4 = 5 So, 19 − 14 = 5 
	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.	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.	Use a number line and a part-whole model to support the method. 13 − 5 

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

Topic: Subtraction

Year 2

Stem sentence/ Maths talk

I need to subtract _____ to get to 10

I can partition _____ into _____ and _____

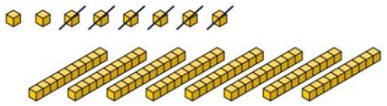
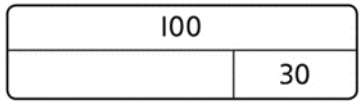
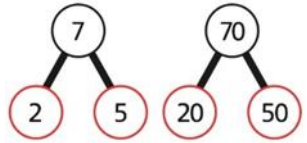
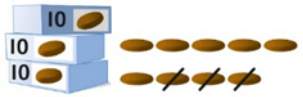
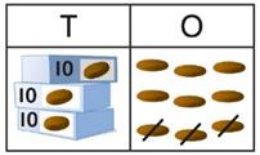
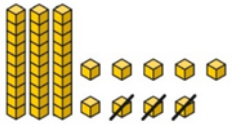
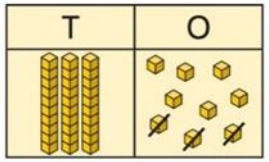
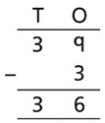
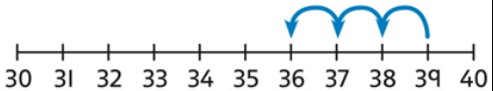
I need to subtract _____ more.

_____ less than _____ is _____

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

_____ + _____ = 10, so 10 – _____ = _____

If 10 – _____ = _____, then _____ – _____ = _____

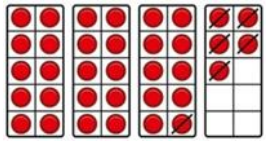
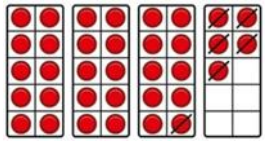
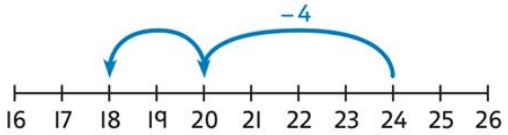
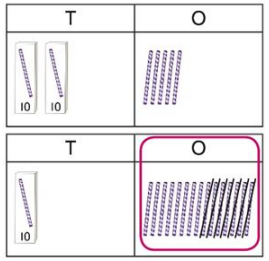
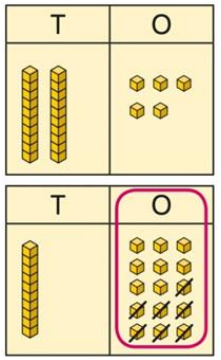
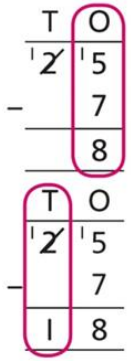
Notes / Vocabulary	Concrete	Pictorial	Abstract
The use of concrete resources such as ten frames and counters, base 10 and Rekenreks can support children in choosing the most efficient way to partition the 1-digit number they are subtracting and can also aid their understanding. Other representations, 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.	Use known number bonds and unitising to subtract multiples of 10.  8 subtract 6 is 2. So, 8 tens subtract 6 tens is 2 tens.	Use known number bonds and unitising to subtract multiples of 10.  10 − 3 = 7 So, 10 tens subtract 3 tens is 7 tens.	Use known number bonds and unitising to subtract multiples of 10.  7 tens subtract 5 tens is 2 tens. 70 − 50 = 20
	Subtract the 1s. This may be done in or out of a place value grid.  	Subtract the 1s. This may be done in or out of a place value grid.  	Subtract the 1s. Understand the link between counting back and subtracting the 1s using known bonds. 9 − 3 = 6 39 − 3 = 36  

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

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

Year group objectives

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- 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
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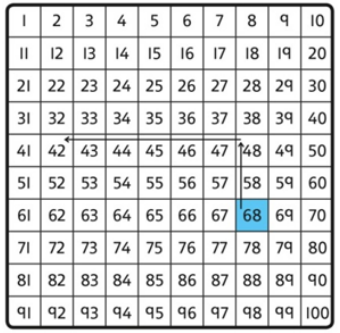
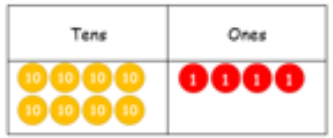
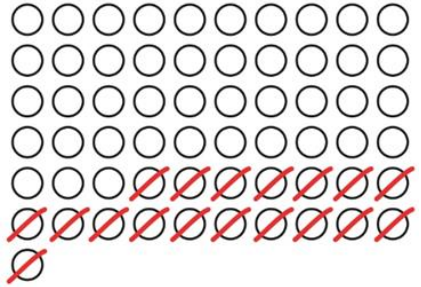
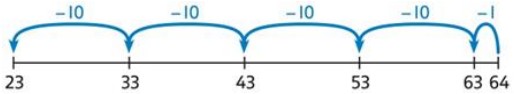
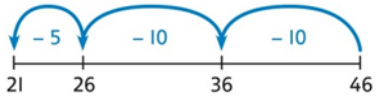
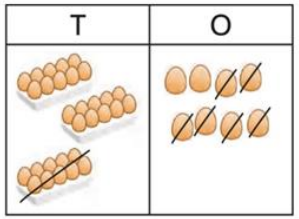
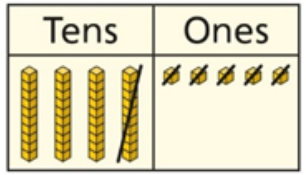
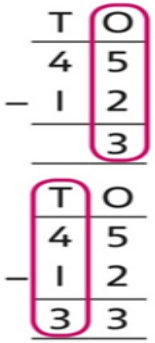
Topic: Subtraction

Year 2

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

Year group objectives

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a two-digit number and 10s
2 two-digit numbers
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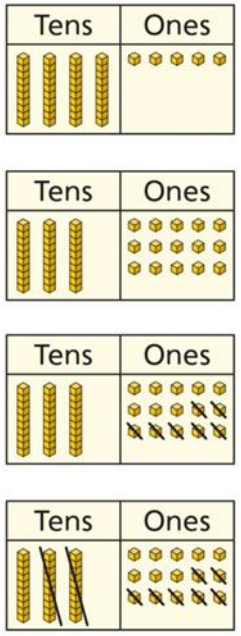
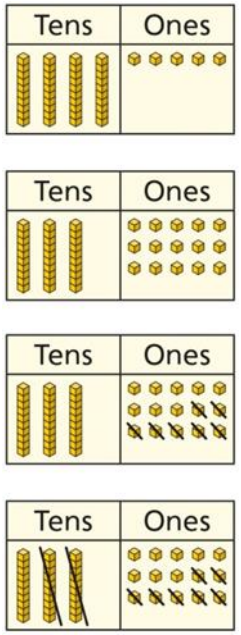
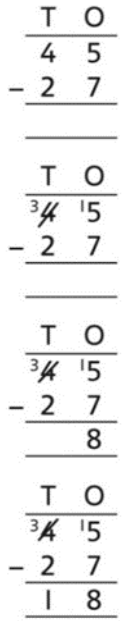
Topic: Subtraction

Year 2

Notes / Vocabulary	Concrete	Pictorial	Abstract
	Use base 10 to explore the exchange. **45 -27 = ?** 	Exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s. 	Using column subtraction, exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s. 45 – 27 = ? ? + 27 =45 

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
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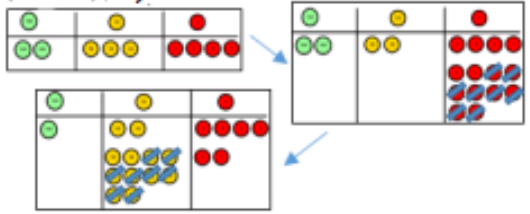
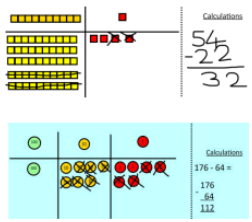
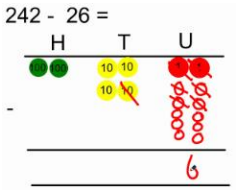
- show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Topic: Subtraction

Year 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 _____

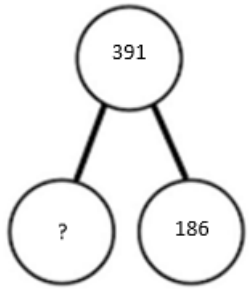
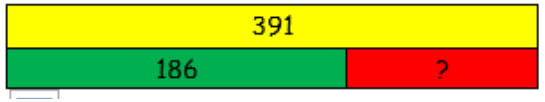
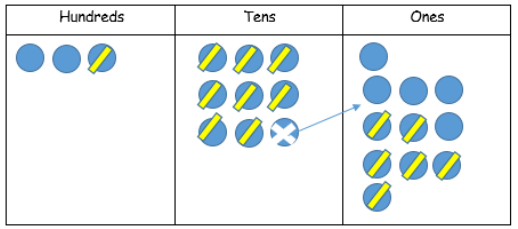
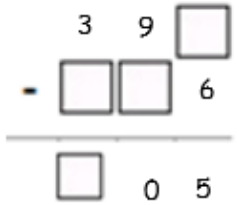
Notes / Vocabulary	Concrete	Pictorial	Abstract
Subtraction, difference total altogether, half, halve, one less, two less … ten less … one hundred less, inverse **Note**: stress importance of '**difference**' as subtraction language Use of place value counters to subtract HTO + TO, HTO + HTO etc. once the children have had practice, they should be able to apply it to larger numbers and the abstract	**Without regrouping** Work out 769 – 147  **With regrouping** **Column method** (using place value counters) 234-88 	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.  Draw the Base 10 or place value counters alongside the written calculation to help to show working. 	

Year group objectives

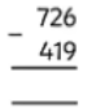
- Subtract numbers with up to 3 digits using formal written methods.
- Subtract numbers mentally including –
  3 digit number and ones
  3 digit number and tens
  3 digit number and hundreds
- Estimate the answer to a calculation and use inverse operations to check answer.
- Solve subtraction problems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

Topic: Subtraction

Year 3

Notes / Vocabulary	Concrete	Pictorial	Abstract
Mental strategies and inverse operations involving fact families. Part whole models to support.	Use place value counters, or represent pictorially.	 	What's the calculation? What's the answer?   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

<u>Example questions</u> 600 – 1 = 231 – 100 = 973 – 19 = 500 - ? = 350



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.

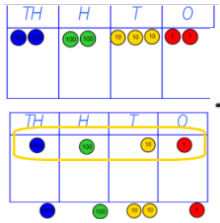
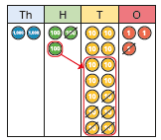
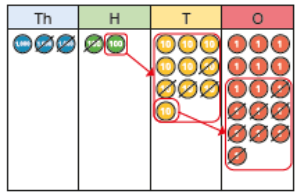
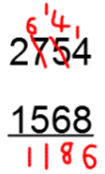
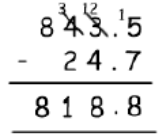
Solve addition problems including missing number facts, place value and more complex addition.

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 _____

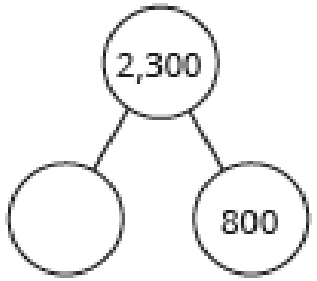
Notes / Vocabulary	Concrete	Pictorial	Abstract
Subtraction, difference total altogether, half, halve, one less, two less … ten less … one hundred less, one thousand less, inverse **Note**: stress importance of '**difference**' as subtraction language Use of place value counters to subtract THTU – TU and THTU – HTU before moving to THTU – THTU and the abstract. Pupils to move to multiple exchanges	 2232 -1121 **2343 – 151**   **3206 - 2148** Make exchanges across more than one column where there is a zero as a place holder.	Use place value grids to support 3572 – 1221 =  2951 – 2543 = 	2754 – 1568 = 1186  Use of decimals in context (money)  Include examples that exchange in ones, tens hundreds and in more than 1 column.

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.

Topic: Subtraction

Year 4

Notes / Vocabulary	Concrete	Pictorial	Abstract
Mental strategies and inverse operations involving fact families. Part whole models to support. 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.	Use place value counters, or represent pictorially.	 Use inverses to check calculations 2,853 + 309 = 3,162 – 3 1 6 2	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. **Bella spends £2.56 in the shop out of her £5 note pocket money.** **How much change will she receive?** Checking word problems by using inverse 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

Example questions	250 – 25 – 25 =	9000 – 500 =	700 - ? = 280	5,018 - 2,046

Year group objectives

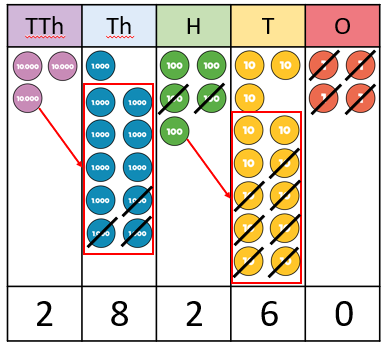
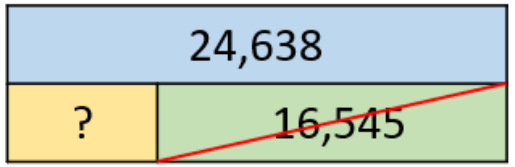
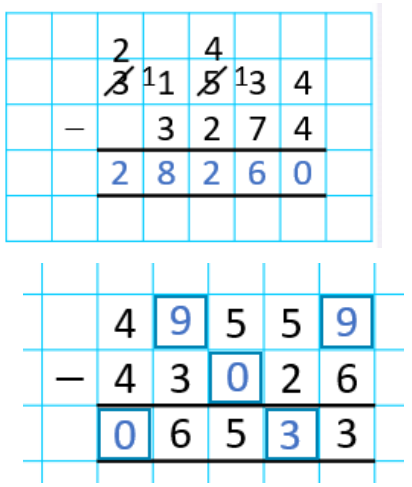
- Subtract numbers with up to 3 digits using formal written methods.
- Subtract numbers mentally including –
3 digit number and ones
3 digit number and tens
3 digit number and hundreds
- Estimate the answer to a calculation and use inverse operations to check answer.
- Solve subtraction problems including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

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.

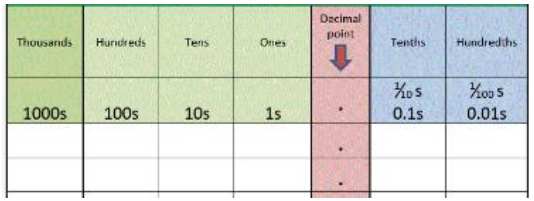
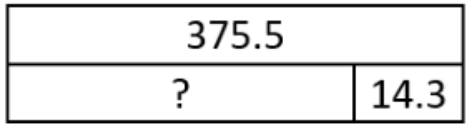
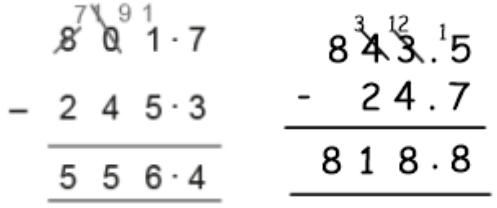
Notes / Vocabulary	Concrete	Pictorial	Abstract
how many more to make …? how many more is … than …? how much more is …? subtract take away exchange how many are left/left over? how many have gone? one less, two less, ten less … one hundred less how many fewer is … than …? how much less is …? difference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

Year group objectives

- Subtract whole numbers with more that 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

Topic: Subtraction

Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract
Starting to subtract decimals but only when each number has the same number of decimal places	Counters will help with place value grids.   	 3.9 − 1 = 2.9 2.9 − 0.5 = 2.4  	

Year group objectives

- Subtract whole numbers with more that 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

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.

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 …?

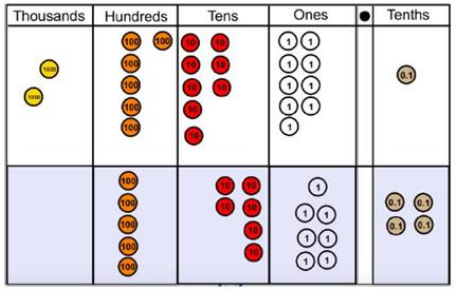
- Vary the number of digits in the number
- Missing boxes
- Balanced equations

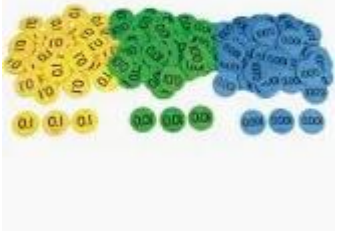
15.743 - 214.9 =

? – 200 = 2,307

Concrete

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





Pictorial

487.3	
?	2.9

Abstract

$$\begin{array}{r} {}^{2}\cancel{5}{}^{1}7.\cancel{3}0 \\ -\ 6.08 \\ \hline 51.22 \end{array} \qquad \begin{array}{r} {}^{2}3{}^{9}\cancel{0}{}^{1}{}^{2}\cancel{3}{}^{1}1.8 \\ -\ 1867.3 \\ \hline 1164.5 \end{array}$$

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

Topic: Subtraction

Year 6

Example SAT questions

Arithmetic

$50{,}000 - 500 =$

$12 - 6.01 =$

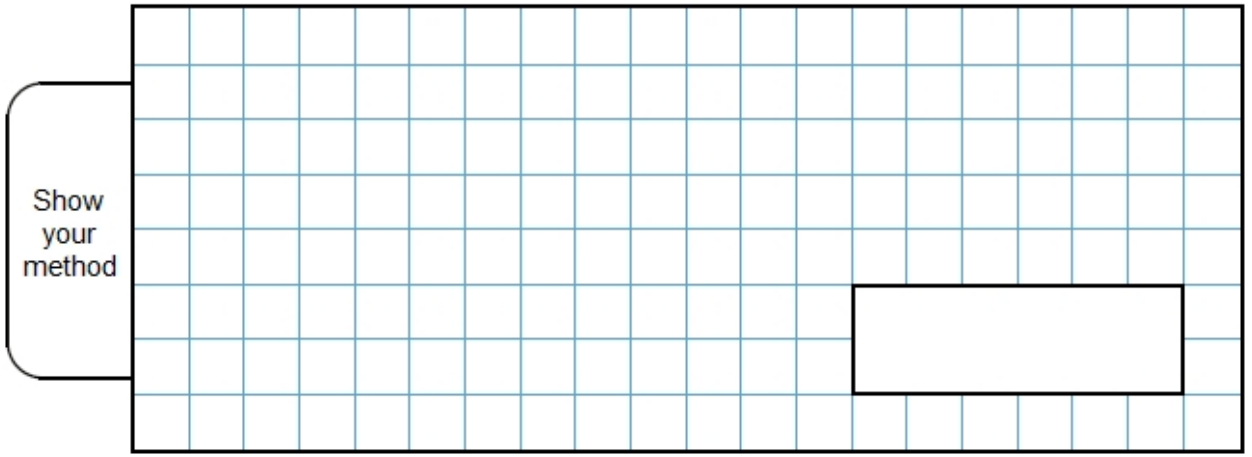
Reasoning

A pack of paper has 150 sheets.

4 children each take 7 sheets.

How many sheets of paper are left in the packet?

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

$$\begin{array}{r} {\scriptstyle 2}\ \ \ \\ 2\ 4 \\ \times\ \ 6 \\ \hline 1\ 4\ 4 \end{array}$$

Answer: 144

342 × 7 becomes

$$\begin{array}{r} \ \ {\scriptstyle 2\ 1}\ \\ 3\ 4\ 2 \\ \times\ \ \ 7 \\ \hline 2\ 3\ 9\ 4 \end{array}$$

Answer: 2394

2741 × 6 becomes

$$\begin{array}{r} \ {\scriptstyle 4\ 2}\ \ \\ 2\ 7\ 4\ 1 \\ \times\ \ \ \ 6 \\ \hline 1\ 6\ 4\ 4\ 6 \end{array}$$

Answer: 16 446

Long multiplication

24 × 16 becomes

$$\begin{array}{r} {\scriptstyle 2}\ \ \ \\ 2\ 4 \\ \times\ 1\ 6 \\ \hline 2\ 4\ 0 \\ 1\ 4\ 4 \\ \hline 3\ 8\ 4 \end{array}$$

Answer: 384

124 × 26 becomes

$$\begin{array}{r} {\scriptstyle 1\ 2}\ \ \ \\ 1\ 2\ 4 \\ \times\ \ 2\ 6 \\ \hline 2\ 4\ 8\ 0 \\ 7\ 4\ 4 \\ \hline 3\ 2\ 2\ 4 \\ {\scriptstyle 1\ 1}\ \ \ \ \end{array}$$

Answer: 3224

124 × 26 becomes

$$\begin{array}{r} {\scriptstyle 1\ 2}\ \ \ \\ 1\ 2\ 4 \\ \times\ \ 2\ 6 \\ \hline 7\ 4\ 4 \\ 2\ 4\ 8\ 0 \\ \hline 3\ 2\ 2\ 4 \\ {\scriptstyle 1\ 1}\ \ \ \ \end{array}$$

Answer: 3224

Topic: Multiplication

Year 1

Stem sentence

Equal groups/ unequal groups

There are (number) groups/lots/sets of (number/ item).
There are 3 groups of 5 cars.

This is not (number) groups/lots/sets of (number/ item) as they are not equal groups.
This is not 2 groups of 10 sweets, as they are not equal groups.

Arrays

In this array, there is/ are (number/ item) in each row. There is/ are (number) rows of (number/ items).
In this array, there are 5 oranges in each row.
There are 6 rows of 5 oranges.

In this array, there is/ are (number/ item) in each column. There is/ are (number) columns of (number/ item).
In this array, there are 10 cookies in each column.
There are 3 columns of 10 cookies.

Double

Double (number) is (number).
Double 5 is 10.

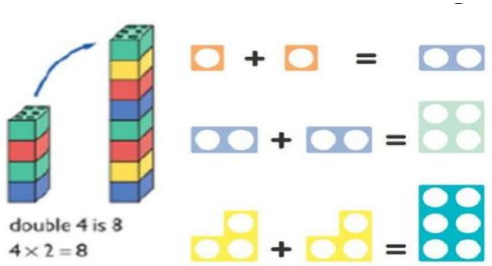
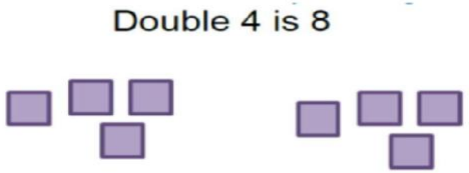
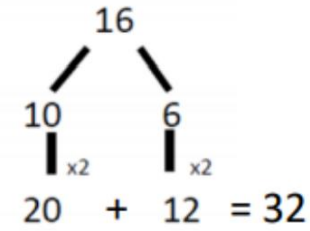
Twice as much as (number) is (number).
• *Twice as much as 5 is 10*

Year group objectives

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

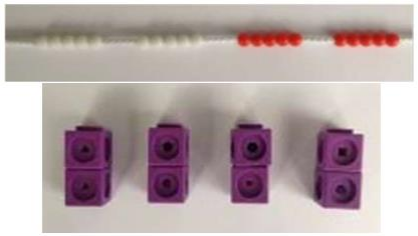
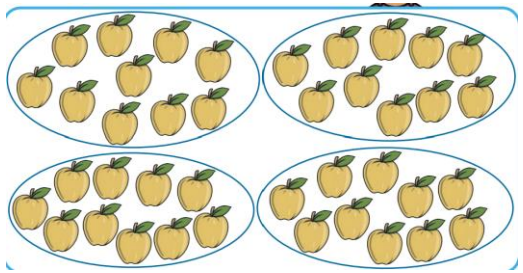
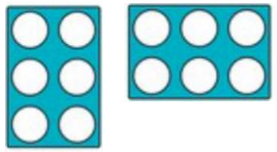
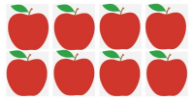
Counting in multiples (2s, 5s, 10s) including making equal groups and counting the total

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.

Notes / Vocabulary	Concrete	Pictorial	Abstract
Double Twice as much Odd Even Equal groups Groups of Lots of repeated addition	Children will double using concrete resources such as base 10, pv counters and numicon. 	Draw pictures to show how to double numbers 	Children will learn to partition a number and then double each part before recombining it back together. 

Topic: Multiplication

Year 1

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

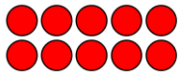
Example Questions

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 group objectives

To understand multiplication is related to doubling and combing 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.

Year 2

Topic: Multiplication

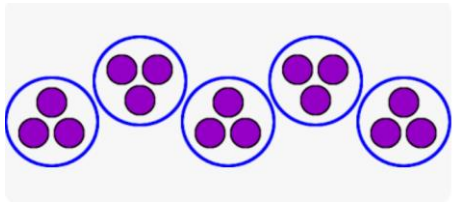
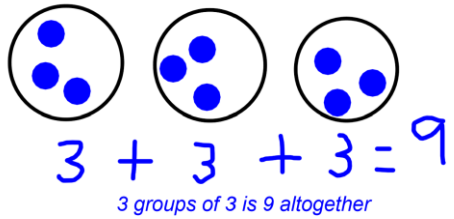
Stem sentence

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 ------ =

Notes / Vocabulary	Concrete	Pictorial	Abstract
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.	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.	Children can draw groups to support working out and either count totals, use repeated addition or skip count.  3 groups of 3 is 9 altogether	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,…….

Year group objectives

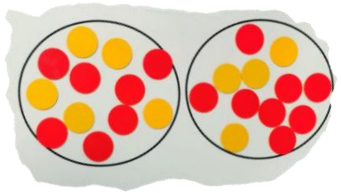
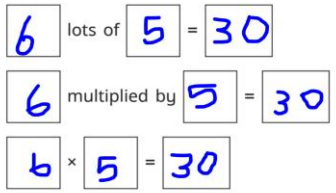
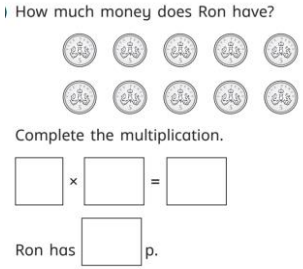
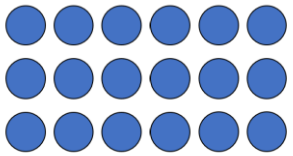
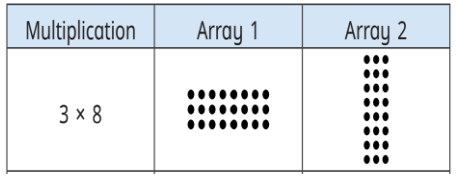
Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

Calculate mathematical statements for multiplication and write them using the multiplication (×) 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)

Topic: Multiplication

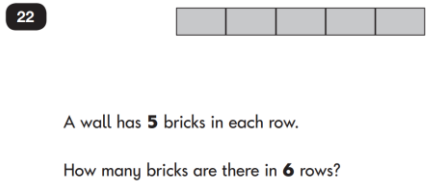
Year 2

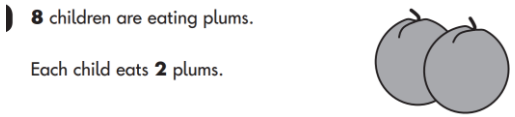
Children will understand what a multiplication sentence represents. They will be able to understand that 3 x 5 and 5 x3 will look different in terms of groups and number in groups but will produce the same total.	Children can use counters, cubes or any other suitable resources to make multiplication sentences. *Make 2 groups of 12 or 2 x 12* 	Children will use pictures or draw their own to support understanding.  	Children will be able to calculate mathematical statements for multiplication and show these using x and = signs. 
It important that children understand the different calculations in an array e.g.4x5 and 5x4 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. 	Children can use their preferred method of multiplication when calculating multiplications e.g. a pupil may choose to swap 8 x 5 for 5 x 8 and use the 5 times tables as they will understand that it will produce the same total. 9 x 3 = 3x9 = 12 x 2 = 2 x 12 =

KS1 Example Questions

$2 \times 7 =$ ☐

$10 \times 5 =$ ☐





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 (×) 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)

Topic: Multiplication

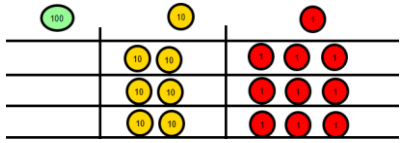
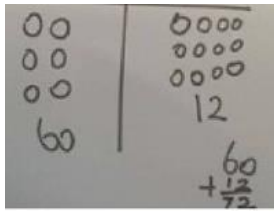
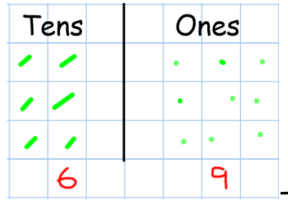
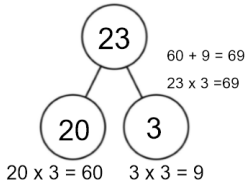
Year 3

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 _____

Notes / Vocabulary	Concrete	Pictorial	Abstract
multiplication multiply multiplied by multiple, repeated addition doubling array inverse Extended practical and pictorial methods looking at X as repeated addition and partitioning prior to pupils tackling written methods	Represent multiplication as repeated addition  **No exchange** 	 Representing the counters pictorially  	Show link to multiplication □+□+□+□=□ □×□=□ Part whole models to expose structure  If appropriate, moving towards formal written methods. 23 × 3 69

Year group objectives

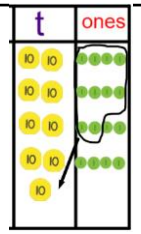
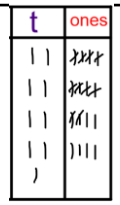
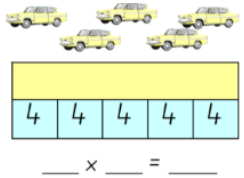
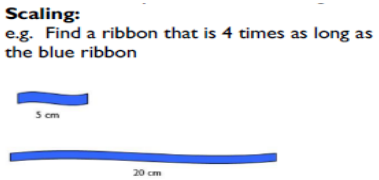
Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables

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.

Topic: Multiplication

Year 3

Notes / Vocabulary	Concrete	Pictorial	Abstract
Deines and base 10 can be used alongside pictorial methods. Move towards formal written methods **if appropriate.**	**Exchanging** Deins or place value counters   	Use of place value grid and drawn images  	24 20 4 4 × 20 = 80 4 × 4 = 16 80 + 16 = 96 4 × 24 = 96 If appropriate, use of formal written methods 24 × 3 72 1
Mental strategies and inverse operations involving fact families. Part whole models to support. Pupils to begin tackling correspondence and scaling problems.	Use place value counters, or represent pictorially.	Bar models can be used to help solidify multiplication tables knowledge  Children develop their understanding of correspondence and scaling problems.  	Children use symbols to stand for unknown numbers to complete equations using inverse operations: ☐ x 5 = 20 3 x △ = 18 ☐ x ○ = 32

<u>Example</u> questions: 7 x 3 = ____ x 5 = 25 4 x ____ = 16

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

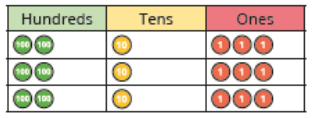
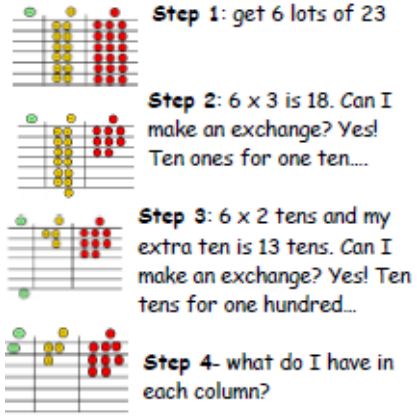
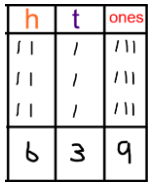
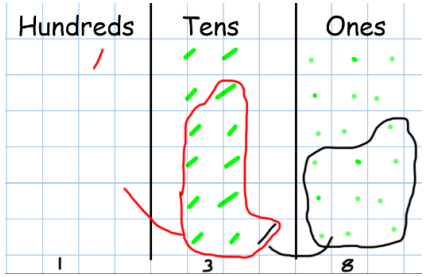
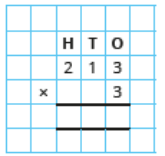
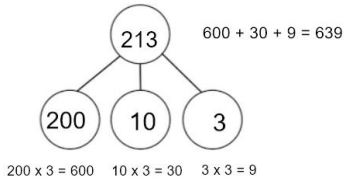
Solve problems, including missing number problems, involving multiplication and positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

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

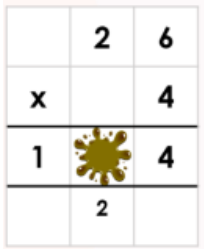
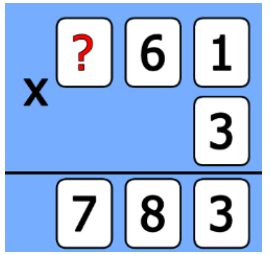
Notes / Vocabulary	Concrete	Pictorial	Abstract
Multiplication, multiply multiplied by, multiple, factor groups, doubling array, inverse, remainder, factor, factor pairs, product, commutative Pupils build on learning in Y3 by moving towards multiplying 3 digit by 1 digit with exchanges	**No exchange** Use of place value counters or Deins  **Exchange** 6 x 23 	Representing counters pictorially  	  Part whole models to expose structure 6 x 23 = 23 × 6 138 1 1 **Variation within fluency** eg Find the product of 6 and 23 ___ = 6 x 23

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.

Topic: Multiplication

Year 4

Notes / Vocabulary	Concrete	Pictorial	Abstract
Mental strategies and inverse operations. Correspondence and scaling problems	Use place value counters, or represent pictorially. A dressmaker has 6 buttons. He needs 3 times as many. How many does he need? 	What do you notice about the bar model? 	A sunflower is 5 times taller than a daisy. The daisy is 8 cm tall. How tall is the sunflower? Missing number problems   Find the missing numbers. a) 22 × ☐ = 88 b) _1 × ☐ = 124

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

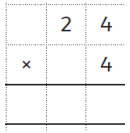
Solve problems, including missing number problems, involving multiplication and positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

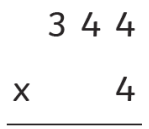
Example questions

5 x 6 =

34 x 1 =

5 x 3 x 5 =



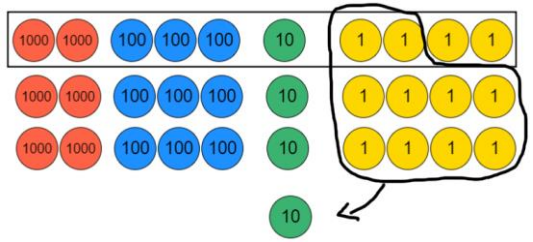
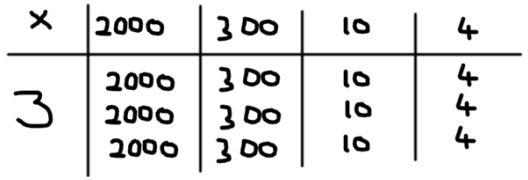
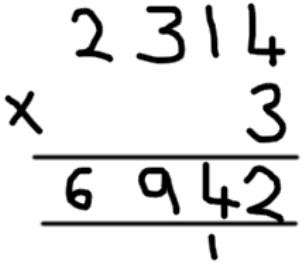
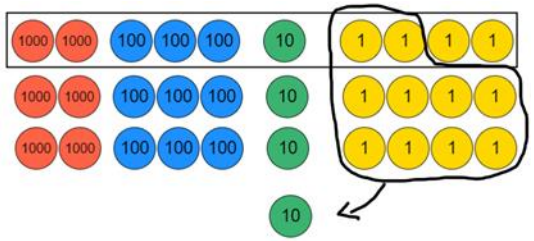
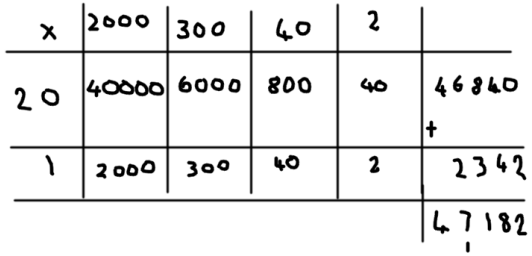
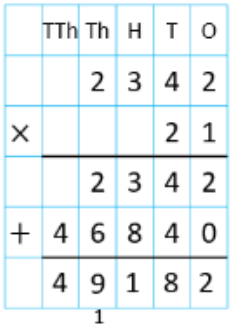


Topic: Multiplication

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?

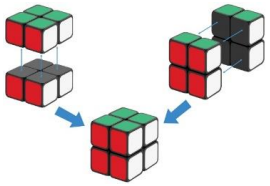
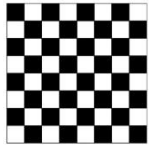
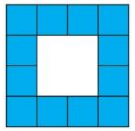
Notes / Vocabulary	Concrete	Pictorial	Abstract
multiplication multiply multiplied by multiple, factor groups of times product once, twice, three times … ten times repeated addition doubling array inverse multiplication table multiplication fact square, squared cube, cubed commutative associative distributive	 Use place value counters to show exchanging.		
Long multiplication with . Exchange below the line.	 Use place value counters to show exchanging.		

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
Use facts to multiply mentally. Use factors to multiply mentally. Use properties of distributive rules to multiply mentally	Use cubes or counters to explore the meaning of 'square numbers'. *25 is a square number because it is made from 5 rows of 5.* Use cubes to explore cube numbers.  8 is a cube number.	Use images to explore examples and non-examples of square numbers. *8 × 8 = 64* *8^2 = 64*  *12 is not a square number, because you cannot multiply a whole number by itself to make 12.* 	$25 \times 23 = 25 \times 20 + 25 \times 3$ $= 500 + 75$ $= 575$ $2 \times 6 \times 5 = 2 \times 5 \times 6$ $= 10 \times 6$ $= 60$ $80 \times 70 = 8 \times 7 \times 10 \times 10$ $= 56 \times 100$ $= 5600$ $36 \times 20 = 36 \times 2 \times 10$ $= 72 \times 10$ $= 720$

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

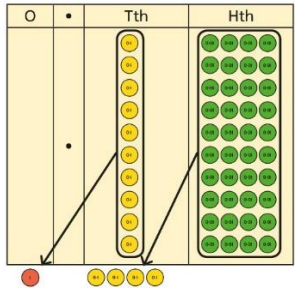
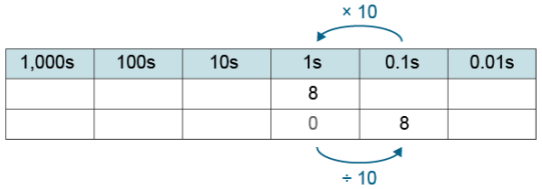
Multiply and divide whole numbers and decimals by 10, 100 and 1000

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
Place value sliders are a good way of showing digits moving in a place value chart. MUST NOT mention adding or taking of zeros	Use place value equipment to explore and understand the exchange of 10 tenths, 10 hundredths or 10 thousandths. Represent multiplication by 10 as exchange on a place value grid.  0·14 × 10 = 1·4	 	8 ÷ 1 = 8 8 ÷ 10 = 0.8 0.8 x 1 = 0.8 0.8 x 10 = 8

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
Use bar models to represent problems visually	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. 4 4 4 4 4 4 Peter has 4 books Harry has five times as many books as Peter. How many books has Harry? five times four 4 × 5 = 20 Harry has 20 books	Lesley spends £15. Megan spends five times as much as Lesley. How much money does Megan spend? Step 1. Lesley £15 Step 2. Lesley £15 £15 £15 £15 £15 £15 Megan Step 3. 5 lots of £15 = £75 5 x £15 = £75	5 x 15 = £75

Example questions

$$\begin{array}{r} 3216 \\ \times \quad 9 \end{array}$$

$$\begin{array}{r} 1367 \\ \times \quad 29 \end{array}$$

$2 \times 5 \times 3 =$

$60 \times 40 =$

$36.05 \times 10 =$

$6 \times 32 = 6 \times 4 \times \square$

$6 \times 5 \times 4 = 5 \times \square$

$480 = 8 \times 10 \times \square$

$72 = 2 \times 6 \times \square$

$\square \times 5 \times \square = 105$

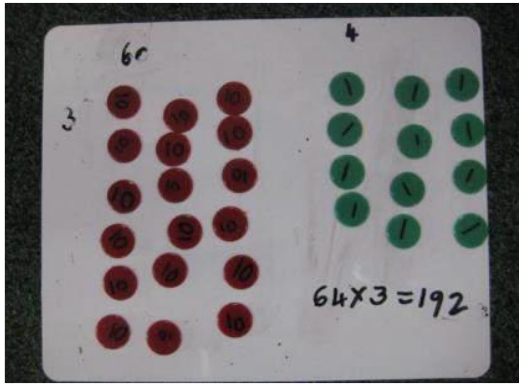
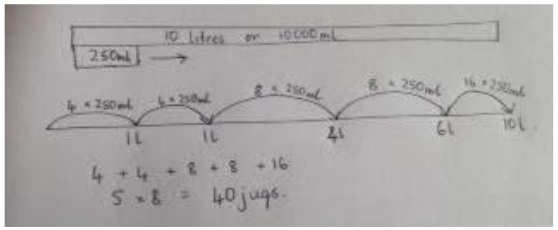
$7 \times \square \times \square = 140$

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 6

Notes / Vocabulary	Concrete	Pictorial	Abstract
When children start to multiply 3d x 3d and 4d x 2d etc, they should be confident with the abstract: **factor x factor = product** A factor is a whole number, so this wouldn't be appropriate language when multiplying decimals **multiplicand x multiplier = product** **multiplier x multiplicand = product**		Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods. 	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. 1 2 4 × 2 6 7 4 4 2 4 8 0 3 2 2 4 1 1 Answer: 3224

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

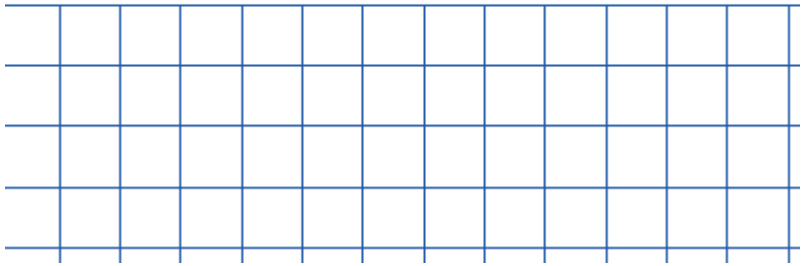
Topic: Multiplication

Year 6

Example SAT questions

Arithmetic

$1.52 \times 6 =$



		6	7	8
×			5	4

		2	1	9	5
×			3	8

Show your method

Reasoning

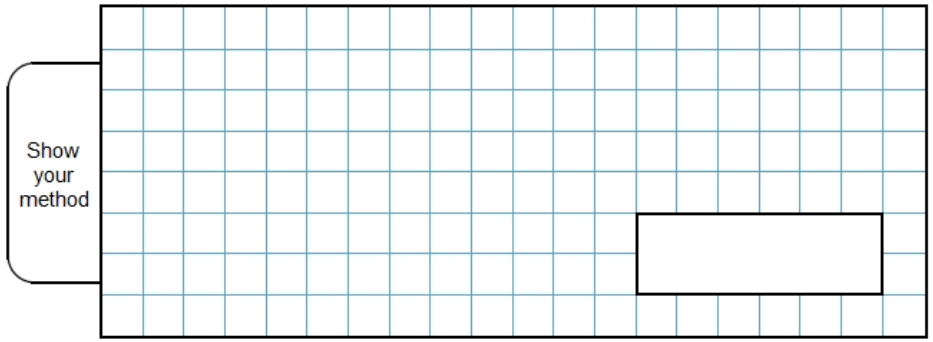
		4	□
×		□	6
	2	4	6
	8	2	0
1	0	6	6

A pack of paper has 150 sheets.

4 children each take 7 sheets.

How many sheets of paper are left in the packet?

Show your method



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 ÷ 7 becomes

$$\begin{array}{r} 1\ 4 \\ 7\overline{)\,9\ 8} \\ \scriptstyle 2 \end{array}$$

Answer: 14

432 ÷ 5 becomes

$$\begin{array}{r} 8\ 6\ \text{r}\,2 \\ 5\overline{)\,4\ 3\ 2} \\ \scriptstyle 3 \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{r} 4\ 5\ \text{r}\,1 \\ 1\ 1\overline{)\,4\ 9\ 6} \\ \scriptstyle 5 \end{array}$$

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

Long division

432 ÷ 15 becomes

$$\begin{array}{r} 2\ 8\ \text{r}\,12 \\ 1\ 5\overline{)\,4\ 3\ 2} \\ 3\ 0\ 0 \\ \hline 1\ 3\ 2 \\ 1\ 2\ 0 \\ \hline 1\ 2 \end{array}$$

Answer: 28 remainder 12

432 ÷ 15 becomes

$$\begin{array}{r} 2\ 8 \\ 1\ 5\overline{)\,4\ 3\ 2} \\ 3\ 0\ 0 \quad 15\times20 \\ \hline 1\ 3\ 2 \\ 1\ 2\ 0 \quad 15\times8 \\ \hline 1\ 2 \end{array}$$

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

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

432 ÷ 15 becomes

$$\begin{array}{r} 2\ 8\cdot 8 \\ 1\ 5\overline{)\,4\ 3\ 2\cdot 0} \\ 3\ 0 \\ \hline 1\ 3\ 2 \\ 1\ 2\ 0 \\ \hline 1\ 2\ 0 \\ 1\ 2\ 0 \\ \hline 0 \end{array}$$

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.

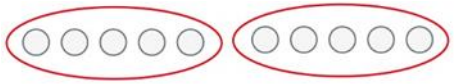
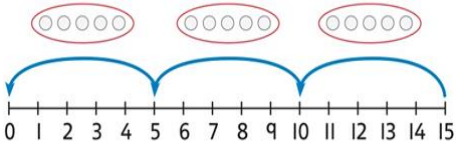
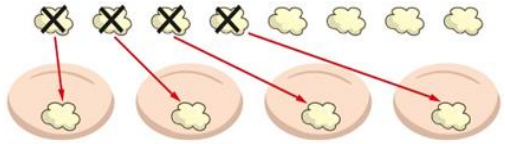
The _____ have/have not been shared equally.

I know this because ...

There are _____ altogether.

They are shared equally between _____ groups.

There are _____ in each group.

Notes / Vocabulary	Concrete	Pictorial	Abstract
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.	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.	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.	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.

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

Topic: Division

Year 2

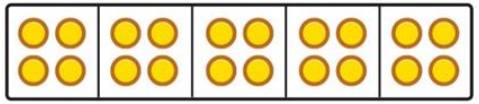
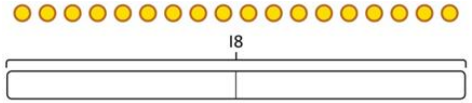
Stem sentence/ Maths talk

_____ 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.

Notes / Vocabulary	Concrete	Pictorial	Abstract
Equal, sharing, whole, division.	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	Represent the objects shared into equal parts using a bar model.  20 shared into 5 equal parts. There are 4 in each part.	Use a bar model to support understanding of the division.  18 ÷ 2 = 9

Year group objectives

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

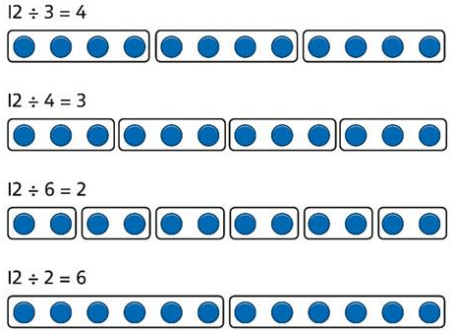
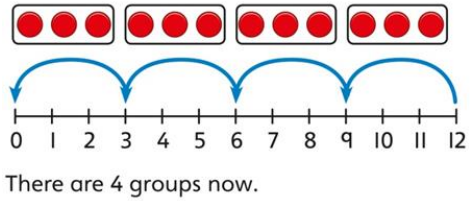
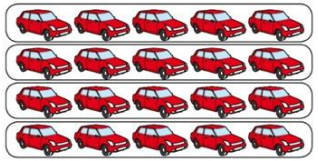
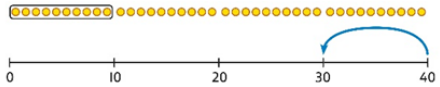
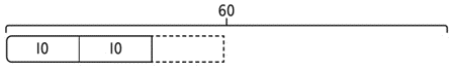
calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs

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

Topic: Division

Year 2

Notes / Vocabulary	Concrete	Pictorial	Abstract
Grouping, division, multiplication, total.	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 grouping and the division statements. 	Understand how to relate division by grouping to repeated subtraction. 12 divided into groups of 3. 12 ÷ 3 = 4 There are 4 groups.  There are 4 groups now.
	Understand the relationship between multiplication facts and division. 4 groups of 5 cars is 20 cars in total. 20 divided by 4 is 5. 	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. 	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 × 10 = 30 so 30 ÷ 10 = 3 1 × 10 = 10 2 × 10 = 20 3 × 10 = 30 4 × 10 = 40 5 × 10 = 50 6 × 10 = 60 7 × 10 = 70 8 × 10 = 80 I used the 10 times-table to help me. 3 × 10 = 30.

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 (×), division (÷) and equals (=) signs

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

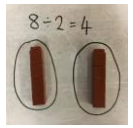
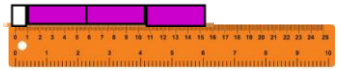
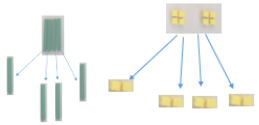
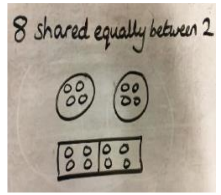
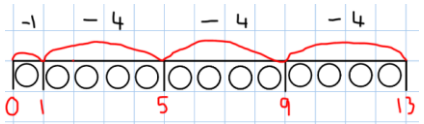
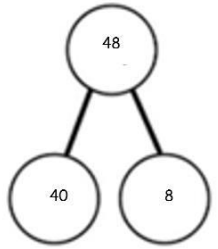
solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

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 ___ ÷ ___ = ___ r

Notes / Vocabulary	Concrete	Pictorial	Abstract
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	  8 ÷ 2 **Dividing as grouping** 8 grouped into 2s 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 	 	 Use of number lines to show repeated subtraction 48 ÷ 4 4 tens ÷ 4 = 1 ten 8 ones ÷ 4 = 2 ones 10 + 2 = 12 

Year group objectives

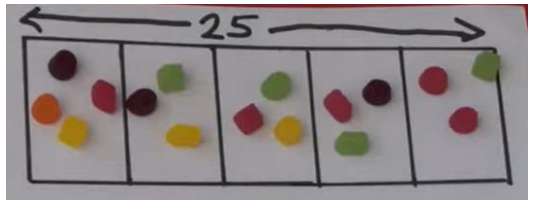
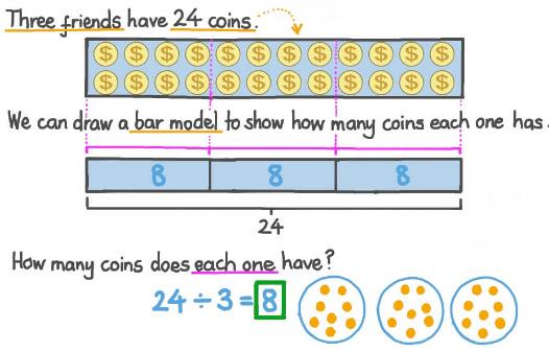
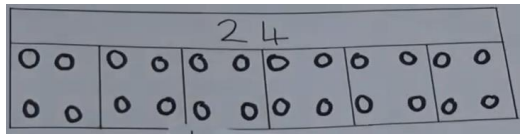
Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables

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.

Topic: Division

Year 3

Notes / Vocabulary	Concrete	Pictorial	Abstract
Mental strategies and inverse operations involving fact families. Part whole models to support.		  	4 x 5 = 20 5 x 4 = 20 20 ÷ 5 = 4 20 ÷ 4 = 5 5 + 5 + 5 + 5 = 20 4 + 4 + 4 + 4 + 4 = 20 20 – 5 – 5 – 5 – 5 = 0 20 – 4 – 4 – 4 - 4 - 4 = 0

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.

Example questions

36 ÷ 4 =

__ ÷ 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 ÷ 4 ◯ 45 ÷ 3

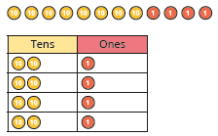
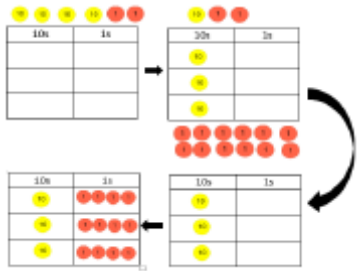
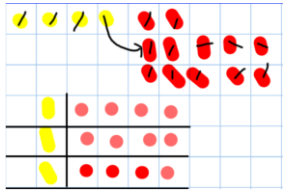
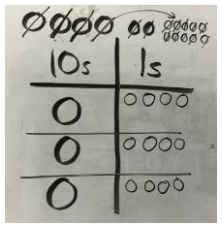
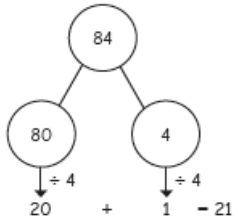
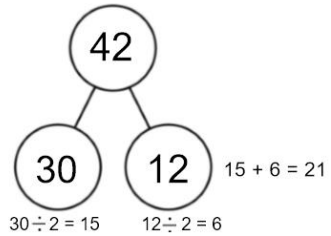
52 ÷ 4 ◯ 42 ÷ 3

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 ___ ÷ ___ = ___ 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.

Notes / Vocabulary	Concrete	Pictorial	Abstract
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	**Without exchanges 2 digits**  **With exchanges 2 digits** 	Use place value chart or similar to pictorially share out.   	Flexible partitioning  42 ÷3 

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.

Topic: Division

Year 4

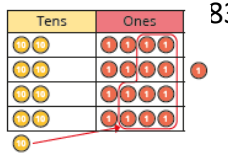
Notes / Vocabulary

Pupils progress to dividing 3 digits with remainders

Mental strategies and inverse operations involving fact families. Part whole models to support.

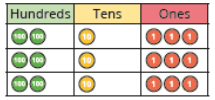
Concrete

With remainders

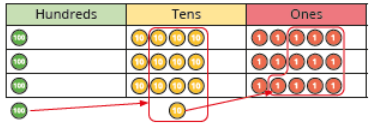


83 ÷ 3

3 digits

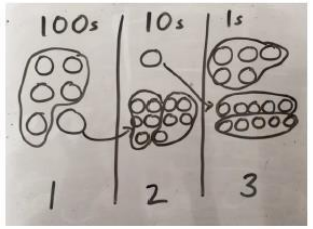


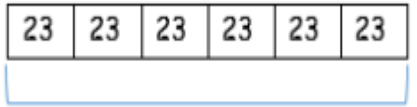
with exchanges

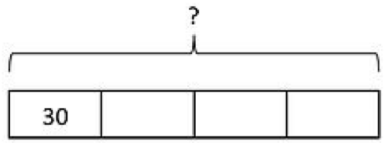


Pictorial

Represent place value counters pictorially

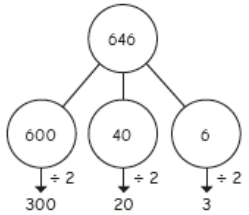




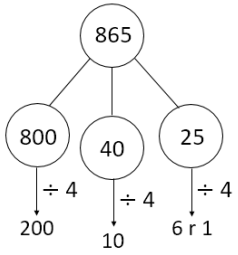


30 × 4 = 120

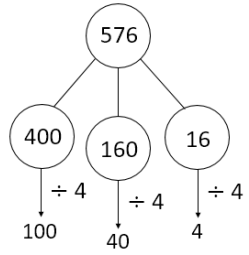
Abstract



with flexible partitioning



83 ÷ 3 = 27 r2
95 ÷ 4 = 23 r3



100 + 40 + 4 = 144

134 ÷ 4 = 33 r2
365 ÷ 6 = 60 r5

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.

Example questions

_____

96 ÷ 8 =

__ ÷ 7 =

Which of these division calculations have the answer of 3 r 2

23 ÷ 7	17 ÷ 5	32 ÷ 6
7 ÷ 2	14 ÷ 4	30 ÷ 8

	Has a remainder? (Yes or No)
48 ÷ 7	
48 ÷ 8	
48 ÷ 9	

It takes 7 minutes to make a pom-pom. How many complete pom-poms can Malik make in 30 minutes?

Topic: Division

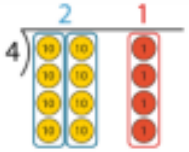
Year 5

Stem sentence/ Maths talk

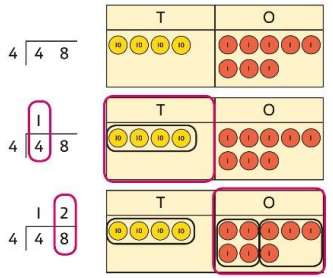
473 = ___ hundreds + ___ tens + ___ ones.
____ hundreds ÷ ___ = ___ **hundred(s)** r ___ hundred (s).
___ hundred(s) + ___ tens = ____ tens
___ tens ÷ ___ = ___ **tens** r ___ tens
__ tens + ___ ones = ___ ones
___ ones ÷ ___ = ___ **ones r** ___ **ones**
So
_____ ÷ ____ = ____ r__

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

21 ÷ 4



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

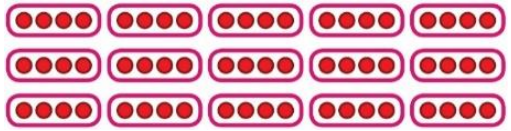
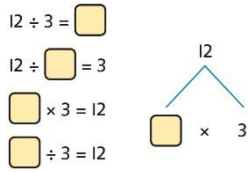
Notes / Vocabulary	Concrete	Pictorial	Abstract
multiply divide column exchange place value share Groups Short division Divisor Dividend	Explore grouping using place value equipment. *268 ÷ 2 = ?* *There is 1 group of 2 hundreds.* *There are 3 groups of 2 tens.* *There are 4 groups of 2 ones.* *264 ÷ 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. *There is 1 group of 4 in 4 tens.* *There are 2 groups of 4 in 8 ones.*	Use short division for up to 4-digit numbers divided by a single digit. *3,892 ÷ 7 = 556* Use multiplication to check. *556 × 7 = ?* *6 × 7 = 42* *50 × 7 = 350* *500 × 7 = 3500* *3,500 + 350 + 42 = 3,892*

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

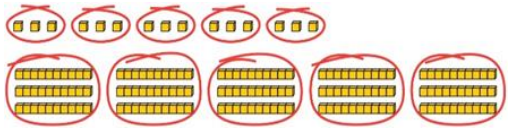
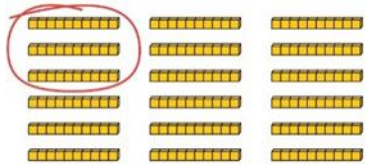
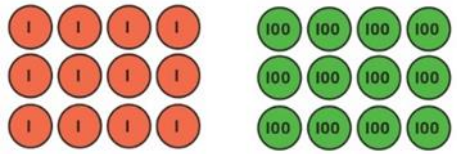
Notes / Vocabulary	Concrete	Pictorial	Abstract
Inverse operations, multiplication, grouping and sharing.	Use equipment to group and share and to explore the calculations that are present. *I have 28 counters.* *I made 7 groups of 4. There are 28 in total.* *I have 28 in total. I shared them equally into 7 groups. There are 4 in each group.* *I have 28 in total. I made groups of 4. There are 7 equal groups.*	Represent multiplicative relationships and explore the families of division facts. *60 ÷ 4 = 15* *60 ÷ 15 = 4* 	Represent the different multiplicative relationships to solve problems requiring inverse operations. Understand missing number problems for division calculations and know how to solve them using inverse operations. *22 ÷ ? = 2* *22 ÷ 2 = ?* *? ÷ 2 = 22* *? ÷ 22 = 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: 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 ÷ 3 = 5 15 tens put into groups of 3 tens. There are 5 groups. 150 ÷ 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 ÷ 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 ÷ 400 = 3	Reason from known facts, based on understanding of unitising. Use knowledge of the inverse relationship to check. 3,000 ÷ 5 = 600 3,000 ÷ 50 = 60 3,000 ÷ 500 = 6 5 × 600 = 3,000 50 × 60 = 3,000 500 × 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

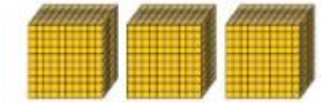
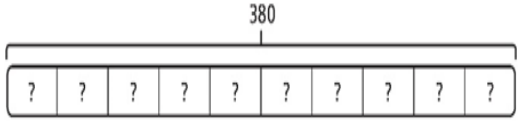
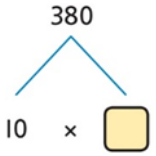
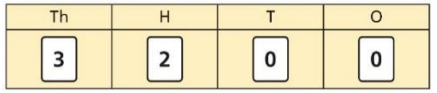
Multiply and divide whole numbers and decimals by 10, 100 and 1000

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
multiply divide column exchange place value share Groups Short division Divisor Dividend Partition	Use place value equipment to support unitising for division. 3,000 ÷ 1,000  3,000 is 3 thousands. 3 × 1,000= 3,000 So, 3,000 ÷ 1,000 = 3	Use a bar model to support dividing by unitising. 380 ÷ 10 = 38  380 is 38 tens. 38 × 10 = 380 10 × 38 = 380 So, 380 ÷ 10 = 38  	Understand how and why the digits change on a place value grid when dividing by 10, 100 or 1,000.  3,200 ÷ 100 = ? 3,200 is 3 thousands and 2 hundreds. 200 ÷ 100 = 2 3,000 ÷ 100 = 30 3,200 ÷ 100 = 32 So, the digits will move two places to the right.

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

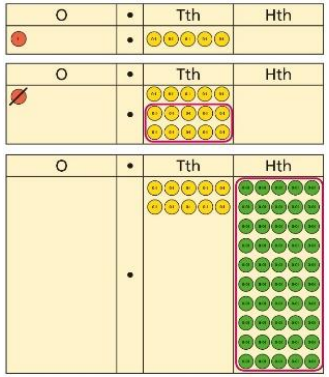
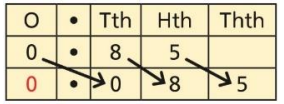
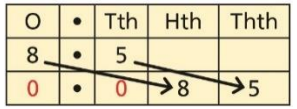
Multiply and divide whole numbers and decimals by 10, 100 and 1000

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. *2 ones are 20 tenths.* *20 tenths divided by 10 is 2 tenths.*	Represent division using exchange on a place value grid.  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 ÷ 10 = 0.15	Understand the movement of digits on a place value grid. 0·85 ÷ 10 = 0·085  8·5 ÷ 100 = 0·085 

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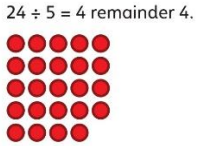
Topic: Division

Year 5

Notes / Vocabulary	Concrete	Pictorial	Abstract
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	Use equipment to explore the factors of a given number.  *24 ÷ 3 = 8* *24 ÷ 8 = 3* *8 and 3 are factors of 24 because they divide 24 exactly.*  5 is not a factor of 24 because there is a remainder.	Understand that prime numbers are numbers with exactly two factors. 13 ÷ 1 = 13 13 ÷ 2 = 6 r 1 13 ÷ 4 = 4 r 1 1 and 13 are the only factors of 13. 13 is a prime number.	Understand how to recognise prime and composite numbers. I know that 31 is a prime number because it can be divided by only 1 and itself without leaving a remainder. I know that 33 is not a prime number as it can be divided by 1, 3, 11 and 33. I know that 1 is not a prime number, as it has only 1 factor.

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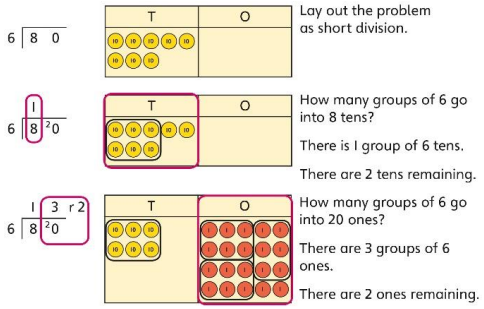
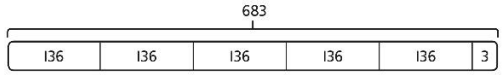
Topic: Division

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. *80 cakes divided into trays of 6.* *80 cakes in total. They make 13 groups of 6, with 2 remaining.* 	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 × 5 + 3 683 ÷ 5 = 136 r 3 

Year group objectives

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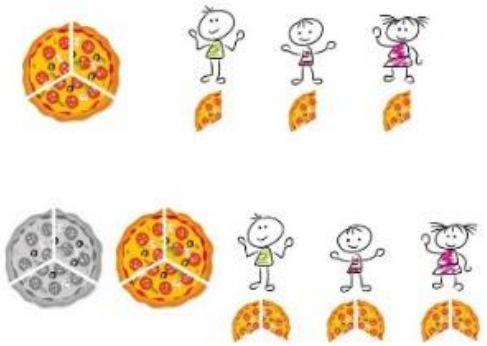
Topic: Division

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

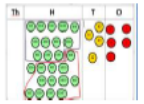
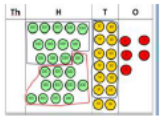
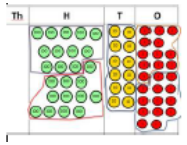
If I multiply the dividend by ____, I must multiply the divisor by ____ for the quotient to stay the same.

Dividend ÷ divisor = quotient.

8 ÷ 4 = 2
×10 ×10
80 ÷ 40 = 2
×10 ×10
800 ÷ 400 = 2

____ 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 ___

Notes / Vocabulary	Concrete	Pictorial	Abstract
multiply divide decimal decimal place (dp) recurring decimal placeholder place value tenth hundredth thousandth product fraction	 $12\overline{)2544}$ 0212, 24, 14, 12, 24, 24, 0 2544 ÷ 12 How many groups of 12 thousands do we have? None  Exchange 2 thousand for 20 hundreds.  $12\overline{)2544}$ 02, 24, 1 How many groups of 12 are in 25 hundreds? 2 groups. Circle them. We have grouped 24 hundreds so can take them off and we are left with one.  $12\overline{)2544}$ 021, 24, 14, 12, 2 Exchange the one hundred for ten tens so now we have 14 tens. How many groups of 12 are in 14? 1 remainder 2.	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	$12\overline{)2544}$ 0212, 24, 14, 12, 24, 24, 0 Some pupils may find it easier to have a list of multiples alongside the calculation at this point. Expressing remainders in different ways. $4\overline{)175}$ 043 answer 43 r3 answer $43\frac{3}{4}$ $4\overline{)175.30}$ 043.75 answer 43.73

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

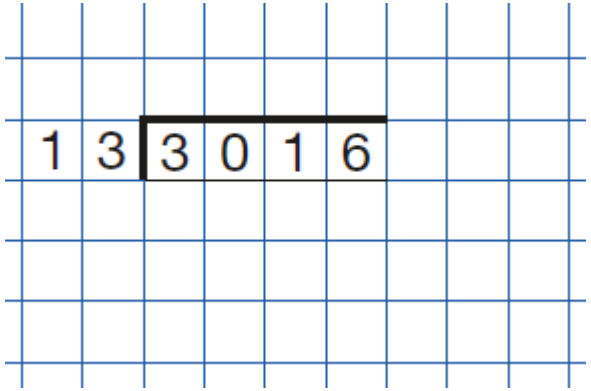
perform mental calculations, including with mixed operations and large numbers

Topic: Division

Year 6

Example SAT questions

Arithmetic

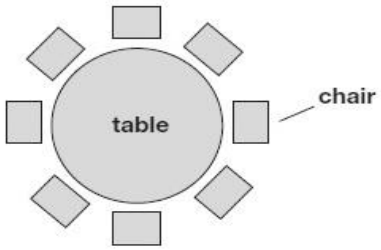


2 1 6 7 2

Show your method

Reasoning

One table can seat 8 people.



How many tables are needed to seat 40 people?

tables

What is 444 minutes in hours and minutes?

hours

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